

**Agricultural Modernisation in Colombia 1936-1990:  
Markets, Institutions and Technology  
in Sugar, Banana and Potato Production**

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*To my mother and father*



## **Abstract**

This study analyses the factors associated with rural modernisation between 1936 and 1990 and places them in an international context. It focuses on the production of three commodities--sugar, bananas and potatoes. The approach departs from orthodox neo-classical analysis, which maintains that markets are the central agency responsible for change, and argues that institutions, the nature of the crop, technology, labour and land tenure as well as markets determined the path of agrarian transformation. This argument is sustained by considering scale- and capital-bias in agrarian technology, patterns of land usage and the changing role of labour in the productive process.

The three commodities studied are regionally specific, sugar in the Cauca Valley, bananas in the Magdalena Valley and the Gulf of Urabá and potatoes in the departments of Boyacá and Cundinamarca. Developments within these regions are presented with reference to appropriate national and international trends. For the sugarmill owner, informal institutions and political links assisted in obtaining machinery and inputs. For the banana exporter, links with international markets and capital availability allowed them quickly to establish production and trade. For potato growers, private local initiative and indirect state programmes fostered development. With bananas and sugarcane most changes to the productive process were labour and land saving. Nonetheless, labour remained an important aspect of cultivation and harvesting and some methods reverted to more labour intensive production with the passage of time. Moreover, low-cost techniques played an important role for all three crops throughout the modernisation process. The research proves that though relative prices have an influence on production, existing land usage structures, institutional arrangements, technical change absorption, and capital-bias distorted market prices and resulted in paths to modernisation that were less than optimal.

## Acknowledgement

This thesis represents four years of research which was primarily taken on in Colombia and England. Although the people who supported and encouraged my work throughout this period are too numerous to mention, I hope to acknowledge those who have been crucial to the completion of the study.

First, my gratitude extends to the Banco de la República for financing three years of my work--both in Colombia and England. Particularly José Antonio Camacho and Gloria de Fonseca deserve commendation for their attentiveness, understanding, flexibility and efficiency when dealing with my urgent requests. My colleagues at the Universidad Externado de Colombia, especially Roberto Hinestroza, must be thanked for they supported me before embarking on this study and when I returned for field research. In Colombia, the remaining list of people who have assisted me is massive ranging from librarians at the SAC, FEDESARROLLO, and CENICAÑA to those who guided me towards potential sources of primary data. Ricardo Villaveces, president of ASOCAÑA, facilitated my contact with the sugar mill of my choice, Manuelita. Many of the people at Manuelita went beyond their call of duty, especially Alberto Anzola, the President, who quickly permitted my research, provided me accommodation in the *casino*, allowed me to roam freely through the field and factory archives and conduct interviews. Banana research would not have been possible without Camilo Peñalosa who slipped me into a training programme so that I could travel to Medellín and Urabá. I also owe a great deal to Ricardo Vargas, Mariano Arango, Ricardo Chica and Gabriel Martínez for their input and generosity. Lastly, my sister and brother-in-law, Jordana and Alvaro Robledo, will be remembered for their hospitality and more importantly, their optimism and humour which was so needed after returning from many trips down blind alleys.

In London and otherwise, I am indebted to my supervisor Colin Lewis, who gently guided the direction of the study and patiently read through excessively long rough drafts. Without his feedback I would have had a difficult time to see the forest for the trees. Also, the departmental secretary, Linda Sampson, must be thanked not only for her affection but for her help during the 'crunch' period.

I also am thankful to my friends Rosa Bernal, Patti Londoño, Marie Eve Detouf, Jyoti Patel, Abé Selassie, Sheila Findley, Massimo Quatrocchi, Sylvia Schwaag and Ramona Dzinkowski who were enthusiastic about this study and believed that it would be completed (at times when I doubted). Additionally, I am indebted to Noreen Beg who generously called me overseas during the majority of the time when we were living in different continents. Gunnar Klum also deserves my gratitude for his comfort, concern and encouragement, particularly after hearing that yet another redraft was necessary.

I am especially grateful to my mother and father who were a incessant source of support (emotional, intellectual and financial) and advice which helped me keep things in perspective. I am also thankful for their steady stream of good vibes which were able to keep my spirits high, a vital ingredient to any long-term research.

Finally, I take full responsibility for all errors of logic and facts.

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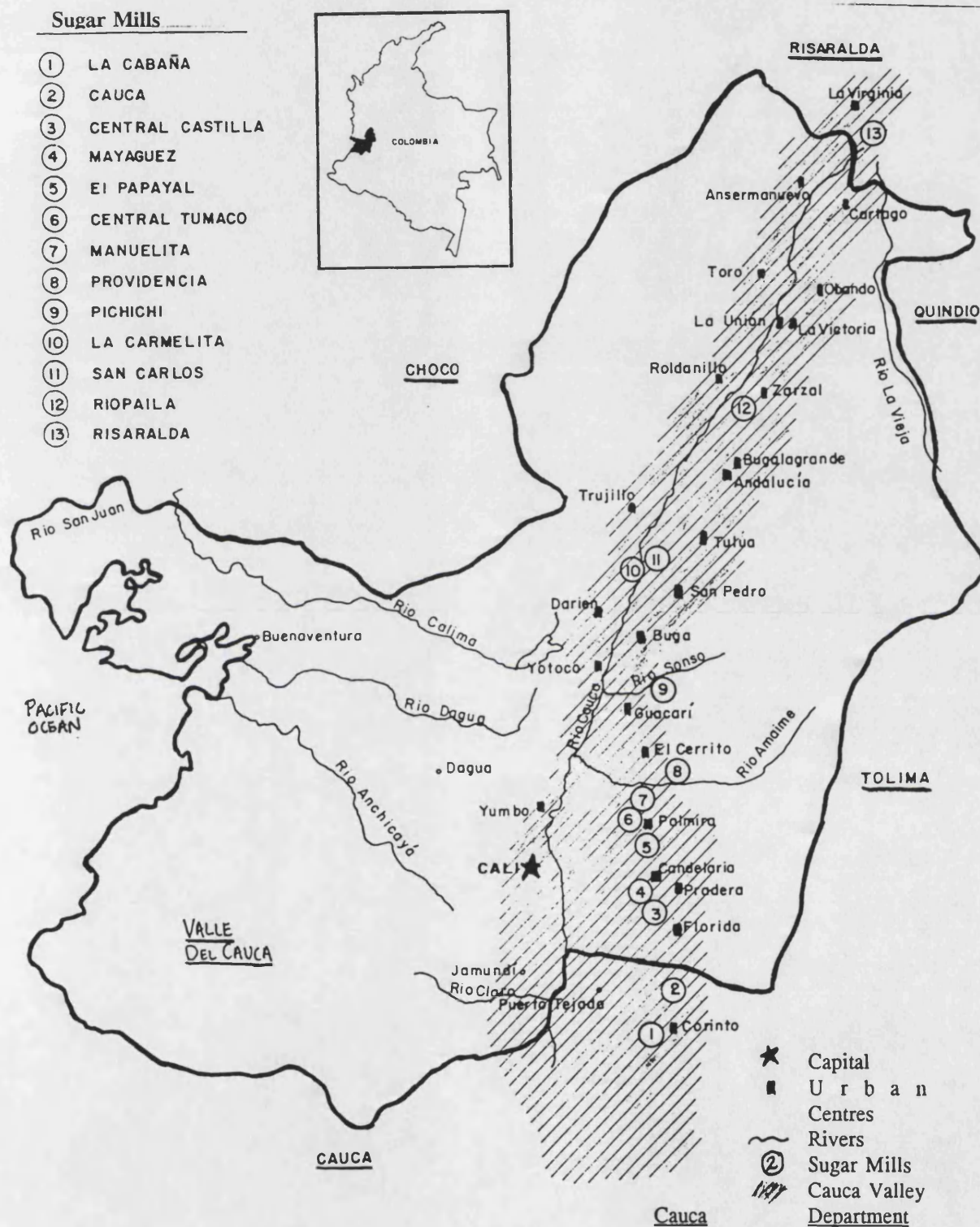
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## List of Acronyms and Abbreviations

ANDI	Asociación Nacional para el Desarrollo Industrial
APU	Agricultural Production Unit
ASOCAÑA	Asociación de Cultivadores de Caña de Azúcar de Colombia
AUGURA	Asociación de Agricultores y Bananeros de Urabá
BANACOL	Banadero Colombianos Sociedad Anónima
Caja Agraria	Caja de Crédito Agrario, Industrial y Minero
CAM	Compañía Agrícola de Magdalena, Ltda.
CAT	Certificado de Abono Tributario
CEDAL	Centro de Estudio Democráticos de América Latina
CEGA	Corporación de Estudios Ganaderos y Agrícolas
CENICANA	Centro de Investigación de la Caña de Azúcar
CEPAL	Centro de Estudios Económicos y Políticos para América Latina
CIAT	Centro Internacional de Agricultura Tropical
CIP	Centro Internacional de la Papa
CORABASTOS	Centrales de Abasto
CORPOURABA	Corporación de Desarrollo de Urabá
CVC	Corporación Autónoma Regional del Valle del Río Cauca
DANE	Departamento Administrativo Nacional de Estadística
DNP	Departamento Nacional de Planeación
DOT	Department of Trade
GDP	Gross Domestic Product
GNP	Gross National Product
EBN	Exportadora Bananera Noboa
ECLA	Economic Commission for Latin America
FAO	Food and Agriculture Organization
FEDEPAPA	Federación Colombiana de Productores de Papa
FEDESARROLLO	Fundación para la Educación Superior y el Desarrollo
FEDERACAFE	(FEDECAFE) Federación Nacional de Cafeteros de Colombia
FINAGRO	Fondo para el Financiamiento del Sector Agropecuario
FLACSO	Facultad Latinoamericana de Ciencias Sociales
FFAP	Fondo Financiero Agropecuario
FONADE	Fondo Nacional de Proyectos de Desarrollo
FONAZUCAR	Fondo Nacional del Azúcar y la Panela
Ha/Has	Hectare/Hectares
ICA	Instituto Colombiano de Agricultura
ICFES	Instituto Colombiano para el Fomento de la Educación Superior
IDEMA	Instituto de Mercadeo Agrícola
IFI	Instituto de Fomento Industrial
IICA	Instituto Interamericano de Cooperación para la Agricultura
INA	Instituto Nacional de Abastecimiento
INCORA	Instituto Colombiano de Reforma Agraria
LDC	Less Developed Country
MT	Metric Tonnes
MTCD	Metric Tonnes of Cane per Day

OPSA	Oficina de Planeación del Sector Agropecuario
PRO	Public Records Office
PROBAN	Promotora de Banano Sociedad Anónima
UFCO	United Fruit Company
UNIBAN	Unión Nacional de Bananeros
SAC	Sociedad de Agricultores de Colombia
SAG	Sociedad de Agricultores y Ganaderos
SENA	Servicio Nacional de Aprendizaje
TNC	Trans National Corporation
TSPA	Tonnes of Sugar per Annum
TVA	Tennessee Valley Authority
WINBAN	Windward Islands Banana Growers Asociation

Map S2.1  
THE CAUCA VALLEY SUGAR MILL COMPLEX, 1990



Source: Adapted from Orozco, Guillermo A. (1984). *La Agroindustria Azucarera Colombiana, 1960-1983*. Cali: Asocaña, figure 2, p.14.

### Map B2.1



XV



Map B2.2  
URABA BANANA GROWING AREA



Source: Adapted from Zamosc, Leon (1986). The Agrarian Question and the Peasant Movement in Colombia. Cambridge: Cambridge University Press.

Map P2.1  
THE DEPARTMENTS OF BOYACA AND CUNDINAMARCA



Source: Adapted from Zamosc, Leon (1986). *The Agrarian Question and the Peasant Movement in Colombia*. Cambridge: Cambridge University Press.

## **Introduction**

This thesis analyses the historical experience of the agricultural transformation in Colombia, using as reference three different commodities-- sugarcane, bananas, and potatoes--and places their experience in a broader theoretical context. The three main areas for discussion are markets, institutions and technology: themes which are identified as being those that most strongly affected change. The thesis integrates some aspects of the new institutionalism and neoclassical economics and applies this framework to a multi-crop study of Colombian agriculture.

Initially, this study was designed to measure the biases of technical change and their effects on the development of agriculture. However, while it was found that the biases of technical change that influenced future transformations were of intrinsic interest, the underlying mechanisms which stimulated those changes were fundamental elements necessary for this type of study and therefore demanded attention. For this reason, other factors which contributed to modernisation were examined. These include, in addition to technology: markets; institutions; land usage; production-, and capital-bias; and characteristics of crop and processing. Finally, to interpret this in a human context, the interaction of these factors on labour was examined, particularly the benefits which accrued to 'workers' in the process of technical adoption.

Issues such as social and political struggles will not be reviewed. The thesis will also not discuss directly concerns such as the quality of human capital, organisational changes in the labour force and trade union activity. Obviously, labour-capital relations affect production decisions but a consideration of these relations and a discussion of the long-run distributional effects of agrarian change does not require an extensive analysis of labour formation. This has already been done elsewhere. Labour is discussed to place the analysis of modernisation in the



context of the long-term distributional effects of technical change<sup>1</sup>.

The 1936-1990 period was chosen in order to provide a framework for the analysis of long-run change. The point of departure was selected because 1936 was the year when a land reform bill was passed which attempted to bring security of tenure to squatters with uncertain title<sup>2</sup>. It was hoped that land reform would lead to modernisation. In fact, the main changes were that landowners ensured that squatters and tenants did not gain title land by expelling them, and replaced labour-intensive crops with cattle grazing<sup>3</sup>. Nonetheless, it represents a point in which agriculture, started expanding significantly by increasing land under cultivation. In 1936 agriculture comprised nearly one-half (46%) of GDP. By 1988, its significance had declined almost half to 24%<sup>4</sup>, while the share of the economically active population employed in the sector had declined from 60% in 1938 to 32.4% in 1984<sup>5</sup>. Below the issues which influenced modernisation will be analyzed. This will be followed by a discussion of the case studies.

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<sup>1</sup>For literature on the importance of human capital see for example, Schultz, Theodore W. (1990). "Investing in People." In Eicher, Carl K. and Statz, John M. (Eds.). Agricultural Development in the Third World. Baltimore (2nd edition): The Johns Hopkins University Press, pp.280-289. For an excellent study on labour in the agricultural sector see Booth, Anne and Sundrum, R.M. (1985). Labour Absorption in Agriculture. Oxford: Oxford University Press. For a specific case study of the influence of labour during the transformation to modern methods see for example, Clemens, Harrie and de Groot, Jan P. (1988). "Agrarian Labour Market and Technology Under Different Regimes: A Comparison of Cuba and the Dominican Republic." Latin American Perspectives, 15(4), pp.6-36.

<sup>2</sup>Hirschman, Albert O. (1963). Journeys Toward Progress. New York: The Twentieth Century Fund, p.108.

<sup>3</sup>Ibid., pp.112-113.

<sup>4</sup>These figures are based on GDP deflated to 1975 prices. See Londoño, Juan Luis (1990). "Income Distribution during the Structural Transformation: Colombia 1938-1988." PhD Disseration: Harvard University, appendix, table 1.

<sup>5</sup>Censo de Población de 1938. Bogotá: DANE; Londoño, Juan Luis (1990), op.cit., appendix, table 19.

## ELEMENTS OF AGRICULTURAL MODERNISATION

Agriculture traditionally was addressed by Adam Smith and David Ricardo to understand the forces behind surplus creation, capital accumulation and eventual 'development'. In the writings of Smith, Ricardo and Marx the agricultural sector was analyzed to comprehend the causes of the Industrial Revolution and the process of growth<sup>6</sup>. In later writings the agricultural sector was often given secondary importance in the face of more 'dynamic' ones. Recently the debate has come full circle and the agricultural sector is again considered to be a vital player *per se* in the economic system. In 1961, the five main functions of the agricultural sector within an economy were delineated by Mellor and Johnston: a)provision of foodstuffs, b)generator of employment, c)producer of inputs for other sectors, d)creator of markets for industrial output, and e)generator of foreign exchange<sup>7</sup>. With a large proportion of the world's population still involved in agricultural pursuits, the process of agricultural modernisation is viewed as of crucial importance, not only to push development forward but also to improve rural conditions. The agricultural sector in less developed countries (LDCs), particularly in Latin America, experienced a sluggish transformation in the twentieth century, often characterized by pockets of commercial agriculture that exhibited high growth rates and existed alongside static zones of subsistence. Some of the debates concerning the restraints on agricultural

---

<sup>6</sup>Smith, Adam (1976, 3rd edition). An Enquiry into the Nature and Causes of the Wealth of Nations. Campbell, R.H. and Skinner, A.S. (Eds.) Oxford: Clarendon Press; Ricardo, David (1817), Edited by Sraffa, P and Dobb, M.H. (1951), The Works and Correspondence of David Ricardo Vol.I, Cambridge: Cambridge University Press; Marx, Karl and Engels, Frederick (1967, follows the German 1983 edition). Capital: A Critique of Political Economy. Moscow: Progress Publishers.

<sup>7</sup>Johnston, B. and Mellor, J.W. (1961). "The Role of Agriculture in Economic Development." American Economic Review, Vol.51, pp.566-593.

modernisation will be reviewed, and their links with the research in the thesis will be underlined. Lastly, the theoretical debates on labour's participation in the benefits of technical adoption will be presented.

## Markets

Both factor and product markets will be analyzed to observe change over time. Two aspects of the transformation of factor markets will be analyzed. First, it will be seen that the increased penetration of capital into LDCs resulted in the internationalisation of capital. Progressively the global market has become more homogeneous, with similar production patterns and final products. This point will be addressed in the case of bananas. Second, and related to this is the maturation of factor markets which resulted in wider availability of market information and the resultant trend to the increased perfection of market signals. For instance, the gradual development of international markets has effected changes in the location and ownership of sugar refining and shifts in production responsibilities in banana cultivation.

International product markets will also be studied, to assess the gains of trade in modernisation. The importance of external trade for providing an impulse to modernisation will be revisited. The recent onslaught of liberalisation policies in LDCs is based on assumptions inherent in the traditional theory of the gains from trade<sup>8</sup>. It is argued in this thesis that a sudden entrance into international markets

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<sup>8</sup>See Alpine, Robin and Pickett, James (1993). Agricultural Liberalisation and Economic Growth in Ghana and Cote d'Ivoire, 1960-1990, Paris: OECD; Nguyen, T.T. and Wigle, R.M. (1992). "Trade Liberalisation with Imperfect Competition: The Large and the Small of it." European Economic Review 36 (1), pp.17-35.

can create less than optimal conditions for modernisation, for the accompanying rise in prices (of land, inputs and labour) can negatively affect other agricultural activities and regional development in general.

### Institutions

The second central theme to the thesis is institutions. The importance of institutions in economic development and their incorporation into neoclassical theory has been recent<sup>9</sup>. Their significance to this study is that explanations for market failure and seemingly irrational economic behaviour can be better understood by a close examination of institutional constraints. Informal and formal institutions are devised within each society which Douglass North describes as 'rules of the game'<sup>10</sup>. Informal institutions are defined as norms of behaviour, conventions, and codes of conduct<sup>11</sup>. Formal institutions consist of laws, economic policies, property rights--anything that is explicitly established and codified. Economic research on institutions has focused on transaction costs and property rights. Within the thesis, property rights will be explicitly addressed and implicit changes in transaction costs will be observed through the analysis of choice of techniques--new technologies. The evolution of property rights and their effect on future economic performance will be

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<sup>9</sup>See North, Douglass (1993). "The New Institutional Economics and Development." London: Paper presented for the Conference on Public Choice and Development; North, Douglass (1981). Structure and Change in Economic History New York: Norton; Coase, Ronald (1937). "The Nature of the Firm." Economica 4, pp.386-405; Coase, Ronald (1960). "The Problem of Social Cost." Journal of Law and Economics 3, pp.1-44; Bates, Robert (1981). Markets and States in Tropical Africa. Berkeley: The University of California Press.

<sup>10</sup>North, Douglass, (1993), op.cit., p.14.

<sup>11</sup>North, Douglass C. (1991). "Institutions" Journal of Economic Perspectives 5(1), pp.97-112.

assessed<sup>12</sup>. The main issues to the analysis on property rights will be defined below.

First, within the LDC literature, the inefficiencies resulting from highly skewed land distribution were commonly considered a source of sectoral stagnation<sup>13</sup>. Alain de Janvry maintained that early twentieth century development in Latin America was characterized by traditional landed elites who extended their sectoral command toward industry and finance, while retaining control of land in latifundio<sup>14</sup>. According to a study of 16 developing countries based on census material for 1950, 1960, and 1970, there were three major trends in terms of land tenure: 1) rising inequality in the distribution of landholding; 2) increasing polarization in the agrarian structure and 3) small constrained farms produce most of the food grain<sup>15</sup>. The transformation of landed elites will be directly addressed in sugar production and the evolution of their participation in agricultural modernisation will be analyzed. In addition, the obstacles faced by small producers will be examined in all three crops and explanations for the observed trends will be discussed.

Second, land ownership has also been linked positively to credit access and contributes to the discussion presented below concerning credit-bias. A problem for many farmers in LDCs is their temporary access to land. This makes it difficult for

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<sup>12</sup>For an excellent review of agrarian institutions see Bardham, Pranab (Ed.) (1989). The Economic Theory of Agrarian Institutions. Oxford: Clarendon Press.

<sup>13</sup>de Janvry, Alain and Sadoulet, Elisabeth (1990). "Investment Strategies to Combat Rural Poverty in Latin America." In Eicher, Carl K. and Statz, John M. (Eds.). Agricultural Development in the Third World. Baltimore (2nd edition): The Johns Hopkins University Press, p.446.

<sup>14</sup>de Janvry, Alain (1984). "The Political Economy of Rural Development in Latin America: An Interpretation" In Eicher, Carl and Staatz, John (Eds.) Agricultural Development in the Third World. Baltimore: The Johns Hopkins University Press, p.87.

<sup>15</sup>El-Ghonemy, M. Riad (1990). The Political Economy of Rural Poverty. London: Routledge, p.29.

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them to obtain credit from formal lending agencies as land has several attributes which are desired as collateral<sup>16</sup>. The most important question to be asked is whether provision of better defined and increased access to land titles raises agricultural output by easing access to credit. Data from three states in Brazil in 1978 show that capital per hectare is substantially higher on titled farms than on undocumented or encroached land<sup>17</sup>. William Rodgers has also concluded that as land quality increases, the likelihood of rural migrations declines<sup>18</sup>. Therefore it appears that better land quality and provision of legally enforced land titles encourages permanent settlement and increases agricultural output. In this thesis the significance of strong property rights and the importance of land titling to increase agricultural output will be examined, and the circumstances under which titling expands output will be explored.

Third, in connection with unequal land distribution and inadequate access to land is the emergence of contractual arrangements. Land markets are rigid and sometimes determined by a long process of evolving land rights, a process that is identified by institutional economists as path-dependent<sup>19</sup>. Because of rigid ownership patterns tenancy agreements emerged which motivated different patterns of agricultural production. Some examples include: sharecropping, contractual

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<sup>16</sup>Binswanger, Hans and Rosenzweig, Mark (Eds.), (1984). Contractual Arrangements, Employment, and Wage in Rural Labor Markets in Asia. New Haven: Yale University Press.

<sup>17</sup>Feder, Gershon and Noronha, Raymon (1987). "Land Rights Systems and Agricultural Development in Sub-Saharan Africa." The World Bank Research Observer 2(2), p.160, citing Villamizar, F. (1984). "IDB Financing in Land Administration Programs." Paper presented at the International Workshop on Land Tenure Administration, Salvador, Brazil.

<sup>18</sup>Rodgers, William M. (1991). "The Significance of Access to Land as a Determinant of Kenya's Interregional Migration." World Development, 19(7), pp.921-926.

<sup>19</sup>Bardham, Pranab (Ed.) (1989), op.cit., p.9.

agreements, squatters, colonists, and cooperative and common property rights. Within the thesis, squatter and contractual arrangements will be the two types discussed. The rationale for entering into these types of arrangements will be examined and their economic function will be explored.

Lastly, in addition to the focus on property rights, another significant aspect of institutions is that of innovation<sup>20</sup>. The role institutions have in the organisation of research and development, technological diffusion, establishment of links between local producers and consumers and State protection of local cultivators will be reconsidered. Well-organised public sources can obtain exceptional results such as the case of the Land Grant College System in the USA. However in LDCs the State is often not strong enough to create these institutions<sup>21</sup>.

## Technology

The third central issue is technology. Arguments expounding the necessity of technical change are related to increases in productivity, efficiency and economic growth. Increased productivity can reduce the price level that would have otherwise induced an inflationary process<sup>22</sup>. An increase in productivity is also believed to

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<sup>20</sup>See for example, Ruttan, Vernon M. and Hayami, Yujiro (1990). "Induced Innovation Model of Agricultural Development." In Eicher, Carl K. and Statz, John M. (Eds.). Agricultural Development in the Third World. Baltimore (2nd edition): The Johns Hopkins University Press, pp.97-114.

<sup>21</sup>For an excellent concise review of the U.S. system see Bonnen, James T. (1990). "Agricultural Development: Transforming Human Capital, Technology, and Institutions." In Eicher, Carl K. and Statz, John M. (Eds.). Agricultural Development in the Third World. Baltimore (2nd edition): The Johns Hopkins University Press, pp.265-269.

<sup>22</sup>Based on the assumption that in many LDCs there is an excess demand (supply does not meet demand) for food, see Ghatak, Subrata and Ingersent, Ken (1984). Agriculture and Economic Development. Brighton: Wheatsheaf Books Ltd., pp.34-36.

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effectively increase real wages and thus the general standard of living. Consistent with the classical economist's notion, there is clear evidence from a macroeconomic perspective that industrial expansion was greater in those years in which the increase in the price level of foodstuffs was comparatively lower<sup>23</sup>. Although there are inherent paradoxes within the modernisation of agriculture, such as the relative decline in the social and economic value of agricultural products as development proceeds, technology in the main can be considered beneficial. Nonetheless, one of the dilemmas to be addressed is the detrimental effects of technical change under conditions of a highly skewed income distribution. In this case, the benefits of change are channelled continually to one strata of the population with little gain accruing to the rest<sup>24</sup>.

Although technology is considered vital for growth, the incorporation of technical change in neoclassical theory is relatively new. This is due to the difficulty of quantifying innovation, therefore technical change and new technologies have been relegated frequently to the economist's black box of residuals<sup>25</sup>. Technical change was seen as being embodied indeterminately in the factors of production, and was not

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<sup>23</sup>See Sarmiento, Eduardo (1988). "Las Complementariedades en la Teoría del Desarrollo." Desarrollo y Sociedad, No.1, pp.17 and Sarmiento, Eduardo (1984). Funcionamiento y Control de Una Economía en Desequilibrio. Bogota: CEREC.

<sup>24</sup>For discussion of the importance of socio-economic structures see Lewis, W.A. (1954), "Economic Development with Unlimited Supplies of Labour", The Manchester School (22), pp.139-191. Amartya Sen's discussion of entitlement access also sheds light on this issue. See Sen, Amartya (1984). Poverty and Famines: An Essay in Entitlement and Deprivation. Oxford: Clarendon Press. See also Chenery, Hollis et.al. (1974). Redistribution With Growth. New York: Oxford University Press.

<sup>25</sup>See Harrod, R.F. (1948). Towards a Dynamic Economics. New York: St. Martin's Press; Domar, E.D. (1946). "Capital Expansion, Rate of Growth and Employment." Econometrica, pp.137-147; Solow, Robert (1956). "A Contribution to the Theory of Economic Growth." Quarterly Journal of Economics, pp.65-94.



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considered an independent factor which pushed forward development<sup>26</sup>. This study will focus on the long term path of technical change, examining the impulses for research and development, diffusion, and adaption. First, the discontinuous pattern of technical change will be analyzed. In other words, technical change can be pushed by the introduction of one new method which will trigger changes in the rest of the process. Second, the economic and political conditions under which technology is diffused and farmers adapt will be investigated. Third, the effect externally-induced technology has on development will be analyzed. A problematic condition facing developing countries is that technical change is largely based on inputs produced outside the country. Therefore, one of the most important effects technical change has on economic growth is inevitably externalized: production diversification and market amplification<sup>27</sup>.

The significance of internally-diffused, low-cost techniques will also be examined. The approach will be drawn from Ester Boserup's pioneering interpretation of the relationship between technical change and population growth<sup>28</sup>. One of the elements of her study was the belief that low-cost, labour intensive

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<sup>26</sup>Economists who directly addressed technical change include: Schumpeter, J.A. (1959); Rostow, W.W. (1960); Kaldor, Nicholas (1957); Economist historians which analyze technical change include: Landes, Davis S. (1960). The Unbound Prometheus. London: Cambridge University Press; David, Paul (1975). Technical Choice, Innovation and Economic Growth. London: Cambridge University Press; Headrick, D.R. (1988). The Tentacles of Progress New York: Oxford University Press.

<sup>27</sup>Balcazar, Alvaro (1986). "Cambio Técnico en la Agricultura." In Machado, Absalon (Ed.), Problemas Agrarios Colombianos. Bogota: Siglo Veintiuno Editores, p.213. For discussion on socially optimal technologies see Stewart, Frances (1977). Technology and Underdevelopment. London: The Macmillan Press, Ltd; Stewart, Frances (Ed.) (1987). Macro-Policies for Appropriate Technology in Developing Countries. Boulder: Westview Press; Berry, Albert and Cline, William (1979). Agrarian Structure and Productivity in Developing Countries. Baltimore: The Johns Hopkins University Press. Nadal Egea, Alejandro (1990). "Choice of Technique Revisited: A Critical Review of the Theoretical Underpinnings." World Development, 18(11), pp.1451.

<sup>28</sup>Boserup, Ester (1981). Population and Technology. Oxford: Basil Blackwell.

techniques were vital to increasing productivity in the agricultural sector during the process of economic development. For example, in labour abundant economies a parasite attack could be halted by removing the insects manually, and soil fertility could be replenished by applying organic manures<sup>29</sup>. Without high capital to labour ratios, four out of the five economic functions described earlier by Johnston and Mellor are obtainable. In this study, it will be argued that low-cost techniques do not necessarily impede competitiveness but can actually enhance it.

Production- and capital-biases contributed to the explanation of diverse production methods. An extensive study conducted by Berry and Cline establishes that the agricultural sector in LDCs is characterized by constant returns to scale<sup>30</sup>. For example, qualitative data identify the availability of machinery rental arrangements, the scale irrelevance of cattle ranching (it can be a feedlot activity or conducted on large expanses of land), and the more highly motivated labour force on family owned enterprises as compared to the use of wage labour as explanations for this phenomena<sup>31</sup>. Quantitative data can be observed in the ample base of literature containing empirical production functions<sup>32</sup>. If there happen to be inverse

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<sup>29</sup>Ibid, pp.24-26.

<sup>30</sup>Berry, Albert and Cline, William (1979). Agrarian Structure and Productivity in Developing Countries. Baltimore: The Johns Hopkins University Press, p.6.

<sup>31</sup>Ibid. See also Bardhan, P.K. (1973). "Size, Productivity and Returns to Scale: An Analysis of Farm Level Data in Indian Agriculture." Journal of Political Economy 81(6), pp.1370-1386.

<sup>32</sup>Sidhu, Surjit (1974). "Relative Efficiency in Wheat Production in the Indian Punjab." American Economic Review (Sept 1974; Bardhan, P.K. (1973). "Size, Productivity and Returns to Scale: An Analysis of Farm Level Data in Indian Agriculture." Journal of Political Economy 81(6), pp.1370-1386; Lau, L. and Yotopoulos, P. (1971). "A Test for Relative Efficiency and Application to Indian Agriculture," American Economic Review. 61(1), pp.94-109.

relationships in farm size and output per hectare it was attributed to production uncertainty in agriculture and other phenomena such as monopolistic control by large landowners of certain factors of production<sup>33</sup>. Nevertheless, there is a widely-accepted conception that large farmers are more productive because they supposedly provide efficient marketing services, produce high quality products, levels of education are usually higher thus they are most likely to be entrepreneurs. Therefore this sector is often regarded as being 'dynamic', 'progressive', 'modern', 'capitalist', etc.<sup>34</sup>. In this study the incentives that face small as well as large producers will be discussed and the motivations behind technical change will be analyzed so that the different mechanisms underlying technique selection can be understood.

Despite constant returns to scale among farm size, capital markets tend to be biased towards large landowners<sup>35</sup>. This results in a greater use of improved techniques on large farms, and further aggravates the distortions of factor use. Because of their relatively easy access to capital, large landowners will be more likely to employ capital using techniques instead of utilising labour, the more socially efficient factor in most LDCs. Nonetheless, it has been shown that highly sophisticated techniques are used to a similar extent amongst both small and large farms, despite the small farmer's inferior access to credit<sup>36</sup>. Although time lags may have occurred during the initial adoption phase, (i.e. large farms adapt more quickly

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<sup>33</sup>Bardhan, P.K. (1973), *op.cit.* pp.1370-1386.

<sup>34</sup>El-Ghonemy, M. Riad (1990). The Political Economy of Rural Poverty. London: Routledge, p.123.

<sup>35</sup>Berry, Albert and Cline, William (1979), *op.cit.*, pp.29-30

<sup>36</sup>Ruttan, Vernon W. and Binswanger, Hans (1978). "Induced Innovation and the Green Revolution." In Binswanger, Hans and Ruttan, Vernon (Eds.), Induced Innovation: Technology, Institutions, and Development. Baltimore: Johns Hopkins University Press.

than small farms<sup>37</sup>), within a few years of the introduction of new techniques the relevance of plot size and the use of the new technology usually has disappeared. Regardless of production scale-neutrality, this thesis will argue that large landowners in LDCs have qualitative advantages in terms of access to credit and markets, and usually own higher quality land (both in terms of geographic location and fertility)<sup>38</sup>. Biases in credit markets and easier access to technology can lead to inefficient allocation of resources, to the detriment of small producers.

What occurs to small producers under conditions of capital-bias? Originally small farmers, belonging to the 'traditional' sector, were considered risk averse and therefore less likely to adopt new techniques. However, evidence suggests that small scale farmers are just as willing to adapt new techniques as soon as they have demonstrated their profitability in the region<sup>39</sup>. Moreover small producers are also beneficial because with their development factor markets are stimulated. The importance of small scale production will be underlined, and their efficiencies will be examined.

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<sup>37</sup>See Griffin, Keith (1981). Land Concentration and Rural Poverty. London: MacMillan; and Pearce, Andrew (1980). Seeds of Plenty, Seeds of Want. Oxford: Clarendon Press.

<sup>38</sup>For a general discussion on land distribution in Colombia see Kalmanovitz, Salomon (1974). "Problemas del Campesinado Parcelario." Desarrollo Rural. Kalmanovitz explained that the landed class in Colombia slowly rose during the colonial era and monopolized the territory where there were possibilities for servile labour relations. However García García refutes this claim by asserting that "...most large farms were located in the Urinoquian and Amazonic regions and had poor soil, inadequate water and were far away from consumption centres." See García García, Jorge (1991). "Colombia" in Liberalizing Foreign Trade : Brazil, Colombia, Peru (Vol.4). Papegeorgiou, G., et. al. (Eds.), Washington, D.C.: The World Bank, p.23. This view is supported by more recent analyses which claim that land fragmentation had already occurred on the more fertile lands as they were opened to agricultural production in the first instance. The large farms were predominantly located in expansion areas of the agricultural frontier with low-quality soils. However this statement is difficult to maintain as there are many large farms on fertile land surrounded by small units on marginal land

<sup>39</sup>Ibid.

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The nature of the crop is also crucial to production decisions. With regard to agriculture, Charles Kindleberger was one of the first economists to identify that the nature of a crop affected technological change.

Tree crops, like rubber, cocoa, and coffee take a long time to bear their first harvest, and they last for years in production. They do not encourage agricultural experimentation by the individual farmer as do annual crops<sup>40</sup>.

Do only annual crops stimulate research and development, or do production structures and regional producer associations have an impact? Through the case studies it will be observed that some crops, because of their biological nature, are more easily cultivated in some areas, technology is more quickly diffused and, production patterns sometimes converge. In others, research is more troublesome to organise, and technology derives primarily from abroad or from slow to develop internal efforts.

## Labour

Two main issues for labour will be discussed. First, the transformation of labour in the modernisation process with the introduction of new techniques. Is labour always proletarianized? Second, the effects of technical change on labour both in terms of methods of recruitment, working conditions and qualitative changes in standard of living will be examined<sup>41</sup>.

With regard to the transformation from peasant to proletarian and estate

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<sup>40</sup>Kindleberger, Charles (1965). Economic Development. New York: McGraw Hill, p.77.

<sup>41</sup>For general literature on these issues see Booth, Anne and Sundrum, R.M. (1985). Labour Absorption in Agriculture. Oxford: Oxford University Press; Boserup, Ester (1981). Population and Technology. Oxford: Basil Blackwell; Burton, Henry J. (1973). "Economic Development and Labor Use: A Review" World Development 1(12), pp.1-22; Wharton, Clifford (Ed.), (1970). Subsistence Agriculture and Economic Development. London: Cass.

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farming to capitalist relations of production, Lenin delineated two mutually exclusive processes of transformation: internal proletarianization (Junker road) and external proletarianization (Kulak path) to capitalism. Internal proletarianization is characterized by the landlord's increased control over the estate to the detriment of the labourer. External proletarianization is based on differentiation of small producers. It arises when tenants obtain title to land and begin to work the land independently of the landlord<sup>42</sup>. The former tenant is encouraged to become autonomous of the landlord in both production and distribution. In this phase, wage-labourers are obtained from the existing body of workers in the region, and internal differentiation proceeds in such a way to enrich some peasants and impoverish others<sup>43</sup>. Paths of rural transformation in Latin America have been found to be less straightforward than this classification suggests and peasants often portray 'polyvalency' in which they have various roles in society, such as wage-labourers and small commodity producers<sup>44</sup>. Does polyvalency enrich these farmers and protect them from the inadequacies of the market, or does it prevent them from being mobile and flexible agricultural labour since they are tied to their property? Particularly, with potato growing these changes will be observed.

Does agricultural development improve conditions for the rural worker? The problem with many studies is that they regard the rural sector as composed of farmers, workers or a combination of the two, and fail to see major differences within

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<sup>42</sup>Goodman, David and Redclift, Michael (1981). From Peasant to Proletarian: Capitalist Development and Agrarian Transitions. Oxford: Basil Blackwell Publisher, p.103.

<sup>43</sup>Roxborough, Ian (1979). Theories of Underdevelopment. London: Macmillan Publishers Ltd., p.99.

<sup>44</sup>Goodman, David and Redclift, Michael (1981), op.cit., pp.103-105.

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the farmer category. Illustrations of the diversity of the rural sector include the landowner, the squatter, the labourer who owns a small plot of land, the small size farmer who hires labour (and hires himself out), the large landowner who hires labour, the absentee farmer and the manager (*mayordomo*). Therefore it is difficult to devise a study analysing rural workers well-being using only changes in real wage rates over time. Moreover, there have only been a few empirical studies discussing the determinants of rural wage rates. These studies have run into many problems such as inadequate data on rural households, nonpecuniary differences in wage paying jobs, and the extent to which labour is mobile. Because of the diversity of the rural population, and the fact that the standard of living can not be simply measured by money wages, perhaps a more accurate variable is 'regional development' such as construction of transport networks, hospitals, schools, literacy, etc. which reflect general levels of welfare. These variables are too vast to be accurately analyzed in this thesis, however the contribution of technical change to development and some qualitative changes that the labour force undergoes *vis-à-vis* the introduction of new techniques can be observed and weighed.

## CASE STUDIES

The selection of sugar, bananas and potatoes was based on their importance to the national economy, location, trade orientation, land usage and data availability. Heterogeneity in all these aspects was the objective. Also these three crops, particularly the first two, were concentrated geographically therefore regional data could be used to supplement micro data. Also, patterns of technical adaption,

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changes in land usage, and patterns of labour recruitment were more easily observed. For all three crops it was discovered that modernisation commenced earlier than the 1950s, contrary to the accepted periodization which marks the 1950s as the benchmark for the shift to modern production methods.

The most salient qualities of sugar were its aseasonal harvests, concentrated industry structure, and centralized production in the region of the Cauca Valley. Sugarcane production was first impelled by buoyant domestic demand and later commercialisation expanded to external markets in 1964 with the Colombian access into the US sugar quota. Therefore modernisation has been pushed by internal and external stimuli. The cane-sugar industry directed some production toward the price-supported domestic market which created a degree of income security for the industry. Land usage in the Cauca Valley was characterized by landed estates therefore the transformation of these organisations can be observed. Migrant labour, common to cane harvests in other regions, was not used because sugar harvests can be conducted year-round, due to ideal climatic conditions. This also implied lower factory investments as a smooth flow of cane could be ensured year-round.

Export-bananas were selected because foreign capital was involved in its transformation since the 1890s and continued to be important until 1983, at which point cultivation and export were entirely absorbed by local initiative. Cultivation has been concentrated in the regions of Santa Marta (mainly until the 1960s) and Urabá (from the 1960s). Moreover, few studies have dealt specifically with a comparative



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analysis of the two regions, and with Urabá in general<sup>45</sup>. Bananas provided an example of an export oriented crop, allowing the "virtues" of integration into the global economy to be assessed. Since, unlike sugar, bananas participate in a less-protected, highly competitive world market, they were more sensitive to external standards. State-of-the-art technical change might be the only means of survival for the banana producer. Different to the literature on export-banana regions which centres on TNC activity, the thesis will underline the vitality and dynamism of small independent producers. Land usage was varied with many types of producers supplying the export market. The early entrance of foreign capital also resulted in a quickly proletarianized labour force.

Potatoes have been grown principally for internal markets throughout the period, and the growth in output has been strong since 1936. Although production was dispersed throughout Colombia, this thesis will focus on the largest producing regions, Boyacá and Cundinamarca. Location of producers was highly diffuse, being characterized by many small producers with low levels of capital. However the crop, unlike export-bananas or cane-sugar, was a mixed crop which indicated that both modern and traditional methods were employed. In addition, land ownership within potato growing areas tended to be less concentrated which sheds light on a different labour force structure in contrast to the transformation of capitalist relations predominant for bananas and sugar. Production decisions were determined by input and credit availability, factors which for most producers were in shorter supply. As

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<sup>45</sup>One main study which compares the two regions is Bucheli Gómez, Marchelo (1991). "El Surgimiento y la Caída de un Enclave Agrícola: Estudio de las Zonas Bananeras de Magdalena y Urabá, 1948-1968." Masters Thesis, Universidad de los Andes.

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regional potato techniques were not nearly as homogeneous as the other studied crops, they provide an example of disjointed technical change. It is argued that, because of this structure, modernisation of production has been slower, and marketing and commercialisation have been a major bottleneck to change.

The thesis is divided into three parts corresponding to each crop and each part is divided into two sections. The first section examines crop modernisation in other regions of the world with emphasis on the important issues outlined here and provides a comparative context for the Colombian case. The second section analyses the Colombian experiences. Finally, the conclusion integrates the results of the three parts and answers the questions laid out above.

Despite the constraints and imperfections of the agricultural sector, sugar, bananas and potatoes have experienced favourable expansion. Cane-sugar evolved from small bases of the 1930s to achieve the highest world cane yields in 1990. Growth has been sustained throughout the period discussed. Export bananas most salient qualities were their rebound into world markets in the late 1960s and the departure of TNCs as the agent of technical diffusion and marketing. Lastly, potatoes achieved positive five-year growth rates throughout the period and met increasing demands to feed the population despite inconsistent state policy.

## Sugarcane

Sugarcane was the first source of processed sugar and has been an important element to the agricultural mix in many developing countries such as Brazil, the Dominican Republic, Mauritius, Peru, India, Cuba, Indonesia, Guyana and Colombia. Between 1600 and 1900 sugar was the most important of the internationally traded commodities<sup>1</sup>. During this period most sugar exports derived from cane though by the late nineteenth century beet-sugar exports surpassed those of cane-sugar until 1914 when cane-sugar exports regained and maintained their dominance until 1990<sup>2</sup>. In 1985 sugar was second only to coffee as a source of agricultural export income for developing countries<sup>3</sup>. In terms of growth and development, sugar was a significant export earner, an important foodstuff, and in some cases employed substantial amounts of rural labour. Today sugar is produced in most countries: in temperate climates it can be obtained from beet; in tropical areas cane is used. Moreover it can be processed from a broad range of commodities such as corn, sorghum, milk, and fruits. Recently, synthetically produced low-calorie sweeteners have also emerged as a competitor to cane- and beet-sugar, particularly as an additive in a wide range of processed food. Because of the diverse form sugar can take, competition from

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<sup>1</sup>Fogel, Robert William (1989). Without Consent or Contract. New York: W.W. Norton and Co., p.21.

<sup>2</sup>Evenson, Robert (1976). "International Transmission of Technology in the Production of Sugarcane." The Journal of Development Studies. 12(2), p.227; Chalmin, Philippe (1990). The Making of a Sugar Giant: Tate and Lyle 1859-1989. Chur: Harwood Academic Publishers, table 8.2, pp.142-143; citing the International Sugar Council; Galloway, J.H. (1989). The Sugar Cane Industry. Cambridge: Cambridge University Press, Figure 6.1, p.132.

<sup>3</sup>Mulherin, K.S (1986). "The Economic Importance of Sugar and Sugar Cane--Problems and Perspectives." Paper presented in FAO conference entitled, "Producción y Sanidad Animal." Santo Domingo, p.7.

substitutable compounds comes from many products and production methods<sup>4</sup>. In this thesis, sugar processed from sugarcane (cane-sugar) will be placed at the centre of the discussion<sup>5</sup>.

This chapter is organised into two sections. Part I concentrates on the general characteristics of the sugar agroindustry. First, crop and processing characteristics and international trade will be addressed. Second, technical change and patterns of technical diffusion will be analyzed. Third, production- and capital-bias will be discussed. Lastly, methods of labour procurement, proletarianization and the changing role of labour within the production process will be examined. Part II will address the issues discussed in part I within the Colombian context.

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<sup>4</sup>The extent of substitutability varies as each new sweetener has distinct qualities thus perfect substitution is difficult to obtain; see Rands Barros, Alexander (1993). Prospects for the World Sugar Trade. Discussion Paper No. 55, Geneva: United Nations Conference on Trade and Development, p.2.

<sup>5</sup>To the chemist sugar denotes a myriad of compounds, eg. fructose, lactose, etc.; the term sugar in this thesis will refer to sucrose and not any other chemical compound.

## Part I

### CROP CHARACTERISTICS, PROCESSING and MARKETS

To provide background for the sugar analysis first the physical properties of sugarcane and general features of cultivation and will be described. This will be followed by a review of processing techniques. Lastly, the changing structure of international markets and centres of production will be analysed.

Sugarcane is a perennial grass that is grown in tropical climates between 35 degrees northern and southern latitude<sup>6</sup>. There are two methods to propagate cane: by planting cuttings (rhizomes) or leaving a ratoon crop. Because cane reproduces asexually, cuttings are planted and seed is only used for experiment in breeding stations<sup>7</sup>. Once cane is harvested, a ratoon crop remains which will mature in 12-18 months<sup>8</sup>. Ratooning can continue for up to ten years, however each successive crop yields less, and when the grass becomes unprofitable new cuttings must be planted<sup>9</sup>. In some regions ratooning can continue longer, depending on variety, climatic conditions, and extent and frequency of irrigation and input application. However, in cooler climates cane is often replanted annually, which considerably increases production costs. Cane requires high levels of rainfall during the growing season and

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<sup>6</sup>Tacke, E.F., *et.al.* (1963). The World Sugar Economy Structure and Policies. Vol.II: The World Picture. London: International Sugar Council, p.3.

<sup>7</sup>Hagelberg, Gary (1989). "The Structure of World Production and Consumption." In Brooks, C. *et.al.* (Eds.), Cane Sugar: the Small Scale Processing Option. London: Intermediate Technology Publications, p.41.

<sup>8</sup>Galloway, J.H. (1989), *op.cit.*, p.13. The growth period is highly variable as it is dependent on climatic conditions. For example in Louisiana cane matures in 8-9 months, in Australia and Taiwan 15 months, and in Hawaii and South Africa 18-22 months. Ratoons generally mature in less time. See Encyclopaedia Britannica Macropaedia (1980). Chicago (15th edition): William Benton Publishers, p.769.

<sup>9</sup>Galloway, J.H. (1989), *op.cit.*, p.13.

## *Part I: Sugarcane*

sunshine to ripen the plant<sup>10</sup>. Weeding and pest control must also be carried out but these tasks are not as demanding as for potato or coffee. Fertilization is also important as cane depletes the soil rapidly: the monocrop nature of large-scale plantations exacerbates this problem. Cane is also intercropped by small farmers. Because cane is a perennial and land planted with cane cannot be taken over immediately by other crops, intercropping could protect these producers against market fluctuations<sup>11</sup>. For example if semestral crops are included in the mix, they could smooth out income flows and supply foodstuffs to the household. In many parts of the world cane is cultivated and produced by traditional methods. These are largely beyond the scope of this thesis but aspects of traditional processing will be reviewed briefly in order to provide context for the analysis of milling. Particularly in part II, production trends of traditionally processed cane (panela) will be examined as they had an impact on the transformation to modern methods.

Cane-sugar can be processed in various ways, ranging from the rudimentary to the highly sophisticated. This results in a wide range of production structures and applications. Traditionally cane was mainly produced for export markets and, to a lesser extent, was processed in households for domestic consumption. Processed cane (e.g. whether with traditional or modern methods) had a long shelf life and could be traded in regional markets. Technical change had a large impact on the way cane was produced and marketed. These changes will be discussed below.

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<sup>10</sup>Abbott, George C. (1990). *Sugar*. London: Routledge, p.14.

<sup>11</sup>Abbott, George C. (1990), *op.cit.*, p.15; Haraksingh, Kusha (1988). "The Uneasy Relationship: Peasants, Plantocrats and the Trinidad Sugar Industry, 1919-1938." In Albert, Bill and Graves, Adrian (Eds.), *The World Sugar Economy in War and Depression, 1914-1940*. London: Routledge, p.119.

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The industrial side was the first to be transformed through the introduction of new technology<sup>12</sup>. Traditionally cane processing involved three stages: juice extraction, boiling and cooling. Under the impact of technological innovation cane-sugar manufacturing became more complex and differentiated involving six stages. These are shown in figure S1.1.

Traditional processing was (and continues to be) conducted with human or animal power. Cane was crushed in primitive mills to extract the juice<sup>13</sup>. Once extracted, cane juice was heated and then allowed to cool into a hard block. In Spanish America this is called *panela*, in Brazil *rapadura*, in Haiti *rapadou*, and in India *gur*<sup>14</sup>. These traditional mills were known as *trapiches* or *guildives*<sup>15</sup>. By modern standards, traditional methods of processing are obsolete, but *trapiches* can still be found in the Third World because they are easy to build and can be financed by small cultivators who supply local markets.

Technological change, leading to capital intensive, large scale processing, resulted from market growth and triggered demand for labour, improved transport and the need to establish synchronised links between field and factory. If raw cane

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<sup>12</sup>Beechert, Edward (1988). "Technology and the Plantation Labour Supply: The case of Queensland, Hawaii, Louisiana and Cuba." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.133.

<sup>13</sup>Rojas, José Maria (1983), Sociedad y Economía en el Valle del Cauca: Empresarios y Tecnología en la Formación del Sector Azucarero en Colombia, 1860-1980. Bogotá: Banco Popular, pp.13-19.

<sup>14</sup>Pierre, Guy (1988), op.cit., p.122; Bermúdez Méndez, Nora and Pochet Coronado, Rosa M. (1986). La Agroindustrial de la Caña de Azúcar en Costa Rica. Buenos Aires: CLACSO, p.194; Galloway, J.H. (1989), op.cit., p.139.

<sup>15</sup>See Rojas José Maria (1983), op.cit., pp.13-19; Pierre, Guy (1988). "The Frustrated Development of the Haitian Sugar Industry between 1915/18 and 1938/9: International Financial and Commercial Rivalries." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.122. In general *trapiche* was the term in Spanish America and *guildive* in Haiti

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is not processed within twenty-four hours of the harvest, sucrose levels drop dramatically. These characteristics differentiate cane from other plantation crops for there was always a need to reconcile labour-intensive field practices with capital-intensive factory methods. The use of steam power, shredders, vacuum pans, and centrifugals were the innovations that impelled the shift from small-scale processing to large-scale centrals.

Modern milling emerged largely during the nineteenth century with notable advances in six areas: cane cutting/shredding/crushing, juice clarification, filter and evaporation, vacuum boiling pans, centrifugals, and drying<sup>16</sup>. The patio is the arrival point of cane from the field and is where cane is weighed and stored before being fed into the mill<sup>17</sup>. After passing through the patio, the cane is conveyed into cutters and shredders for juice extraction. In this stage approximately 60% of juice is separated<sup>18</sup>. In stage two the shredded material is then fed into roller mills where it is crushed and more juice is extracted. To clarify the juice, milk of lime is added, the mixture is heated and sent to a juice clarifier which separates the unpolluted and muddy juice. The muddy juice is removed and the clarified juice is then sent through a series of evaporators (stage 3) which remove almost all the water. A syrupy substance remains and is drawn into vacuum boiling pans to extract remaining water

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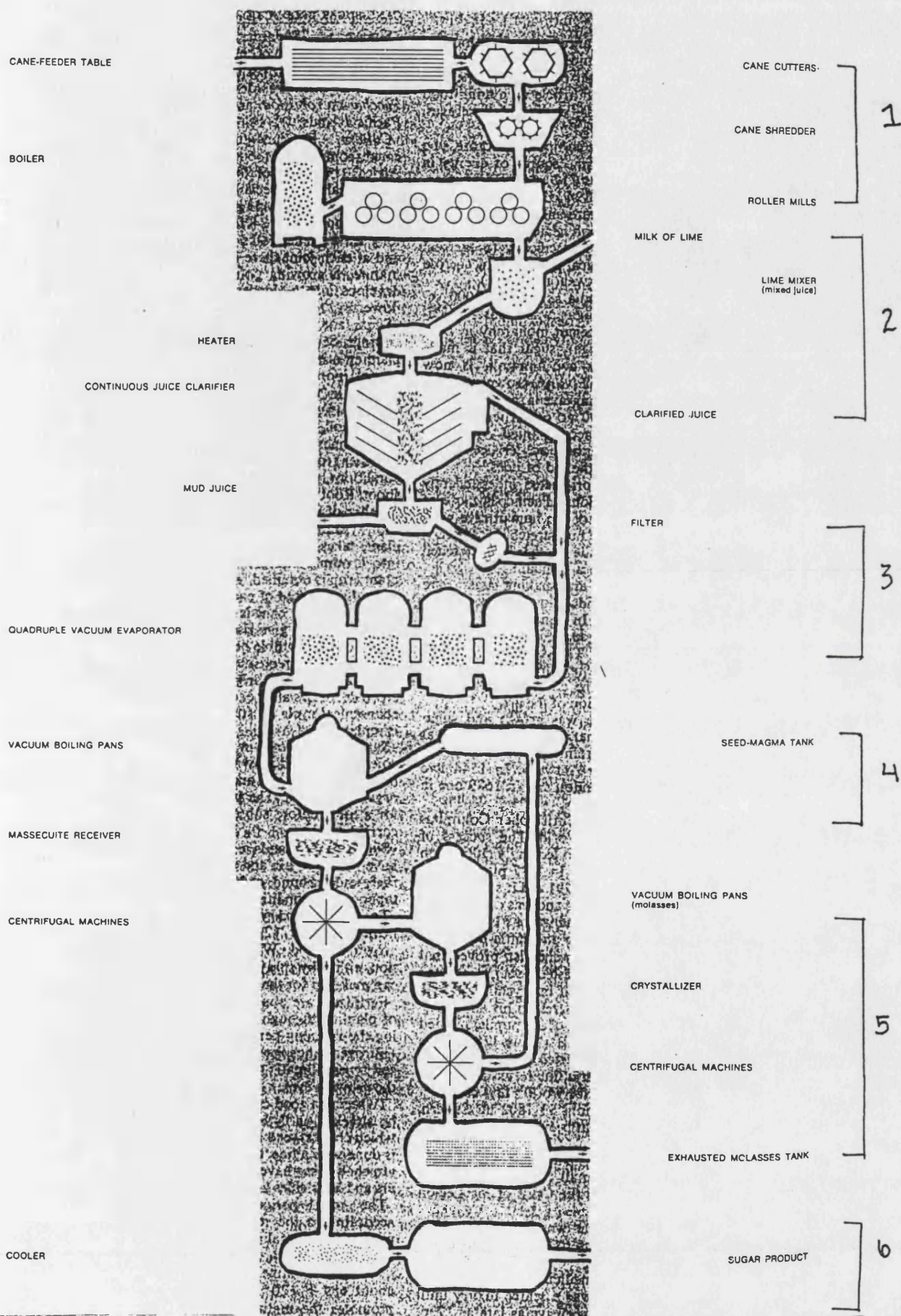
<sup>16</sup>See Galloway, J.H. (1989), *op.cit.* pp.135-138, and Deerr, Noel (1950). The History of Sugar Vol 2. London: Chapman and Hall, chapter 33; see Figure S1.1 for a diagram of the basic steps of cane-sugar processing.

<sup>17</sup>Interview with Hugo Mosquera (9 Feb.1992), Factory Engineer, Manuelita, Palmira, Colombia.

<sup>18</sup>Encyclopaedia Britannica: Macropaedia. (1980), Chicago (15th ed.): William Benton Publishers, p.771.



Figure S1.1  
Basic Steps in Cane-Sugar Processing



Source: Encyclopedia Britannica: Macropaedia No.17. Chicago: William Benton Publishers (15th Edition), p.770. Drawing by D. Meighan by courtesy of the Hatchi Zosen Co. Ltd., Tokyo.

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(stage 4). The syrup boils and seed crystals, small crystals of sugar, are added to activate the crystallisation process. During the boiling phase crystals grow from .3mm to 1.0mm<sup>19</sup>. After crystallization, a thick, gummy substance (massecuite) remains which is sent to centrifugal machines (stage 5). Centrifugals are cylindrical baskets pierced with holes in which massecuite is separated into raw sugar and molasses. This process is repeated until further extraction of raw sugar is no longer profitable. Raw sugar is then conveyed to the cooler where it is dried (stage 6), before packaging.

A chronology of technical change is presented in Part II in the sub-section on Manuelita. It will be seen that the introduction of new technology in one stage sometimes had a knock-on effect on other stages. In others, new methods were substituted for old with little effect elsewhere in the production process. The most salient feature of modern milling technology was its impact on scale of production<sup>20</sup>.

International sugar markets have become increasingly regulated since the establishment of modern milling centres in the nineteenth century<sup>21</sup>. During the twentieth century, different sugar agreements were established to control exports and prices<sup>22</sup>. Similar to bananas, this was different from the majority of agricultural commodities which were sold on 'freer' global markets. International

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<sup>19</sup>Ibid., p.772.

<sup>20</sup>Forsyth, David (1977). "Appropriate Technology in Sugar Manufacturing." World Development 5(3), p.194.

<sup>21</sup>Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, pp.3-5; Pérez-López, Jorge (1991), op.cit., p.122.

<sup>22</sup>See for example, Chalmin, Phillippe (1990), op.cit., chapter 1.

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sugar agreements and/or bilateral quotas were still common by 1990 and were often based on political relationships between exporting and importing countries. The political economy of many LDCs and their association with the industrialised world determined the direction of sugar exports. The nature of non-free markets was also evident in price differentials. For example, Brian Pollitt signals 1934 as the year US and London (world) markets began to diverge. At this time US prices improved through a tariff reduction from two cents per pound to .9 cents<sup>23</sup>. Moreover, in the 1980s countries that exported to the EC benefitted with higher export earnings than those in the US sugar quota which experienced declining US imports which effected a drop in export income<sup>24</sup>. These preferential "high" price agreements however are volatile and can result in lower prices. For example, in 1960, the evidence also suggests that sugar sales to the Soviet Union were made at prices far below world market prices<sup>25</sup>.

In addition, sugar was often a powerful domestic political concern<sup>26</sup>. The importance of government policy was evident with the emergence of the nineteenth century European beet-sugar industry which expanded as a result of protection<sup>27</sup>. In contrast, for most of the nineteenth century producers of cane-sugar did not enjoy

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<sup>23</sup>Pollitt, Brian (1988). "The Cuban Sugar Economy in the 1930s." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.101.

<sup>24</sup>Jabara, Cathy and Valdés, Alberto (1993). "World Sugar Policies and Developing Countries." In Marks, Stephen and Maskus, Keith (Eds.), The Economics and Politics of World Sugar Policies. Ann Arbor: The University of Michigan Press, p.136.

<sup>25</sup>Pérez-López, Jorge (1991), op.cit., p.137.

<sup>26</sup>Pierce, Paulette (1984). Noncapitalist Development: The Struggle to Nationalize the Guyanese Sugar Industry. New Jersey: Rowman and Allenheld.

<sup>27</sup>Fraginals, Manuel Moreno (1990), op.cit., p.133; see also Chalmin, Philippe (1990), op.cit., chapters 1 and 2.

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the same advantages. Only during the twentieth century, did domestic sugar policy in LDCs, coupled with increased population become vital and lead to spiralling consumption at home. From the 1970s onwards the majority of sugar was produced and consumed in LDCs<sup>28</sup>. For instance, India was the single largest producing country and consumed all its output domestically in 1988<sup>29</sup>. Sometimes government intervened to keep prices low to foster consumption. On other occasions production subsidies were devised to stimulate production, reduce costs and secure adequate supplies for the domestic market<sup>30</sup>. The importance of institutional (public and private) support was manifest in the emergence of the agroindustrial complex in the Cauca Valley and will be examined in Part II.

The location and ownership of the value-added process milling also changed at much the same time as shifts in production and consumption. Refining during the eighteenth and nineteenth centuries was undertaken in capital-rich countries which had resources to invest in large mills (e.g. France, England, USA). Crude sugar was exported from cane producing areas to be refined abroad. (Once cane was transformed into crude sugar, refining could be delayed.) Three reasons explain why sugar was processed in consuming centres: a) before the introduction of refrigerated shipping crystals of sugar would coalesce during the long, hot ocean journeys and had to be reworked; b) during the nineteenth and part of the twentieth centuries fuel costs were high in cane producing areas while energy was cheap in centres of consumption;

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<sup>28</sup>Rands Barros, Alexandre (1993), *op.cit.*, table 3, p.14.

<sup>29</sup>*The Economist Book of Vital World Statistics* (1990). London: Hutchinson Business Books Ltd., p.95.

<sup>30</sup>Attwood, Donald W. (1992). *Raising Cane: The Political Economy of Sugar in West India*. Boulder: Westview Press.

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c)refining created jobs and governments in developed countries preferred to promote employment domestically<sup>31</sup>. In the twentieth century, new developments in shipping, the wider use of bagasse as fuel, increased demand for refined sugar in cane-sugar producing regions coupled with proactive government policy resulted in refining investments in LDCs<sup>32</sup>.

The shift of refining to cane growing countries demonstrates the industrial and policy maturity of LDC cane-sugar regions. Before the twentieth century the bulk of cane-sugar was refined in capital-rich areas. However with increasing capital accumulation in cane growing regions, investments were made to modernize mills. Technological change, increased local investments and stronger domestic support effected a shift to modern processing methods in cane-sugar growing regions. Thus with the modernisation of sugar production, infrastructure improvements were made, additional capital was invested and factor markets became increasingly perfected. A comparison can be drawn with the world banana experience. As markets matured domestic agents within banana growing regions gained a wider access to banana production, marketing and distribution and capital became increasingly internationalised<sup>33</sup>. How the changing international market structure affected sugarcane refining in Colombia will be examined in part II.

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<sup>31</sup>Galloway, J.H. (1989), *op.cit.*, p.17.

<sup>32</sup>For an in-depth analysis of these changes, particularly with reference to England see Chalmin, Philippe (1990), *op.cit.*, parts I and II.

<sup>33</sup>See Banana Part I.

TECHNICAL CHANGE: discontinuous adaption patterns and reasons for adaption

After reviewing aspects of cultivation and processing, this section will commence with a general background of the larger trends of technical change in field and factory. This will be followed by an analysis of two central issues of the thesis. First, the discontinuous nature of technical change will be examined. Second, the reasons for technical adaption will be discussed.

Despite the long history of cane cultivation and sugar production, substantial technical changes did not take place until the late eighteenth and early nineteenth centuries<sup>34</sup>. During this time modern milling was established for beet-sugar refining and transferred to the cane industry. But field activities remained traditional because renovative practices such as fertilization and disease control hardly developed before the twentieth century. Therefore field techniques remained mainly land extensive<sup>35</sup>. When soil became depleted, cane was planted in another area, leaving the previous area fallow. As adequate moisture was crucial, irrigation and drainage systems were the only major areas where change was observed before the 1900s. In the twentieth century the introduction of land and labour saving techniques represented significant productivity increases within the field. Nonetheless planting and harvesting remained arduous labour-intensive tasks<sup>36</sup>. Cultivation technological change was not

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<sup>34</sup>Hagelberg, Gary (1989). "The Structure of World Production and Consumption." In Brooks, C., *et.al.* (Eds.), Cane Sugar: The Small Scale Processing Option. London: Intermediate Technology Publications, p.41. See Figure S1.2.

<sup>35</sup>Murphy, Martin (1991), *op.cit.*, p.14; Fraginals, Manuel Moreno (1976). The Sugarmill. New York: Monthly Review Press, p.20; Thomas, Clive (1984), *op.cit.*, p.11. More discussed on cultivation practices below.

<sup>36</sup>Galloway, J.H. (1989), *op.cit.*, p.15.

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necessarily linked with mill innovation but mill innovations almost always resulted in the modification of transport networks as there was a need to increase the quantity of cane milled. This extended the area from which cane could be transported. As a guide to the initial progression of technical changes figure S1.2 is used as a point of reference. The dates represent the point when a technique was discovered or applied. Now to examine the discontinuous nature of change.

The literature on technical change in field and factory typically enumerates changes that occurred in each area of production. Some analysts identify two distinct periods of change: early and late; while others specify phases of change<sup>37</sup>. For example, Beechert considered varietal strain, cultivation, fertilization and irrigation developments as the first phase of technical change<sup>38</sup>. In this thesis it is argued that, technical change is discontinuous. Technical change is not a gradual ongoing process, but occurs when a new method of organisation, or tool, or product is introduced.

Schumpeter argued:

. . . an economy in circular flow may be expanding, but it is not development. Development occurs only when an entrepreneur makes an innovation-- a new technique, product, or way of organizing things--and shifts coefficient or rules of the game. . . and the system moves to a new configuration of circular flow<sup>39</sup>.

It is maintained that technical change does not only move activity to a new configuration of circular flow, but this move is a lengthy process, adjusting all areas of production to new technique of a particular area. Two major catalysts clearly

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<sup>37</sup>For examples see de las Carreras, Alberto (1990), *op.cit.*, p.69-70; Piñeiro, Martín, *et.al.* (1982), *op.cit.*, Beechert, Edward (1988), *op.cit.*.

<sup>38</sup>Beechert, Edward (1988). *op.cit.*, p.131.

<sup>39</sup>Handbook of Development Economics. (1988) Chenery and Srinivasen, p.163.

impulsed field modernisation. The first was varietal change and diversification, the second harvest mechanisation. Varietal switch will first be discussed, followed by a cursory review of transport and milling changes. As there were no significant changes in milling during the twentieth century, a detailed discussion need not be provided<sup>40</sup>. Moreover, the examination of field mechanisation will be implicitly reviewed in the section on reasons for technical change. It is placed here because it can illustrate both the institutional and economic reasons behind technical changes and its discontinuous nature.

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<sup>40</sup>Discussed above.



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**Figure S1.2**  
**BENCHMARKS IN THE EVOLUTION OF THE CANE AGROINDUSTRY**

1650s	-Manure applied as fertilizer in Barbados due to increasing complaints about declining soil fertility.
1747	-Andreas Marggraf discovered a process for extracting sugar from red and white beets.
1797	-Steam power used to mill cane (only functioned for more than a few weeks) in Cuba.
1799	-Franz Case with assistance of King of Prussia built first beet-sugar factory.
1813	-Patent by Edward Charles Howard of vacuum pan.
1820	-Steam had become accepted means of powering sugar mills, however the rate of adoption remains slow.
1833	-Abolition of slavery in the British Colonies.
1840s	-Plough, harrow and cultivator used in Louisiana and Cuba.
1840s	-Centrifugal force first used in beet-sugar industry.
1848	-Abolition of slavery in the French Colonies.
1850s	-Use of railways in cane plantations for transport of cane from field to factory.
1858	-Cane seedlings first identified in Barbados.
1880s	-First successful version of a shredder installed in Louisiana cane-sugar mill.
1882	-Beet-sugar trade exceeds that of cane-sugar.
1900	-Since the early twentieth century no radical innovations diffused in cane milling.
1920	-Cane-sugar regained prominence on world markets and now comprised 70% of the international sugar trade.
1921	-First successful cane variety bred in Java in 1921.
1930s	-Use of machinery for soil preparation and transport of cane. -First successful attempt at mechanized harvesting in the USA.
1960	-Fertilization with nitrogen.
1960s	-Anti-viral and -fungal seed treatments.

Source: Constructed from Friginals, Manuel Moreno (1990). "Agricultural Backwardness—Industrial Development Experiences of Sugar Production in the Caribbean." In Lundahl, Mats and Svensson, Thommy (Eds.) *Agrarian Society in History*. London: Routledge, pp.125-139; Heitmann, John Alfred (1987). *The Modernization of the Louisiana Sugar Industry 1830-1910*. Baton Rouge: Louisiana State University Press; Galloway, J.H. (1989). *The Sugar Cane Industry*. Cambridge: Cambridge University Press.

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There were no major modifications in cane variety until the eighteenth century. From the sixth to the eighteenth centuries all was of a single type, creole<sup>41</sup>. During the eighteenth century a second wild type was discovered, 'Bourbon' of Otaheite' which proved to be superior to creole<sup>42</sup>. Because both of these varieties were wild, only asexual cane reproduction was possible, therefore these "new" varieties could only be used in the localities where they occurred<sup>43</sup>. During the second half of the nineteenth century cane reproduction was enhanced by the discovery of seedlings in 1858. This was significant as it enabled the survival of cane production in the face of competition from beet-sugar<sup>44</sup>. Cane seedlings could now be bred scientifically in laboratories and robust varieties reproduced from cuttings<sup>45</sup>. Potentially this meant that new varieties could be bred to improve yields, suit different climatic conditions and resist disease. Also, varieties could be transferred internationally. The first successful strain was bred in Java<sup>46</sup>, POJ 2878<sup>47</sup>, was disease resistant and high yielding. Today it still is a robust t

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<sup>41</sup>Evenson, Robert (1976). "International Trasnmision of Technology in the Production of Sugarcane." The Journal of Development Studies, 12(2), p.209.

<sup>42</sup>Ibid.

<sup>43</sup>Timoshenko, Vladimir and Swerling, Boris (1957). The World's Sugar: Progress and Policy. Stanford: Stanford University Press, p.126. For a discussion of the varietal revolution see pp. 125-132 of this source.

<sup>44</sup>Galloway, J.H. (1989), op.cit., p.123.

<sup>45</sup>Hagelberg, Gary (1989). op.cit., p.41; Galloway, J.H. (1989), op.cit., ppp.141-142. For an example of the problems of the creole variety in Mexico in the mid-nineteenth century see Barrett, Ward (1970). The Sugar Hacienda of the Marquesa del Valle. Minneapolis: The University of Minnesota Press, pp.45-46.

<sup>46</sup>Evenson, Robert (1976). op.cit., p.213.

<sup>47</sup>The letters in the name of cane variety signal the location in which it was bred, eg. CP 57603 is Canal Point, Florida. The first two numbers are the year in which it was bred, eg. 1957, and the last numbers denote the particular cane seedling.

ype and is grown in many parts of the world.

With the discovery of new varieties a system of diversification was implemented to diminish losses due to virus or disease. Different strains would be planted in separate sections of the estate. This practice became common by the 1930s when more successful varieties were bred. Another knock-on effect was the introduction of upgraded irrigation networks. Although the development of irrigation systems took place earlier, later with the introduction of new types, extensive irrigation networks were important because they reduced the dependence on weather variability and enabled the programming of year-round harvesting in some areas. With the increasing practice of diversification, post-1950 anti-viral and anti-fungal seed treatments were conducted prior to planting. Also, new strains facilitated the transfer of later innovations such as input application. Without the presence of modern varieties the use of chemical inputs was unlikely. Although fertilization with manure was common as early as the mid-seventeenth century in Barbados, it was not until the 1960s that nitrogen-based fertilizers were widely used<sup>48</sup>. This triggered improved irrigation methods as a steady supply of water heightened the responsiveness of fertilizer and pesticides.

New varieties also impuled scientific harvest programming. An important element to obtain optimum sucrose levels was targeting field productivity according to cutting frequency. During the season, cane continues to accumulate sucrose, however the rate decreases after a particular period. To maximize productivity the determining features are: a)to conduct the cut before diminishing returns of sucrose

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<sup>48</sup>Galloway, J.H. (1989), *op.cit.*, p.99. See Figure S1.2.

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levels set in, and b) to maximize output/hectare/month. Cuts had a high variance; in earlier times they occurred between 12-30 months, the most frequent were between 15 and 20 months<sup>49</sup>. More scientific practices reduced and standardised the time between cuts and maintained longer ratoons which became profitable with increased fertilization<sup>50</sup>.

The last significant impulse motivated by varietal switch was the breeding of more erect varieties (coupled with improved transportation) which made cane burning feasible. Cane can either be harvested green or after burning. The cane itself will not burn because of its high water content (about 70-80%), although burning young plants can damage or destroy the plots<sup>51</sup>. The table below illustrates the differences in productivity of burnt and non-burnt cane. The data derived from the Manuelita mill however cross-country qualitative evidence suggest similar trends<sup>52</sup>. The advantages of burning are three-fold. First, it eliminates extraneous material such as undergrowth and top leaves<sup>53</sup>. Secondly, it makes cutting easier because stalks are not as heavy (some of the water has evaporated) and cutters or machines do not have to wade through thick underbrush. Thirdly, the mills receive less organic rubbish, which results in easier processing. As table S1.1 shows, the percentage of fibre in factory and percentage of extraneous material were substantially lower for burnt cane.

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<sup>49</sup>Piñeiro, Martín, *et.al.* (1982). Articulación Social y Cambio Técnico: La Producción de Azúcar en Colombia. San José: Instituto Interamericano de Cooperación para la Agricultura, p.294.

<sup>50</sup>Hagelberg, Gary (1974), *op.cit.*, pp.72-76.

<sup>51</sup>Galloway, J.H. (1989), *op.cit.*, p.14.

<sup>52</sup>Abbott, George C. (1990), *op.cit.*, p.89; Pollitt, Brian and Hagelberg, G.B. (1992), *op.cit.*, p.11.

<sup>53</sup>Pollitt, Brian and G.B.Hagelberg (1992), *op.cit.*, p.11.

**Table S1.1**  
Productivity of Burnt Cane Versus Non-burnt Cane at Manuelita, 1990

Cane Condition	Non-Burnt Cane	Burnt Cane
Cutters Output	3.7 MTCD	7.2 MTCD
% Extraneous Material	8.6%	2.4%
% of Fibre in Factory	18.2%	13.4%
% of Sucrose	17.6%	18.5%
Sugar Output	11.2%	11.9%

Source: Gómez, Jaime (1992). "Manejo de la Caña Verde." *El Manualito*. No.145, p.1.

But there are also disadvantages of burning. Trash that was normally generated with unburnt cane provided ground cover and preserved moisture in non-irrigated areas<sup>54</sup>. Thus irrigation became more important when burning was introduced. Bagasse and sucrose levels were lower and sucrose levels dropped faster after twenty-four hours than for un-burnt cane<sup>55</sup>. Burning was less common in the early part of the twentieth century because of the dearth of efficient transport facilities and mechanical cutters. This once again evidences the interlinkages of technical change.

Apart from field changes, transport and milling were the most influential on sugar output as their efficiency largely determined production levels. Cane initially was transported to mills on oxen-drawn carts on trails and roads<sup>56</sup>. Early railways were often horse-drawn carts on portable tracks which were then updated with permanent tracks and then finally powered by steam. During the late nineteenth and early twentieth centuries, narrow gauge railways in Cuba and the Dominican Republic replaced oxen-drawn carts. Later, railways were replaced by tractors. Tractors

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<sup>54</sup>Pérez López, Jorge (1991). *op.cit.*, p.67.

<sup>55</sup>Ibid.

<sup>56</sup>Murphy, Martin (1991), *op.cit.*, p.14.

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connected with wagons or carts started to be used in the twentieth century although it was not uncommon to observe traditional methods used alongside modern<sup>57</sup>. Tractors transported cane from field to factory and then dumped cane in the mill patio. From here the cane was lifted and placed onto feeder tables. As can be seen, similar to milling, most transport changes were capital intensive.

Milling largely has remained the same since the beginning of the twentieth century. This makes technology easier to transfer and accommodate to local conditions. The mills themselves also have more opportunities to modify whole processes or elements of the milling process can be improved, replaced and repaired within the region. These characteristics make breaking the reliance on foreign exchange and technical experts easier. Steam powered mills since the 1820s and was still widely used until the 1990s. The type of fuel that was used to generate steam was either wood or bagasse. Noel Deerr observed that the earliest mention of milling also records the use of bagasse as fuel<sup>58</sup>. However the instantaneous adaption of bagasse as fuel did not always occur as some accounts stressed the use of wood first followed by its phasing-out and the use of bagasse. For example, the depletion of wood in Cuba in the nineteenth century, resulted in the introduction of new technology which allowed bagasse to replace wood<sup>59</sup>. The problem with bagasse was it could only be used if it was sufficiently dry. Once modern milling was introduced (Louisiana steel mills) bagasse as a main energy source became

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<sup>57</sup>Abbott, George C. (1990), *op.cit.*, p.92. See Sugar Part 2.

<sup>58</sup>Deerr, Noel (1950). *The History of Sugar Vol. Two*. London: Chapman and Hall, Ltd., p.584.

<sup>59</sup>Fraginals, Manuel Moreno (1990), *op.cit.*, p.127.

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possible<sup>60</sup>. The use of bagasse meant a reduction in costs and enabled mill owners to increase output. It also showed that in the face of wood shortages (wood was also used for mill, cart and housing construction) new techniques were innovated and quickly adapted to maintain the mill in operation.

Why were techniques adopted? There are three main lines of argument: economic, political, institutional and social. Some analysts maintain that adoption of new techniques was driven by labour scarcity, pace of mill modernisation, and technology availability<sup>61</sup>. In other words, they take a neoclassical stance, believing that economic decisions are based on relative resource availability. Others contend that markets, international and domestic, were the prime factors that impulsed the shift to modern milling<sup>62</sup>. Yet others stress that internal politics and social relations were the chief determinants for the development of the sugar economy<sup>63</sup>. Within this analysis institutional constraints will be integrated to examine their supporting role in market development.

First, relative resource availability was considered the principal impulse for modernisation. For example in Louisiana and Queensland in the late nineteenth and early twentieth centuries and in post-Revolutionary Cuba it can be argued that labour

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<sup>60</sup>Knight, Rolf (1972), *op.cit.*, p.30; Deerr, Noel (1950), *op.cit.*, p.584.

<sup>61</sup>Nagano, Yoshiko (1988). "The Oligopolistic Structure of the Philippine Sugar Industry during the Great Depression." In Albert, Bill and Graves, Adrian (Eds.), *The World Sugar Economy in War and Depression, 1914-1940*. London: Routledge, p.170.

<sup>62</sup>Pierre, Guy (1988), *op.cit.*, pp.121-130; Pérez López, Jorge (1991), *op.cit.*, p.27.

<sup>63</sup>Thomas, Clive (1984), *op.cit.*, p.107; Clemens, Harrie and de Groot, Jan P. (1988). "Agrarian Labour Market and Technology Under Different Regimes: A Comparison of Cuba and the Dominican Republic." *Latin American Perspectives*, 15(4), pp.6-36.

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scarcity motivated the adoption of labour-saving techniques<sup>64</sup>. Gary Hagelberg implicitly links mechanisation to abundant resources as he notes that until the mid-1950s only Hawaii and Louisiana (capital-rich areas), adopted mechanised cutting and loading<sup>65</sup>. However this logic is flawed as mechanisation was not only related to capital availability but to labour or nationalist resistance<sup>66</sup>. Furthermore cane mechanisation was closely related to corn as both crops have similar characteristics<sup>67</sup>. Thus technology transfer was more easily conducted in Louisiana than in the Caribbean, where large-scale corn cropping was negligible. Another aspect of technology transfer was that regardless of capital availability, often mechanised techniques were difficult to adopt as they required--costly, often difficult to integrate--changes to be made throughout the rest of the production process<sup>68</sup>. In addition, a skilled labour force was needed. Lastly, relative prices were influenced largely by other factors. These factors masked the significance of market signals.

Secondly on a broad level, the political economy of international market relationships between importers and exporters had a significant impact on technique choice. During the nineteenth century many traditional cane-sugar producers were forced to shift to modern methods due to an expanding, more efficient beet-sugar sector. Competition from beet-sugar resulted in a fall in international sugar prices and posed a formidable obstacle for the less-advanced cane industry. The result was

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<sup>64</sup>Beechert, Edward (1988), *op.cit.*, pp.131-141; Pollitt, Brain (1988), *op.cit.*, pp.97-108.

<sup>65</sup>Hagelberg, Gary (1974). *The Caribbean Sugar Industries: Constrains and Opportunities*. New Haven: Yale University Press, p.93.

<sup>66</sup>See below.

<sup>67</sup>de las Carreras, Alberto (1990), *op.cit.*, p.71.

<sup>68</sup>Discussed below.



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that many beet-sugar processes were copied or modified and integrated into cane-sugar production<sup>69</sup>. This enabled cane-sugar to once again be competitive and regain dominance on international markets. On another level, individual country relationships with sugar importers were also convincing reasons for growth or stagnation. For instance, Guy Pierre fiercely argued that in Haiti the main forces behind growth or decline during the first half of the twentieth century were international agreements and patterns of international trade<sup>70</sup>. In Cuba trade with the USA during the first third of the twentieth century was identified as the primary stimulus to the expansion of the Cuban sugar industry<sup>71</sup>. Moreover the trade embargoes imposed after the Revolution of 1959 represented the largest restraint on production<sup>72</sup>.

Market growth also motivated producers to adopt output-augmenting methods. For example, during the late 1800s in the Dominican Republic there were 200-300 *trapiches* throughout the country, some of which dated back to the 1600s<sup>73</sup>. Upon entrance into world sugar markets more efficient techniques were adopted to expand output. Martin Murphy reports that the Dominican industry was transformed during the 1875-1882 period when exports became important<sup>74</sup>. Until a dramatic change in demand for output was precipitated, the two-hundred odd *trapiches* met internal

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<sup>69</sup>Fraginals, Manuel Moreno (1990). "Agricultural Backwardness--Industrial Development Experiences of Sugar Production in the Caribbean." In Lundahl, Mats, and Svensson, Thommy (Eds.) *Agrarian Society in History*. London: Routledge, p.133; Galloway, J.H. (1989), *op.cit.*, pp.130-134.

<sup>70</sup>Pierre, Guy (1988), *op.cit.*, pp.121-130.

<sup>71</sup>Pollitt, Brain (1988), *op.cit.*, p.198.

<sup>72</sup>Pérez López, Jorge (1991), *op.cit.*, p.27.

<sup>73</sup>Murphy, Martin (1991). *op.cit.*, p.13.

<sup>74</sup>*Ibid.*, p.14.

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and colonial demand and modernisation was not a necessity. Increased demand for output, whether it derived from internal or external markets and changing social structures, was also a significant force. As stated above, during the twentieth century, domestic markets were a powerful stimulus to production in many LDCs<sup>75</sup>.

Institutional support was essential to the development of domestic and export markets. Historically one of the main restraints on cane production for internal consumption was limited markets due to poor transport networks and internal communication. Stronger institutions, such as state involvement in infrastructure construction paved the way for improved commercialisation. This, in conjunction with population growth, resulted in a rise of internal demand and consumption. Another reason for the importance of institutions were that only through some type of umbrella organisation could a country lobby for entrance into a sugar quota<sup>76</sup>. In addition state reform also impulsed modernisation in some regions. For example, in Mexico the implementation of agrarian reform resulted in structural transformations and effected a displacement and expansion of internal sugar production<sup>77</sup>.

The third approach focuses on social relations and State reaction to labour demands<sup>78</sup>. Harie Clemans and Jan P. de Groot analyzed the complex transformation process in the Dominican Republic from 1875 to the 1980s in the context of the changing roles of peasants and labour in the production process.

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<sup>75</sup>See above.

<sup>76</sup>Interview with Ricardo Villaveces (various times), President, ASOCAÑA, Bogotá, Colombia.

<sup>77</sup>For a consice account of the Meixican transformation during the first half of the twentieth century see Crespo, Horacio (1988). "The Cartelization of the Mexican Sugar Industry." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routlege, pp.85-95.

<sup>78</sup>Hagelberg, G.B. (1974), op.cit., pp.92, 96.

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Choice of techniques were specifically related to labour market policies arising from the nature of the state. In brief, under a neo-colonial trade regime after 1885 this led to rapid sectoral expansion and a landholding concentration<sup>79</sup>. After 1890 there was a crisis, wages dropped and peasants were no longer willing to become temporary labourers. Because land was abundant they became involved in production<sup>80</sup>. After 1916, the occupation of the Dominican Republic resulted in an enclave sugar sector which further concentrated production and relied on migrant labour from Haiti. Because labour was cheap and the State did not promote local independent producers, contracted seasonal labour became widely used and until the 1980s the harvest remained labour intensive<sup>81</sup>. This illustration intends to emphasize the role State policies have in the transformation.

The Cuban experience also illustrates social and political realities which induced the shift to mechanisation. Prior to the Revolution of 1959, large amounts of labour were used in cultivation and harvesting. The period has been characterized by some experts as having high 'open' and 'disguised' unemployment<sup>82</sup>. Timoshenko and Swerling argued that labour had been sufficiently abundant in Cuba which resulted in organised resistance to field mechanisation<sup>83</sup>. In this situation, labour seemed to have influenced the preservation of manual harvest techniques.

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<sup>79</sup>Clemens, Harrie and de Groot, Jan P. (1988), op.cit., pp.7-8.

<sup>80</sup>Ibid., p.8.

<sup>81</sup>Ibid., p.6.

<sup>82</sup>Pollitt, Brian (1981). "Revolution and the Mode of Production in the Sugar-Cane Sector of the Cuban Economy, 1959-1980: Some Preliminary Findings." Glasgow: University of Glasgow Occasional Paper No.35, p.1.

<sup>83</sup>Timoshenko, Vladimir and Swerling, Boris (1957). op.cit., p.60.

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After the 1959 Revolution the pool of agricultural wage-labourers contracted because there were more employment opportunities in urban areas<sup>84</sup>. This pulled labour out of rural areas and stifled the supply of urban workers recruited for seasonal labour<sup>85</sup>. This severely affected Cuban agriculture and consequently the new government put agricultural restructuring high on the national agenda. Attempts were made at mechanizing planting and harvesting. However, because of the US embargo and trade restrictions from other countries, mechanised technology could only be obtained through internal research or trade with socialist countries. Mechanical cutters were first used in 1963 and proved to be inefficient. Machinery was not suited to cut, clean nor load cane<sup>86</sup>. Subsequent research led to structural changes. Cane variety was replaced by those which were more conducive to mechanisation, cane was burnt in order to minimize extraneous field material and modifications of plot design were executed to accommodate the mechanised process<sup>87</sup>. Full-scale mechanical loading in Cuba was then achieved relatively quickly after the introduction of mechanical cutters in the 1960s. Finally, by 1986 two-thirds of the harvest was fully mechanised<sup>88</sup>. Therefore because of State involvement production methods were substantially changed.

These examples demonstrate that relative resource scarcity did not always

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<sup>84</sup>Pollitt, Brian and Hagelberg, Gary (1992). "Labour supply, harvest mechanisation and the demand for Cuban Sugar." Glasgow: University of Glasgow Occasional Paper No.54, p.3.

<sup>85</sup>Ibid.

<sup>86</sup>Pérez-López, Jorge (1991). *op.cit.*, p.63. Inadequate harvests were due to machinery that was unable to consistently cut at the bottom of the rhizome.

<sup>87</sup>Modifications of plot design consist of making plot size uniform throughout sugar growing areas and systematizing distance between cane plants. See Sugar Part II.

<sup>88</sup>Pollitt, Brian and Hagelberg, Gary (1992). *op.cit.*, p.8; Pérez López, Jorge (1991). *op.cit.*, p.67.

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significantly influence technical change. Although price signals in many cases motivated production decisions, these signals were determined by State policy or other insitutional forces besides resource availability. In many cases institutional action clearly encouraged changes. In others they were able advance entrance in international markets or were crucial to create internal conditions for domestic commercialisation, and research and development. In yet others such as the Dominican Republic, State support of foreign investment occurred to the detriment of local producers and workers. In Cuba, organised field resistance in the 1930s slowed down the move to mechanical harvests. However after the Revolution a labour shortage stimulated the State to develop mechanical harvesters. Throughout the period, increased demand was the most common factor to impulse technical change. Also, as discussed earlier, production for domestic markets became increasingly important to expand output and shift to modern production methods.

### LAND USAGE and PRODUCTION BIASES

After reviewing technical change and the reasons of modernisation, the production biases of cane cultivation and milling will be analysed. Production scale-biases appears to exist: there are many interpretations within the literature which attest to the duration of large-scale units both in cultivation and processing. Explanations such as biological characteristics, ability to monitor labour, existence of large landholdings and milling economies of scale are emphasized. Was scale-bias the result of the nature of production or did institutional preference for large-units result in their widespread survival?

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Undoubtedly small growers were common. The decomposition of traditional processing methods did not always result in the disintegration of small scale production. Empirical evidence points to a great variance in size of plots from the onset of modern milling to the present<sup>89</sup>. In some areas mammoth plantations were consolidated. In others, estate owners leased small plots with the agreement that leasees would plant cane. In yet other areas small and large units coexisted and cane was processed in cooperatively owned factories. What were the economic reasons for these divergent trends? Below the discussion will concentrate on two trends: land monopolization and the promotion of independent suppliers.

A common theme in plantation studies was the tendency towards land concentration<sup>90</sup>. Land monopolisation occurred as a means to obtain irrigation water, as a source of collateral or to gain access to labour. Michael Gonzáles in his study of Peru in the late nineteenth and early twentieth centuries argued that land consolidation expanded the labour market as it divested small- and medium-sized producers of their land<sup>91</sup>. But when hacienda production patterns transformed into other modes of production it was often difficult for the hacienda workers to gain title to land. In Peter Eisenberg's book on sugar during the 1840-1910 period in

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<sup>89</sup>Abbott, George C. (1990), *op.cit.*, pp.78-82; Attwood, Donald W. (1992). *op.cit.*, chapters 8 and 9.

<sup>90</sup>See Florescano, Enrique (1984). "The Formation and Economic Structure of the Hacienda in new Spain." In Bethell, Leslie (Ed.), *The Cambridge History of Latin America Vol.II*. Cambridge: Cambridge University Press, pp.167-168; Steward, Julian H., et.al. (1956). *The People of Puerto Rico*. Urbana: University of Illinois Press; Guerra y Sanchez, Ramiro and Guerra y Deben, Jose Antonio (1964). *Sugar and Society in the Caribbean*. New Haven: Yale University Press; Pérez López, Jorge (1991), *op.cit.*; Attwood, Donald W.(1992), *op.cit.*; Hutchinson, Harry (1957). "Village and Plantation Life in Northeastern Brazil." Seattle: American Ethnological Society Monograph 27; Mintz, Sidney (1979), *op.cit.*.

<sup>91</sup>Gonzáles, Michael (1985), *op.cit.*, pp.120-121.

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Pernambuco, Brazil this process was described as 'modernisation without change'<sup>92</sup>.

The great estates continued with large expanses of fertile land while the labourers lived outside the estate and maintained low standards of living. Clive Thomas analyzing, Guyana during the early twentieth century, also believed that land markets were formed historically and the transformation to modern milling did not result in any changes to the previously-existing plantation system.

While there was a reprieve based on the shortages and dislocations created by the 1914-1918 war, the plantation system was forced to adapt to the transformations occurring in the mode of production. These were subsequently to become the pillars on which the modern industry was built.<sup>93</sup>

By the end of the Second World War II, sugar production in Guyana was largely under the control of Trans National Corporations (TNCs). TNCs emerged from local planters who owned estates as early as 1835 (i.e. Josiah Booker) and also became involved in shipping, or mills which were consolidated in the late nineteenth and twentieth century. Later their investments extended to other areas such agricultural machinery services, shipping, retail sales, alcohol production, etc<sup>94</sup>. It was not until 1976, when industry nationalisation significantly broke down this structure in Guyana.

The second path mill owners pursued was the promotion of small producers. This was done to maintain a reserve army of labour in rural areas, to secure low-cost cane, and/or to generate capital. In Guyana, to dissuade immigrants from leaving estates after their contracts expired, estate owners granted small plots of land within estate empoldered areas in the late nineteenth century<sup>95</sup>. Between 1921 and 1937

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<sup>92</sup>See Eisenberg, Peter (1974), op.cit., particularly part II.

<sup>93</sup>Thomas, Clive (1984), op.cit., p.23.

<sup>94</sup>Ibid., pp.27-29.

<sup>95</sup>Ibid., p.20.

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the Mauritian plantocracy also supported the growth of independent growers as a source of labour, cheap cane, and a source of capital (mill land was sold to independent cane growers)<sup>96</sup>. Granting land to labourers was evidenced in a British Foreign Office document referring to Colombia in 1943.

. . . to counteract the lure of the town he [Mr. Rodgers] suggests that every estate labourer should be established on a small holding. The holding need only be half of hectare where he can grow vegetables and fruit, keep chickens and a cow or goats<sup>97</sup>.

Two overriding reasons in Trinidad were stated for the promotion of independent suppliers: to guarantee an adequate supply of labour and cheap cane<sup>98</sup>. In general, Bill Albert and Adrian Graves maintained that mill ownership concentration was accompanied by the disintegration of large units and/or increased independent growers<sup>99</sup>. With these trends, it can be seen that in some regions in the late nineteenth and twentieth centuries estate owners maintained their monopoly over land. In others, they promoted independent producers for cane and labour supply. During the twentieth century, with the increasing concentration of mill ownership, independent producers arose as a result of increased demand of cane from mills during the twentieth century. Yet another trend located in the literature is the proletarianization of suppliers. This will be discussed in the labour section. The rise of independent suppliers will be explored immediately below.

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<sup>96</sup>North-Coombes, M.D. (1988). "Struggles in the Canefields: Small Growers in Mauritius, 1921-1937." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, pp.195-198.

<sup>97</sup>PRO, Foreign Office (17 Aug. 1943). "Dr. Pound's Report on Agriculture in Colombia," FO371.33809, Registry Number A7730/2266/11.

<sup>98</sup>Haraksingh, Kusha (1988), op.cit., p.113.

<sup>99</sup>Albert, Bill and Graves, Adrian (Eds.)(1988), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.13.



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The importance of independent suppliers was that, in some areas, they diminished the extent of cane land concentration and shifted the risk of cultivation from mills to growers. For example, in Cuba until the 1930 independent growers (of all sizes) were the main source of cane supply. In Jamaica the number of independent farms doubled in the twenty year period following World War Two and the volume of cane produced by them increased four times<sup>100</sup>. In India as many as 50,000 small independent cultivators might supply one mill in the 1980s<sup>101</sup>. As described above, in some areas with the support of estate owners independent suppliers were established. In others, mill owners could not afford new land purchases nor were not interested in cultivation so they resorted to contracting independent suppliers. Also, country experiences were related to institutional forces (e.g. estate owners and State policy) which guided the evolution of land tenure.

Some of the literature discusses the tensions between growers and mill owners with regard to cane price establishment. These conflicts will not be explored in depth here but hint at future debate presented in the Colombia case study. The underlying theme is that although mill modernisation resulted in concentrated milling ownership (discussed below) the corresponding increase in independent suppliers (in some areas, in some periods) resulted in profit sharing. Therefore mill owners were not always the sole beneficiaries of technical progress.

In addition to the formal institutions of land usage arrangements, biases that

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<sup>100</sup>Hagelberg, G.B. (1974), *op.cit.*, p.79.

<sup>101</sup>Abbott, George (1990), *op.cit.*, p.93. For another example see de las Carreras, Alberto (1990), *op.cit.*, table 23, pp.90-91.

affected production decisions could explain the existence of cane growing structures. First, in 1991 Jorge Pérez López maintained that the biological characteristics of cane facilitate large-scale growing as opposed to input-intensive crops such as vegetables, coffee or tobacco<sup>102</sup>. He argued that with these commodities tasks were difficult to programme and required the constant care and attention of labour. However this explanation is simplistic as crops that were less demanding and required less labour during the growing period led to early mechanisation of many cultivation tasks. This resulted in a scale-bias towards large units. Paradoxically, the qualities of cane did not facilitate early capital-intensive field methods and labour was used to a large extent in many areas<sup>103</sup>. Therefore the physical properties of cane do not explain widespread large scale cultivation.

Secondly, some analysts confirm that the ability to organise and to monitor labour effectively made the system scale-biased where forced labour could be employed (namely in the era of slavery).

The industrial discipline, so difficult to bring about in the factories of free England and free New England, was achieved on sugar plantations more than a century earlier--partly because sugar production lent itself to a minute division of labor, partly because of the invention of the gang system, which provided a powerful instrument for the supervision and control of labor, and partly because of the extraordinary degree of force that planters were allowed to bring to bear on enslaved black labour<sup>104</sup>.

The gang system allowed labour to be divided and organised to perform non-specialized tasks. Robert Fogel evidences the eventual predominance of large-scale

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<sup>102</sup>Pérez-López, Jorge (1991). *The Economics of Cuban Sugar*. Pittsburgh: University of Pittsburgh Press, p.56.

<sup>103</sup>Early mechanisation occurred in Hawaii and Louisiana: the first harvester was not successfully used until the mid-1930s. Crops characterized by early technical advance were wheat, rice, and corn. See Timoshenko, Vladimir and Swerling, Boris (1957), *op.cit.*, pp.132-144; de las Carreras, Alberto (1990), *op.cit.*, p.69.

<sup>104</sup>Fogel, Robert William (1989), *op.cit.*, pp.25-26.

production and the demise of small-scale growers.

In sugar production, on the other hand, free labor was vanquished almost everywhere by the gang system. Where small-scale production persisted it was largely for local markets protected by tariffs and the like or aided by some special local advantage. When the gang system was extended to rice, coffee, and cotton, it also conquered these crops and left small-scale farmers with minor fractions of these markets<sup>105</sup>.

Clearly dominion over the labour force could offer an explanation for the persistence of large units that was witnessed during this period. However plantation economies, such as those described above, also gained advantages because they had command of *all* factors of production<sup>106</sup>. Therefore the ability to monitor labour was only part of the explanation. Nonetheless, it can be concluded that during the period when slave labour was used in plantation agriculture (roughly 1502-1880s) production bias was a result of this particular organisational arrangements. What occurred in later years?

In the mid-eighteenth and nineteenth centuries, before major mill innovations were adapted, land monopolization originally occurred as a means for estate owners to gain access to irrigation water, a critical resource for cane growth<sup>107</sup>. Later, the establishment of modern mills resulted in a complementarity between land consolidation and capital concentration. Particularly, the drive to increase technical levels in the mill, resulted in the need for more land to increase cane production and meet higher mill capacity. Therefore the demand for land and higher capital

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<sup>105</sup>Ibid., p.35.

<sup>106</sup>The use of the term plantation economies will be used loosely, to describe concentrated land ownership, extensive cultivation, the use of servile labour and large amounts of capital. In the literature there is debate on the hazards generalizing Caribbean agriculture into the term plantation economy. See Hagelberg, Gary (1974). The Caribbean Sugar Industries: Constraints and Opportunities. New Haven: Yale University Press, pp.1-7. Implicitly this view is shared as the divergences of "plantation economies" are underlined throughout the thesis.

<sup>107</sup>González, Michael J. (1985), op.cit., pp.43-69; Thomas, Clive (1984), op.cit., p.15.

requirements of mill innovations resulted in the establishment of large units. Within the literature there are many accounts of industrial and land concentration from the nineteenth century onwards. For instance, Galloway relates mill modernisation to a consolidation of landholdings in the late nineteenth century in general<sup>108</sup>. In the Dominican Republic Martin Murphy observed industrial and land concentration with the shift to more efficient techniques after 1875<sup>109</sup>. Similarly, Rolf Knight described a comparable process in many parts of Latin America when central mills were established during the late nineteenth century. However Knight observed two trends: the first was land and industrial concentration by one agent, the other was the establishment of central mills. Central mills were organised by smaller independent growers who would pool their resources and invest in one mill where cane could be processed. This arrangement allowed small sized planters to compete with plantations that milled their own cane. However the long term trend was that the operator of the central would gain control of land and diminish his use of and dependence on cane produced by independent suppliers<sup>110</sup>. Thus far, production scale-biases have been related to institutional factors existing in particular periods. During the era of slavery plantation owners were able to maintain control of all factors of production. With the abolition of slavery estate owners either maintained or expanded landholdings. Moreover, as a response to labour scarcity, they invested in capital intensive milling

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<sup>108</sup>Galloway, J.H. (1989), *op.cit.*, p.135; For an illustration of production concentration in the Philippines see Abbott, George C. (1990), *op.cit.*, pp.172-178.

<sup>109</sup>Murphy, Martin (1991), *op.cit.*, p.16.

<sup>110</sup>Knight, Rolf (1972), *op.cit.*, pp.59-60. The pace and concentration of land acquisition was variable throughout sugar producing areas and a strict paradigm cannot be developed. For an illustration of the existence of centralized or cooperative milling see Emmet, Boris (1928). The California and Hawaiian Sugar Refining Corporation. Stanford: Stanford University Press, pp.3-6.

and/or promoted the establishment of individual planters. Did other factors in the twentieth century enforce this trend?

The most important factor to increased industrial and/or land concentration was capital-bias and milling economies of scale. Capital-bias was also seen in slower rates of field technical adoption in small units. Capital-intensive technical change tended to displace small producers. M.D. North-Coombes maintained that small plots in Mauritius during the 1921-1937 period had lower yields because access to new techniques, credit and fertile land was deficient and colonial laws were biased towards estate and mill owners<sup>111</sup>. Clive Thomas also describes discriminatory capital markets after 1950 in Guyana.

Generally, peasant cultivation, lacking capital to provide adequate drainage and irrigation, and with no marketing capacity to export sugar, developed largely as a system of petty commodity production outside of sugar and based on the emerging domestic market<sup>112</sup>.

In this case it is possible that they would transform into kulaks, however with inadequate access to essential capital for infrastructure improvements and input purchases their existence appeared precarious. In the 1960s in India lower yields on smaller farms were attributed to short-term leases and insufficient capital<sup>113</sup>. Beechert observed that higher capital requirements of recent decades (post-1960) in the field effected an increasing tendency toward consolidation of large-scale

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<sup>111</sup>North-Coombes, M.D. (1988). "Struggles in the Canefields: Small Growers in Mauritius, 1921-1937." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, pp.199-200.

<sup>112</sup>Thomas, Clive (1984), op.cit., p.19.

<sup>113</sup>Hagelberg, G.B. (1974), op.cit., p.76 citing Stead, B.A. (1968). "Sugar cane production by Indian growers in Natal." South African Sugar Journal, 52 (8), pp.708-712.

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production and hindered small-scale units in Queensland, Australia and Hawaii, USA<sup>114</sup>. Thus as will be seen in banana cultivation capital intensive techniques had a tendency to displace small producers if no institutional support existed to extend credit and diffuse new techniques<sup>115</sup>. This implicitly demonstrated the existence of capital-bias in later years when capital-intensive techniques became important, which resulted in an apparent production-bias towards large units.

Another aspect of capital-bias was that of land quality. Much of the title-less land was often of a lower quality or located in geographically isolated areas. For instance in Peru the large estates owned the best land with ample amounts of irrigation water between 1875 and 1933<sup>116</sup>. In the 1960s, there was also evidence that small growers in the West Indies were at a further disadvantage because of their far location from the mill (transport costs were higher)<sup>117</sup>. The only circumstance under which this was changed was through institutional support. In the face of state reform such as Mexico in the 1920s and Peru in the late 1960s the structure was broken<sup>118</sup>. In Mexico the three principal interests within the industry were gradually separated (the workers, planters, and industrialists). Within the State of Morelos, the country's leading producer before the Revolution (1910), much of the

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<sup>114</sup>Beechert, Edward (1988), *op.cit.*, pp.138-139. Completely mechanised harvest were not possible until the 1960s.

<sup>115</sup>See 'Banana Parts I and II. for more sources on capital-bias in cane-sugar production see Abbott, George (1991), *op.cit.*, p.72; de las Carreras, Alberto (1990). *El Azúcar en la Argentina y en el Mundo*. Buenos Aires: Editorial Hemisferio Sur, p.71; Hagelberg, Gary (1974), *op.cit.*, pp.82, 84-85.

<sup>116</sup>González, Michael (1985), *op.cit.*, chapters 1 and 3, p.121 citing report on small farmers in the Lambeyeque Valley by the Sociedad Nacional Agraria, 1937, Archivo del Fuero Agrario.

<sup>117</sup>Timoshenko, Vladimir and Swerling, Boris (1957), *op.cit.*, p.73.

<sup>118</sup>Crespo, Horacio (1988), *op.cit.*, pp.85-95; Lowenthal, Abraham F. (1975). "Peru's Ambiguous Revolution." In Lowenthal Abraham F. (Ed.), *The Peruvian Experiment*. Princeton: Princeton University Press.

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irrigated hacienda land was redistributed to *ejidos*<sup>119</sup>, thereby removing the bias of hacienda production and redistributing land to cooperative units. In Peru according to Lowenthal, after the 1968 Revolution, the sugar haciendas were successfully reformed with profits being distributed among permanent workers. Nonetheless, migrant workers continued to be as badly off as before, not receiving any of the benefits of the reform<sup>120</sup>. Therefore it is seen that land-quality bias (an aspect of capital-bias) features prominently in the literature and land rights were often fixed, with successful redistribution occurring only with State reform.

Although mill and land ownership appeared to be increasingly concentrated, by the end of the nineteenth and the beginning of the twentieth centuries cultivation often expanded to independent suppliers. The only clear empirical evidence that showed that scale-bias existed was that of the factory which operated with economies of scale and high amounts of capital. The introduction of capital-intensive field techniques in the twentieth century which resulted in the displacement of small producers corroborates the existence of capital-bias. Nonetheless regional experiences showed conflicting trends, in some areas small independent producers flourished while in others huge plantations persisted. Capital-bias appeared to be a clear disadvantage for small producers who were less able to receive credit and were also located on less fertile land. Also, the historical background of cane growing and the colonial institutions that were formed often misrepresented future conditions of

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<sup>119</sup>Crespo, Horacio (1988), *op.cit.*, p.86 citing González Herrera, Carlos and Embriz Osorio, Arnulfo (1984). "La Reforma Agraria y la Desaparición del Latifundio en el Estado de Morelos." In Crespo, Horacio (Ed.), *Morelos. Cinco Siglos de Historia Regional*. Mexico, pp.285-98.

<sup>120</sup>Lowenthal, Abraham F. (1975), *op.cit.*, p.16.

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exchange. For instance, plantations of the seventeenth and eighteenth centuries often survived into the nineteenth and twentieth centuries and were located on higher quality land. State policy further strengthened scale-bias or in some cases, through agrarian reform, reversed the process.

### LABOUR: proletarianization, contracting and the effect of technical change

In this section three important aspects of labour will be addressed. First, an analysis of the transformation of cane peasants to proletarians will be presented. Second, a discussion of the labour contract system will be provided. Third, the influence of new techniques on labour-use will be examined. In the case study detailed sectoral employment trends, wages, harvest organisation, the direct effect of technology on labour and proportional changes of labour used in field and factory will be provided. Broader issues frequently addressed in the literature will be presented here, but a comparative analysis of micro changes similar to that presented in part II will not be included due to the breadth and diversity of country experiences.

One of the most notable features of the history of cane was the use of high levels of labour during cultivation, particularly the harvest. Until the nineteenth century slave labour was used extensively in plantations. Sugar was the greatest of the slave crops<sup>121</sup>. There are also accounts of indentured labour procured from the

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<sup>121</sup>Fogel, Robert William (1989), *op.cit.*, p.18. During the 1502-1860 period, between 60 and 70 percent of all the Africans who survived the Atlantic voyages were situated on one of Europe's sugar colonies



Indian Sub-continent and coolies from China<sup>122</sup>. In yet other regions such as Cuba during the last decade of the eighteenth century and again after 1850, mill owners would also employ temporary wage-labour recruited from the peasantry who cultivated tobacco and minor crops, shipyard workers and numerous small artisans<sup>123</sup>. First, these cases demonstrate the diversity of the work force before the twentieth century. Second, the gradual abolition of slavery and servile labour induced innovations in cane growing that resulted in new social organisations of cultivation that were present throughout the twentieth century. In the short term, the abolition of slavery in most regions resulted in labour shortage for plantation owners. However throughout the twentieth century, labour-intensive production became beneficial as rapid population growth occurred in many LDCs.

Sugar production moreover necessitates the employment of a particularly large amount of labour per acre cultivated. And since so many countries have a problem finding employment for the agricultural population they have found sugar a very convenient means of doing so.<sup>124</sup>

During the twentieth century populous less developed countries theoretically had a comparative advantage. Nonetheless, as labour demand was seasonal due to the annual *zafra* (harvest) and agricultural workers were not a homogenous body of labourers (they were not solely agricultural wage-labourers), it was often difficult to obtain labour<sup>125</sup>. With the exception of Hawaii, Peru and Colombia where harvests could be conducted year-round, labour demand was highly cyclical because during the

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<sup>122</sup>Abbott, George C. (1990), *op.cit.*, p.12; Galloway, J.H. (1989), *op.cit.*, p.127.

<sup>123</sup>Fraginals, Manuel Moreno (1976), *op.cit.*, pp.19-20

<sup>124</sup>PRO, Foreign Office. (3 May 1937). "International Sugar Conference and Negotiations Leading up to the International Sugar Conference of 1937." FO371.21220, Registry Number W9889/246/50.

<sup>125</sup>See chapter 2 for a discussion of the diversity of the agricultural work force. For a specific discussion of the difficulty in analyzing cane labour see Hagelberg, Gary (1974), *op.cit.*, pp.85-93.

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growing period cane did not require large amounts of labour<sup>126</sup>. Huge amounts of workers were only needed during planting and the harvest. However, what happened to the cane labour force when technical changes were introduced? How did labour's relationship with the means of production change when production was intensified and modern mills emerged?

With the maturation of sugar economies, empirical evidence suggests that many small producers and ex-estate workers became internally proletarianized being displaced by concentrated mills. For instance this was largely the case in the Dominican Republic post-1875, Cuba post-1930, and in Guyana after World War II<sup>127</sup>. The reasons for internal proletarianization were that rural inhabitants had difficulty obtaining access to land and others who acquired land title or usufruct rights faced discriminatory policies. For example in Cuba *colonos* (independent Cuban sugar growers) supplied cane to mills throughout the history of pre-revolution Cuba. In fact, between 1899 and the mid-1920s, a period of buoyant output, the number of *colonos* in Cuba increased<sup>128</sup>. Hence *colonos* were externally proletarianized. This demonstrated that it was possible to protect land rights of individual producers<sup>129</sup>. Although the reasons that *colonos* survived were related to the high variation of landholding size and tenure which was diverse ranging from very small-scale owners, leasees, or sharecroppers to medium- and large-scale planters<sup>130</sup>. Thus it was not

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<sup>126</sup>Interview with Oscar Gerardo Ramos (Feb. 1992), Historian at ASOCAÑA, Cali, Colombia.

<sup>127</sup>Thomas, Clive (1984), *op.cit.*, pp.18-23; Murphy, Martin (1991), *op.cit.*, pp.16-18; Clemens, Harrie and de Groot, Jan P. (1988), *op.cit.*, pp.6-12.

<sup>128</sup>Pollitt, Brian (1988), *op.cit.*, pp.98-99, graph 8.1.

<sup>129</sup>Pérez-López, Jorge (1991). *op.cit.*, p.20.

<sup>130</sup>Beechert, Edward D. (1988), *op.cit.*, p.134; Pollitt, Brian (1988), *op.cit.*, p.103.

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necessarily the interests nor livelihood of small-size farmers that were protected. Moreover during the sugar crisis of the 1930s small and medium producers significantly declined in Camaguey and the East, areas where US-owned modern mills predominated<sup>131</sup>. Between 1930 and 1934 as much as 90 per cent were displaced<sup>132</sup>. Thus, in the long term, the junker road to capitalism occurred. However a linear transformation into total proletarianization did not ensue as many times labour was seasonal, following the harvest, or lived near plantations and became polyvalent peasants (discussed below).

The diversity of this work force cannot be denied. Nonetheless, a theme common to many analyses was the use of contracted labour. Though other methods to procure labour existed in cane growing, labour contracting will be discussed as it directly related to the Colombian case. In the Caribbean, inter-island migration became common in the nineteenth century. People from densely populated areas such as Barbados and St. Kitts, Haiti and Jamaica immigrated to those expanding sugar industries such as Trinidad, British Guyana, Cuba and the Dominican Republic<sup>133</sup>. Other methods of labour acquisition were also necessary:

. . .the first spectacular experiment in 1840-41: the big harvesting job was begun by a group of Catalans contracted by the trafficker in whites.<sup>134</sup>

The labour contract system was common to cane growing in many parts of the world from the mid-nineteenth century in the Caribbean, from the late nineteenth century

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<sup>131</sup>Pollitt, Brian (1988), *op.cit.*, pp.100,102.

<sup>132</sup>Pollitt, Brian (1988), *op.cit.*, p.102, citing Soto, *Revolución*, Vol.II, p.286.

<sup>133</sup>Galloway, J.H. (1989), *op.cit.*, p.130.

<sup>134</sup>Fraginals, Manuel Moreno (1976), *op.cit.*, p.136.

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to 1940 in Peru, and from the second half of the twentieth century in Colombia. It came to play an important role in securing cutters which were a scarce resource during the harvest.

Contracted cutters were typically obtained by a middleman hired to insure an appropriate number of workers. These middlemen, otherwise known as *enganchadores*, were responsible for supervision and also directly distributed pay checks<sup>135</sup>. Within the literature there is much argument on the exploitative nature of this relationship. For example, workers were employed temporarily, received few benefits and were subject to long hours as harvesting had to be conducted within a specific period. This was particularly so for cane cutting. The importance of contracting to this thesis is that it was not used in Colombia until *after* the 1950s and only was used widely after 1970s. What can explain the late use of contracted labour?

Chris Knight analyzed labour contracting during the late nineteenth century until 1940 in northern Peru. He explained that the use of contracted workers was related to labour scarcity and the inability of labour to organise. Moreover, he signals the use of labour contracting and temporary methods of recruitment as a stage in the development of regional labour markets<sup>136</sup>. Therefore when modern methods reached maturity (post-1940) more stable patterns of labour procurement and an increase in non-wage payments were observed. Knight, maintained three reasons for

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<sup>135</sup>Scott, C.D. (1993). "*Bonos, Beneficios y Bienestar: A Study of Wages, Work and Welfare on Peruvian Sugar Plantations.*" In Abel, Chris and Lewis, Colin M. (Eds.) Welfare, Poverty and Development in Latin America. London: The Macmillan Press, p.161.

<sup>136</sup>Ibid., pp.326-333.

the disintegration of labour contracting<sup>137</sup>. First, as a result of population growth and the consequent abundance of labour, workers presented themselves at haciendas instead of being recruited by *engachadores*. Second, labour could more easily organise (due to its size) and demand improved working conditions. Lastly, the use of mechanical cutters reduced the demand for contracted workers<sup>138</sup>. Knight further observed that the decline of labour contracting led to a growing proportion of urban-residents who were hired to work in the fields<sup>139</sup>.

By reworking Ruth Dixon's research another explanation to the situation is offered by relating land tenure to the use of wage labour. Using regional landholding averages for 95 countries around 1970 Dixon discovered that where small plots (under 5 ha) predominated the use of wage-labour was low. The converse was also true<sup>140</sup>. Another factor observed in her study was market orientation, namely export-oriented crops correlated positively with the use of wage-labour<sup>141</sup>. Thus, the prevalence of wage-labour correlated negatively with the proportion of holdings under five hectares and positively with the value of exports<sup>142</sup>. In Dixon's study Latin America was classified as the region with the smallest relative share of small landholdings in the Third World. This also implied that wage labour was used more extensively. Corroborating her findings, the use of contracted labour would suggest the relative

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<sup>137</sup>Ibid., pp.333-337.

<sup>138</sup>Ibid., pp.333-335.

<sup>139</sup>Ibid., p.335.

<sup>140</sup>Dixon, Ruth (1983). "Land, Labour, and the Sex Composition of the Agricultural Labour Force: an International Comparison." Development and Change, 14(3), pp.350-351.

<sup>141</sup>Ibid., pp.355-356.

<sup>142</sup>Ibid., p.356.

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abundance of wage labour. Several things can occur in this scenario: a) because the labour market is large there is an over supply of labour, thus wages remain low. However since labour is seasonal, its availability may contract during the harvest. Or b) because the labour market is regionally segmented workers cannot effectively organise to campaign for higher wages and better working conditions<sup>143</sup>. The labour contract system explains both of these factors. Higher (short-term) wages must be offered to attract workers for temporary periods of work and, workers can not effectively organise and pressure for improved working conditions because they are few and transitory. Therefore the differences in the use of contracted labour could be due to these factors. After analysing the Colombian data different reasons for the use of contracted labour were discovered. They will be reviewed in part II.

Why did labourers become seasonal agricultural labourers? Brian Pollitt and Gary Hagelberg argued that migrant labour in Cuba, before the Revolution of 1959, was driven by the need to maximize income over a few months given limited opportunities for paid employment (they were peasants otherwise). In these circumstances men tended to highly mobile and work very hard when they got a job<sup>144</sup>. Peter Boomgaard, analysing Java between 1914 and 1940, also asserted a similar view.

. . . a sizeable proportion of casual labourers came there [cane harvests] with a target income in mind. They wanted to work off a debt, or needed a specific amount of money for one of the many life cycle ceremonies that Javanese custom prescribed<sup>145</sup>.

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<sup>143</sup>For a discussion of effective organized labour in cane see Scott, C.D. (1993), *op.cit.*, pp.149-174.

<sup>144</sup>Pollitt, Brian and Hagelberg, Gary B. (1992), *op.cit.*, p.5.

<sup>145</sup>Boomgaard, Peter (1988). "Treacherous Cane: The Java Sugar Industry Between 1914 and 1940." In Albert, Bill and Graves, Adrian (Eds.), The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.163.

This is consistent with other general studies on agricultural wage-labour. Analysts have concluded that seasonal labour survives because in many countries unskilled workers need to supplement their income. The Colombian case has elements of the above issues.

The explanations behind the shift to modern methods of labour recruitment were discussed above. Below the specific changes that affected labour will be described. Regional cultivation practices demonstrated that in most cases throughout the twentieth century manual cultivation and harvesting were utilized to a much greater extent than mechanised methods<sup>146</sup>. For example a task not improved with mechanisation was cane planting. Even when mechanised methods became available many planters still preferred to hire manual labour for planting because less seedlings were damaged and more care and control could be taken<sup>147</sup>. Moreover, disregarding capital costs, in many areas of the world fully mechanised harvests were unthinkable due to the difficulty of effectively harvesting uneven and rocky terrain. The Cuban experience demonstrated the enormous restructuring of harvest organisation necessary for efficient technological adaption. Administrative costs were high: a virtual reorganisation of the production process was needed in addition to capital for machinery purchase. This is not a question of replacing labour for more efficient mechanical practices; rather it was a problem of supplanting a highly

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<sup>146</sup>For example cane techniques in Thailand, India, Colombia, and the Dominican Republic. See Abbott, George C. (1990), *op.cit.*, table 2.4, pp.90-91.

<sup>147</sup>Interview with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department, Manuelita, Palmira, Colombia.

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sophisticated, organised manual process for a mechanical process of the same quality.

New techniques, such as care of cane seedlings and machinery operation resulted in increasingly stratified field and factory tasks. For example anti-virus and -fungal seed treatments demanded trained work force in contrast to the unskilled labour used for herbicide application. Increasing stratification in the work force was also observed in bananas. Its effect was that wages became progressively differentiated, often resulting in more temporary work and intensified rural conflict. This effect will be discussed further in bananas. Within sugarcane, differentiated wages resulted in higher wages for specialized tasks and signalled the development of a semi-skilled and skilled work force.

In conjunction with labour stratification, increased capital-intensity reduced labour demand per unit of output. Data from Jamaica, Puerto Rico, Guyana, and Peru and Jamaica during the 1950-1969 period demonstrate an absolute decline of labour in field and factory<sup>148</sup>. The most labour-intensive milling tasks during the first half of the century were mainly concentrated in the cane patio. In the patio a large labour force was initially demanded for cane movement, however, later in the period fully mechanised methods were introduced for this area of cane processing and the large teams of labour needed for the manoeuvre of cane became obsolete. This shows that increased technical levels led to decreased labour use. From the mill owners' view point, the initial switch from traditional to modern milling was beneficial because it allowed the relocation of factory workers into the field<sup>149</sup>.

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<sup>148</sup>See Hagelberg, G.B. (1974), *op.cit.*, tables 12,13,16, pp.121,122,125 (the period for Guyana is between 1949 and 1966); Scott, Chris (1982), *op.cit.*, p.324.

<sup>149</sup>Pérez López, Jorge (1991). *op.cit.*, pp.56-57.



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However, from the perspective of rural labour, it would be advantageous to construct several small mills (1000 tspa) throughout the countryside, as smaller mills demanded more labour per unit of output<sup>150</sup>. From a developmental perspective, both characteristics are disadvantageous to population-rich, capital-poor LDCs. The use of labour in commercial sugar production has declined, though in many countries where sugar is produced population remains large. Resources are being allocated inefficiently as mill owners receive incorrect signals because of their easier access to capital. Also, evidence points to more efficient field techniques which resulted in a decrease in total labour use.

The evidence presented above corroborated that small producers were displaced by modern mills. Nonetheless complete proletarianization did not occur as only seasonal work was available. The use of contracted cutters in certain regions in particular periods was open to debate. Scott maintained that it was a stage in the modernisation of the labour force, whereas Dixon's model would have attributed it to land usage structures. Lastly, the introduction of technical change resulted in

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<sup>150</sup>Lower labour-use can be seen clearly in this table:

**Table S1.2**  
Cost of Production and Level of Employment in Sugar Processing, 1975

Mill Output (tspa)	Average cost (US cents/tonne)	Employment	Employment per Output (Men/tspa)
50,000	34.4	1030	.0206
25,000	38.9	701	.0280
10,000	50.0	435	.0435
1,000	92.0	683	.6830

Source: Constructed from Forsyth, David (1977). "Appropriate Technology in Sugar Manufacturing." *World Development* 5(3), p.194.

tspa=tonnes of sugar per annum.

increased stratification and job specialization. Moreover, mill modernisation implied increased capital-intensity. This occurred in a period when many sugar producing regions experienced increased population growth. Therefore in most cases the effect of technical change on labour was reduced employment levels.

## CONCLUSION

Cane-sugar has been processed for thousands of years although only recently was production modernised. Traditional cane processing can be conducted on a small-scale and can be more readily compared with the 'democratic' potato. The virtues of *panela/gur/rapadura* are numerous. Foremost, traditional methods of cultivation and processing are labour intensive thereby stimulating rural labour markets and exchange in general.

The shift to modern milling methods resulted in far-reaching transformations throughout the production process. The most common trend being agroindustrial centralization due to milling economies of scale. Cultivation scale-bias was difficult to assess as the historical plantation structure, capital and technical scale-bias mask many of the changes that took place. Some analysts argued that the nature of cane resulted in large-scale cultivation. However this is difficult to sustain on the grounds that large-scale cultivation often persisted because of institutional, capital and technological bias. The increasing concentration of mill ownership in the twentieth century also resulted in a rise in independent suppliers. The general trend seemed to be an increase in large scale planters however in some regions farmers persisted. In other cases where land reform or other policies were implemented to favour

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independent cultivators small and medium growers emerged, not necessarily to the detriment of the industry. Thus the political economy often shaped the course of cane production.

The structure of international trade can be compared with banana as markets were not entirely free, in this case being controlled by sugar agreements. Moreover, access into agreements was dependent on political relationship. Since the birth of the trade, foreign agents were widely involved in production, exportation and refining which were also the initial forces in technology transfer. However, later in the period, in some countries, maturation was reached and cane became refined domestically.

The pace of technical changes was varied, and a general trend of technical adoption cannot be established. Two main catalysts impulsed change: varietal switch and field mechanisation. Mill modernisation did not always result in a concomitant change in field practices as many times more suppliers were contracted or cultivation was extended. Also, labour-intensive field practices could keep pace with milling demands. In contrast to what will be seen in banana, international markets did not have as much influence in the spread of field and factory techniques. The increased use of technology in the twentieth century often resulted in a decline of absolute levels of labour employed in the sector. However mechanisation did not entirely phase out labour as in some regions manual and mechanised techniques were used alongside one another. Instead of huge capital investments and farm reorganisation, manual methods were more attractive economically, especially when the imperfections of mechanised harvests were considered. The reasons behind technical change were

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economic, political and social. Although in most countries economic reasons were the least important and market, institutional and social factors were the deciding forces behind development or stagnation.

The population explosion of the twentieth century gave production a second wind as labour scarcity during the nineteenth century often made large-scale cultivation onerous. Methods to procure labour have changed tremendously from slavery to migrant labour to contracted labour finally to organised labour who demanded improved working condition. Scott affirms that these stages were indicative of modernisation. However perhaps the change is not linear as the unique characteristics of rural labour may result in different outcomes<sup>151</sup>. The road to proletarianization occurred in many countries, resulting in the formation of junkers or kulaks. Although the existence of kulaks in many parts appeared precarious as they faced discrimination in terms of capital- and technology-bias, nonetheless, their survival further demonstrates the ability of small producers to withstand adverse conditions.

Sugarcane modernisation has been very complex characterized by rich regional experiences. Colombia is not a traditional sugar producer as many of the countries reviewed in part 1. The effect of distinct political economies, both internally and externally, gave way to yet other routes to modernisation.

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<sup>151</sup>See Sugar Part II.

## **Part II: La Manuelita Sugar Mill**

This second part is based on data compiled from Manuelita sugar mill, one of the largest mills in Colombia, and official material. The story of sugarcane in the Cauca Valley<sup>1</sup> is not as turbulent as that of bananas nor as capital-scarce as potatoes, and provides an example of a gradual expansion and development. Problems related to potato or banana production such as inadequate infrastructure, rural unrest, violence, and lack of national capital and/or interests have not been present in the Cauca Valley. In addition, controversial issues such as the role of foreign investment, absorption of technological change and State intervention that have disrupted patterns of production in other parts of the world, have not disturbed the development of sugar production in Colombia<sup>2</sup>. The Cauca Valley is also distinct in another respect; as in Peru and Hawaii the climate permits year-round harvesting. Hence the agricultural work force is aseasonal, plant capacity is not determined by a seasonal peak, and cane seedlings can be bred and planted through the year. Moreover the push to modernise was not stimulated by external markets, and rather, entrance into sugar agreements was a result of high productivity levels.

The chapter will examine the evolution of sugar production in the Cauca Valley from 1936 to 1990. The analysis will centre around the same factors discussed in other chapters, namely institutions and markets, and crop-specific factors that influence land and labour use. Manuelita was selected as a case study for many reasons. First, cane-sugar growing on the estate dates back at least to the nineteenth century thus antecedents to transformations in the twentieth century can be reviewed. Secondly, it was and remains one of the largest mills in

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<sup>1</sup>When "Cauca Valley" is used in this thesis it refers to the geographic Cauca River Valley which is located in the Departments of Valle del Cauca, Cauca and Risaralda. When referring to the departments within the region, Cauca, Valle del Cauca, and Risaralda will be used; see Map S2.1.

<sup>2</sup>See Sugar Part I.

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the country and has pioneered technological advances: it established the first steam-driven mill in 1901 and the first centrifugal in 1953. Thirdly, and of critical importance, the archives survive although they have not been used by other scholars. Nevertheless, while accessible, the archives are unorganized. The data consulted included mill records, payrolls, account books, cadastral surveys, field department reports, private records of company directors, and annual submissions to government. In addition interviews were conducted with current staff.

### MARKETS: domestic demand and the shift to modern methods

As in other areas of the world small-scale methods of cane conversion were forerunners of large-scale agroindustry. Before discussing the development of large-scale mills, the evolution of cane production and milling will be analysed, as they provide insights to later transformations. The circumstances under which sugar production developed in the Cauca Valley will be examined.

During the first half of this century cane was processed primarily for internal consumption. Processed sugar, or rather *panela*, was widely consumed<sup>3</sup>. *Panela* was a traditional cane product akin to Indian *Gur* and Brazilian *Raspado*. Because *panela* was easily manufactured and transported, it was produced on a small-scale throughout the country for sale in regional markets. *Panela* experienced significant changes over time in terms of location of production, labour availability, and access to land and markets. Although an inferior good, total production has remained remarkably bouyant due to the physical growth

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<sup>3</sup>See Table S2.1.

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of the market despite competition from refined sugar<sup>4</sup>. Panela continues to make an important contribution to the Colombian economy as an employer of rural labour (panela has employed roughly one-third of rural work force since 1960) and a food staple. Nevertheless competition from sugar has brought about a number of changes. Some panela producers were able to increase their scale of operations, substituting large-scale mills for *trapiches*. For example, Alfredo Posada who established the El Arado panela mill in 1929 and later transformed it into the Ingenio Maria Luisa<sup>5</sup>. Some producers became suppliers of raw cane to modern mills: many relocated to different regions. Entrepreneurial responses by panela producers to competition from modern sugar mills had an impact on patterns of land ownership and also on the dynamics of sugar expansion itself.

Though there is little quantitative data available prior to the 1950s, qualitative evidence shows that panela and other sugarcane byproducts such as *chicha*, *guarapo* and *aguardiente* were important elements of the Colombian diet in the nineteenth and early twentieth centuries<sup>6</sup>. Even as late as 1954 average consumption of panela was 27 kg. per annum (Table S2.1)<sup>7</sup>. By 1970 per capita consumption had increased to 30 kg. per annum.

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<sup>4</sup>See Table S2.2

<sup>5</sup>Rojas, José Maria (1983). *Sociedad y Economía en el Valle del Cauca: Empresarios y Tecnología en la Formación del Sector Azucarero en Colombia, 1860-1980*. Bogotá: Banco Popular, p.88.

<sup>6</sup>Melo, Jorge Orlando (1991). "Las Vicistudes del Modelo Liberal" In Ocampo, Jose Antonneio (Ed.), (1991). *Historia Económica de Colombia*. Bogotá: Siglo Veintiuno Editores, p.167.

**Table S2.1**  
Per Capita Panela and Sugar Consumption  
in Seven Colombian Cities 1953, 1970 and 1984-5 (Kg/year)

Year	1953	1970	1984-5	Growth Rate during 53/70	Growth Rate during 70/85
Panela	27	30	30	.5%	0%
Sugar	10	24	31	5.0%	1.8%

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During the same period processed sugar consumption rose from 10 kg. per capita per annum in 1955 to 24 kg. in 1970. By 1984/5 panela and sugar consumption were about equal at 30 and 31 kg. per capita respectively. Five reasons account for the sustained importance of panela consumption despite the growing preference for sugar. First, the modern sugarcane industry could not meet internal demand. Second, employing locally available technology, panela was cheap to produce. Third, poor inter-regional communication tended to protect local producers of panela from centrally-produced refined sugar: panela was easier to transport and store than sugar. Fourth, rural consumers had a strong preference for the traditional product. Last, panela was an important staple used in traditional recipes<sup>8</sup>. Increased sugar consumption can be attributed to population growth and urbanization (city dwellers consume a higher proportion of sugar) and to the development of a modern food processing industry which used sugar as a sweetener and preservative<sup>9</sup>. Although panela may be considered an inferior good, many consumers still see sugar and panela as substitutes. Therefore price differentials must be taken into account. When average annual prices of the two commodities are plotted, a close inverse relationship is seen to exist throughout the 1936-1988 period. However panela prices are highly volatile as, unlike

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Source: Rudas, Guillermo (1990). "Estudio General de la Agroindustria Pañalera en Colombia." Bogotá: Pontificia Universidad Javeriana, p.33; Calculated from DANE Statistics.

<sup>8</sup>Sociedad de Agricultores y Ganaderos (1984). *El Valle del Cauca: Tierras y Gentes*, Cali: Sociedad de Agricultores y Ganaderos, p.73. Scientific research proves that panela is highly nutritious, containing several vitamins and minerals. Interviews conducted by Rudas in the late 1980s confirmed that the results of this research were widely known: 93.8% of Rudas' respondents stated that they knew that panela was more nutritious than sugar. See Rudas, Guillermo (1990, *op.cit.*, p.45.

<sup>9</sup>See Fernández Riva, Javier and Motta Tello, María Teresa (1988). "Agroindustria y Desarrollo Agropecuario." *Revista Nacional de Agricultura*, No. 882, pp.112-146.



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sugar, production is irregular being determined by labour availability<sup>10</sup>. Panela tends to be produced during the 'dead-time' of coffee production when labour is available<sup>11</sup>. Annual price data disguise seasonal fluctuations making an analysis of the effect panela prices have on panela and sugar production difficult. Yet over time there were important changes in the location and scale of panela production. Rapid population growth and an undersupply of processed sugar, created space in the market place for the traditional product as the data on per capita consumption in note seven show.

Three types of change in the location and structure of panela production may be observed. In some cases modern sugar mills moved into and out of panela production in response to sugar/panela price differentials. In others, a few traditional farmers increased their scale of operations, displacing small- and medium-scale competitors. In yet others, small and medium producers survived by relocating to frontier regions. Contrary to the popular assumption that panela producers were mainly small- and medium-sized cultivators, tables S2.2 and S2.3 demonstrate that large-scale producers became increasingly important. First, to observe table S2.2.

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<sup>10</sup>Junguito, Roberto, et.al. (1975). Las Industrias Azucareras y Pañaleras en Colombia. Bogotá: FEDESARROLLO, p.191; Rudas, Guillermo (1990), op.cit., p.4.

<sup>11</sup>Rudas, Guillermo (1990), op.cit., pp.4-5.

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**Table S2.2**  
Principal Regions of  
Cane-Panela Cultivation, 1959/1986.

Region*	Area, 1959(ha)	Area, 1986(ha)	% variation 1959/1986
Nariño	14,127	26,000	84
Montaña Nororiental	7,295	21,320	192
Rionegro	8,102	19,045	135
Amalfi	16,269	7,437	-54
Cauca Valley	28,200	4,897	-83
Andes	6,694	2,449	-63
Magdalena Medio Norte	1,332	2,250	69
Lengupa	3,127	1,600	-49
Támesis	7,503	1,437	-80

Source: Constructed from Rudas, Guillermo (1990). "Estudio General de la Agroindustria Pañalera en Colombia." Bogotá: Pontificia Universidad Javeriana, p.21. Adapted from Censo Agropecuario (1959), Bogotá: DANE; Estadísticas del Sector Agropecuario. Consensos Municipales, 1986 (1987), Bogotá: Ministerio de Agricultura and DANE; Anuario Estadístico del Sector Agropecuario, 1986, 1987 (1987 and 1988), Bogotá: Ministerio de Agricultura; Anuario Estadístico Agropecuario, 1988, 1989 (1989 and 1990), Bogotá: Ministerio de Agricultura; Encuesta Agropecuaria Piloto del Valle del Cauca, 1986 (1988), Bogotá: Ministerio de Agricultura; Estadísticas del Sector Agropecuario, Consensos Municipales, 1986 (1988), (Boyacá, Santander, & Cundinamarca), Bogotá: Ministerio de Agricultura.

\*Due to different methods of data gathering the regions in the 1959 census and 1986 survey are not identical. But every effort has been made to ensure accuracy.

Table S2.2 refers to cane land exclusively devoted to panela through the period in the main producing areas<sup>12</sup>. In 1959 the region with the largest amount of cane-panela land was the Cauca Valley with 28,200 hectares or 30% of the total. By 1986 this dropped to 4,897 hectares or 6%. As can be seen, the area under cane-panela in the Cauca Valley decreased by 83% between 1959 and 1986. Other regions which experienced a decrease in absolute and relative importance were Andes, Tamesis, and Amalfi (Antioquia) and Lengupa (Boyacá). Regions that experienced a significant fall in panela cultivation were those which

<sup>12</sup>In 1959 a total of 304,743 hectares was devoted to the cultivation of cane-panela. Of this total approximately 100,000 hectares was located in the principal regions which were responsible for about 90% of market output; Rudas, Guillermo (1990), *op.cit.*, pp. 21, 23.

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possessed fertile agricultural land and where producers responded rapidly to changes in the market, particularly Antioquia and the Cauca Valley. Thus it appears that panela producers in these areas either changed their crop composition, shifting into coffee and domestic staples, or were displaced to other regions, of apparently lower quality land. Larger changes in Antioquia or Boyacá are beyond the scope of the thesis which is principally concerned with the developments in the Cauca Valley. Generally, increases in panela hectareage tended to occur in northeastern and eastern Colombia, marginal areas of lower quality land.

**Table S2.3**

Panela: Output Evolution for the Most Dynamic Regions, 1959, 1986 (tonnes/year).

Region*	1959 (Dept.)	% of total production in 1959	1986 (Region)	% of total production in 1986	Variation 59/86	Annual Growth Rate
Cauca Valley	3,941	20	15,881	31	303.0	5.3
River Suarez Banks	3,678	19	12,009	24	225.7	4.5
Frontino	3,244	17	9,452	18	191.4	4.0
Andes	3,244	17	7,020	14	116.4	2.9
Nariño	1,074	5	5,077	10	372.6	5.9
N.E. Mountains	4,494	23	1,577	3	-64.9	-3.8

Source: Constructed from Rudas, Guillermo (1990), *op.cit.*, p.23 and based on calculations from information from table S2.2.

Note: %s may not add to 100 due to rounding.

Due to different methods of data gathering the regions in the 1959 census and 1986 survey are not identical. But every effort has been made to ensure accuracy.

Table S2.3 refers to panela output and contains data on the most dynamic regions.

Paradoxically it shows that panela output increased in all areas. Were cane-panela producers the sole suppliers of panela? Obviously not. Increased consumption of sugar and panela was driven by population growth and the evidence seems to suggest that modern mills in the

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Cauca Valley elaborated panela from time to time. Therefore it proves that modern mills often competed with or displaced small producers. Table S2.2 shows that in 1959 the Cauca Valley had the largest amount of land under cane-panela and table S2.3 corroborates that it was the largest producer of panela with 20% of total output. However, by 1986 the share of output increased to 31% while cane-panela land decreased massively, falling by 83% since 1959. The apparent contradiction in terms of the contraction of cane-panela land and the growth of panela output can be explained by sugar mills responding to seasonal price differentials, switching to panela some cane that had been earmarked for refining. A recent study by Oscar Delgado for 1981 indicated that 42.7% of panela was produced by agribusinesses<sup>13</sup>. Beechert's research on Australia shows that the emergence of capital-intensive sugar refining led to the consolidation of large-scale units and discouraged small-scale production<sup>14</sup>. If all large-scale mills are located in the Cauca Valley it can be assumed that panela produced in other regions was elaborated by small- to medium-sized producers, some of whom might have been displaced from the Valley. As tables S2.2 and S2.3 also demonstrate, in Departments such as Nariño there was a substantial increase in hectares planted with panela (hectarage grew by 84% between 1959 and 1986) while the share of panela output only increased slightly from five to ten percent. This would seem to indicate that less-efficient traditional methods of production prevailed in these regions. In Antioquia

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<sup>13</sup>Delgado, Oscar (1985). "La Estructura Agraria en Colombia." In Bejarano, Jesús Antonneio (Ed.), Lecturas Sobre Economía Colombia Siglo XX. Bogotá: Procultura, p.49. Delgado defines 'agribusiness' as capital-intensive units engaged in the production, processing and distribution of farm products.

<sup>14</sup>Beechert, Edward (1988). "Technology and the Plantation Labour Supply: The Case of Queensland, Hawaii, Louisiana and Cuba." In Albert, Bill and Graves, Adrian (Eds.). The World Sugar Economy in War and Depression, 1914-1940. London: Routledge, p.138. For further discussion on the impact of technology change on the scale of production see Sugar Part I.

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(Amalfi, Andes, and Támesis) cane-panela hectarage declined absolutely, yet at the same time absolute output increased (Frontino and Andes). A probable explanation is that cane-panela was intercropped with coffee and domestic staples and that census enumerators had failed to classify the land correctly. Another explanation for the discrepancy between the fall in cultivated area and the growth in output may be that productivity levels were higher in central parts of the country where producers had access to better land, credit and inputs (e.g. chemical inputs and seedlings). This would support the analysis in part I that capital-bias was prevalent in modernised sectors, to the detriment of marginalised small producers. Also, large scale cultivation resulted in general changes in production structures with plantations obtaining the highest quality land and initiating a process where small producers were forced to relocate to less desirable areas.

With reference to the Cauca Valley, tables S2.2 and S2.3 demonstrate that within 27 years, the region was transformed from the area with the largest share of cane-panela land and output to the status of marginal cultivator but most important producer. However does this mean, as has been suggested above, that the expansion of modern sugar mills in the valley drove out small- and medium-sized panaela producers? Table S2.4 signals that for an earlier period (1901-1952) this was the case.

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**Table S2.4**  
Crops Displaced by Cane-Sugar between 1901 and 1952  
in the Cauca Valley

	Land Displaced , 1901- 1922	%	Land Displaced, 1922-1952	%	Total Area Displaced, 1901-1952	%
Land Use	Ha.	%	Ha.	%	Ha.	%
Pasture	8,114	67.9	21,291	70.7	29,406	69.9
Forests and Stubble	384	3.2	4,048	13.4	4,432	10.5
Cane-panela	1,101	9.2	2,271	7.6	3,376	8.0
Rice	54	.5	506	1.8	560	1.3
Cocoa	4,211	19.2	371	1.2	2,662	3.6
Others	-	-	1,620	5.3	1,620	3.8
Total	11,945	100	30,111	100	42,056	100

Source: Mancini, Simeone (1954), "Tenencia y Uso de la Tierra por la Industria Azucarera Colombiana." *Acta Agronómica*, Vol. 4, Palmira: Facultad de Agronomía de Palmira.

Table S2.4 shows that in the main (between 1901 and 1952) land under sugar grew at the expense of pasture and forests. This is not surprising given the land extensive nature of cattle ranching and the felling of timber on virgin land. However, cane-panela was the most important commodity displaced by sugar during 1901-1952. A total of 3,376 hectares of cane land was shifted into cane-sugar cultivation for large-scale processing. If this land was mainly absorbed by modern cane-sugar producers this would imply that 1,125 families were proletarianized<sup>15</sup>. Also extrapolating from table S2.4 it is plausible to argue that panela displacement continued after 1952 and that, as indicated above, modern sugar production resulted in the expulsion of many small cane growers. Furthermore the data in tables S2.2, S2.3 and S2.4 also suggest a high degree of mobility in rural populations and that the

<sup>15</sup> Assuming that most cane-panela producers farmed three-hectare plots and given that 3,376 hectares of cane land were displaced this results in 1,125 households. The assumption of three-hectare plots is based on table S2.9, that evidences that the majority of plots in the Cauca Valley were comprised of less than 5 hectares in 1960, 1970/71, 1977/78, and 1986.

expansion of modern sugar production had a substantial impact on land markets and rural institutions.

INSTITUTIONS and LAND USAGE: development of organisations, evolution of land tenure and formal institutions

In this section changes in land usage patterns will be further discussed. First, the development of informal institutions will be analysed. Secondly, early Manuelita land usage data will be examined. Thirdly, larger Cauca Valley trends will be discussed for the 1936-1960 period. Fourthly, the evolution of cane contracts will be mapped. Fifthly, later Manuelita land usage trends, particularly the increased in contractual cane will be explored. Lastly the formation of formal institutions will be outlined.

Historically, large-scale cane growing in the Cauca Valley was often combined with cattle ranching, a land extensive activity. These processes were complementary in that cane bagasse served as cattle feed. Although little data is available about land usage in the late nineteenth century, Germán Colmenares argues that if haciendas existed as productive enterprises it was only as an activity subsidiary to mining, providing draught animals and food staples for the mining camps. Labour scarcity also precluded the existence of large-scale sugar plantations<sup>16</sup>. However during the twentieth century, stagnation in other sectors, coupled with increased demand for sugar, encouraged capitalists to develop cane. Growth in domestic demand after the 1930s coupled with investment in infrastructure also facilitated the development of inter-regional trade in sugar. In addition, between 1950 and 1970

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<sup>16</sup>Colmenares, Germán (1975). Terratenientes, Mineros Y Comerciantes. Cali: Siglo Veintiuno Editores, p.130.

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domestic sugar prices doubled in real terms, further fostering market production. Given these circumstances it is likely that *hacendados* intensified cane cultivation at the expense of ranching<sup>17</sup>. However, transformations in the Cauca Valley were more complex<sup>18</sup>. Mill owners were not drawn exclusively from the traditional landed class. Two types of sugar capitalists have been observed by José María Rojas, *capitanes de hacienda* and *capitanes de industria*<sup>19</sup>. Responding to market circumstances some *hacendados* switched pasture and cane-panela land to cane-sugar and founded large-scale mills. Another type of mill owner derived from urban capitalists who diversified into sugar production, these were the *capitanes de industria*.

Thus the founders of the sugarcane industry in the Cauca Valley were different from the mixed-cropping small commodity producers described in part I. They were also different from independent large-scale cane growers in other areas in the world because many were mill owners. It must also be emphasized that most *capitanes de industria* who initially entered the sugar industry as mill owners, eventually acquired land<sup>20</sup>. As Cauca Valley sugar processors grew most of their cane, the conflict between cane growers and processors present in other parts of the world was more muted in Colombia<sup>21</sup>.

Moreover, given their status *capitanes de industria* and *hacienda* experienced little

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<sup>17</sup>Vásquez, Edgar (1990). "Historia del Desarrollo Económico y Urbano en Cali." Boletín Socioeconómico, No.20, p.6.

<sup>18</sup>See Collins, Charles David (1985). "Formación de un Sector de Clase Social: la Burguesía Azucarera en el Valle del Cauca Durante los Años Treinta y Cuarenta." Boletín Socio-Económico, Nos. 14-15, pp.35-90; Rojas, José María (1983), op.cit.

<sup>19</sup>Rojas, José María (1983), op.cit., p.91, (author's translation).

<sup>20</sup>See below.

<sup>21</sup>Rojas, Jose María (1985). "Sobre el Papel de los Empresarios en la Formación del Sector Azucarero." Boletín Socio-Económico, Nos. 14-15, pp.7-34, pp.7-45.



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difficulty obtaining capital unlike small cane-panela growers. As entrepreneurial large landowners they rapidly acquired new technology. They were also well represented within the Colombian political system and obtained preferential treatment in terms of access to credit and import licenses. The benefits conferred by this status are illustrated by the cases of two Cauca Valley mill owners who were able to mobilize diplomatic support in their efforts to procure modern equipment during a time of international crisis,

. . .the Gómez Sierra family are among Colombia's wealthiest landowners and are highly responsible and influential, could lend the weight of their support for obtaining the permit. It may be recalled that the Gómez Sierra sugar factory, the Ingenio San José near Palmira, Valle was equipped with British machinery delivered during the war, and experience with this machinery has been so satisfactory that the family are anxious to obtain, by preference, British equipment where possible<sup>22</sup>.

OR

It now happens that the sugar factory above mentioned <La Esperanza> urgently needs to receive these spare parts as soon as possible, seeing that the factory is half paralysed by lack of them; and that, in order to send them rapidly by aeroplane, a priority is required, which it is within the competence of His Majesty's Government to grant<sup>23</sup>.

This supports the argument maintained by Rojas and Charles David Collins that these *capitanes de hacienda* and *industria* had connections with the government which facilitated the procurement of machinery<sup>24</sup>.

The typologies of sugar capitalists established by Rojas and Collins provide a useful starting point for a more detailed analysis of the evolution of the agroindustrial complex in the Cauca Valley although it is difficult to fit all individuals within their classification as the case of Ingenio Manuelita discussed below proves this case. The Cauca Valley cane complex originated from three large-scale mills founded during the first three decades of the century:

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<sup>22</sup>PRO, Foreign Office (10 Oct. 1945). "Quarry machinery for Colombian family," FO371.44952, Registry Number AS5688/198/11.

<sup>23</sup>PRO, Foreign Office (4 Aug. 1945). "Air Priority for Pistonne Rings ordered by La Esperanza Sugar Factory," [signed J. Jaramillo Arango, Colombian Ambassador to the UK]. FO371.44955, Registry Number AS4118/610/11.

<sup>24</sup>Collins, Charles David (1985), *op.cit.*, pp.35-90; Rojas, Jose María (1985), *op.cit.*, pp.7-34.

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Manuelita, Riopaila and Providencia<sup>25</sup>. Although the number of mills in operation between 1900 and 1990 fluctuated between 3 and 21, as can be seen in table S2.5, most modern mills were founded between the 1930s and 1950s. In 1990 there were thirteen mills in operation<sup>26</sup>.

**Table S2.5**  
Dates of Foundation and Closure of Modern Mills in the Cauca Valley, 1900-1990

Year	Sugar Mills Founded/(Closed)
1900-19	Manuelita*
1920-29	Riopaila*, Providencia*
1930-39	Bengala (1980), Mayaguez*, María Luisa (1968), La Industria (1976)
1940-49	Pichichí*, Central Oriente (1980), Balsilla (1985), San Carlos*, Papayal*, Central Castilla*, El Porvenir (1975)
1950-59	La Carmelita*, San Fernando (1969), Central Tumaco*, La Cabaña*, Meléndez (1976)
1960-69	Naranjo (1981), Cauca*
1970-79	Risaralda*
1980-90	No mills established

Source: Constructed from Orozco, Guillermo A. (1984). La Agroindustria Azucarera Colombiana, 1960-1983. Cali: ASOCAÑA, p.39; Sociedad de Agricultores y Ganaderos (1984), op.cit., p.62; Knight, Rolf (1972). Sugar Plantations and Labor Patterns in the Cauca Valley, Colombia. Toronto: University of Toronto Anthropological Series Number 12, p.38; ASOCAÑA (1992). Aspectos Generales del Sector Azucarero, 1990-1991. Cali: ASOCAÑA.

\*Sugar mills in operation in 1990.

(date)=year in which sugar mill closed.

The table also shows the volatility of the industry. For example of the fourteen mills established between 1930 and 1960 only seven were still in operation in 1990.

Despite the fluctuation in the number of firms in operation, table S2.6 proves that the industry was dynamic. Land under cane grew almost continuously from 1915 to 1990. Growth was particularly intense in the late 1930s and the 1950s. A comparison between tables S2.5 and S2.6 confirms that there was a close correlation between the growth in the

<sup>25</sup>Orozco, Guillermo A. (1984). La Agroindustria Azucarera Colombiana, 1960-1983. Cali: ASOCAÑA, p.35.

<sup>26</sup>Aspectos Generales del Sector Azucarero, 1990-1991. (1992) Cali: ASOCAÑA, p.13.

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number of mills and the area of land under cane. From the arguments advanced by Rojas and Collins it is logical to assume that most mills farmed their own land. Moreover table S2.11 shows that until the 1960s most cane was cultivated on mill-owned land. Only after the 1960s did mills begin to buy in cane from independent growers. This would appear to suggest that most mills set up before 1960 had access to sufficient land. This argument will be expanded below.

**Table S2.6**  
Land Under Cane Cultivation in the Cauca Valley, 1915-1990

Year	Hectares	% variation from year to year
1915	7,958	
1937	14,341	80
1941	29,398	105
1951	36,926	26
1952	37,495	2
1960	61,600	64
1965	70,363	14
1970	91,982	31
1975	118,450	29
1980	133,187	12
1985	131,557	-20
1990	143,435	9

Source: Adapted from Vásquez, Edgar (1990). "Historia del Desarrollo Económico y Urbano en Cali." Boletín Socioeconómico, No.20, p.5 based on: Anuario Estadístico, 1912 (1941). Cali: Secretaría de Agricultura y Fomento del Valle; Censo Agropecuario 1950 (1951), Bogotá: Ministerio de Agricultura; Anuario Estadística del Sector Agropecuario 1990, Bogotá: Ministerio de Agricultura. ASOCAÑA, 1990.

According to Urrea's study of the Cauca Valley in 1960, the sugar agroindustry was composed of 16 sugar mills which owned a total of 133,187 hectares. By 1980 the number of sugar mills declined to 14 with 135,600 hectares<sup>27</sup>. If Urrea's figures are compared with

<sup>27</sup>Urrea G., Fernando (1987). "Competencia y Cambio Técnico en el Sector Azucarero en la Década del 80." Cuadernos de Agroindustria y Economía Rural. No.19, p.11.

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those in table S2.6 it can be seen that only a small proportion of cane was cultivated on land not owned by mills. The data above would appear to confirm that, at least until the 1960s, most mills owned sufficient land for cane production, probably land was under-utilized before the 1960s. This also suggests that rapid growth in production during the decade soon exhausted available stocks. Thereafter increased mill output could only be sustained by buying in cane. Urrea's statistics also corroborates that the number of mills did not increase significantly during the 1960-1980 period and that not all mill-owned land was used for cane growing until the end of the period. This would again indicate that most cane producers began as land-extensive operations that gradually devoted a larger and larger area of the estate to cane. Only when all the available land was planted with cane was there a trend towards more capital-intensive methods of production and a tendency to purchase cane from independent growers. Though as Rojas described two different types of mill owner (*capitán de hacienda* and *capitán de industria*) after the decision to establish a mill strategies for the agribusiness converged.

As has been proved, after the 1930s cane-sugar cultivation rapidly displaced cattle ranching. It has also been demonstrated that there were sound economic reasons for producing cane. However was there an opportunity cost and were there alternatives to specializing in sugar? Why did these entrepreneurs decide to grow cane and not other important, highly-demanded commodities such as cotton, wheat, or rice, that do not require such high capital investments for processing and that are suitable to the biological conditions in the Cauca Valley?<sup>28</sup>

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<sup>28</sup>The Cauca Valley has the unique characteristic that tropical, citrus, and temperate crops can all be cultivated. See Holt, Pat M. (1964). Colombia Today- And Tomorrow. New York: Praeger Publishers, p.168.

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One explanation is attempts at agrarian reform. The land reform bills passed in 1936 and 1961 were aimed at appropriating land that was not being economically exploited<sup>29</sup>. Most analysts agree that the Colombian land reform bills were effective in influencing production decisions and firming land ownership, but did little to redistribute land. One way landowners could demonstrate that their land was being exploited for economic purposes was to plant an extensive crop such as cane which could be combined with cattle ranching in order to spread risks. This type of land extensive activity that distributed risks was more difficult with cotton or wheat. Though the argument can be made that there were many possibilities for market growth for sugar, the same reasoning can be used for wheat or cotton. At this time Colombia was not self-sufficient in the production of many foodstuffs and imported sugar, wheat, and rice<sup>30</sup>. Furthermore the export potential for sugar was limited. Processing methods were not competitive and international sugar agreements restricted the entrance of new exporting countries<sup>31</sup>. Only after the 1959 Revolution when Cuba lost its US sugar quota was it possible for Colombia to gain entry to the US market. Thus it appears that landowners resorted to cane growing in order to secure land rights.

A second explanation for the preference for sugar could be flexible land ownership patterns during the late nineteenth century and the late 1940s to early 1960s, the epoch of

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<sup>29</sup>A review of the agrarian reform policies is not within the scope of this thesis. For information on the 1936 policy see Machado, Absalón (1986). *Políticas Agrarias en Colombia 1900-1960*. Bogotá: Universidad Nacional de Colombia; Fajardo, Darío (1983). *Haciendas, Campesinos y Políticas Agrarias en Colombia, 1920-1980*. Bogotá; Gaitán, Gloria (1976). *Colombia: la Lucha por la Tierra en la Década del Treinta*, Bogotá; Moncayo, Victor (1975). "La Ley al Problema Agrario en Colombia." *Revista Ideología y Sociedad* No.14-15; Tirado Alvaro (1981). *Aspectos Políticos del Primer Gobierno de Alfonso López Pumarejo*. Bogotá: Siglo Veintiuno Editores; Hirschman, Albert O. (1963). *Journeys Toward Progress*. New York: The Twentieth Century Fund. For more sources on the 1961 agrarian reform see Banana Part II.

<sup>30</sup>Rojas, José Maria, (1983), *op.cit.*, p.101.

<sup>31</sup>See Sugar Part I.

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*la violencia*<sup>32</sup>. The Cauca Valley in the nineteenth century has been described by some historians as an area of large landed estates. This view has been challenged by Rolf Knight<sup>33</sup>. Knight contends that because of constant fighting and wars during the last quarter of the nineteenth century, there was much room for entrepreneurial enterprise and land acquisition<sup>34</sup>. Although violence continued into the twentieth century, the nature and origins of conflict became more complex. From the late 1940s to the early 1960s, a period when the majority of mills were established, political instability and rural-rural and rural-urban migration intensified<sup>35</sup>. For Salomón Kalmanovitz this flight from rural conflict in the later period probably led to a concentration of agricultural units: rural areas were less attractive and small producers pulled out or were expelled<sup>36</sup>. Dale Adams reverses causality, arguing that the growth of large-scale, land extensive methods of production placed pressure on small producers who were unable to defend their properties and led to migration and violence<sup>37</sup>.

Thus, changing land ownership patterns of the late nineteenth century and mid-twentieth century allowed *capitanes de industria* to acquire more land and *capitanes de hacienda* to further consolidate holdings. Moreover, this situation of intense rural out-migration and changing land usage patterns influenced mill owner's decisions to refrain from

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<sup>32</sup>There is an extensive body of literature on violence in Colombia. Two sources which provide an excellent introduction are: Ocquist, Paul (1980). Violence, Conflict and Politics in Colombia. Boulder: Academic Press, particularly chapters 1,4 and 6; Sánchez, Gonzalo (1991). Guerra y Política en la Sociedad Colombiana. Bogotá: El Ancora Editores.

<sup>33</sup>See Melo, Jorge Orlando (1991), op.cit., Fals Borda, Orlando

<sup>34</sup>Knight, Rolf (1972). Sugar Plantations and Labor Patterns in the Cauca Valley, Colombia. Toronto: University of Toronto Anthropological Series Number 12, p.32.

<sup>35</sup>Adams, Dale (1969). "Rural Migration in Agricultural Development in Colombia." Economic Development and Cultural Change 17(4), pp.527-539.

<sup>36</sup>Kalmanovitz, Salomón (1988). Economía y Nación. Bogotá: Siglo Veintiuno Editores, pp.397-399.

<sup>37</sup>Adams, Dale (1969), op.cit., p.528.

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contracting cane suppliers. Because small- and medium-sized producers found it difficult to defend their plot in times of rural unrest and violence (i.e. they did not have the resources to hire guards, etc.) mill owners preferred to grow their own cane<sup>38</sup>. Hence, this can explain why independent cultivators were used less in Colombia than in other regions of the world. It also demonstrates other forms of production-biases which accrue to large units. Manuelita provides an example of the importance of informal organisations that existed and enabled easier access to land during the last half of the nineteenth century and the first half of the twentieth.

The origin of the Manuelita estate can be traced to Spanish Colonial times. Until 1767, when it was sold to the Jesuits, the estate was crown land-- an *Hacienda Real*<sup>39</sup>. By 1799, 127 cane mills (*trapiches*) were in operation. Subsequently, the hacienda passed to Pedro González de la Penilla and was later sold by an heir to Mariano Becerra Caravajal. He sold the land to Jorge Enrique Isaacs who bequeathed the debt-ridden hacienda to Santiago Eder. Eder, the founder of Manuelita, was a Russian-US immigrant who had close ties to the USA. By the end of the 1860s Eder owned 1000 hectares of land cultivated with cane<sup>40</sup>. Eder can be described as a entrepreneur who set up the first modern *trapiche* in Colombia<sup>41</sup>. Later his family was to be the first to introduce steam-driven milling in the

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<sup>38</sup>See Ocquist, Paul (1980), *op.cit.*; Kalmanovitz, Salomon (1978). "Capitalist Development in the Colombian Countryside." In Arrubla, Mario *et.al.* (Eds.), *Colombia Hoy*. Bogotá: Siglo Veintiuno Editores. More discussed below on methods of cane procurement.

<sup>39</sup>Sociedad de Agricultores y Ganaderos (1984), *op.cit.*, p.69, citing Cordoba Zuloaga.

<sup>40</sup>Fals Borda, Orlando (1982). *Historia de la Cuestión Agraria en Colombia*. Bogotá: Carlos Valencia Editores, p.98. For a history of Manuelita see Eder, Phanor James (1981). *El Fundador Santiago M. Eder*. Bogotá: Publicismo y Ediciones.

<sup>41</sup>Rojas, Jose Maria (1984), *op.cit.*; Collins, Charles (1984), *op.cit.*, Ocampo, Jose Antonio, *op.cit.*

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Cauca Valley in 1903<sup>42</sup>.

One of Eder's main asset was his status as a "foreigner". He was able to profit from the informal institutions of Colombian society. Namely, throughout the nineteenth century Colombia was plagued with Civil Wars and land was transferred over to the temporary winner; a common expression of the time was: 'he who lost the war, lost his hacienda' (*quien perdía la guerra, perdía la hacienda*)<sup>43</sup>. Losses were related to political party loyalty which was highly correlated to family lineage, therefore foreigners were the only landowners who escaped expropriation. This enabled Eder to start his agricultural enterprise in the middle of the nineteenth century and maintain the land throughout the war period.

According to Knight:

While bands of armed irregulars occasionally penetrated the plantation boundaries and some military commanders attempted to draft peons on Manuelita, the plantation and its workers seem to have been relatively uninvolved in the fighting<sup>44</sup>.

He was able to accumulate--and hold--land because he was a foreigner. National and international business contacts enabled him to secure the latest mill machinery<sup>45</sup>.

Similar to other enterprises, Manuelita at this time was devoted to cattle ranching, coffee and tobacco, as well as cane growing. An example of this diversity is provided by

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<sup>42</sup>Borrero, Hernán (1984). "El Azúcar en Colombia." In Valle del Cauca: Tierras y Gentes, Cali: Sociedad de Agricultores de Colombia, p.79.

<sup>43</sup>Rojas, José María (1983), op.cit., p.17.

<sup>44</sup>Knight, Rolf (1972), op.cit., p.33.

<sup>45</sup>Rojas, José Maria (1983). op.cit., p.18.



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the Manuelita census of 1918:

**Table S2.7**  
Manuelita Land Use in 1918

Land Use	Acres	%
Sugarcane	1003.3	48.9
Improved Pasture	437.6	21.3
Natural Pasture	168.5	8.2
Coffee Plots	51.5	2.5
Woodland	337.3	16.5
Worker's Camp ( <i>Campamento</i> )*	36.3	1.8
Factory and Yard	15.8	.8
Total	2050	100

Source: Constructed from Knight, Rolf (1972), *op.cit.*, pp.36-38.

\**Campamento* consists of five barracks capable of housing close to 600 men, 31 family houses for administrative staff and mayordomos, 12-room house housing single clerical staff and 3 storehouses and a company store.

Almost a third of the land was under pasture and another 16.5% consisted of woodland. However, at 2,050 hectares, land held in 1918 represented only 25% of the size of the property in 1990. This indicates that a great deal of land was acquired in the twentieth century, particularly in the period before the twentieth century sugar "boom"<sup>46</sup>. Therefore, land acquired at the end of the nineteenth century was not significant in contrast to the estates in Brazil and the Dominican Republic which were described as experiencing a process of modernisation without change.

Prior to the establishment of Manuelita S.A. the enterprise was officially registered in the USA as the Cauca Valley Agricultural Company. In 1927 the Company was divided, the Cauca Valley Agricultural Company was left with cattle-ranching properties: cane land

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<sup>46</sup>Interviews with Luis Ernesto Sanclemente (Feb. 1992), Ex-president of Manuelita, Cali, Colombia; Oscar Gerardo Ramos (Feb. 1992), Historian at ASOCAÑA, Cali, Colombia.

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was transferred to a new entity, Ingenio Manuelita, S.A.<sup>47</sup>. Cultivation maps, cadastral surveys, and annual reports submitted to the Superintendencia de Sociedades chart the expansion of the estate over time and changes in origin of cane<sup>48</sup>. This data shows that approximately half the land held originated from the creation of the Manuelita S.A.: most of the rest was obtained by the mid-1950s. In 1944 the company owned 3,329 hectares of land, 2,231 planted with cane<sup>49</sup>. By 1956 Mañuelita and affiliated Sociedades Anónimas possessed 5,522 hectares with 3,941 under cane<sup>50</sup>. The land that was not planted with cane was used for pasture for draught animals or granted to workers to raise subsistence crops. Gradually more and more of the estate was converted to cane as little new land was available for purchase or lease. Appendix S.4 shows the gradual expansion of land devoted to cane. By 1964 it can be seen that most of the estates, except Carbonara, were producing cane. In 1990 Manuelita owned 5,400 hectares of land; 4,626 were planted with cane and the remainder was primarily dedicated for fodder crops, roads, worker's housing and the mill<sup>51</sup>.

The change in land usage from a mixed enterprise in the nineteenth century to concentration on cane shows the specialization of the enterprise and more intensive land-use. It also demonstrates that most land was acquired before 1956; in other words before exports

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<sup>47</sup>Eder, Phanor James (1981). *El Fundador Santiago M. Eder*. Bogotá: Publicismo y Ediciones, p.636. S.A., Sociedad Anónima, which loosely defined, is a company which is owned by stockholders. Yearly reports to the Banking Superintendency from Manuelita reveal progressive changes in Manuelita *Sociedad Anónima* structure. These reports were unearthed from 1922 onwards. Accounting was conducted on a sociedad anónima basis until the 1960s.

<sup>48</sup>Sometimes a farm would expand its landholding yet this would not appear in the sociedad anónima statements. Thus the need to analyse cadastral surveys in order to note changes in farm size. See Appendix S.4.

<sup>49</sup>Eder, Phanor James (1981). *op.cit.*, p.643.

<sup>50</sup>*Ibid.*, p.654.

<sup>51</sup>Interviews with Gerardo Ortiz (Feb 1992), Cultivation Department, Manuelita S.A., Palmira, Colombia; Carlos Navia (13 Feb.1992), Head of Field Department, Manuelita S.A., Palmira, Colombia. See table S2.15

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became important. Furthermore these developments show that it is difficult to categorise Eder as a *capitán de hacienda* or *industria*. He was not a traditional land owner but became a major capitalist who invested heavily in agriculture.

An analysis of land usage patterns in the early history of the sugar industry in the Cauca Valley was presented above. Below the post-1950 period will be examined. After 1959, with the foundation of the Departamento Administrativo Nacional de Estadística (DANE) and ASOCAÑA, more sophisticated data is available. Ministry of Agriculture material is also more specific. These sources compile information by department. First, aggregate Valle del Cauca land tenure data will be presented. Secondly, this will be followed by an analysis of cane data in the Cauca Valley. Thirdly, the section will conclude with analysis of Manuelita data. It must be emphasized that Valle del Cauca department and the geographic region of the Cauca Valley are two distinct areas. The latter comprising the whole area where cane is grown, primarily of Valle del Cauca and sugar producing areas of the departments of Risaralda and Cauca (Map S2.1). Thus Valle del Cauca data will serve as a proxy as the majority of cane-growing lands are located there.

In the 1960-1990 period land that was owned and administered by a sugar mill enterprise was almost entirely dedicated to cane growing, though mixed cropping persisted in some areas. The widespread practice of diversified hacienda production which had prevailed until the early part of the twentieth century had all but disappeared by the 1960s. Now land located close to mills was devoted exclusively to cane. However intercropping was normal in areas of rough terrain, lacking suitable supplies of water, or those with lower quality soil where crops such as red beans, corn, tobacco, sunflower, or soyabean were

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planted in addition to cane<sup>52</sup>. This diversification helped reduce regional food price instability, avoided cane overproduction, and maintained employment of the agricultural work force<sup>53</sup>. Nevertheless, monocropping by cane-sugar plantations was more harmful to the environment than mixed cropping techniques used by cane-panela producers.

Gini coefficients for Valle del Cauca show land usage concentration was high throughout the period.

**Table S2.8**  
Valle del Cauca Gini Coefficient for Land Concentration, 1960-1986.

Year	Gini Coefficient
1960	.79
1970	.80
1977	.83
1986	.79

Source: Encuesta Agropecuario Piloto del Valle del Cauca (1987), Bogotá: Ministerio de Agricultura, Chart 10, p.30. Calculated based on data from: National Agricultural Census of 1960 and 1970 (1961 and 1971), Bogotá: DANE and Ministerio de Agricultura; Cauca Valley Agricultural Census 1977/78 (1979), Bogotá: SEAM; Initial Agricultural Survey of Cauca Valley 1986 (1987), Bogotá: Ministerio de Agricultura.

Crop characteristics influenced land tenure structures in the Cauca Valley. In the case of cane-sugar it was easier to maintain land extensive production patterns because labour demand was aseasonal in contrast to other crops. Whereas in the cases of tobacco and coffee, the seasonality of labour requirements forced large-scale producers to pull out of production because they were unable to compete with their small- and medium-scale counterparts<sup>54</sup>.

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<sup>52</sup>"Impacto Social Azucarero." (11 Oct. 1989), La República.

<sup>53</sup>Ibid.

<sup>54</sup>Kalmanovitz, Salomón (1988), op.cit., p.331. This does not contradict the argument of scale-bias presented in Sugar Part I as the ability to maintain a permanent labour force conferred cane growers an added advantage over cultivators which only demanded seasonal workers.

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Tables S2.9 and S2.10 contain a break-down of land distribution by plot size during the 1960-1986 period. The data refer to usufruct rights rather than land ownership. Tenants paid rents in cash, kind, labour services or a combination of any of the above. Other arrangements included sharecropping and colonisation<sup>55</sup>. The data show that the most common plot size was less than five hectares throughout. Total plots under 50 hectares comprised the majority of all landholdings (consistently around 90%). Thus demonstrating that there were a considerable number small holders who could supply cane and labour to the mill.

**Table S2.9**  
Distribution of Land in Valle del Cauca, 1960-1986  
Number of Plots and their Respective Percentages.

Size of Ag Prod. Unit	1960		1970/71		1977 /78		1986	
(Hectares)	#Plots	%	#Plots	%	#Plots	%	#Plots	%
<5	25760	52.1	26185	53.7	19268	54.2	26440	51.4
5-10	8774	17.7	6955	14.3	4916	13.8	7960	15.5
10-50	10789	21.8	10892	22.3	7672	21.6	11933	23.2
50-100	2012	4.1	2339	4.8	1711	4.8	2570	5.0
100-500	1842	3.7	2064	4.2	1685	4.7	2197	4.3
500-1000	201	.4	234	.5	226	.6	266	.5
> 1000	69	.1	102	.2	94	.3	65	.1
Total # of Plots	49447		48771		35572		51431	

Source: Constructed from Encuesta Agropecuario Piloto del Valle del Cauca (1987), Bogotá: Ministerio de Agricultura de Colombia, OPSA, SEAM, PNUD, FAO, URDA,9, p.28. Comité de Producción Agrícola (1971), Bogotá: DANE; Censo Nacional Agropecuario del Valle del Cauca 60/70. Bogotá: DANE; Censo Agropecuario de Valle del Cauca 77/78 (1979), Bogotá: Ministerio de Agricultura.

<sup>55</sup>Primera Encuesta Nacional Agropecuaria: Total Departamentos. (1990). Bogotá: Ministerio de Agricultura, pp. 6-7.

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**Table S2.10**  
Total Land Area in Valle del Cauca, 1960-1986  
and their Respective Percentages.

Size of Ag Prod. Unit	1960		1970/71		1977 /78		1986	
(Hec-tares)	Total Plot Area	%	Total Plot Area	%	Total Plot Area	%	Total Plot Area	%
<5	44550	4.0	37985	3.1	22947	2.2	38833	3.2
5-1)	62634	5.6	49508	4.1	35413	3.4	53367	4.4
10-50	231932	20.8	240275	19.8	171262	16.4	246376	20.3
50-100	138189	12.4	158621	13.1	117779	11.3	171778	14.2
100-500	381134	34.2	403795	33.3	348337	33.4	426358	35.1
500-1000	132874	11.9	136156	11.2	148371	14.2	172640	14.2
> 1000	123006	11.0	185262	15.3	199843	19.1	103914	8.6
Total	1114049		1211602		1043952		1213266	

Source: Constructed from Agropecuário Piloto del Valle del Cauca (1987), Ministerio de Agricultura de Colombia, OPSA, SEAM, PNUD, FAO, URDA, Chart 9, p.28; Censo Nacional Agropecuario del Valle del Cauca 60/70 (1971), Bogotá: DANE; Censo Agropecuario de Valle del Cauca 77/78 (1970), Bogotá: Ministerio de Agricultura.

As can be seen the total number of plots varied considerably during the period: the highest number was in 1986 with 51,431, and the lowest in 1977/78 with 35,572. This indicates an increasing trend to divide units. This variation also showed dynamic changes in access to land. The period of greatest volatility was between 1970 and 1986 and the most stability was between 1960 and 1970. However in terms of percentages of total landholdings the most prominent plots size (< 5 ha) only comprised 4 to 2.2 per cent of total land area throughout the 1960-1986 period. These small plots had the highest proportion of land area in 1960 (4%) and their lowest in 1977/78 (2.2%). In 1986 they accounted for 3.2%. This demonstrates that, as in other sugar producing regions of the world, land became more concentrated and small-scale producers cultivated only a small share of land<sup>56</sup>. However

<sup>56</sup>See Eisenberg, Peter (1974). The Sugar Industry in Pernambuco: Modernisation Without Change, 1840-1910. Berkeley: University of California Press; see Sugar Part I.

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it must be borne in mind that cane cultivation represented a small percentage of agricultural land-use in Valle del Cauca. A comparison of tables S2.6, S2.9 and S2.10 suggests that in 1980 approximately 10% of land was devoted to cane cultivation, a figure that has been steadily increasing. (The 1960 figure was 6%). Thus increasing land concentration appears to be a general feature of the Valle del Cauca and not only a characteristic of the sugar agroindustry.

A similar trend is observed if the analysis groups plots of 50 ha. and under (instead of 5 ha.). It can be seen that the proportion of total land farmed accounted for by these units fell from a high of 30.4% in 1960 to a low of 22% in 1977/78, with a modest recovery to 27.9% in 1986. Though there were considerable variances from the mean, on average small- and medium-sized units accounted for 27% of land area. These variations again show the relative instability of plots of up to 50 hectares. The data demonstrate that there were possibilities for small- and medium-sized (up to 50 ha.) growers to supply cane to the mills. But as will be seen below, their share in terms of numbers supplying cane and amount of cane supplied is only marginal.

Landholdings of 100-500 hectares comprised the largest share of land area, with a low of 33.3% in 1970/71 and a high of 35.1% in 1986. The plot size category that experienced the most volatility was greater than 1000 ha. From 1960 to 1977/78 the share of land represented by very large landholdings increased continuously, virtually doubling. However between 1977/78 and 1986 the share fell dramatically from 19.1% to 8.6%, a level below that of 1960. Over time, large-landowners (above 100 ha.) continued to maintain a dominant proportion of land in their control. Plots over 100 hectares represented between 5 and 6% of the number of landholdings during the entire period though in terms of land area, they

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comprised 66.7% in 1977/78 and 57.9% in 1986.

This clearly illustrates the extent to which large landholdings were still prevalent in the region. After the land reform bill of 1961 one would expect an increase in plot numbers. The converse occurred, there was a slight decrease from 1960 to 1970 confirming the widely held view that land reform once again solidified property rights but did very little to change plot distribution. The increase in large landowning in the 1970s can also be attributed to many factors such as the land extensive nature of cane, the effects of the Chicoral Pact of 1972 and the inflow of drugs money which was frequently invested in land<sup>57</sup>.

What happened to land ownership in the sugar sector? Have mills expanded their holdings or have independent owners obtained more land? Before analysing table S2.11 a discussion of the different contract arrangements in cane growing will be conducted.

In Colombia, cane contracts became important as the industry expanded. During the first half of the century if more cane was needed, it was relatively easy to purchase land or devote more of the estate to cane. However, as mills were established, contracts became more usual. Though there are references to contracts at the beginning of the industry, their importance increased dramatically from the 1960s, and the share of cane grown on mill-owned land declined as a consequence<sup>58</sup>. Contracts between mill and supplier are difficult to categorise. Occasionally cane shortage led mill owners to search for additional suppliers

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<sup>57</sup>The Chicoral Pact of 1972 formally initiated the dismantlement the agrarian reform law of 1961 and guaranteed that landowners would not face land expropriation under any conditions. See for example, Kalmanovitz, Salomon (1988), *op.cit.*, p.456.

<sup>58</sup>Roldán, Diego (1985). "Progreso Técnico, Crisis y Perspectivas del Sector Azucarero Colombiano." *Boletín Socio-Económico*, Nos.14-15, pp.180-182.



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from neighbouring producers<sup>59</sup>. Many contracts were based on personal relationships between mill owners and family and friends: informal contacts became significant in procuring cane for mills. According to a study conducted in 1957, contracts lasted on average ten years; a trend that continued to 1990<sup>60</sup>. Contracts were also arranged with small- and medium-sized landowners, and absentee landlords.

Four types of contracts exist in Colombia: cane in supply, participation shares, administered land, and land rental<sup>61</sup>. The first type, cane in supply (*compra de caña en la mata*), occurs when cane is cultivated by a farmer and the mill is responsible for cutting, lifting and transport. The producer is paid in one of two ways: a) according to the amount of cane that is produced; or b) according to the amount of sugar that is extracted per tonne of cane<sup>62</sup>. Most growers were paid in kind by weight of cane cut. The second type, participation shares (*cuentas en participación*) is characterized by landowners that allow the sugar mill to cultivate their land for a period of approximately ten years. Cutting, lifting, transport and payment of cane are conducted in the same manner as cane in supply.

A third type, administered land (*tierras cedidas en administración*) is a combination of the two previous forms. The sugar mill provides technical assistance to the landowners who cultivate cane. The cultivator will receive a certain amount of refined sugar for every tonne produced. This amount is calculated to cover the administration and production costs

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<sup>59</sup>Interview with Carlos Arias (22 Nov.1991), Head of Cane Contracting Operations at Manuelita, Manuelita S.A., Palmira, Colombia. Much of the information in this section derives from this interview.

<sup>60</sup>Castillo, Jorge Americo (1967). "Notes on Recent Developments in Colombian Agriculture." Cali: Universidad del Valle., p.13; Interview with Carlos Arias (22 Nov.1991), Head of Cane Contracting Operations, Manuelita, Palmira, Colombia.

<sup>61</sup>Junguito, Roberto, *et.al.* (1975), *op.cit.*, p.173.

<sup>62</sup>*Ibid.*, pp.173-174.

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incurred by the sugar mill e.g., new techniques, cutting and transport<sup>63</sup>. The producer, in return, must pay back a portion of refined sugar as payment. In 1990 growers received 20 kg of sugar/tonne of cane<sup>64</sup>. This was a substantial improvement on earlier periods. According to Piñeiro the share paid to land in administration cultivators was 13 kg sugar/tonne cane in 1960 and in 1978, 10 kg.<sup>65</sup>. According to Carlos Navia Manuelita had always paid 20 kg before 1990 at which point it began to pay 25 kg.<sup>66</sup>. This might demonstrate the greater efficiency of Manuelita. It is one of the largest mills in the Cauca Valley and unit costs for processing cane were low<sup>67</sup>. Furthermore, because of the time dependent nature of cane, the radius of land from which Manuelita could draw supplies was limited. It is possible the company was willing to offer higher prices to guarantee supply.

The last type is land rental (*arrendamiento de tierras*). The sugar mill being responsible for cultivation. The producer is accountable for land improvements such as construction of drainage ditches and wells, and land levelling. Rented land is not paid according to cane output as with other contracts, but by money rent calculated on the basis of hectareage<sup>68</sup>. With all types of contract, producers receive part advance payments.

Table S2.11 presents changes in cane acquisition. Column 5, cane in supply, covers

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<sup>63</sup>Ibid., p.175.

<sup>64</sup>Ibid., p.174.

<sup>65</sup>Piñeiro, Martín, *et.al.* (1982), *op.cit.*, p.69.

<sup>66</sup>Interviews with Carlos Navia (Jan. and Feb.1992), Director of Field Department, Manuelita S.A., Palmira, Colombia. The 1990 increase can be explained by increases in land values, or a decrease in real sugar prices, decreases in chemical input prices or a combination of a myriad of factors which affect the production process.

<sup>67</sup>See Sugar Part I.

<sup>68</sup>Ibid.

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the first two types of contract arrangements indicated above. Orozco does not have data on participation shares, it is possible that he groups participation shares and administered land together as in both types the mill is largely responsible for cultivating cane<sup>69</sup>. Table S2.14 shows that mill-owned property remained relatively stable. Most fluctuation in mill-owned property occurred during the 1968-1983 period. The increase in mill-owned property between 1968 and 1974 can be attributed to the regressive land reform bill. Yet taking the period as a whole there were only slight changes. The amount of mill-owned land in 1960 and 1988 was similar, at 45,866 ha. and 49,307 ha. respectively. However greater changes were observed in cane obtained under contract possibly because independent suppliers had the option of entering into an agreement with any one of several neighbouring mills.

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<sup>69</sup>In some literature administered land and participation shares are grouped together. See Junguito, Roberto, *et.al.* (1975), *op.cit.*, p.196.

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**Table S2.11**  
Changes in Cane Acquisition Modalities in Valle del Cauca, 1960-1988.

	(1)		(2)		(3)		(4)	(5)	
Type of Contract	Sugar Mill Property		Administered Land		Rented Land		% of cane cultivated by mills (1+2+3)	Cane in Supply	
Year	Area (ha)	(%)	Area (ha)	(%)	Area (ha)	(%)	%	Area (ha)	(%)
1960	45866	74.5	-----	0	4570	7.4	81	11164	18.1
1964	45643	71.1	1065	1.7	6230	9.7	82	11263	17.5
1968	46317	53.8	1058	1.3	16043	18.6	74	22632	26.3
1974	53693	46.2	14672	12.6	11917	10.2	69	35984	31.0
1980	45416	34.1	20910	15.7	4795	3.6	55	62065	46.6
1983	48576	35.2	19994	6.0	8155	14.5	54	61186	44.3
1988	49307	34.3	18269	12.8	5909	4.3	51	69938	48.5

Source: Constructed from Orozco, Guillermo A. (1984). *La Agroindustria Azucarera Colombiana, 1960-1983*. Cali: ASOCAÑA, p.86; citing Fadul, M. and Peñalosa, E. (1961), *op.cit.*; Junguito (1974), *op.cit.*, and ASOCAÑA.

In addition to the absolute stability of mill-owned land, the principal trends observable in the above table are on the one hand the relative decline in the importance of mill owned land and the percentage of cane cultivated by mills and on the other the increasing importance of cane in supply. The rapid growth of cane in supply shows that a increasing proportion of cane was derived from independent cane growers who by the late 1980s were responsible for almost half of the cane processed by mills.

Who were these suppliers? Were they "urban cane growers"? Helmsing used this term in relation to cotton growing on the Atlantic Coast. He described urban cotton growers as these landowners who let small- to medium-sized landholdings, lived in urban areas, and

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held an occupation in public or private sectors<sup>70</sup>. This phenomenon had earlier been typical in cattle raising. From this it might be extrapolated that the same process was occurring in the cane sector.

The phenomena of "urban cane growers" is illustrated by the experience of the Risaralda Mill. Rising land costs in the Cauca Valley meant that late-coming mills found it difficult to buy land. In most cases cane was obtained by means of contracts. Risaralda, established in the 1970s, negotiated contract arrangements covering approximately 10,000 hectares of cane<sup>71</sup>. Risaralda is located on the northern fringe of the sugar-producing zone in an area previously dedicated to cattle ranching<sup>72</sup>. This shows that one land extensive activity was replaced by another. Although specific land tenure data is not available one cannot be certain of the size of producer growing cane. But it is likely that large cattle owners contracted land to the mill. Furthermore mills that have shut-down processing operations, often contract their cane land to other mills<sup>73</sup>.

Did these contract arrangements diffuse profit participation?<sup>74</sup> First, the advantages for the sugar mill owner will be analysed. The main reason these contracts were established was to guarantee a sufficient flow of cane. As contracts are established for ten years it is a way in which mill owners could control cultivation without having to purchase new land and plan mill capacity expansions in accordance with the amount of cane that will be

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<sup>70</sup>Helmsing, A.H.J. (1986). Firms, Farms, and the State in Colombia. Boston: Allen and Unwin, Inc., p.223.

<sup>71</sup>Rojas, José Maria (1983). op.cit., p.151.

<sup>72</sup>Ibid.

<sup>73</sup>Orozco, Guillermo (1984), op.cit., table 31, p.86; Rojas, José Maria (1984), op.cit.; See also Table S2.5.

<sup>74</sup>See also Sugar Part I.

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received. In addition capital can be concentrated in mill investments, and the introduction of new techniques in both field and factory processes sustained. Other technical changes such as improved harvesting techniques and transport methods will remain in the domain of the mill.

What are the advantages to landowners of the cane contracts? First, a landowner with insufficient capital can become involved in the agroindustry by supplying mills with cane. Second, because most contracts are paid according to cane weight, sucrose content is not a critical factor. Thus there is a tendency for growers to over-irrigate (if cane is heavily irrigated weight increases without increasing sucrose levels) and select higher weight varieties in order to increase tonnage/hectare. So a cane cultivator is eager to increase cane weight and not necessarily sucrose content. Third, some of the gains from technical change such as improved cane variety, disease control, fertilizer application, and plot redesign could result in higher weights of raw cane which would benefit landowners, while technical change resulting in sucrose productivity improvements would be biased towards sugar mill. The administered land contracts can be a form of technical assistance and credit to farmers and allow absentee "urban cane growers" to use land productively. However the trend towards cane in supply shown in table S2.14 would appear to suggest that landowners, rather than the mill owners, were the principal beneficiaries.

What are the economic explanations for letting land? The most apparent explanation is that landowners were also involved in other pursuits, in which case receiving rent from the mill was a means of investing in other areas. Also, it could be that start-up costs for land preparation, i.e. machinery rental for irrigation ditch construction, land preparation, etc. were too high for small landowners. Furthermore because payment for rented land is related

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to its hectarage, payment was technical change neutral. Payment in the other forms of contracts, e.g. land in administration and cane in supply, was according to output. Hence as improved techniques make land more productive and the activity less risky, landowners may move away from letting and become more involved in cultivation. Analysis of rental contracts show that returns were highly biased in favour of the mill. Rojas shows that mills obtained 88% of output, landowners 12%<sup>75</sup>. FEDESARROLLO, a private economic research organization, estimated different proportions, 75%/25%<sup>76</sup>. The increase of cane in supply contracts can be explained by more scientific, less risky techniques mentioned above. Also, given the bias of land rental, a landowner would benefit if he became involved in cultivation.

Recent trends in Manuelita are illustrated in the following stacked bar graph and table.

The bottom half of the graph denotes land that is cultivated but not necessarily owned by Manuelita which corresponds to columns 1 and 2 in S2.13.

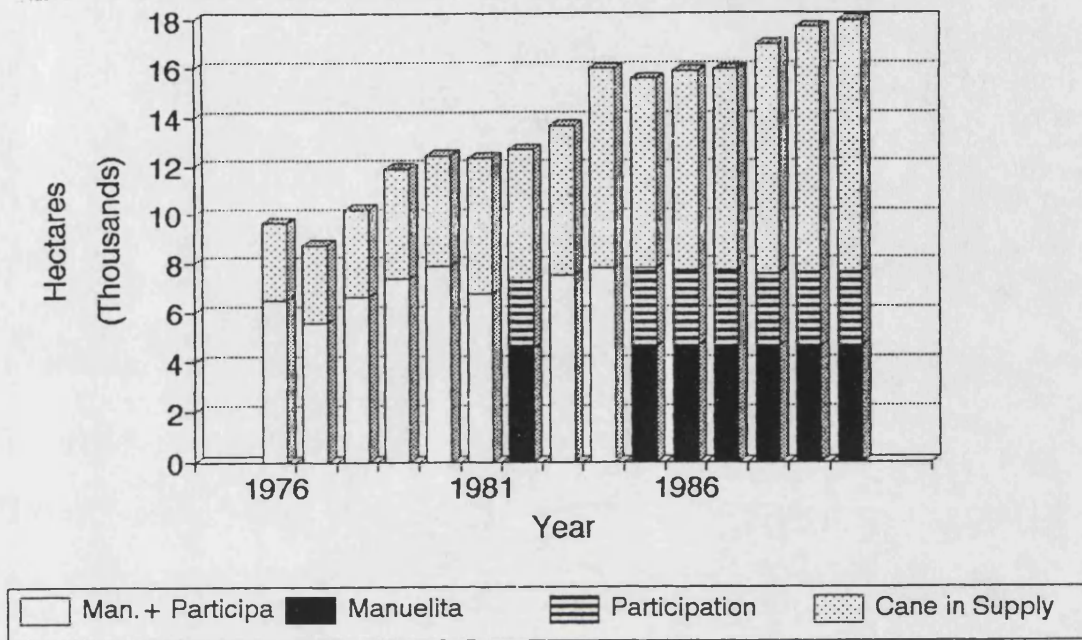
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<sup>75</sup>The estimate is based on 1963 statistics of a monthly rent of 50.00 pesos per plaza (set according to price of sugar/quintal + 10.00 pesos). After 18 months the landowner would receive 900 pesos, the equivalent of 22.5 quintals of sugar. Assuming average production/plaza to be 93 tonnes of cane; the conversion to sugar is on average 10% of raw cane which equal 9.3 tonnes of sugar (186 quintals). Of these 186 quintals, in sugar terms, only 22.5 quintals must be paid to the landowner. See Rojas, José Maria (1983), *op.cit.*, pp.149-150.

<sup>76</sup>Junguito, Roberto, *et.al.* (1975), *op.cit.*, p.372.

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**Figure S2.1**  
Evolution of Forms of Manuelita Cane Acquisition, 1976-1990.



Source: See Table S2.12.

Prior to 1982 no distinction was made between Manuelita property and participation shares. Furthermore rented and administered land shares were not included in the data suggesting that these two modes were not used in Manuelita. After 1982 disaggregated for Manuelita-owned property and participation shares were available.



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**Table S2.12**  
Evolution of Forms of Manuelita Cane Acquisition, 1976-1990

Year	Manuelita Property(Ha)	+ Participation Shares	% Cultivated by Mill	Cane in Supply	Total Area (Ha)
1976		6518	67	3161	9679
1977		5570	64	3180	8750
1978		6598	65	3603	10201
1979		7381	62	4499	11880
1980		7844	63	4579	12423
1981		6717	55	5579	12296
1982	4500	2789	61	5369	13687
1983		7524	61	6163	15967
1984		7766	47	8201	15566
1985	4607	3192	51	7767	15875
1986	4625	3071	49	8179	15933
1987	4626	3073	51	8234	16948
1988	4629	2950	45	9369	16948
1989	4614	3068	43	10018	17700
1990	4626	2999	47	10282	19230

Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department 1970-1990. Superintendencia de Campo, Monthly Reports of Harvest Department 1970-1990.

From 1983 onward, Manuelita land property remained relatively stable as did participation shares. Total land directly cultivated by Manelita dropped slightly quicker than the sectoral trend. However during the 1980s Manuelita cultivated less than half of the cane. The most variable form of cane acquisition during this fifteen year period was cane in supply. Manuelita trends converge with sectoral tendencies in that cane in supply has represented a similar share of the total cane grown (between 19-49%). Cane in supply contracts began in the mid-1960s, most of which originated from plots of less than 75 hectares (Table S2.13)<sup>77</sup>.

<sup>77</sup>Interview with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department.

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**Table S2.13**  
Manuelita Land Usage Data  
Number and Plot Size of Cane in Supply 1985-1989.

Size of Ag Prod. Unit	1985		1987		1989		1991	
(Hectares)	#Plots	%	#Plots	%	#Plots	%	#Plots	%
1-25	9	13.2	7	10.9	8	11.3	14	14.7
26-50	20	29.4	15	23.4	15	21.1	27	28.4
51-75	9	13.2	11	17.2	18	25.4	18	18.9
76-100	14	20.6	14	21.9	7	9.9	11	11.6
101-200	7	10.3	6	9.4	7	9.9	10	10.5
201-300	2	1.5	4	6.3	4	5.6	2	2.1
301-500	5	7.4	4	6.3	9	12.7	10	10.5
501-1000	2	1.5	3	4.7	3	4.2	3	3.2
Total # Hectares	7767		8234		10017		11258	

Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department 1970-1990. Superintendencia de Campo, Monthly Reports of Harvest Department 1970-1990.

\*Plot sizes of suppliers and participation shares were only available Manuelita from 1985 onwards.

**Table S2.14**  
Manuelita Land Usage Data  
Number of Cane in Participation Shares, 1985-1991

Size of Ag Prod. Unit	1985		1987		1989		1991	
(Hectares)	#Plots	%	#Plots	%	#Plots	%	#Plots	%
1-25	4	11.4	4	12.1	6	17.1	4	10.8
26-50	12	34.3	10	30.3	8	22.9	12	32.4
51-75	4	11.4	6	18.2	8	22.9	7	18.9
76-100	3	8.6	2	6.1	3	8.6	4	10.8
101-200	9	25.7	8	24.2	8	22.9	8	21.6
201-300	2	5.7	2	6.1	1	2.9	1	2.7
301-500	1	2.9	1	3.0	1	2.9	---	
501-1000	---	---	---	---	---	---	1	2.7
Total # Hectares	3192		3073		3068		3346	

Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department 1970-1990. Superintendencia de Campo, Monthly Reports of Harvest Department 1970-1990.

Although aggregate data does not exist, tables S2.13 and S2.14, show that Manuelita

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obtained most of its cane in supply and participation shares from small- to medium-sized landowners. In 1985 they represented 45.7% of total plots and by 1991 (figures were not collected in 1990) had declined slightly to 43.2%. Manuelita small- and medium-scale growers farmed a larger area of total land than aggregate data for the Valle Del Cauca data displayed earlier would appear to indicate. This would seem to imply that patterns of land distribution (usufruct rights) were more equitable than elsewhere in Valle del Cauca. Large landowners (100 ha. and above) also figured less prominently in terms of land area. Manuelita data showed that the smaller supplier's plots (1-50 ha) and large-sized supplier's plots (> 100ha) lost importance, while medium-sized supplier's plots (50-100 ha) gained.

How can these changes be accounted for? A reasonable assumption is that 75-100 hectare plots were broken up into smaller plots (50-75ha). The relative decline in importance of supplies from small-sized plots is consistent with the general Valle del Cauca trend described above. A plausible reason for the displacement of large-sized plots is that these growers found it profitable to move out of production, whereas small- and medium-sized cultivators were less inclined to do so as they depended heavily on their plot both for subsistence and money income.

The emergence of cane-sugar production in the Cauca Valley displaced other agricultural activities, primarily cattle ranching and cane-panela production. Though some cane-panela producers transformed and became involved in modern milling, others were clearly displaced. As witnessed in part I, a reverse process in the transformation to modern cane milling was observed. Either mill owners first owned land and were engaged in mixed agricultural enterprises or quickly purchased land and became involved in cane milling. Mills also were rapidly concentrated within the Valley, for reasons of climatic conditions,

## *Part II: La Manuelita Sugar Mill*

land reform policies and the early establishment of formal institutions which fostered agroindustrial development. Gradual industrial concentration was observed in the Cauca Valley only until the twentieth century.

In the twentieth century, the use of independent suppliers increased which was similar to trends described in part I. The rise of contractual cane resulted in the diffusion of profits, as before cane was solely cultivated within the mill estate. Although land rental was biased towards mill owners, the other contracts did not necessarily put independent growers at a disadvantage. Despite these new trends, total land concentration in the sugar sector remained high. However this can not be attributed exclusively to the sugar agroindustry as Valle del Cauca demonstrated and yet more concentrated tendencies. Manuelita trends also exhibited a comparable behaviour, but had a larger proportion of cane procured from cane in supply.

Formal institutions that assisted in sugar operations were also instrumental in promoting and protecting Cauca Valley mill formation. Some of these organizations were set up at the instigation of planters and others were established as a result of State initiative. Research and development efforts were present as early as the 1920s with a state experimental farm established in Palmira<sup>78</sup>. Another important impulse in the 1920s was the Chardon Mission, a group of Puerto Rican specialists, contracted to assess cane growing in the Valley in 1929. By this time Eder was the largest mill owner in the Cauca Valley and was also US consul in Cali. He, along with Enrique Olaya Herrera, Colombian ambassador

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<sup>78</sup>Orozco, Guillermo (1984), *op.cit.*, p.36.

## *Part II: La Manuelita Sugar Mill*

in Washington, were principally responsible for the Mission<sup>79</sup>. The Mission argued that natural endowments such as ideal soil conditions, levels of annual rainfall and sunlight, and year-round harvests provided strong foundations to establish a modern industry. In the 1930s the Escuela Superior de Agricultura Tropical, later transformed into Facultad de Agronomía de Palmira also assisted in cane research efforts<sup>80</sup>. Furthermore, as a formal lobby, the sugar agroindustrial sector was swift to organize. In 1934 the Sociedad de Agricultores y Ganaderos (SAG) was formed only seven years after the powerful FEDERACAFE had been set up in 1927<sup>81</sup>.

These developments mark an impressive degree of organisational and institutional support for a crop that was not nearly as important to the Colombian economy as coffee<sup>82</sup>. The SAG was complemented by the Corporación Autónoma Regional del Cauca (CVC) in 1954 which was modelled on the Tennessee Valley Authority (TVA) in the United States with the objective to promote regional development<sup>83</sup>. The CVC was established to provide technical assistance, power and flood control and drainage for the Cauca Valley<sup>84</sup>. Subsequently ASOCAÑA, the cane growers association, was formed in 1959. In 1962 ASOCAÑA pressed the National government to join the International Sugar Organization so

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<sup>79</sup>Rojas, José María (1983), *op.cit.*, p.21.

<sup>80</sup>Ibid., p.3.

<sup>81</sup>Jiménez, Margarita and Sideria, Sandro (1985). Historia del Desarrollo Regional en Colombia. Bogotá: CEREC, p. 94.

<sup>82</sup>For the importance of coffee see for example, Palacios, Marco (1980). Coffee in Colombia, 1850-1970. Cambridge: Cambridge University Press; McGreevey, William Paul (1971). An Economic History of Colombia 1845-1930. Cambridge: Cambridge University Press. Bergquist, Charles (1981). Café y Conflicto en Colombia. Medellín: Universidad de Antioquia.

<sup>83</sup>Holt, Pat M. (1964). Colombia Today- And Tomorrow. New York: Praeger Publishers, p.167.

<sup>84</sup>Ibid.

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that Colombian producers could obtain preferential access to the US market<sup>85</sup>. Later, the Fondo Nacional del Azúcar y Panela (FONAZUCAR) was established in 1978 as a non-profit organisation to promote the development of the sector *vis-à-vis* production, marketing, import, export, and credit policies and also levied a tax on sugar sales to set up a research and development centre for the sugar industry, Centro de Investigación de la Caña de Azúcar (CENICAÑA)<sup>86</sup>.

The development of these institutions, particularly ASOCAÑA and CENICAÑA, has been attributed to the concentrated industry structure in which funds were more easily pooled at micro and macro industry levels<sup>87</sup>. A less apparent advantage was the gradual geographic concentration of mills in the Cauca Valley which made the diffusion of technical change easier<sup>88</sup>. Innovation diffusion was also facilitated by the centralized, highly oligopolistic structure of large-scale cane growing. Hence learning externalities were high<sup>89</sup>.

The Colombian industry was mainly based on domestic sales until the Cuban Revolution. Until 1959 Cuban sugar accounted for 80% of purchases from foreign sources in US markets. Colombia did not export sugar until 1960 and only obtained access in the USA in 1964 when allocated a quota of 300,000 tonnes<sup>90</sup>. Most Colombian historians assert

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<sup>85</sup>Ramos, Oscar Gerardo (1990). *Treinta Años: Apuntes Para Una Historia*. Cali: ASOCAÑA, p.9.

<sup>86</sup>Roldán, Diego (1985). "Progreso Técnico, Crisis y Perspectivas del Sector Azucarero Colombiano." *Boletín Socio-Económico*, Nos.14-15, p.174. Interview with Juan Pablo Cabal (Nov. 1991), Chief Economist, ASOCAÑA, Bogotá, Colombia.

<sup>87</sup>Junguito, Roberto, *et.al.* (1975), *op.cit.*, p.15.

<sup>88</sup>See Map S2.1.

<sup>89</sup>For a discussion of learning externalities see for example, Stiglitz, Joseph (1989). "Markets, Market Failures and Development." *The American Economic Review*, 79(2), pp.197-203.

<sup>90</sup>Jiménez, Margarita and Sideri, Sandro (1985), *op.cit.*, Table I.4.D, p.38. Rojas, José María (1985), *op.cit.*, p.21.

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that the 1960s was a period of sugar sector consolidation driven by opportunities in export markets<sup>91</sup>. This was not the case. As demonstrated above there was substantial institutional consolidation prior to 1964. In fact, had there not been considerable modernisation of cane processing before 1964, it is most unlikely that Colombia would have gained access to the market<sup>92</sup>. In addition there is evidence of estate level modernisation before the 1960s. In 1953 the first estate-based refinery in Colombia was installed in Manuelita. This represented a significant move in the history of the cane industry. However subsequent progress was slow, by 1990 there were only three sugar mills which had refining capabilities<sup>93</sup>. This meant that most estates still transformed cane into crude sugar for use in industrial processes at home and abroad or exported it to be refined overseas. Until the late 1970s, the greater part of sugar was exported crude: exports of refined sugar commenced in 1980. These developments--production for export and later the export of refined sugar--represented a formidable impulse. But it must be stressed that modernisation in terms of irrigation, cultivation, mill machinery, etc. had already occurred on the larger mills like Manuelita before the 1960s. While many changes occurred in the 1960s and a tight unified industrial structure was not evident until the 1970s and 1980s, consolidation in terms of the creation of basic infrastructure, technical change adoption and institutional support for the industry were all features of the 1930-1950 period<sup>94</sup>.

Much of the institutional support established in Colombia occurred before export

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<sup>91</sup>Collins, Charles David (1985), *op.cit.*, pp.35-90; Rojas, Jose María (1985), *op.cit.*, pp.7-34.

<sup>92</sup>Bulmer-Thomas argues the same for the Central American republics. See Bulmer-Thomas, Victor (1987). *The Political Economy of Central America Since 1920*. Cambridge: Cambridge University Press, pp.158-159.

<sup>93</sup>Interview with Juan Pablo Cabal (various times), Chief Economist, ASOCAÑA, Bogotá, Colombia.

<sup>94</sup>Technical change to be discussed below.

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growth and the centralisation of agroindustrial sugar production in the Cauca Valley. Institutional development was determined by informal and formal agents. The political influence of large landowners and their connections with the ruling political class obviously explains the founding of official organisations. But businessmen, like Eder, who were able to accumulate land and enter the industry were also responsible for significant advances. Thus in the Cauca Valley foreign markets were not necessary for economic expansion and competitiveness. Before 1964 (the year Colombian entered into the US sugar quota) technically advanced milling was established and industrial concentration, a feature common to sugar production in other areas of the world, had already taken place<sup>95</sup>. What other elements indicated early modernisation?

### TECHNICAL CHANGE: Industrial concentration, foreign technology, and discontinuous adaption patterns

This section will discuss patterns of technical change. First industrial concentration *vis-à-vis* mechanisation in the Cauca Valley will be illustrated by Manuelita data. Secondly, the importance of foreign technology will be examined. Lastly, the discontinuous nature of technical change will be analysed.

The process of modernisation is signalled by tangible and intangible factors. These include industrial concentration, mechanisation, upgraded irrigation and drainage networks, more efficient transport networks, variety diversification, appropriate fertilizer dosage, improved plot lay out, and changes in machete design. There were three patterns of

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<sup>95</sup>See Sugar Part I.



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technological adoption. Some technologies were imported and continue to be so through the period. Others were initially imported but subsequently refined and adapted in Colombia. Yet others were internally derived. In the literature excessive attention has been devoted to industrial concentration as indicating modernisation. This neglects the importance of other issues listed above. The topic of industrial concentration will be addressed immediately below, the other factors will be discussed subsequently.

One indication of industrial concentration in sugar was the early mechanisation of field tasks: in other sectors machinery was not widely used until the 1950s and 1960s or even the 1980s. This probably indicates that *capitanes de industria* were able to acquire capital through other activities which funded the modernisation of sugar production. Contrary to neo-classical analysis, early mechanisation occurred in the 1930s and continued into the 1950s and 1960s, despite capital and foreign exchange scarcity and the relative abundance of other factors (land and labour)<sup>96</sup>. Given relatively easy access to land and labour, land- and labour-using methods could have been expected to prevail<sup>97</sup>. Yet cane cultivated for agro-industrial processing became and remains one of the most highly

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<sup>96</sup>If real wages indicate labour scarcity, data demonstrate negligible improvement in rural real wages and income distribution during the 1925-1972 period. For example, Miguel Urrutia and Mario Arrubla witness a small recovery of real wages in the 1930s, following the collapse of the late 1920s. Data gathered by Ocampo confirm these findings. Nonetheless a deterioration of rural wages during the 1935-1945 period left the rural worker with wages similar or inferior to levels of the previous decades (1920s). During the 1945-1965 period, although there are various problems with the wage data in Colombia, Urrutia claims that generally the distribution of income improved, however the rural sector distribution of income continued to deteriorate. In addition, according to Urrutia, between 1964 and 1972 aggregate rural incomes remained constant and rural incomes did not increase. See Urrutia, Miguel and Arrubla, Mario (1970). Compendio de Estadísticas Históricas de Colombia, Bogotá: Universidad Nacional, p.34; Berry, Albert and Urrutia, Miguel (1976). Income Distribution in Colombia, New Haven: Yale University Press; Ocampo, José Antonio (1991), op.cit., pp.237-238; Urrutia, Miguel (1979). Cincuenta Años de Desarrollo Económico Colombiano, Bogotá: La Carreta, p.201; Urrutia, Miguel (1985). Winners and Losers in Colombia's Economic Growth of the 1970s, New York: Oxford University Press, p.68.

<sup>97</sup>Within the Colombian literature Jesús Antónneio Bejarano levelled criticism at high levels of mechanisation despite the abundant internal supply of labour. See Bejarano, Jesús Antónneio (1978). "Industrialization and Economic Policy 1950-1976." In Arrubla, Mario et.al. (Eds.), Colombia Hoy, Bogotá: Siglo Veintiuno Editores, p.224.

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mechanised crops in Colombia and perhaps explains the high degree of mechanisation already prevailing in the Cauca Valley in the 1950s, indicated in the table below<sup>98</sup>.

**Table S2.15**  
Mechanisation Intensity According  
to the Most Mechanised Geographic Zones, 1959, 1972.

Column	i		ii		iii		iv	
Department	HP/1000 ha of arable land		HP/1000 ha of cultivated land		Arable Ha/Tractor		Cultivated Land (Ha)/Tractor	
Year	1959	1972	1959	1972	1959	1972	1959	1972
Cauca Valley	969	1233	804	1116	47	45	54	52
Tolima	365	582	641	1136	120	100	68	51
Cundinamarca	354	534	967	1281	123	108	45	45
Total for Colombia	190	249	395	740	230	226	110	76

Source: Constructed from FEDESARROLLO (1976), *op.cit.*, p.36, FEDESARROLLO chart derived from: Arable Hectares: DANE Agricultural Census; Cultivated Hectares: Caja Agraria; Horse Power and number of tractors: Kalmanovitz, Salomon (1974a). "La Agricultura en Colombia, 1950-1972." *Boletín Mensual de Estadística*, No.276, pp.75-169.

Table S2.15 refers to production in the three most highly mechanised departments. Column i represents horsepower per hectares of total arable land (the amount of land that can be feasibly cultivated) and demonstrates mechanisation intensity per department. Column ii provides data on mechanised intensity on cultivated land. A comparison of columns i and ii illustrates the extent to which a department is mechanised, e.g. if there is a large difference between the columns we observe that mechanisation is more prevalent in a certain area of the department. Column iii gives hectares of arable land per tractor and compared with column i provides an idea of the degree of power intensity of mechanisation. Column iv displays hectares of cultivated land per tractor and if compared with column ii, tractor horse

<sup>98</sup>*El Desarrollo Agropecuario en Colombia, Tomos I, II* (1990). Bogotá: Ministerio de Agricultura, p.302.

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power can be estimated. Cane growing tasks are generally power extensive in contrast to power intensive tasks such as harvesting root crops, thus we should observe lower power intensity in the Cauca Valley. In cane growing, machines were needed primarily for plantation preparation such as irrigation network construction and ploughing<sup>99</sup>. First, column i demonstrates that horsepower/1000 hectares for arable area was the highest for both 1959 and 1972 in the Cauca Valley. Thus we observe an early high intensity of mechanisation. In fact an intensity so high in 1959 that Cauca Valley figures are not surpassed by other departments until 1972. All the columns show a high degree of intensity in the Cauca Valley in 1959. In the other departments mechanisation levels increased from 1959 to 1972, whereas the Cauca Valley experienced a decrease. This would appear to support the argument that Cauca Valley mill owners "over-mechanised" early, so much so that mechanisation levels dropped in later years. Easy access to information and investment funds encouraged producers (*capitanes de industria* and *hacienda*) to use capital-intensive techniques too quickly and consequently over-mechanise cultivation. Adequate levels of efficiency could be reached with much less capital<sup>100</sup>.

Arable hectares/tractor (column ii) were extremely low in the Cauca Valley for 1959 and 1972, and cultivated land/tractor ratios decreased only marginally between the two years. This shows that much of the Cauca Valley was mechanised before 1959. In other areas of Colombia the decrease was much larger, confirming the relative early speed of mechanisation in the Cauca Valley. Furthermore as expected with cane growing, arable ha/tractor in the Cauca Valley were the lowest in 1959 and 1972, demonstrating that mechanisation was used

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<sup>99</sup>Interview with Juan Carlos Osorio (Feb.1992), Field Preparation Agricultural Engineer, Manuelita, Palmira, Colombia.

<sup>100</sup>See Sugar Part I.

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for extensive tasks such as tilling. When this is compared with hp/1000 ha of cultivated land it is observed that power intensive tasks, those which machines can most effectively perform, are used to a greater extent in Cundinamarca and Tolima and less in the Cauca Valley by 1972. Thus mill owners tended to mechanise earlier than was necessary.

How does Manuelita data compare to sectoral trends? Manuelita data allows an analysis of mechanisation intensity (tractor accumulation) on an individual mill. In 1921 Manuelita first imported machinery for ploughing<sup>101</sup>. But oxen continued to be used for ploughing until the 1950s<sup>102</sup>. Despite the early introduction of machinery for ploughing, field department records show that for all other tasks human and animal power was the norm. For planting manual methods predominated until the mid-1970s when some tasks started to be mechanised<sup>103</sup>. For other field tasks such as irrigation, input application and harvesting there was little mechanisation until the mid-1970s<sup>104</sup>. This confirms that mechanisation was primarily used in land preparation: in 1990 almost 100% of ploughing was mechanised except for areas of rocky terrain<sup>105</sup>. For the 1971-1990 period Manuelita data reveal that although mechanised planting gradually expanded and predominated from 1978, manual

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<sup>101</sup>Manuelita Una Industria Centenaria, 1864-1964, (1964), Bogotá: Plazas & Perry, p.202.

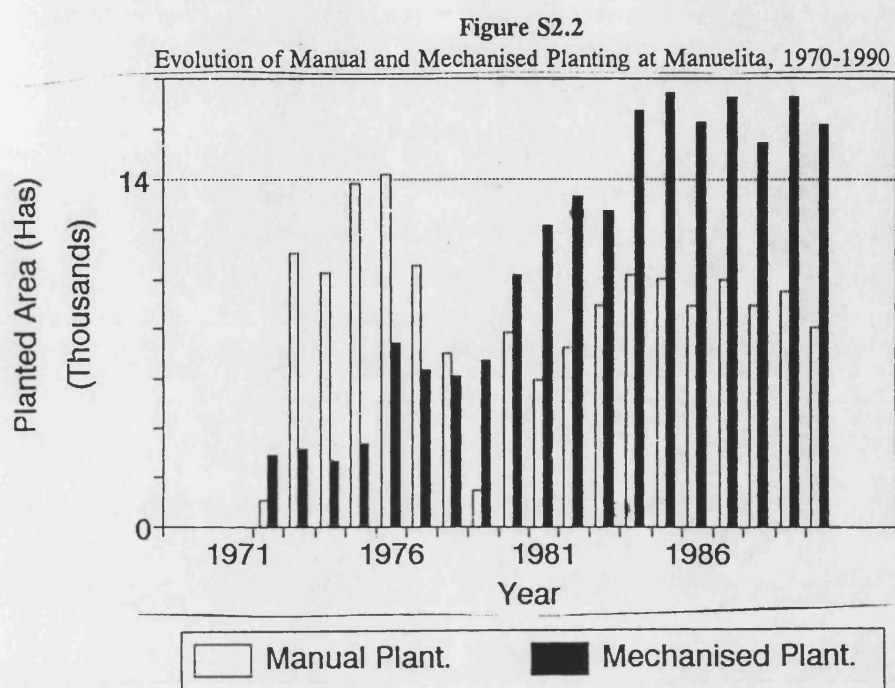
<sup>102</sup>According to Weekly Workers Notes there was a space for oxen drivers. After 1953 this space had disappeared. Manuelita S.A.Archives, Week No.6, 2-8 Feb. 1939; Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec- 4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Manuelita S.A., Palmira, Colombia.

<sup>103</sup>Superintendencia de Campo, Monthly Reports of Irrigation Department 1971-1990; Superintendencia de Campo, Monthly Reports of Cultivation Department 1970-1990; Superintendencia de Campo, Monthly Reports of Harvest Department 1970-1990; Interviews with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department Manuelita, Palmira, Colombia.

<sup>104</sup>See Appendix S.2. Interview with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department.

<sup>105</sup>Interview with Juan Carlos Osorio (Feb.1992), Field Preparation Agricultural Engineer, Manuelita S.A., Palmira, Colombia; see Appendix S.1.

planting continued (Figure S2.2).



Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department, 1970-1990, Palmira, Colombia.

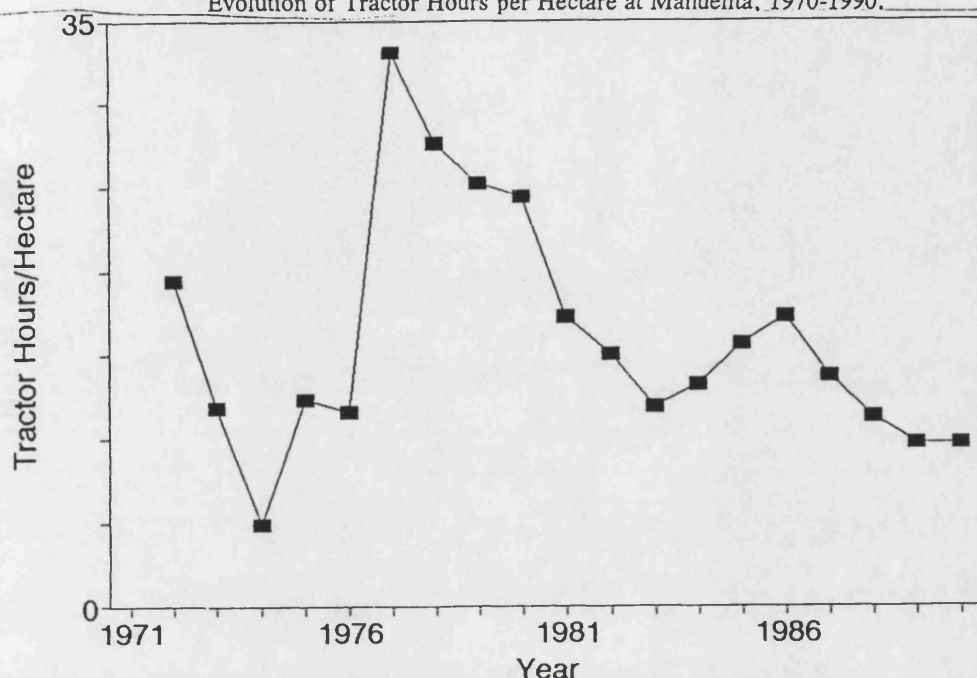
The peak of manual planting was reached in 1975, followed by a dramatic decline during the following three years. This corroborates regional analysis which show that from 1974 to 1978 there was relative labour scarcity in the Cauca Valley<sup>106</sup>. After the trough in 1978, the use of manual labour again increased until 1983 when the relative and absolute levels of manual and mechanised planting stabilized.

Data on tractor hours per hectare were collected based on aggregate sums of tractor hours and hectares. These statistics include both Manuelita-owned land and land which was controlled via participation and rental contracts. The data demonstrate an erratic if increasing tendency during 1971-1977, followed by a slow decline.

<sup>106</sup>Roldán, Diego (1985), *op.cit.*, p.184.

Figure S2.3

Evolution of Tractor Hours per Hectare at Manuelita, 1970-1990.



Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department, 1970-1990, Palmira, Colombia.

Between 1971 and 1977 labour figures show an increase of tractor drivers (Table S2.21) which reinforces the argument that there was increased use of capital and labour. Thus the data show that capital did not entirely displace labour, and that early mechanisation of the sector did not imply a rapid expansion of capital-using techniques.

The trend of early mechanisation in the Cauca Valley diverges from the experience of other sugar producing countries. Typically in developing countries, cane was considered a beneficial crop because of the high amounts of relatively unskilled labour that could be incorporated into the production process<sup>107</sup>. In Colombia even cane field preparation was mechanised very quickly and early compared with other crops. Technology for the mechanisation of all tasks from ploughing to harvesting was available for other crops such as rice or wheat. Why did partial mechanisation occur first in sugar? The issue of relative

<sup>107</sup>See Sugar Part I.

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factor prices appears to be irrelevant to these cane farmers/mill owners. These cultivators apparently preferred to use machinery to labour even if labour could perform the same task efficiently. Producers were not small growers who would be more likely to use oxen for land cultivation. Rather the *valluno* cane landowner was a large-scale operator who preferred to invest in and use machinery for all tasks except harvesting for which machinery was not available at the time<sup>108</sup>. Cane growers had easy access to capital because of informal and formal institutions that were established within the Cauca Valley which allowed them to mechanise quickly.

Despite preferential treatment and the consequent early mechanisation, this early reliance on foreign technology did not lead to future dependence<sup>109</sup>. Thus, although the process of agricultural modernisation began with the importation of ploughs in the 1920s, experimentation on the estates and institutional support for the sugar sector reduced the dependency on imported technology.

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<sup>108</sup>See Sugar Part I.

<sup>109</sup>As can be observed in appendix S.1 technical changes in soil preparation (category 1) were initially externally induced but later, from the 1960s, were induced internally.

## *Part II: La Manuelita Sugar Mill*

According to the Chardon Mission, Colombian technology in field and factory in the 1920s was backward compared to other producing areas<sup>110</sup>. However by the mid-1980s Colombia exhibited the highest productivity in cane growing in the world and was also highly competitive in cane processing--a factor that underlay increasing levels of exports<sup>111</sup>. Productivity gains were not simply a function of importing foreign technology. Other complex processes were at work, some of which have been hinted at above. Before exploring these factors a discussion of specific technical changes, the impact of foreign capital on change, and the discontinuous nature of change in the Cauca Valley will be provided. Although a myriad of changes have occurred within the factory, only major advances will be discussed here, such as cane patio, choppers, heaters, and centrifugals. The changes have been selected because of their high labour requirements. Since milling is a capital-intensive process, those processes that underwent capital deepening will not be reviewed<sup>112</sup>. Deepening is not as important to the thesis as changes which replace capital for labour<sup>113</sup>.

The industry initially relied to a large extent on foreign technology. Later modernization was propelled by domestic research, experience and the adoption of imported equipment--a process fostered by the strong institutional bases established

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<sup>110</sup>Piñeiro, Martín, et.al. (1982). Articulación Social y Cambio Técnico: La Producción de Azúcar en Colombia. San José: Instituto Interamericano de Cooperación para la Agricultura, p.293.

<sup>111</sup>Interview with Ricardo Villaveces (various times), President, ASOCAÑA, Bogotá, Colombia.

<sup>112</sup>See Sugar Part I.

<sup>113</sup>As a guide, a summary of the historical evolution of technical change in the field and its biases is provided in Appendix S.1.



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in the Cauca Valley for research and development. The early importance of foreign capital can be seen in the establishment of Manuelita. The first steam-driven sugar mill was imported by Manuelita from England in 1901<sup>114</sup>. Foreign capital was used to purchase heavy equipment for the mills such as the choppers, heaters, and centrifugals. But in later years much of this machinery was manufactured in Colombia, particularly heaters<sup>115</sup>. The establishment of large mills in the 1940s and 1950s (see Table S2.5) can be attributed to government policy which favoured capital goods imports. According to José Antonio Ocampo, the beginning of agricultural modernization took place in the post-Second World War years when policy mechanisms designed to promote industrialisation was implemented<sup>116</sup>. Tariff and exchange arrangements that were devised to meet industrial needs had the unintended effect of promoting the rapid growth of capital-intensive agribusinesses as land owners made use of these measures to import machinery.

As the data on capital inflows is insufficiently disaggregated, it is difficult to demonstrate directly the impact of these policies on modernization in the sugar sector. However the establishment of mills in the 1940s and 50s demonstrated that many were set up when these tariff and exchange policies were in effect. Hence it can be argued that government policies indirectly promoted modernization in cane processing. Other factors such as structural economy-wide events might have also impulsed investments in productive activities. Nonetheless, informal institutions

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<sup>114</sup>Eder, Phanor James (1981). *op.cit.*, p.530.

<sup>115</sup>Interview with Oscar Gerardo Ramos (Feb. 1992), Historian at ASOCAÑA, Cali, Colombia.

<sup>116</sup>Ocampo, José Antonio (1991), *op.cit.*, p.260.

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within the Cauca Valley which ensured that the sugar sector had preferential access to capital goods imports were critical to modernization. Processing machinery imports set off a chain reaction within the mill, stimulating related developments elsewhere in stages of sugar-making. The experiences of mill establishment were as varied as the number of mills, but the case of Manuelita illustrates these larger trends.

In 1936 the central Manuelita mill was located on Hacienda Rita. In 1953 the mill with refining capabilities was installed on Hacienda Rosario. Manuelita milling machinery was imported from England and the USA. Milling capacity is the most useful overall quantitative indicator of technical change in the factory<sup>117</sup>. As can be observed in figure S2.4. Manuelita milling capacity steadily increased<sup>118</sup>.

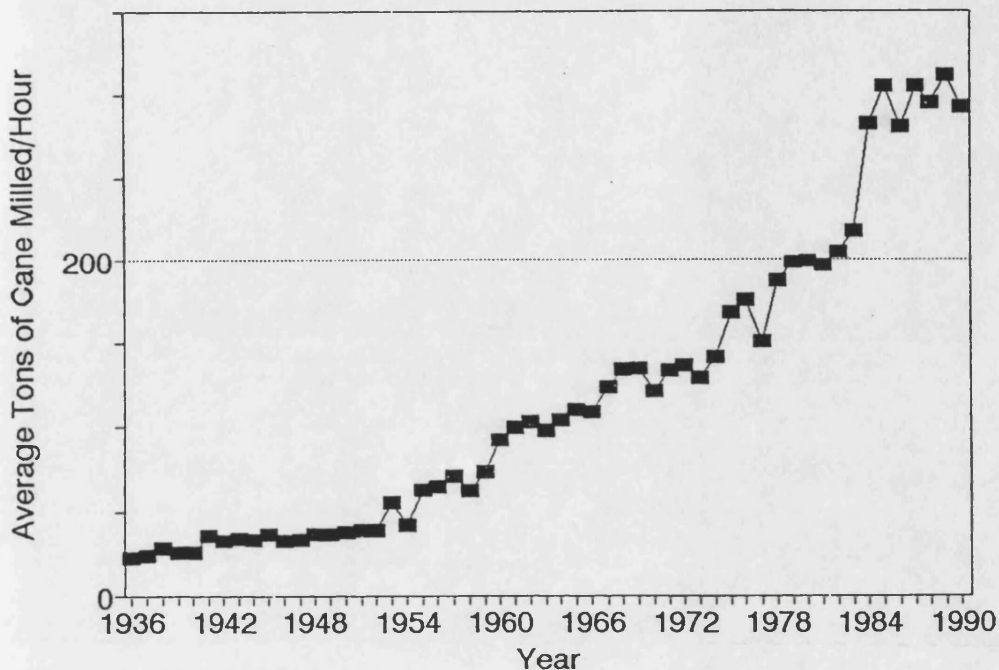
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<sup>117</sup>Qualitative indicators such as product modifications and innovations in the use of byproducts accompanied increases in capacity are also important examples of modernization. However they are difficult to incorporate into the analysis. Interview with Gerardo Ortiz (14 Feb.1992), Head of Factory Operations, Manuelita S.A., Palmira, Colombia.

<sup>118</sup>See Appendix S.3.

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**Figure S2.4**  
Average Tonnes of Cane Milled/Hour at Manuelita S.A., 1936-1990.



Source: Manuelita S.A. Archives: Factory Productive Data, Three Volumes: 1925-1953, 1953-1970, 1971-1990, Palmira, Colombia.

The number of days per annum the plant operates is another quantitative factor that demonstrates mill efficiency. Despite ideal climatic conditions, year-round harvests did not occur until 1978<sup>119</sup>. According to mill engineers, this was due to mill efficiency, not cane growing capacity. The greater efficiency from 1978 onwards was due to the increased capacity of the mill and the rise in the use of locally-manufactured spare parts<sup>120</sup>. This shows that despite labour-using field techniques (ploughing was the only field activity fully mechanized until the 1970s) cane output kept pace with mill demand. In 1901 the Manuelita mill had an installed capacity of

<sup>119</sup>Ibid.

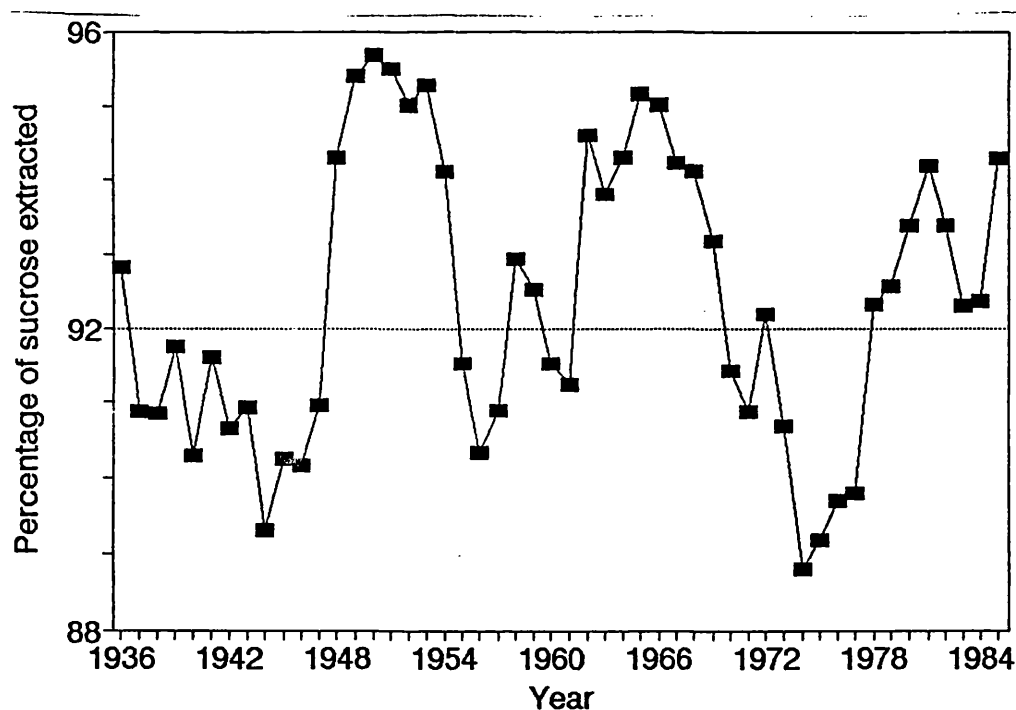
<sup>120</sup>Interview with Gerardo Ortiz (14 Feb.1992), Head of Factory Operations, Manuelita S.A., Palmira, Colombia.

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50 tons cane/day (MTCD) during a shift of 12 hours<sup>121</sup>. In 1953 the capacity of the new mill varied between 1,300 and 2,200 MTCD per 24 hour day (Table S2.9).

Another quantitative indicator of general mill efficiency was sucrose extraction. According to Manuelita engineers, extraction was very low at 89% during the 1940s. However Appendix S.3 (column 6) data demonstrate that the range of sucrose extraction was to 89-95% between 1936 and 1990, and levels show a cyclical trend. High levels of extraction, i.e. 96%, were only obtained in 1941 showing that some areas of milling achieved technical efficiency before the installation of the modern mill in 1953.

Figure S2.5  
% of Sucrose Extracted as a %  
of Initial Cane Sucrose Levels



Source: Manuelita S.A. Archives: Factory Productive Data, Three Volumes: 1925-1953, 1953-1970, 1971-1990, Palmira, Colombia.

<sup>121</sup>Eder, Phanor James (1981), *op.cit.*, p.526.

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Levels of sucrose extraction were cyclical but the peaks coincided with the years when new milling equipment was installed (see Figure S2.5 and Table S2.16). Namely, when mill capacity expanded there was an insufficient amount of cane so the additional capacity was used to extract a higher proportion of sucrose.

**Table S2.16**  
Benchmarks of Increases in Manuelita Milling Capacity, 1953-1990.

Year	Average Milling/Day (MTCD)
1953	1,300-2,200
1965/66	3,200-4,200
1970	6,800
1984	7,500-12,000

Source: Manuelita S.A. Factory Milling Performance Log Book of Three Volumes: 1936-1950; 1951-1980; 1980-present, Palmira, Colombia; Interview with Gerardo Ortiz (14 Feb.1992), Head of Factory Operations.

However when extra cane became available it was more efficient to extract less sucrose/ton and to process larger amounts of cane. This sequence proves that the foundation and expansion of mills was driven by the ability to import foreign technology rather than a processing bottleneck provoked by an excess supply of cane.

Another two mills, again imported from England, were installed in 1965 and 1966, raising average milling capacity to 4,200 MTCD. Between 1970 and 1984 a new tandem of mills from the USA were installed and cranes were purchased in order to repair the new acquisitions. Though all heavy equipment was purchased abroad and imports continued thereafter, important technological innovations occurred internally. An important innovation of this period was the substitution of steel for iron cylindrical crushers to improve cane adhesion. The new cylinders were more durable than the old, had been manufactured to a Manuelita design and were produced in

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Colombia<sup>122</sup>. This reduced reliance on imports<sup>123</sup>. Another example of internally induced innovation in Manuelita occurred in 1984 when an spiral, self-cleaning blade was substituted for multiple bladed choppers. By 1984 milling capacity reached 7,500 MTCD with an excess capacity of 12,000 MTCD<sup>124</sup>.

Manuelita was also modifying production structures in order to reduce operating costs and generate income from byproducts. Further technical change in the mill occurred in the heater section: between 1953 and 1962 three heaters designed to burn bagasse and fuel oil were installed. By 1965 Manuelita started to sell surplus low grade bagasse to Propal, one of the largest paper manufacturers in Colombia, which demonstrated a modern and wider manipulation of cane instead of the traditional by-product use of bagasse. In order for this to occur further changes in the heater section were necessary so that bagasse was sufficiently dry. New equipment--ventilators and heaters--constructed in Colombia were installed. These pieces of machinery were amongst the first of national equipment used by Manuelita. These developments enabled a phasing-out of fuel oil as an energy source. Now the mill was totally fueled with dried bagasse which substantially reduced fuel costs. These changes which occurred on the estate showed increasing levels of technical sophistication.

Technical changes in cane transport coincided with or slightly preceded mill

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<sup>122</sup>The old grey iron cylinders lasted ten years, when damaged they were difficult to repair and spare parts could only be procured after a delay. Interview with Gerardo Ortiz (14 Feb.1992), Head of Factory Operations, Manuelita S.A., Palmira, Colombia.

<sup>123</sup>Interview with Hugo Mosquera (9 Feb.1992), Factory Engineer, Manuelita S.A., Palmira, Colombia.

<sup>124</sup>Ibid.

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improvements. At the time of the installation of the new mill in Manuelita in 1953, cane was transported from field to factory by two methods, light railways constructed around the cane plots or carts pulled by tractors<sup>125</sup>. Cane was moved within the patio by small carts and cranes and then lifted in bunches held together by chains and dumped onto feeding beds which conveyed cane into the mill. The largest share of factory labour was to be found in the cane patio. In 1953 approximately ninety men (thirty per shift) were required to weigh cane, to secure bunches and gather chains once cane was unloaded<sup>126</sup>. The major change that occurred during the 1960s was an autodumping system for the carts. The intermediate task of bunching cane was eliminated. Now tractors would pull carts alongside cane tables and dump directly. Labour in the section was reduced by eighty percent: six men per shift (18 per day) now did the work of thirty (90 per day in 1953). Patio capacity increased from up to ten to fourteen tons/cart as compared to two to three tons of the earlier method and signalled a potential increase in milling capacity. Yet the 1953 scales were still used in 1990 in addition to the modern electrical scales that had been acquired in the 1980s. This demonstrates that in the face of new technology, old technology is often maintained until the new technology can completely replace the old. Historically, this technical overlay is common<sup>127</sup>. Examples can be found with the steam revolution and the computer. For example, often a typewriter is used alongside a computer to

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<sup>125</sup>This section heavily relies upon interviews held with Gerardo Ortiz, Head of Factory Operations, (during 2-6 Feb. 1992), Manuelita S.A., Palmira, Colombia.

<sup>126</sup>Interview with Hugo Mosquera (9 Feb 1992), Factory Engineer, Manuelita S.A., Palmira, Colombia.

<sup>127</sup>David, Paul (1990). "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox." The American Economic Review. 80(2), p.357.

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fill out forms or quickly type labels. This is the case in Manuelita; the mechanical continue to perform the same function only with less precision when compared to the electrical scales. Their virtue rests in their higher capacity and improved performance.

An example of the importance of foreign capital late in the period was collaboration between Manuelita and Caterpillar in the 1980s to design an integrated system of cane transport from field to factory. The joint project resulted in the production of a vehicle fitted with special tyres that allowed it to operate on harvested fields and lift and transport cane directly to the mill where it was automatically dumped onto feeder tables<sup>128</sup>. The previous system required labour for lifting and loading in the plots and unloading in the patio. This capital-intensive technical change resulted in massive labour saving.

As can be observed from other parts of the world, most techniques were capital using<sup>129</sup>. Many of the original techniques were imported and later refined in Manuelita. Gerschenkron considered technical change on a global level and recognized the importance of new techniques for international competitiveness<sup>130</sup>. He maintained that 'backward' countries could develop more rapidly than 'developed' countries by taking advantage of the new techniques on the market. Governments could provide the leadership necessary for adoption of new sophisticated technologies.

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<sup>128</sup>Interview with Eric Halliday, (Nov.1991 and Feb.1992), Sales Department, Manager of International Sales and Acquisitions, Manuelita S.A., Palmira, Colombia.

<sup>129</sup>See Sugar Part I.

<sup>130</sup>Gerschenkron, Alexander (1962). Economic Backwardness in Historical Perspective. Cambridge: Harvard University Press, pp.8-9.



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A backward country could thereby take a short-cut in their development course and narrow the gap between them and the technological bellwethers. Technical change in the later period was internally induced and reliance on foreign capital faded. This pattern corroborates Gerschenkron's theory that LDCs can take short-cuts to reach technological sophistication. Because substantial technical changes in sugar production did not occur in the twentieth century the catch-up phase was much easier to obtain as were modifications. The lag in adopting new technologies in other parts of the mill was directly related to the types of technical change which enlarged mill capacity. For example, as soon as more choppers were purchased this created bottlenecks elsewhere in the production process and induced organizational and technical changes in field and factory. Thus the initial import of mill machinery initiated a process of change throughout sugar production.

As stated in part I, the introduction of a new method reverberated in other areas of the process, which in turn stimulated new techniques to be adopted in these areas. This is illustrated by low-cost technical changes introduced into the field.

The use, adoption and adaption of low-cost techniques was prevalent until 1990 in cane fields in the Cauca Valley. This shows that a capital-intensive milling process does not necessarily signify capital intensity in every area of production. Low-cost technical change was very important. For example in 1936 field techniques, except land preparation which was mechanized, were conducted on a very primitive basis and processing was limited to crude sugar<sup>131</sup>. Generally, techniques

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<sup>131</sup>See mechanisation discussion above.

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prior to the 1950s were labour and capital using and progressive increases in labour and capital per unit of land were the overarching tendency<sup>132</sup>. For example in the 1930s there was little sophisticated land preparation in the Cauca Valley. Ploughing was undertaken by oxen or tractors and the distance between stems of cane was not systematic, ranging from 1.5 to 4 metres. Oxen and mules were also used for harrowing<sup>133</sup>. Weeding was usually carried out by hand. After 1950 techniques became progressively land saving. In the 1960s significant low-cost technical changes started taking place: plot size and shape were redesigned to make plots and planting distances uniform throughout the plantation. Changes in the distance between plantings resulted in productivity increases with planting, input application, weeding, cutting, and harvesting (piling, loading and transport)<sup>134</sup>. Since labourers had smaller distances to walk between plants, all these tasks could be conducted more efficiently and accurately because output per plot could be reliably estimated. These changes represented significant low-cost, output increasing changes. In the 1970s soil analysis became widespread and ensured adequate input application and irrigation. Around the same time, with the introduction of new varieties, plot sizes were redesigned, changing the distance between plants so that each would receive adequate amounts of sunlight and water.

As was discussed in part I, the first "shock" to field technical change was impelled by the introduction of new varieties in the 1930s when POJ 2878 entered

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<sup>132</sup>Piñeiro, Martín, *et.al.* (1982), *op.cit.*, p.298; See Appendix S.1.

<sup>133</sup>*Ibid.*, p.294.

<sup>134</sup>Interviews with Henry Cubillos (Feb.1992), Statistician for Superintendencia de Campo and Juan Carlos Osorio (Feb.1992), Field Preparation Agricultural Engineer, Manuelita S.A., Palmira, Colombia.

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Colombian sugarcane fields. This took place after a five to ten year time-lag following the discovery and planting of the new variety<sup>135</sup>. Despite attempts from the late 1940s to import and cultivate other varieties, POJ 2878 continued to be the dominant variety in the Cauca Valley until the mid 1970s<sup>136</sup>. By the 1960s and 1970s Canal Point 57603 started to be adopted because of its 20% higher yielding nature<sup>137</sup>. In 1974, studies based on fifteen sugar mills that constituted 70% of the total sugarcane area, indicated that 68% of the total cane area was still planted with POJ 2878<sup>138</sup>. However POJ 2878 remained dominant until 1974 when it was displaced by CP 57603 and a robust new variety, bred in Colombia, the Mayaguez (MSC 74275). This was another example of domestic technical advance. The use of POJ 2878 until the 1970s is not particularly due to its high yields nor disease resistance but because it saved cane fields in the 1920s when the Cauca Valley was hit by Mosaic Disease<sup>139</sup>. The new varieties, particularly CP 57603 and MSC 74275 displaced POJ 2878 as table S2.17 shows.

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<sup>135</sup>See Sugar Part I.

<sup>136</sup>Piñeiro, Martín, *et.al.* (1982), *op.cit.*, p.297; Rojas, José María (1983). Sociedad y Economía en el Valle del Cauca: Empresarios y Tecnología en la Formación del Sector Azucarero en Colombia, 1860-1980. Bogotá: Banco Popular, p.165; and see Appendix S.1.

<sup>137</sup>Interview with Carlos Arias, director of the Field Department (Feb.12, 1992). Manuelita S.A., Palmira, Colombia.

<sup>138</sup>Junguito, Roberto, *et.al.* (1975), *op.cit.*, p.212.

<sup>139</sup>Interview with Oscar Gerardo Ramos (Feb. 1992), Historian at ASOCAÑA, Cali, Colombia; Junguito, Roberto *et.al.* (1975), *op.cit.*, p.212.

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**Table S2.17**  
Distribution of Sugarcane Area According  
to Variety Cultivated for  
Mill Processing in Colombia, 1988.

Variety	%	Variety	%	Variety	%
CP 57603	30.9	Co 421	5.6	PR 1141	2.4
MZC 74275	20.3	Mex 5229	5.1	Y1	1.4
POJ 2878	12.1	PR 61632	2.8	CP 72356	1.4
PR 61632	10.8	CP3834	1.9	Misc.	.3

Source: Table constructed from ASOCANA (1990), *Aspectos Generales del Sector Azucarero 1988-1989*, Bogotá: ASOCAÑA, Table 19.

\*Percentages do not add up to 100 due to rounding and exclusion of negligible statistics concerning experimental varieties, seed beds, and 'other'.

Statistics for 1988 prove that by this time 30.9% of cane fields were planted with Canal Point and 20.25% with Mayaguez<sup>140</sup>. If the table is compared with Junguito evidence presented above it also demonstrates the considerable decline of POJ within fourteen years. The most prevalent variety at the beginning of the century and into the 1970s, had dropped to a mere 12.1% of total cane cultivated in the Cauca Valley by 1988. Variety displacement demonstrates the swift rate at which technical change was diffused in the Cauca Valley.

Table S2.12 also shows that several varieties were cultivated in the Cauca Valley in 1988. What does this signify? It indicates that the decision to cultivate new varieties was discontinuous as a gradual transformation of varietal mix did not take place. The decision to cultivate Canal Point was abrupt. Although it had been discovered in 1957 it was not cultivated to a large extent until the 1980s at the same time other varieties were planted. Though no data is available, a possible explanation is that the discovery of a new variety in Colombia, Mayaguez, prompted growers to

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<sup>140</sup>*Aspectos Generales del Sector Azucarero, 1988-1989*, (1990), Bogotá: ASOCAÑA, Chart 19.

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be more adventurous and experiment with several varieties on a wider scale. Thus by 1988 the dominant varieties, CP 57603 and MZC 74275, accounted for approximately 50% but another four varieties comprised a further 30% of area planted. No one variety predominated as had POJ 2878 throughout most of the twentieth century.

The use of anti-fungal and anti-viral treatments and seedbeds also occurred in Colombia after a time-lag. Anti-viral and anti-fungal treatment started in the 1960s and seedbed improvements by the mid-1970s<sup>141</sup>. Yet by 1984 only 60% of Cauca Valley mills were treating seeds<sup>142</sup>. This shows that although the concentration of large-scale sugar production in the Cauca Valley led to rapid diffusion of new seed technology (varietal switch occurred at a fast rate), these circumstances did not foster the speedy adoption of all new techniques. Adoption rates might be explained better by the benefits of the new technique and not to farm size.

The adoption of new seed varieties in Manuelita followed a similar pattern to the Cauca Valley<sup>143</sup>. The land-saving nature of varietal adoption is illustrated by Manuelita cane sucrose levels. Data were available from 1936 onwards. As can be observed in the graph, after 1946 sucrose levels fell.

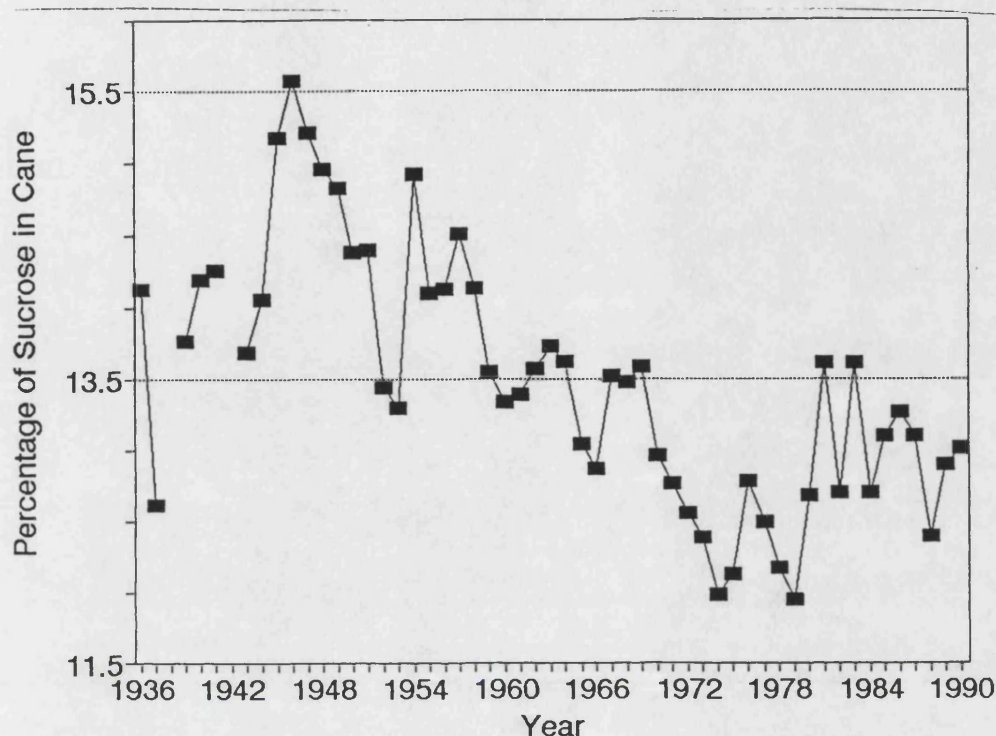
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<sup>141</sup>See Appendix S.1.

<sup>142</sup>El Valle del Cauca: Tierras y Gentes, (1984), Cali: SAG, p.64.

<sup>143</sup>Interview with chief engineer of Manuelita S.A. Sugar Mill, Gerardo Ortiz, (20 Feb 1992), Manuelita S.A., Palmira, Colombia.

Figure S2.6  
Manuelita Cane Sucrose Levels, 1936-1990



Source: Manuelita S.A. Archives: Factory Productive Data, Three Volumes, 1925-1953, 1953-1970, 1971-1990, Palmira, Colombia.

This represents an application of land saving technical change. The period between cuts became more systematic with the result that maximum sucrose/ha/month was obtained. A land saving tendency coincides with a period of increased cultivation and land acquisition<sup>144</sup>. It is a change which is not biased towards owners of capital, and easily implemented by any size producer. This is an example of low-cost technical change which occurred prior to 1950, well before export production and the period identified by historians as the era of commercial crop production.

Another example of the discontinuous nature of change is irrigation. Systematic irrigation networks did not develop as quickly as field mechanisation and

<sup>144</sup>See land usage above.

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most likely played a secondary role as the region is characterized by adequate levels of rainfall. Thus irrigation was not imperative for successful sugar production; investments in other areas of cultivation and processing were more cost effective. Low-cost irrigation techniques were used initially; ditches were dug unsystematically and water would simply flow through the plantation<sup>145</sup>. This resulted in two major problems: puddles formed in the lower parts while higher areas remained dry. The practice was still common in 1944 and proved extremely inefficient as it misused natural resources, i.e water and land<sup>146</sup>. By 1949 this changed and projects for irrigation and water control commenced in Bugalagrande in Valle del Cauca, primarily for cane and rice cultivation<sup>147</sup>. Furthermore the CVC provided a framework for more infrastructure and sophisticated systems to be developed. For example irrigation was intensified and extended. As mentioned earlier, this was a period when land became scarcer so land saving methods of cultivation were attractive. These systems largely remained unchanged until the 1970s when microlevelling, a capital-using method, was introduced from Peru<sup>148</sup>. This created even plots across which water could flow without creating puddles. Systematic irrigation did not develop as quickly as mechanized land preparation. However by the 1970s irrigation techniques became more mechanized falling into line with other areas of cultivation. These changes occurred roughly at the same time as new

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<sup>145</sup>Piñero, Martín (1983), *op.cit.*, pp.293-294.

<sup>146</sup>Rojas, José Maria (1983). *op.cit.*, p.171.

<sup>147</sup>Fals Borda, Orlando (1982). *Historia de la Cuestión Agraria en Colombia*. Bogotá: Carlos Valencia Editores, p.104; see Map S2.1.

<sup>148</sup>Piñero, Martín (1983), *op.cit.*, pp.284-296.

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varieties were planted<sup>149</sup>. By the early 1980s modern irrigation systems were common and the sugar sector in the Cauca Valley accounted for 80% of total Colombian private irrigation<sup>150</sup>. Thus showing the sophistication and modernisation of the region.

Manuelita data conform with the Cauca Valley trend. The first well in Manuelita was dug in 1956. By 1992 roughly sixty percent of the water came from the Cauca River and 40% from wells<sup>151</sup>. In 1973 microlevelling was applied. To complement the sophisticated irrigation system, the drainage network also became denser and highly integrated. Thus the discontinuous nature of change is again revealed with many new capital using technical change introduced in the 1970s. By 1990 most irrigation methods were gravity driven. Only a negligible portion, approximately 20 hectares was irrigated by aspersion methods.

Chemical input application in Colombia also experienced a lag. Manuelita had a long tradition in the use of *cachaza* as fertilizer but chemical fertilizers were only used after 1962<sup>152</sup>. Initially, cane was fertilized once per productive cycle

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<sup>149</sup>Interview with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department, Manuelita S.A., Palmira, Colombia.

<sup>150</sup>Thomas, Vinod (1985). Linking Macroeconomic and Agricultural Policies for Adjustment with Growth: the Colombian Experience. Baltimore: Johns Hopkins University Press, p.167; For data on the late 1980s see also Plusquellec, Herve (1989). "Two Irrigation Systems in Colombia." Washington, D.C.: World Bank Working Papers.

<sup>151</sup>Interview with Carlos Navia (Feb.1992), Head of Field Department at Manuelita S.A., Palmira, Colombia; see Appendix S.1.

<sup>152</sup>Ibid.



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according to the foreign suppliers recommendation<sup>153</sup>. However by the 1970s reliance on foreign knowledge declined as internal tests established that fertilizer was best applied twice per cycle at lower dosages<sup>154</sup>. This represented a process of technical adaptations. Manuelita started using pesticides in 1955. Application was by shovel<sup>155</sup>. The method changed only in 1982 with the importation of a hydraulic agitation tank for pesticide mixing and twenty hand-held pumps<sup>156</sup>. This switch increased application efficiency from 1.5 ha./man/day to 3 ha./man/day<sup>157</sup>.

Imports for field and factory triggered capacity expansion which required appropriate adjustments within the entire production process. Technical change did not follow a smooth trend, but occurred in discrete discontinuous phases determined by milling demands. However, as will be obvious from earlier remarks, changes on the production side induced by processing technology changes also had an impact on patterns of land use and labour absorption. Labour will be explored in more detail below.

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<sup>153</sup>Interview with Jorge Alberto Vallejo (Feb.1992), Cane Variety Agricultural Engineer, Manuelita S.A., Palmira, Colombia.

<sup>154</sup>"Innovaciones Tecnologicas en Manuelita S.A." Document written by Field Department. Signed by Alberto Anzola Jimenez, Vice President. Undated, must have been written post 1988.

<sup>155</sup>Interview with Juan Carlos Osorio (Feb.1992), Field Preparation Agricultural Engineer. Manuelita S.A., Palmira, Colombia.

<sup>156</sup>"Innovaciones Tecnologicas en Manuelita S.A.", *op.cit.*, p.3.

<sup>157</sup>Interview with Carlos Navia (Feb. 1992), Head of Field Department, Manuelita S.A., Palmira, Colombia.

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### LABOUR: changes in the use of, cane cutters, the effect of technical change and Manuelita analysis.

Cane labour supply in the Cauca Valley derived from a variety of sources: small landowners, sharecroppers, urban-rural migrants, rural-rural migrants and small commodity producers<sup>158</sup>. Thus it is difficult to generalize about labour. As already stated, a very important aspect of sugar production in the Cauca Valley is that due to the climatic conditions harvesting can be conducted year-round. Thus migrant seasonal labour, characteristic of other parts of the world for the traditionally labour-intensive harvest period, did not apply in Colombia<sup>159</sup>. Does this mean that mills offered stable employment conditions in the Cauca Valley? First, analysis of employment trends will focus on relative changes in use of labour as compared to other agricultural crops in Colombia as well as comparisons of relative changes in distribution of labour-use within the sugar sector and Manuelita. Second, this will be followed by a discussion of the impact of modern technology on labour, starting with the most labour-intensive area (the harvest) and continuing with other labour-intensive tasks. Third the impact of modern technology will be analysed. Lastly, specific Manuelita data will be presented, some of which could not be analysed with large aggregate data. Sectoral trends will be established before moving to analyse Manuelita data.

In the case of bananas, regional data on housing and health were used as a proxy for changes in the welfare of labour. Similar proxies cannot be used in the

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<sup>158</sup>See Adams, Dale (1969). "Rural Migration in Agricultural Development in Colombia." Economic Development and Cultural Change 17(4), pp.527-539 on rural-rural and urban-rural migration.

<sup>159</sup>See Sugar Part I.

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case of sugar. Located in the fertile Cauca Valley, sugar competed for labour with other agricultural and industrial activities which had an impact on the wages and welfare of sugar workers. These activities also make it difficult to attribute to sugar the creation of regional labour markets and establishment of infrastructure in the Cauca Valley<sup>160</sup>. Despite sugar's importance as a foreign exchange earner from the 1970s onwards, in 1985 only 20% of total agricultural incomes in the Cauca Valley derived from sugar<sup>161</sup>. Therefore, because of the commodity's lesser importance (in contrast to the role of bananas in Magdalena and Urabá), this analysis must take a different tack in order to analyze the impact of the sugar industry on labour working conditions. Nonetheless although it is difficult to construct an argument about the condition of Cauca Valley labour from trends in the sugar sector, the quality and variety of data available for the sector is much better than for bananas and potatoes.

Sectoral data when disaggregated is broken down into field and factory or blue collar and white collar, defined by the manner in which they are paid, i.e. weekly wages vs. bi-monthly salaries respectively<sup>162</sup>. Since 1936 sugar output rose, and

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<sup>160</sup>For literature on the development of Cali see Ocampo, José Antonio (1984). Colombia y la Economía Mundial, 1830-1910. Bogotá: Siglo Veintiuno Editores; Vásquez, Edgar (1990). "Historia del Desarrollo Económico y Urbano en Cali." Boletín Socioeconómico, No.20, pp.1-28.

<sup>161</sup>Banguero, S. (1990). "El Sector Azucarero Colombiano: Evaluación de su Impacto Económico y Social en la Nación, la Región, los Departamentos y Municipios en su Area de Influencia." Cali: ASOCAÑA, p.151.

<sup>162</sup>When analyzing labour in Colombia, the distinction between employee and labourer (whether permanent or seasonal) must be made. Much labour legislation is confined to employees and not applicable to labourers, and laws that do concern labourers are in general not as protective. According to law, an employee is one whose mental activities exceed physical activities. The other most notable distinction is that all employees are engaged by written contracts, whereas contracts are not required for labourers. Because of this, aseasonal agricultural labour is mainly lured by high wages since other benefits are not included. See PRO, Foreign Office (30 Dec. 1943). "Social Legislation in Colombia" FO371.38044, Registry Number AS 469/195/11 and also, for an excellent recent analysis see Reyes, Alvaro (1987).

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absolute employment levels for permanent cane workers progressively increased until the industry high (41,782 direct and indirect workers) was reached in 1970 and thereafter declined<sup>163</sup>. In addition to the advantage of non-seasonal employment enjoyed by sugar workers, wages in the sugar sector have been consistently higher than in the agricultural sector as a whole. Although differentials increased from 1960 to 1970 and then dropped quickly in 1974, they have remained substantial. For example in 1960 sugar sector wages were 36.4% higher than the agricultural average; in 1970 38.1% higher and by 1974 16% higher<sup>164</sup>.

Data on the distribution of field/factory labour shows that the proportion of field hands had declined almost continuously over time. In 1960 field workers constituted 75% of the total work force; in 1970, 73%; 76% in 1975, 75% in 1980 and 70% in 1990.

**Table S2.18**  
Labour Structure of Sugar Mills, 1960-1990.

Year	% Field	% Factory	% Administration
1960	75	22	4
1970	73	21	6
1975	76	16	8
1980	75	17	8
1985	75	16	9
1990	70	17	13

Source: Constructed from Aspectos Generales del Sector Azucarero, 1990-1991, (1991) Bogotá: ASOCAÑA, p.52.

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"Tendencias del Empleo y la Distribución del Ingreso." In Ocampo, José Antonio and Ramírez, Manuel (Eds.), El Problema Laboral Colombiano: Informes de la Misión Chenery, Bogotá: Controlaría General de la República.

<sup>163</sup>Urrea G., Fernando (1987). "Competencia y Cambio Técnico en el Sector Azucarero en la Década del 80." Cuadernos de Agroindustria y Economía Rural. No.19, p.11.

<sup>164</sup>Junguito, Roberto, et.al. (1975), op.cit., p.272.

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The share of factory jobs exhibited a linear trend, experiencing a decline during 1960-1975 which then stabilized around 16% and 17% for the rest of the period. Administrative employment in contrast displayed an increasing trend with no cyclical fluctuations. Thus, as can be expected, by the end of the period when techniques were more capital-intensive, labour in field and factory decreased and that in administrative posts increased. In terms of the distribution of the labour force among different sized mills, the data varies greatly. Data from 1963 showed that labour use in relationship with output was more balanced with the seven smallest mills representing 12% of output and employing 19% of the work force. The four largest mills (including Manuelita) produced 57% of the output and also employed 57% of the labour force<sup>165</sup>. During the 1981-1987 period these proportions change substantially. The four largest firms (again this included Manuelita) employed an average of 28.4% of the total work force in the sector during the 1981-1987 period<sup>166</sup>. The seven smallest firms accounted for 44.87% of the total employment and represented 17.4% of the production<sup>167</sup>. This data serve as a good illustration of the distribution of labour force and also confirm the trend towards capital-intensity of the largest mills. Furthermore since the largest share of labour is employed in the field, it also supports the hypothesis in the land usage section that if capital is available, as it was for the largest mills, they prefer to employ capital using methods,

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<sup>165</sup>ASOCAÑA (1964), *op.cit.*, pp.40-118; figures are based on seventeen sugar mills reporting. Knight, Rolf (1972), *op.cit.*, chart 7, p.62; Manual Azucarero de Colombia. (1964) Cali: ASOCAÑA, pp.40-118.

<sup>166</sup>Machado, Absalon (1991). El Modelo de Desarrollo Agroindustrial de Colombia, 1950-1990. Bogotá: Siglo Veintiuno Editores, p.329. Data on production levels for the four largest mills were incomplete.

<sup>167</sup>Machado, Absalon (1991). *op.cit.*, p.329.

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regardless of the abundance of labour<sup>168</sup>.

Where did the bulk of the labour force originate? As discussed in part I, the analysis of land distribution in labour procurement is germane when analysing rural areas. Table S2.12 illustrates that an average of 53% of holdings were less than 5 ha. throughout the 1960-1986 period. Thus it would demonstrate that there were considerable amounts of small producers that could supply labour to the growing cane sector. However according to Dixon's definition 53% of holdings under five hectares is a small relative share<sup>169</sup>. Dixon argued, by methods set out above, that because of the proportionately small share of small holdings in Latin America, the use of wage labour would be high. In conformity with Dixon's observation and other analysts, land consolidation expanded the labour market as it divested small and medium sized producers from their land<sup>170</sup>. Both of these conditions characterise the Cauca Valley (Tables S2.12 and S2.13). Did this result in the proletarianization?

Proletarianization occurred rapidly in the Cauca Valley and transitional stages such as those that occurred in Cuba, Guyana and the Dominican Republic were not observed. Knight contends that from the 1930s labour was proletarianized, being recruited from non-landowning rural proletariat remaining from the 'plantation' structure of earlier times:

By the early 1930's the majority of these workers appear to have been native to the Cauca Valley 'plantation' region but only a small minority retained ownership or use of

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<sup>168</sup>See Table S2.18.

<sup>169</sup>Dixon, Ruth (1983). "Land, Labour, and the Sex Composition of the Agricultural Labour Force: An International Comparison." *Development and Change*, 14(3), table 2, pp.347-372. In the study, areas characterized by high relative amounts of small landholdings (<5ha.) were Sub-Saharan Africa and Asia with 80% of plots in this category. Central and South America had the lowest relative amounts with 47%.

<sup>170</sup>See Sugar Part I.

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garden and house plots. They were basically a 'rural' proletariat. . . Movement from job to job was quite usual and labor instability was accepted for many of the large number of 'single' workers housed in *batay* barracks<sup>171</sup>.

Rojas also observed a trend of proletarianization in 1961<sup>172</sup>. The long term trend of rural proletarianization was difficult to affirm as land distribution data during the 1960-1986 period showed that small and medium producers survived. However, given the aseasional demand for cane workers and the high growth rates of Cali and the Cauca Valley in general, it is possible that labour was recruited from nearby towns and cities. A study conducted by Orozco showed that most of the labour force originated from urban areas in 1983<sup>173</sup>. Observation of the map of mill location and minor cities shows that most of mills are located near an urban centre (Map S2.2). Thus it may be possible that workers were proletarianized in the 1930s, but soon moved to urban areas. They became "urban agricultural workers", living in urban areas and commuting to nearby cane fields to work. Thus the cane worker had an additional advantage of year-round employment coupled with permanent establishment in a nearby town where access to public goods was superior. Rojas also underlines the nature and significance of employing labour from urban centres. He discovered that in certain cases that it gave mills, located closer to towns, an advantage. Many times smaller mills were able to offer lower wages and maintain their labour force in circumstances of labour scarcity. The explanation was that workers were located closer to home (the urban centre) thus transportation and food expenditures were

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<sup>171</sup>Knight, Rolf (1972), *op.cit.*, pp.38-39.

<sup>172</sup>Rojas, José María (1983), *op.cit.*, p.123.

<sup>173</sup>Orozco, Guillermo (1983), *op.cit.*, table 42, pp.109, 114. Of a sample size of 1,156, 87% resided in towns and cities near mills.

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lower as a member of the family could deliver their lunch<sup>174</sup>. Therefore the case of small commodity producer cum cane worker and rural proletariats might have only occurred during the first third of the century and possibly as early as the 1950s (when urban centres started growing more rapidly) the nature of the labour force in the Cauca Valley became primarily urban based.

Harvesting has always constituted the largest element of cultivation costs. There is an extensive body of literature on cane cutters, much of it written by sociologists focusing on various aspects of rural labour relations and the intransient employment of cutters. These issues will not be considered here. Rather the analysis will consider changes in nominal wages and working conditions, triggered by technological innovations.

High wages and an under-supply of labour have characterized cane cutting in the Cauca Valley<sup>175</sup>. This is reflected in cutters earning well above the average wage rate during the entire history of Manuelita<sup>176</sup>. The practice of contracting cutters for the harvest was not common in Colombia until the 1970s. Between 1970 and 1990 more harvest labour was secured through indirect contracting<sup>177</sup>. In

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<sup>174</sup>Rojas, José María (1984), *op.cit.*

<sup>175</sup>Interviews with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department, Manuelita S.A., Palmira Colombia; Rafael Rodríguez (Feb.1992), Cane Cutter Instructor from SENA; Palmira, Colombia; Piñeiro, Martín, *et.al.* (1982). *op.cit.*, p.75; Rojas, José Maria (1983). *op.cit.*, pp.183-185; Junguito, Roberto, *et.al.* (1975). *op.cit.*, p.219.

<sup>176</sup>Manuelita S.A. Archive Room #2, Weekly Workers Notes Week No.6, 2-8 Feb. 1939; Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec- 4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.49, 4-10 Dec. 1972; Week No.38, Sept. 1976; Week No.52, 16 Dec.1979.

<sup>177</sup>Urrea G., Fernando (1987). *op.cit.*, p.18; for a discussion on contracted workers see Sugar Part I.



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Colombia a worker is considered indirectly contracted (*enganchado*) when his name and national identity number (*cédula de ciudadanía*) are registered in the contractor's notebook. The worker then acknowledges his duties and accepts verbally a code of conduct and the fee offered to him per ton of cane cut<sup>178</sup>.

Why did the use of contracted labour start relatively late and expand rapidly in the Cauca Valley, contrary to trends described in part I? First, rural proletarians were hired in the 1930s as permanent or temporary labour and the widespread use of contracted labour did not occur until the late 1970s. For example between 1978 and 1985 the percentage of contracted labour used in the harvest increased more than 200% from 7.7% in 1978 to 29%<sup>179</sup>. The increase can not be explained by labour scarcity as it has always been characteristic of the Cauca Valley throughout the period. Secondly, the increased use of contracted labourers in the Cauca Valley occurred during a period when labour saving tasks were introduced such as cane lifting. In the face of highly labour saving technology, different methods of labour acquisition were employed to maintain flexible payrolls. Thirdly, it can be argued that increases in population levels *facilitated* labour recruitment. As in the case of bananas, later in the period rural networks become more sophisticated, more interaction occurred between rural and urban sectors and workers became more mobile. Thus, it became easier to contact and attract workers<sup>180</sup>. Fourthly, in contrast to union-organization in Peru, an excess supply of labour in the Cauca Valley

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<sup>178</sup>de Restrepo, Maria (1985), *op.cit.*, p.121.

<sup>179</sup>Urrea G., Fernando (1987). *op.cit.*, p.29, citing SENA-UNIVALLE statistics.

<sup>180</sup>See Banana Part II.

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induced workers to accept lower standards of working conditions. This allowed employers to reduce social security benefits hence the total wage bill (see Table S2.23).

From the perspective of labour in some cases contracted work was desirable. As was discussed in Part I, labour opted to become contracted workers to supplement income. A study conducted by María de Restrepo confirm these results. De Restrepo showed that labourers elected contracted work because it represented a way to obtain temporary work and earn quick cash. It was not considered a means of steady income<sup>181</sup>. Particularly with aseasonal harvests, labour can migrate to the Cauca Valley during the 'dead time' of other crops. Above it was argued that much of the agricultural labour in the Cauca Valley originated from here and became urban residents. In later years, when contracting arose, migrant labour was attracted to fill these temporary positions. At the same time the permanent workers who remained, continued to live in nearby towns and cities. This result concurs with Knights observations that the decline of labour contracting brought about qualitative changes in the work force. One of which was the relocation of residency from rural areas to cities<sup>182</sup>. Thus the proletarianization of labour in Colombia occurred during the early stages (1930s) of sugar expansion. Over time, sugar proletariats moved to the towns and cities. However during this mature stage of the capitalist transformation a new mode of labour acquisition arose, witnessing yet another qualitative change for labour. The trend of increased contracted or temporary labour is also comparable to

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<sup>181</sup>de Restrepo, María (1985). "Los Trabajadores de la Caña y la Contratación Indirecta." Boletín Socio-Económico, No.14-15, pp.121-172.

<sup>182</sup>Knight, Rolf (1982), op.cit., p.335.

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the circumstances of Urabá, however not with potato.

An important change to the harvest was the switch to a new machete. The data below derive from Manuelita, however sectoral trends can be extrapolated as cane cutters are trained by regional instructors hired by the Sistema Nacional de Aprendizaje (SENA) which move from mill to mill<sup>183</sup>. With the adoption of new varieties in the 1970s a different machete was needed to effectively cope new cane conditions as the most prominent new variety grew more erect. The Australian Machete was substituted for the traditional Red Sable Machete, used since 1936. The displacement of the Red Sable machete resulted in an increase in the average cane cut/man/day. In 1975 workers who utilized the Red Sable had a daily average output of 3.8 tons as compared to cutters using the Australian Machete who averaged 7.7 tons<sup>184</sup>. By 1977 average output climbed to 8 tons, and the most efficient hand averaged up to 13 tons<sup>185</sup>. This effected higher wages for all cutters. Furthermore, use of the Australian Machete was also characterized by decreases in accident incidence<sup>186</sup>. Red Sable cutters averaged 300 accidents per month and those using the Australian Machete experienced an average of 30 per month<sup>187</sup>.

At the same time, the order of the cut was reorganized within the plots. In

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<sup>183</sup>Much of this section relies on interviews with Rafael Rodríguez (Feb.1992), Cane Cutter Instructor for SENA, who is in charge of training cutters in all the mills, thus he has a general knowledge of the different harvest organisations in the Cauca Valley.

<sup>184</sup>"Innovaciones Tecnológicas en Manuelita S.A." (1988). *op.cit.*, p.2.

<sup>185</sup>Interview with Rafael Rodríguez (Feb.1992), Cane Cutter Instructor from SENA, Manuelita S.A., Palmira, Colombia.

<sup>186</sup>Interview with Juan Carlos Dávila (20 Feb.1992), Director of Occupation Health, Manuelita S.A., Palmira, Colombia.

<sup>187</sup>Ibid.

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1977 each cutter was assigned less lines (15) to cut because the new variety was planted at a closer distance. The cutter would cut up and down the lines, piling cane every third row<sup>188</sup>. In 1978 lines/cutter were decreased further to seven because the fifteen line approach was slow and often left the automatic lifters waiting. During 1979/80 a new technique reduced lines to five lines/cutter, and the width between plants decreased to 1.5 metres. This also increased cutter productivity. The width was important because the cane cutters cut lines according to width<sup>189</sup>. If the space between plants is optimized, daily cane cutter averages can be increased significantly by two or three tons. These changes indicate integrated technical change with the entire cultivation process, e.g. changes in variety, mechanized cutting, change in plot design and machetes. The introduction of burning fields also facilitated the work of the cutter<sup>190</sup>. According to a FEDESARROLLO sugar mill survey, Manuelita burned 11.7% of the harvested cane in 1974. In 1990 this figures almost reached 100%<sup>191</sup>. However due to the negative environmental effects of cane burning it may be prohibited in the near future. It also had negative health consequences for field hands as they had to work within the ash which obstructs breathing and vision<sup>192</sup>.

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<sup>188</sup>Ibid.

<sup>189</sup>Interview with Rafael Rodríguez (Feb.1992), Cane Cutter Instructor from SENA, Manuelita S.A., Palmira, Colombia.

<sup>190</sup>See Sugar Part I.

<sup>191</sup>Interview with Fernando Giraldo (Feb. 10, 1992), Chief Agricultural Engineer in Harvest Department.

<sup>192</sup>Interview with Rafael Rodríguez (Feb.1992), Cane Cutter Instructor from SENA, Manuelita S.A., Palmira, Colombia.

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Did these qualitative output-increasing productivity changes result in higher wages? Although cane cutting was not mechanized, productivity increased substantially due to improved plot configuration, machete engineering, and seed varieties. Thus, because of the piece-rate system, the cutters directly benefitted from productivity-increasing technical changes. Taussig, who conducted research on cane cutters in the Cauca Valley, agrees with Karl Marx that the piece-rate wage system has many advantages from the point of view of the employer.

As compared with a time-rate method of payment, the piece-rate system offers far more opportunities to the employer to intensify labour, atomize the workforce, maintain the sense of individualization, set the workers in competition with one another, and reduce the average daily wage<sup>193</sup>.

Some of these points are unsubstantiated. Piece-rates do not necessarily set workers in competition with one another because workers are not competing to cut more on the same plot. If workers cut more they directly benefit and their performance has no influence on other workers earnings. The likelihood of piece-rate wages changing from season to season is unlikely given the relative scarcity of cane cutters.

Furthermore the system ensures that a certain amount of cane will be cut. For example if certain plots must be cut in one day, cutters will be hired for that particular day. If a slower cutter is on a particular plot, another 'slow' cutter can be added. The expense of two 'slow' cutters will be the same as one 'fast' cutter. Daily wages are not necessarily decreased as a result of this system and from the point of view of the employer, once the required cane is cut, contracted workers can be dismissed. Furthermore, in the face of technical change the piece-rate system can be advantageous for workers. Now to discuss the impact of modern technology on

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<sup>193</sup>Marx, Karl (1867) Capital Vol. I. New York (1967): International Publishers, pp.551-558.

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labour.

Labour, as discussed in part I, was most heavily demanded for the harvest. However in some regions labour has been entirely replaced by mechanized techniques<sup>194</sup>. What occurred in Colombia? In Colombia employment growth has been limited as the cane industry is capital-intensive. Data displaying the share of labour employed according to crop demonstrate that the share of labour employed in commercial crops was the smallest next to plantation crops, and higher in coffee and mixed crop cultivation during the 1950-1971 period<sup>195</sup>. However due the extension of cultivation, the share of labour used in commercial cropping increased substantially from 1950 to 1971. In 1950 commercial crops employed 4.8%, 10.9% in 1960 and 11.7% in 1971 of the regional labour force. For a later period (1976, 1980 and 1984), amongst commercial crops, cane production absorbed the largest share<sup>196</sup>. However labour demand was still lower than traditional crops such as maize, plantain and potato.

Similar to Cauca Valley trends, contracted cutters did not play an important role in Manuelita until the 1970s. Thereafter data from harvest ledgers show that the

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<sup>194</sup>See Sugar Part I, particularly the case of Cuba.

<sup>195</sup>Kalmanovitz, Salomon (1974b). "La Agricultura en Colombia, 1950-1972." Boletín Mensual de Estadística, No.277, table 4A, p.111. See Appendix S.7.

<sup>196</sup>Interview with Ricardo Villaveces (Nov.1991), President, ASOCAÑA, Bogotá, Colombia.

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presence of permanent cutters diminished substantially<sup>197</sup>. Moreover, in the early 1970s a new accounting system was introduced to accomodate the growing numbers of contracted workers<sup>198</sup>. The changes that took place in Manuelita prove that labour contracting was used to maintain a flexible payroll in the face of technique adaption. Major harvest re-organizations did not take place in Manuelita until the 1970s<sup>199</sup>. During the 1936-1976 period manual lifters were demanded in a 1:2 proportion to cutters<sup>200</sup>. The switch to mechanical lifters (1977/1978) was the most drastic labour saving technical change that took place in the field. By 1990 virtually all cane was mechanically lifted, but mechanized cutting had only been adopted by a few mills. Appendix S.8 demonstrates that there had been an increase in contracted cutters from 1974. According to Fernando Giraldo, Chief Agricultural Engineer for the harvest, Manuelita labour statistics were the following:

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<sup>197</sup>Manuelita S.A. S. A. Archive, Manuelita Old Archive Room #2. Workers Weekly Notes from Week No.6, 2-8 Feb. 1939; Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec- 4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.49, 4-10 Dec. 1972; Week No.38, Sept. 1976; Week No.52, 16 Dec.1979.

<sup>198</sup>Interview with Marco Tulio Carvajal (Feb.1992), Director of Accounting Department, Manuelita S.A., Palmira, Colombia.

<sup>199</sup>See above.

<sup>200</sup>Manuelita S.A. Archive, Manuelita Old Archive Room #2. Workers Weekly Notes from: Week No.6, 2-8 Feb. 1939; Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.49, 4-10 Dec. 1972; Week No.38, Sept. 1976; Week No.52, 16 Dec.1979; demonstrate this ratio.

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**Table S2.19**  
Displacement of Harvest Labour Force in Manuelita  
Upon Introduction of Mechanical Lifting, 1977-1978.

	1977	1978
Manuelita Cane Cutters	1,200	750
Manuelita Cane Lifters	450	---
Contracted Cane Cutters	300	600
Contracted Cane Lifters	150	80
Various Tasks	350	250

Source: Interview with Fernando Giraldo (Feb. 10, 1992), Chief Agricultural Engineer in Harvest Department, Manuelita S.A., Palmira, Colombia.

Between 1977 and 1978 the change from manual to mechanized lifting took place. The switch to mechanisation resulted in a decline of cutters from 1,500 in 1977 to 1,350 in 1978. The drop in total cutters can be explained by increased productivity brought about by machete substitution and plot re-design. A similar trend for lifters is also witnessed. All of the estate lifters were made redundant though Manuelita retained more than half of the contracted lifters. Manual lifters were employed in areas of rough terrain where mechanical lifters could not enter. Manual work in uneven, rocky terrain would also require more physical exertion and could be assumed to lead to more accidents, resulting in higher labour costs if permanent Manuelita workers were used. Mechanical lifters also enabled manual lifters to be released, and to be relocated as cutters, as they continue to be a scarce factor. The reduction in total estate cutters and lifters and the increase in total contracted workers evidences that with the introduction of new technology contracted work is preferred.

In 1987 research on continuous cane lifters commenced in Manuelita<sup>201</sup>.

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<sup>201</sup>"Innovaciones Tecnológicas en Manuelita S.A." (1988), *op.cit.*, p.3.



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Furthermore in 1987 a machine was introduced that chops cane uniformly in the field once cane is cut so that transport vehicles can be more densely loaded<sup>202</sup>. In Manuelita, this could indicate that manual cane cutters will soon be phased out. The largest area of Manuelita employment will be reduced which will make both the industrial and agricultural processes capital intensive. A move which reduced significantly employment possibilities for labour.

What happened to the workers who were made redundant in 1977? In the case of contracted workers, machines were substituted entirely for labour. According to Fernando Giraldo, Manuelita cane cutters and lifters in 1977 were not laid off but relocated to other areas of the company. After mechanical cutters were introduced, a hiring freeze was activated for eleven years until 1988<sup>203</sup>. Mechanical cutters did not lead to the direct unemployment of permanent cutters rather future employment opportunities at Manuelita were reduced for eleven years. It must be emphasized that Manuelita is one of the largest sugar mills in the Cauca Valley and smaller sugarcane enterprises have less room for relocation of labour. Thus smaller mills employ a larger percentage of total Cauca Valley labour; yet when labour must be reduced, larger enterprises have more possibilities to keep existing workers employed.

Interviews with top administrators in Manuelita claimed that mechanized lifting would have tremendous social repercussions and mill owners would have to confront

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<sup>202</sup>Ibid.

<sup>203</sup>Interview with Fernando Giraldo (Feb. 10, 1992), Chief Agricultural Engineer in Harvest Department, Manuelita S.A., Palmira, Colombia.

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sugar workers, both unionized and non-unionized<sup>204</sup>. Rojas expressed a similar view, stating that the enterprises were behaving very cautiously with respect to the introduction of mechanisation<sup>205</sup>. However cutter scarcity contradicts the social repercussions of the switch from manual to mechanized cutting. If mill owners were to adopt mechanical cutting techniques the reasons would be related to relative resource prices and not social awareness as Gabriel Londoño, head of industrial relations and other sugar mill administrators suggested<sup>206</sup>. Relative resource prices in the Cauca Valley, primarily the high costs of purchasing automatic harvesters, are conceivably the most crucial factor. Furthermore purchase of the machinery is only the first part of the chain that must be linked to accomodate this technical change. As was discussed in part I, the reconstruction of appropriate transport networks, installment of new equipment for the patio, appropriate feeder tables, and a new design of choppers and separators to deal with the excess waste generated would be needed<sup>207</sup>.

The Manuelita work force increased steadily from 1948 reaching a high of 2,979 permanent workers in 1990 (Figure S2.9). This is in contrast with sectoral trends which showed a decline from the 1970s. The Manuelita indirect work force almost quadrupled after 1948 while the direct force more than doubled. The share

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<sup>204</sup>Interviews with Gabriel Londoño Domínguez, (February 1992), Head of Industrial Relations and Gerardo Ortiz, Head of Factory Operations (February 1992), Manuelita S.A., Palmira, Colombia.

<sup>205</sup>Rojas, José María (1983), *op.cit.*, p.184.

<sup>206</sup>Interviews with Gabriel Londoño (18 Feb.1992), Head of Industrial Relations and Carlos Navia (13 Feb.1992), Head of Field Department, Manuelita S.A., Palmira, Colombia.

<sup>207</sup>See Sugar Part I.

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of the direct labour in the total work force declined slightly from 92 % to 87 % during the 1948-1990 period<sup>208</sup>.

**Figure S2.7**  
Manuelita Indirect and Direct Work Force, 1948-1990



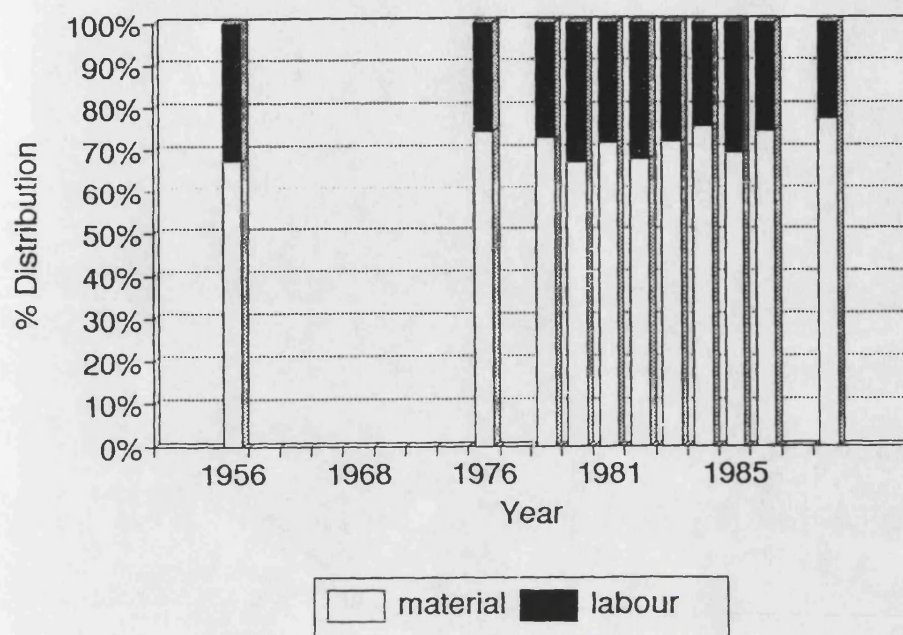
Source: Manuelita S.A. Archives: Administrative Department, Reports to President Anzola on "Direct and Indirect Work Force Benefits." (1990); Manuelita Accounting Statements (1956-1988), Palmira, Colombia.

The largest proportion of the direct force was employed in the field. The indirect work force has always been concentrated in the administrative branch of Manuelita. During the 1950-1990 period labour costs have dominated between 24-36% of the cost structure. There appears to be cyclical trends with no significant increase nor decrease in labour costs.

<sup>208</sup> Direct work force is defined as that which is paid wages and indirect work force is paid a salary.

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**Figure S2.8**  
Break-Down of Costs (Material and Labour) for  
Manuelita Field and Factory



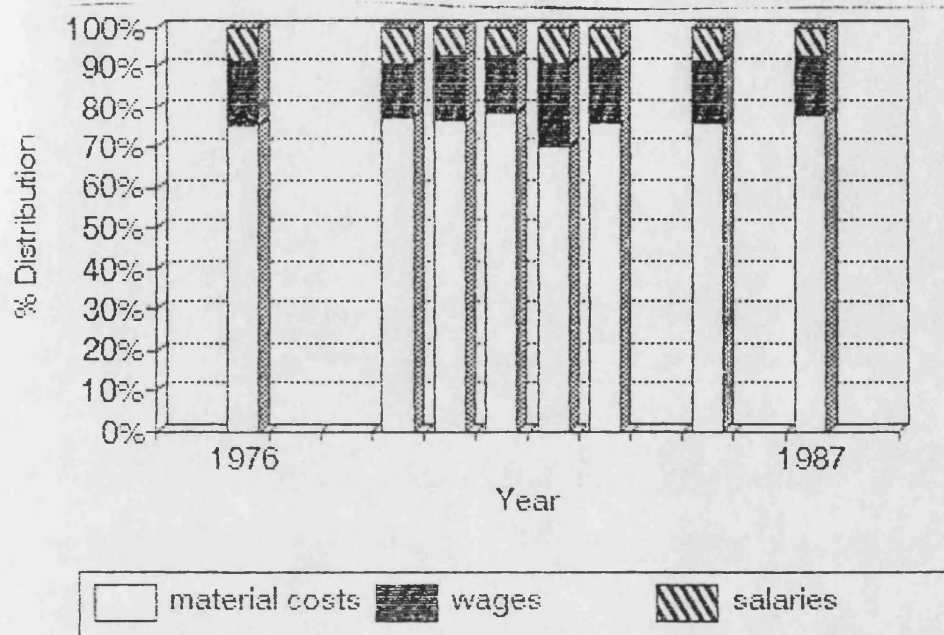
Source: Manuelita S.A. Archives: Administrative Department, Reports to President Anzola on "Direct and Indirect Work Force Benefits." (1990); Manuelita Accounting Statements (1956-1988), Palmira, Colombia.

Data disaggregated into field and factory demonstrate a marked change in labour costs. Manuelita data from 1952 displayed a small increase in the share of cane costs through the years and a decrease in labour costs. Because no radical change occurred in this ratio this shows an increase in both capital and labour using techniques. From 1950 to 1988 costs of indirect work force in field and factory remained relatively constant comprising the same share while costs of direct labour fluctuated. For the factory alone, data were broken down into two areas: maintenance and the industrial process. As can be expected, the industrial process had extremely high material costs which dominated 70% of the bill.



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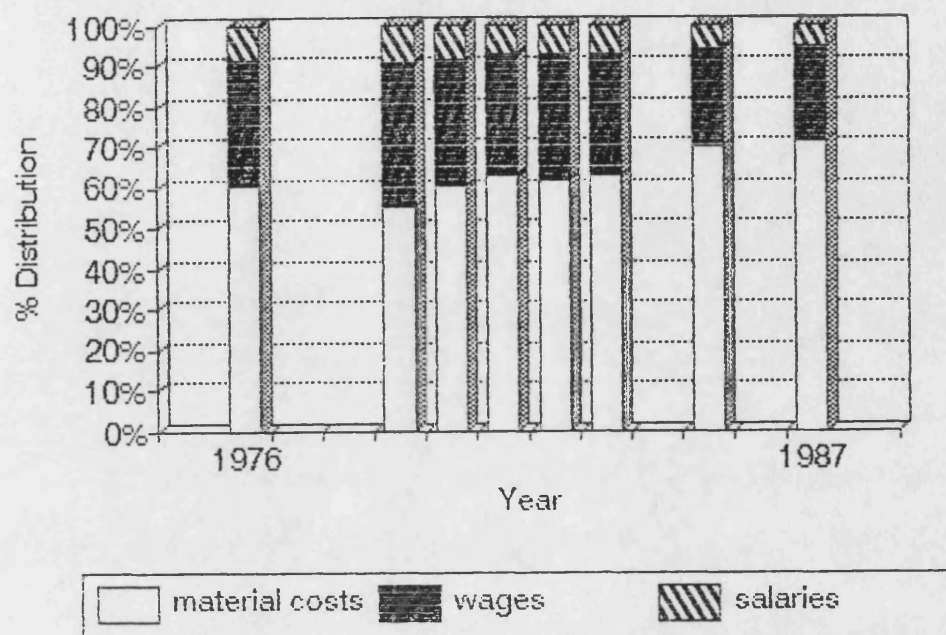
**Figure S2.9**  
Break Down of Industrial Costs (Material and Labour) for  
Manuelita Factory, 1976-1990.



Source: Manuelita S.A. Archives: Administrative Department, Reports to President Anzola on "Direct and Indirect Work Force Benefits." (1990); Manuelita Accounting Statements (1956-1988), Palmira, Colombia.

Direct labour force was next highest, occupying roughly 12-20% while that of indirect labour force stayed constant at around 10%. Costs for labour in maintenance were relatively high (30%) at the beginning of the period but by 1987 they had dropped to about 20%.

Figure S2.10  
Break Down of Costs (Material and Labour) for  
Maintenance, 1976-1987



Source: Manuelita S.A. Archives: Administrative Department, Reports to President Anzola on "Direct and Indirect Work Force Benefits." (1990); Manuelita Accounting Statements (1956-1988), Palmira, Colombia.

Concurrently, the share of material costs and salaries (indirect labour force) remained relatively stable. Thus, the most variable cost in field and factory was labour force wages. The fact labour costs have remained prominent, signals their relative importance in production. Furthermore it shows that a significant relative reduction of labour costs did not occur later in the period (1950-1990) when the majority of capital using, labour saving techniques were implemented<sup>209</sup>.

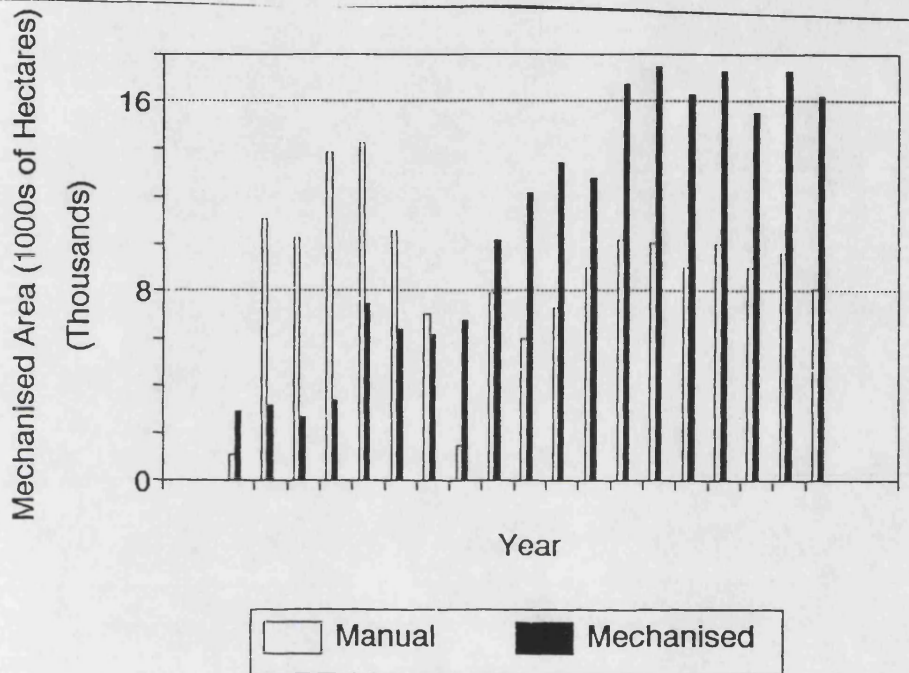
What were the trends in Manuelita in terms of field labour use? Did capital-using methods significantly displace labour? On balance, Manuelita methods were labour using. Although machinery was used, in many cases labour was

<sup>209</sup>See Appendix S.1.

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complementary. Until the end of the period (1976-1990) only some tasks became fully mechanized. Between 1970 and 1990 planting was conducted predominantly by hand, thereafter mechanisation was introduced.

**Figure S2.11**  
Evolution of Manuelita Manual and Mechanised Planting, 1971-1990



Source: Manuelita S.A. Archives: Superintendencia de Campo, Monthly Reports of Cultivation Department, 1970-1990, Palmira, Colombia.

Although Manuelita was quick to import tractors, statistics from 1971-1990 reveal that manual planting was still prominent<sup>210</sup>. The data demonstrated that although manual planting levels of the 1980s were equivalent to those of the 1970s, they proved to be notable, representing roughly one-third of total area planted<sup>211</sup>. Thus even late in the period, when mechanized planting was common virtually world-wide, Manuelita still employed hard labour. Continued use of labour was not necessarily

<sup>210</sup>See above.

<sup>211</sup>See Appendix S.2.



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due to the dearth of capital, but rather related to difficulty in mechanising certain tasks, and the imperative to invest capital to expand mill capacity, purchase replacement parts and construct transport networks<sup>212</sup>.

It was argued earlier that the Cauca Valley was over mechanized in 1959 and by 1972 departmental statistics demonstrated a tendency of de-mechanisation. An interesting trend for the 1970-1990 period was the practice of alternating mechanized with manual techniques. As will be seen below, machines were used to a wider extent in the late 1970s however by the mid-1980s production processes switched back to more labour-intensive methods. Thus it shows the flexibility of these producers to switch back and forth from capital to labour using techniques, and that the switch to mechanisation did not necessarily advance a sequence where higher levels of mechanisation would follow.

Irrigation has been present since before 1936<sup>213</sup>. According to weekly worker's pay roll, in the agricultural process irrigation was the third most labour-intensive job after cutting and lifting during the 1939-1990 period. Direct labour force data indicate increasing amounts of labour employed in the irrigation division until 1965 (see Table S2.20). The decrease from 1965 is attributed to the upgrading of irrigation and drainage systems in the 1960s which thereafter required less

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<sup>212</sup>See Sugar Part I.

<sup>213</sup>Interview with Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department, Manuelita S.A., Palmira, Colombia.



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labour<sup>214</sup>.

**Table S2.20**  
Most Labour Intensive Tasks in the Agricultural Process  
in Manuelita, 1939-1990 (workers employed/week).

Year	Irrigation	Cane Cutters	Cane Lifters
1939	40	192	83
1946	69	249	216
1949	80	63	85
1953	155	240	118
1956	148	257	122
1960	165	376	166
1965	182	497	175
1970	132	435	177
1972	130	574	190
1976	110	870	293
1979	n.a.	967	116
1985	n.a.	1280	n.a.
1990	n.a.	1659	n.a.

Source: Manuelita S.A. archives. Weekly workers Notes: Week No.6, 2-8 Feb. 1939; Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec-4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.49, 4-10 Dec. 1972; Week No.38, Sept. 1976; Week No.52, 16 Dec.1979; Superintendencia de Campo, Monthly Reports of Harvest Department 1970-1990, Palmira, Colombia.

According to table S2.20 irrigation became important in the 1950s. Previously irrigation labour figures were low and during the 1949-1953 period the number of workers employed in irrigation nearly doubled. If the irrigation labour force is compared to cutters an idea of increased land extension versus labour force deepening can be analyzed. The number of cutters demonstrate the extent to which cane is being cultivated, i.e. cane must be cut during a particular period in its life cycle, whereas irrigation labour figures are not easily interpreted since they are weather-

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<sup>214</sup>"Innovaciones Tecnologicas en Manuelita S.A.", *op.cit.*, p.9.

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related. Between 1939 and 1960 labour in irrigation quadrupled while cutters only doubled. This demonstrates that the up-grade of irrigation techniques were labour using. Furthermore early irrigation advances indicate agricultural modernization before the 1960s which was a result of mill expansion and not export markets. From 1965 there was a relative decline in numbers of irrigation workers. As varietal switch took place in the mid-1970s it can be asserted that labour was maintained until that period and thereafter numbers declined as no other significant technical changes occurred in the field that would affect irrigation.

According to cultivation statistics dating back to 1946, manpower used in soil preparation increased in absolute terms until 1976 (Table S2.21) whereas land extension only increased substantially until 1950 (Table S2.5).

**Table S2.21**  
Tractor Operators in Manuelita, 1946-1976.

Year	Tractor Drivers
1946	14
1949	9
1953	27
1956	24
1960	15
1965	64
1970	54
1976	77

Source: Source: Manuelita S.A. archives, weekly payrolls, 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec- 4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.38, Sept. 1976. Manuelita S.A., Palmira, Colombia.

Furthermore the increase in labour force between 1960 and 1970<sup>215</sup>, during a period

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<sup>215</sup>See Appendix S.5.

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of stagnant land extension, demonstrates the labour using, land saving nature of cultivation practices. Therefore labour continued to be used to a large extent.

Analysis of remuneration in Manuelita will be based on direct and indirect labour. Aggregate industry data from the mill demonstrated an expansion of workers in machinery repair and equipment maintenance (i.e. pneumatic, hydraulic and electrical plants and electric instruments for cultivation and processing) and a decline in the less-qualified jobs such as work in the patio<sup>216</sup>. Aggregate field data demonstrated an increase in both direct and indirect labour (see Appendix S.5). Of the changes that occurred in Manuelita, the least substantial were those in the industrial process. Consistent with trends mentioned in part I, as milling capacity increased, absolute labour figures for the factory increased but at a much slower pace. The majority of direct labour in Manuelita was still employed in the field.

The first wage series data presents the evolution of the basic wage rate. This basic wage rate is not the average rate for workers at Manuelita but refers to the lowest paid workers. It is useful because all other unskilled worker's wages are related to this minimum scale. Thus an increase or decrease had repercussions on all other rates. The figures in this series were not collected systematically but efforts have been made to compile data for the earliest month of the year<sup>217</sup>. Because harvests are conducted year-round, this should not affect adversely the quality of the information. In table S2.22 cold climate agricultural wages, average national agricultural wages, and Manuelita wages are displayed. Agricultural wages in

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<sup>216</sup>Urrea G., Fernando (1987). *op.cit.*, pp.18-20.

<sup>217</sup>Eighty-one per cent of the data is composed of wage data originating from the first six months of the year.

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national accounts are differentiated between cool and tropical climates. Cool climates include commodities such as coffee, wheat, flowers and rice are cultivated. Crops grown in the tropical climates include sugarcane, fruit, and generally less profitable agricultural commodities. Manuelita wages consistently remained above the other two indices during the 1935-1970 period and the rate of increase was also faster except between 1967 and 1969.

**Table S2.22**  
Comparison of Colombian Agricultural Basic Wage Rates  
and Manuelita, 1945-1970.

Year	Cold climate (Cundina marca) ag wages	Index	Colombian ag. wages*	Index	Manuelita a basic wage rate	Index
1945	1.00	100	1.09	100	2.00	100
1947					2.50	125
1950	2.30	230	2.52	231	3.36	168
1954					4.50	225
1955	3.25	325	3.46	317		
1959					7.50	375
1960	5.25	525	5.51	505		
1965	11.60	1160	11.28	1035	24.00	1200
1966	12.60	1260	13.17	1208	27.00	1350
1967	14.20	1420	14.07	1291	30.00	1500
1969	17.22	1722	17.03	1562	32.1	1505
1970			18.80	1625	34.10	1605

Source: Urrutia, Miguel (1979). *Cincuenta Años de Desarrollo Económico Colombiano*. Bogotá: La Carreta, pp.208-209, Manuelita S.A. archives. Administrative Department, Report to President on minimum wage rate in Manuelita (1972), Palmira, Colombia.

\*Global Colombian data collected from DANE official statistics.

Colombian agricultural wages were usually higher than those paid in cool climates.

This may be because cool climate wages were collected in Cundinamarca where lower wages can be offered because of the presence of a large urban centre (Bogotá), and

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the easier access to labour. Movements in wage rates can also be interpreted to represent labour scarcity. Higher wages had to be paid to attract or sustain an adequate supply of labour in the Cauca Valley.

Another aspect of the basic wage rate is that it does not include social security benefits (*prestaciones sociales*), which have ranged from 19-33% (Table S2.23) of Manuelita's total labour costs. Social security in Manuelita take the form of vacation pay, increased pay on holidays and Sundays, medical care, subsidized food purchases at the Manuelita cooperative (roughly in operation between 1950-1975), and subsidized transport and housing. According to data gathered during 1954-1988, at the beginning of this period a larger percentage of labour costs comprised social security benefits, a proportion which declined thereafter.

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**Table S2.23**  
Social Security Costs as a Percentage of Total Labour Costs  
in Manuelita, 1954-1988.

Year	% of aggregate labour costs that are social security	wage bill: % of salaries that are social security	% of wages that are social security
1954	31.82	--	--
1955	29.01	--	--
1956	33.29	--	--
1957	32.67	--	--
1958	32.27	--	--
1976	19.62	9.27	22.78
1979	19.02	9.04	21.46
1980	19.36	8.59	22.30
1981	19.00	9.07	21.78
1982	19.10	8.99	21.90
1983	18.66	9.06	21.28
1984	19.09	9.54	21.63
1986	20.60	12.60	22.93
1988	19.96	13.43	21.95

Source: Manuelita S.A. Archives, Figures 1954-58: Letter to Universidad de los Andes, Economics Department on Social Security Benefits (1959); figures 1976-1988: Administrative Department Report to President Anzonla on "Direct and Indirect Work Force Benefits" (1990), Palmira, Colombia. See Appendix SA.6.

The data show that 1956 was the year in which the highest percentage (33.29%) of the labour bill was deducted for these benefits. This figure decreased throughout the decades and remained fairly stable in the 1980s at 20%. The drop in the percentage of aggregate labour costs can be explained partially by the decrease in direct work force and increase in indirect labour. Data commencing in 1976 demonstrated that a much smaller share of the total Manuelita wage bill was directed towards social security benefits as compared to indirect labour (an average of 10% versus 22%). This can partially explain the decline in social security costs; there has been a decline in the direct and an increase in the indirect workforce. Though, if 1976 figures are

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inferred from 1954 to extrapolate indirect and direct work force, there is no denying that Manuelita appears to be devoting a smaller portion to this aspect of the bill in 1990. Furthermore the increase in contracted field workers since the 1970s also reduced the share of social security in the total wage bill. This evidence is the reverse of Knights observation in Peru--the modernization of the work force in Peru led to increased social benefits.

In table S2.24 the minimum wage rate at Manuelita and cane prices are indexed in order to observe the magnitude of relative price increases of both. The price of cane increased at a much slower pace than that of the labour force which increased roughly twice as quickly, indicating reasons for labour saving technical change. However labour using techniques continued to be employed considerably in

## Part II: La Manuelita Sugar Mill

the field.

**Table S2.24**  
Nominal Cane and Labour Prices for Manuelita, 1936-1971\*.

Year	Cane Price (Pesos/Ton)	Index	Wage Rate (Pesos/Week)	Index
1936	\$1.68	12		
1937	\$1.23	9		
1953	\$14.31	100	\$2.56	100
1956	\$19.69	138	\$4.70	183
1959	\$29.64	207	\$7.50	294
1961	\$28.68	200	\$10.00	391
1963	\$67.65	480	\$15.55	607
1964	\$96.67	676	\$35.05	1369
1971	\$94.20	658	\$36.60	1429

Source: Manuelita S.A. Archives, Cane price derived from Reports to the Banking Superintendency 1936, 1937, 1953, 1956, 1959, 1961, 1963, 1964, and 1971. Wage rates derived from Weekly Workers Notes: Week No.6, 2-8 Feb. 1939 Week No.21, 18-24 May 1944; 28 Nov.-4 Dec. 1946; Week No.1, 29 Dec-4 Jan. 1949; Week No.50, 10-16 Dec. 1953; Week No.39, 20-26 Sept. 1956; 17-23 Nov. 1960; 28 June-4 July 1965; 26 Oct.-1 Nov. 1970; Week No.49, 4-10 Dec. 1972 Week No.38, Sept. 1976; Week No.52, 16 Dec.1979. Archive rooms #2 and 3, Manuelita S.A., Palmira, Colombia.

\*The table only reaches 1971 because in that year accounting practices changed and the price of cane was aggregated with all other material field prices.

In the 1950s the price of cane was substantially higher than labour. When field activities were broken down into two tasks, the harvest and general operation, the costs of the harvest were consistently dominated by labour, particularly wage labour. Within the general operation the costs between material and labour were divided approximately 40%/60% in the 1980s<sup>218</sup>. This micro-Manuelita trend is also consistent for the agricultural sector as a whole. According to a study of the Ministry of Agriculture, in the 1980s the most marked trend in agricultural cost structures was the systematic increase in the cost of the labour and the decrease in chemical and

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<sup>218</sup>Interview with Gerardo Ortiz (Feb. 1992), Head of Factory Operations, Manuelita S.A., Palmira, Colombia.



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machinery inputs<sup>219</sup>. Thus field labour costs increased until the mid-1970s and thereafter declined. This can be explained by widespread field technical change. In terms in relative costs, labour share remained stable during 1950-1990.

Labour was used extensively and manual methods persisted until 1990. Although output increased until 1990, sectoral trends demonstrated a decrease in labour employed from 1970. The substantial increases in labour productivity of the 1970s can explain the drop in the use of labour. Proletarianization occurred early in the Cauca Valley. Later, rural proletarians largely moved into the cities and became urban agricultural workers. In contrast with world trends, contracted labour was employed late in the capitalist transition. The shift to contracted work was related to maintaining payrolls flexible in the face of adopting major technical changes in the field and reducing labour costs. Mills were able to shift to this method because a more mobile labour force was willing to migrate to the Cauca Valley in order to supplement income. Moreover, increases in population levels were a cause of workers willingness to accept less than optimal labour conditions. Although labour productivity increases in the 1970s might have placated labour demands as they resulted in increased wages.

Manuelita trends diverge slightly from sectoral trends as total labour employed increased until 1990. However in terms of technical changes, trends converge. The continual use of labour is evidenced both with data of cost structures and absolute numbers of labour employed in particular tasks. Furthermore the enormous relative

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<sup>219</sup>Ministerio de Agricultura and Departamento Nacional de Planeacion (1990). El Desarrollo Agropecuario en Colombia, Tomo I. Bogotá: Ministerio de Agricultura, p.302.

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increase in labour costs relative to cane, shows the prominence of labour in production. The discontinuous nature of technical change is implicitly evident in this section with the related harvest changes in the 1970s. Labour received high wages relative to Colombian agricultural labour. However the long-term differential between Colombian and Manuelita figures declined. Furthermore social security benefits also decreased. This coupled with the increase use of contracted labour signals a quantitative and qualitative decline in labour standards.

## CONCLUSION

Agricultural transformation in Cauca Valley sugar production mainly occurred in the twentieth century in contrast with the earlier trends discussed in part I. As in other sugar growing areas the agroindustrial structure has become highly oligopolistic. By 1990 the existence of only three refining mills out of a total fourteen modern mills in the Cauca Valley illustrate the large amounts of investment required to establish modern processing operations. Capital deepening was also visible in sugar exports.

At the beginning of the period cane was grown throughout the Cauca Valley to be processed in small-scale *trapiches* or modern mills. The data demonstrated that most panela producers were displaced by the modern industry. Thus as in the case of Australia, higher technical levels resulted in the disappearance of small-sized producers. However in the Cauca Valley this could be due to structural elements of the region characterized by large-scale commercial cropping which also influenced the displacement of cane-panela production.

By the 1960s and 70s independent suppliers became more important to the

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industry. However the data showed that most of these units were medium- to large-scale. Between 1960 and 1986 medium- to large-sized (100-1000ha) agricultural production units increased while total land area of small and enormous-sized plots diminished. Moreover the definition of small farms has been generous, in many studies, 10 to 50 hectare farms are considered medium-sized and anything above this would be large. From this perspective, Cauca Valley land ownership would be yet more concentrated. From a departmental level also, gini coefficients confirm the high levels of land concentration in the Cauca Valley. The data from Manuelita exhibit similar trends. Most Manuelita land was acquired before 1950 and independent suppliers were not needed for additional cane supplies until the 1960s.

Technical adoption and modernisation were more closely linked with domestic conditions. Within Colombia technical levels were low at the beginning of the period. The importation of mill machinery impulsed field technical changes to occur when the majority of large-scale mills were established during the 1940s and 1950s. Colombia's entrance into the international sugar market in 1964 did not necessarily increase the number of mills as most were established by 1960. Rather, prior to 1964 as population grew, sugar demand increased, land became more scarce, and the incentive to adopt land and labour saving technical change became stronger. It was not the external market that motivated these changes, rather they were related to firm survival in the Cauca Valley. In addition, informal institutions and political links assisted the sugarmill owner to obtain machinery and inputs. The large-landowning structure was crucial for cane cultivation and procurement of milling machinery.

External purchases of machinery did not set a precedent for complete further

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reliance on technological improvements. According to Piñeiro, most of the technical changes in sugarcane cultivation were induced by exogenous factors<sup>220</sup>. If one looks at the technical change chart (Appendix S.1), a generalization of this nature cannot be sustained. Major contributions of internally induced technical change included, the fabrication of farm implements, new methods of cane transport from field to factory, and the discovery of the new see variety, Mayaguez,--to mention only the major domestic innovation.

In the agricultural process most transformational changes were labour and land saving. Although labour continued to be an important aspect of cultivation and harvesting, recently some methods were modified to become labour using once again. Technological advances in seed varieties and inputs have been notable in the fifty-five year period observed. This may signal a barrier for the small-scale producer because of the difficulty in obtaining credit, purchasing heaving machinery and the lower likelihood of receiving knowledge of technical innovation. However, various modes of land contracts appeared which enabled these producers access to new techniques provided by sugar mill owners. At the time when independent suppliers started being contracted, many small producers had already been displaced. In addition, the oligopolistic structure of processing allowed mills more leverage in the arrangement of contracts. Hence the small-scale producers and independent suppliers were at a clear disadvantage.

Sectoral labour force trends were characterized by a relative increase of indirect and a decrease in direct labour. The field accounted for a much higher

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<sup>220</sup>Piñeiro, Martín, *et.al.* (1982). *op.cit.*, p.308.

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percentage of workers than the factory. It is difficult to ascertain which of the two areas has undergone the highest degree of technical change. If one considers proportional changes in the direct labour force of the industrial and agricultural process, the industrial process demonstrates the most substantial transformation. However, this method of analysis only takes into account changes in capital to labour ratios. Changes in techniques such as new plot design, innovative curvature of the machete, and improved seed variety do not exhibit changes in this ratio, also prove significant for increasing labour productivity.

Have cane workers benefitted from technical change and development in the Cauca Valley? Qualitatively sugar workers situation improved, however quantitatively wages and benefits declined. First, it is clearly observed that some technical changes have augmented worker's productivity which translated into higher salaries when pay is based on the piece-rate system. Second, qualitative changes in the labour market such as the gradual shift of labour to urban areas represents improved standards of living. Third, quantitative data show a closing of the gap between higher than average agricultural wages in the sugar sector as compared to the rest of the primary sector. Lastly, social security benefits clearly declined in the Manuelita.

Comparatively, technical changes in the Manuelita mill were not as labour using. First, the modern factory technology of 1953 did not require much labour. This has continued to be true, and absolute labour demand has been on the decline since the mid 1960s. Increases in demand for trained labour for repairs and maintenance demonstrated a qualitative change in labour force composition in the

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factory. The field does not show as much sophistication. But, this could be a question of accounting practices. Technicians and maintenance workers were aggregated in the factory data; some of which also work in the field. The field does not hire any mechanical technicians *per se*.

From an economic perspective, sugar production has been successful. It is characterized by stable growth and profitable internal and external sales. Because of the nature of sugar nature, the commodity can be used as an industrial input and for direct sale. In addition, many of the byproducts derived from cane can be redirected into the productive process or sold as inputs to other industrial processes such as the paper or plywood industry. Historically sugar exports, have existed since the nineteenth century, but did not gain importance until the middle of the present. Mill owners were geographically concentrated in a fertile and relatively violence-free region in Colombia. Because the area was already characterized by large haciendas of earlier times, land tenure-related conflicts were uncommon. Land claims originated from the Spanish Crown and legalization of title was the tradition. Though land titles have been flexible in certain periods such as the wars of the nineteenth century and "la violencia" of the twentieth, land concentration persisted. Furthermore many mill titles were established prior to the 1950s, before other agricultural pursuits became more modern and productive. Thus, increased demand for land (post-1950) occurred when titles were fixed leaving no room for dispute.

From a labour perspective, the sugar industry has had very few conflicts and still employs large amounts of manual labour as compared to other commercial crops. However when labour figures are compared to small commodity producers, the

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percentages of work force employed by the cane industry is marginal. The level of Manuelita labour absorption also confirms this trend. Manuelita experienced rapid technical changes and productivity increases during the 1936-1990 period. Increases in worker productivity induced a release of some of the labour force. However, its growth in Manuelita offset these lay-offs. Work force figures demonstrated continual increased employment levels. Some of the direct work force in the sugar industry such as cutters receive very high wages in comparison to the agricultural sector as a whole, and Manuelita always ranked above average agricultural wages paid in Colombia. Nonetheless, since employment levels as compared to the agricultural sector are low, its contribution to stimulating internal markets remains low.

On a strictly economic level, the process of rural transformation associated with sugar in the Cauca Valley could be considered advantageous. From a socio-economic standpoint, the excessive land concentration and low use of labour would rate the agroindustry less desirable. The industry provides acceptable working conditions for the direct labour force, and generates foreign receipts. However the increase in indirect contracting and the decrease in the proportion of the wage bill directed towards social security evidences declining conditions for labour. Levels of labour generation are extremely low when compared to the agricultural sector as a whole. This, coupled with concentration of means of production has suppressed the development of an internal market in the Cauca Valley; profits remain in the hands of the owners of capital and land, and development of a middle class is stifled.

Land tenure was consistently skewed throughout the period. Land conflicts have not been prevalent because these large landowners have been able to maintain

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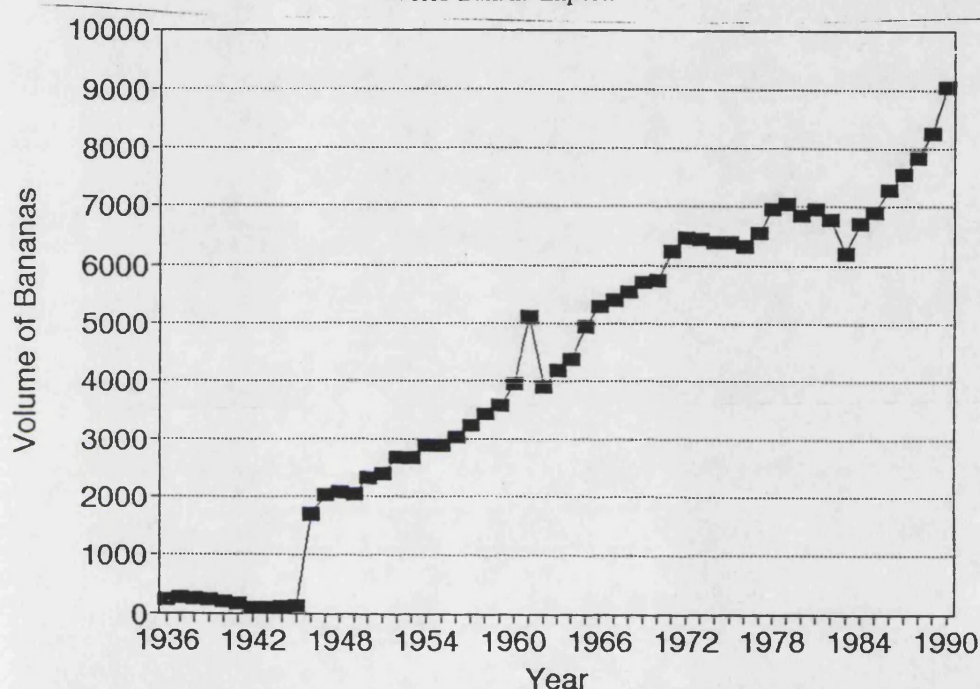
land throughout periods of instability. This is in contrast to other areas of the Colombian countryside where violent conflicts have taken place. Another advantage for the landowners is the initial high-capital requirement for sugar mill establishment; because of this, other possible land conflicts have not arisen. Namely, it is difficult to enter into this business. Furthermore the early development of informal and formal institutions has furnished impressive support for the nascent sugar complex. The development path of the sugar industry has followed a gradual transformation: consolidation occurred by the 1960s. Because of this stability and the initial patterns of land ownership in the Cauca Valley, the sugar industry has experienced less obstacles in to modernization than other crops in Colombia.



## Banana

Bananas are one of a limited number of tropical agricultural commodities to be exploited to a large extent in Latin America. Banana production and commerce experienced a development boom around the beginning of this century and since then trade expansion has been sustained more or less constantly<sup>1</sup>.

Figure B1.1  
World Banana Imports



Source: International Yearbook of Agricultural Statistics 1941-42 to 1945-46, Vol II: International Trade, (1947), Rome: FAO, pp.152-161; International Yearbook of Agricultural Statistics Vol.IV, part 2 (1951), Rome: FAO, table 12, p.36; International Yearbook of Agricultural Statistics (1941), Rome: International Institute of Agriculture, table 77, pp.284-287; World Crop and Livestock Statistics 1948-1985 (1987), Rome: FAO, table 56, pp.516-521; The State of Food and Agriculture 1990 (1991), Rome: FAO, table 6, p.192.

In terms of importance on international commodity markets, bananas were the fourth largest foreign exchange earner in 1989<sup>2</sup>. Because of the historic growth of the trade, banana receipts could be considered a steady source of export income, though not necessarily in all cases. Sources of supply have increased as world production

<sup>1</sup>See Figure B1.1.

<sup>2</sup>Commodity Review and Outlook (1991), Rome: FAO, p.13.

has shifted and competition has pushed some banana-growing regions out of the market while new ones have entered. At the outset of the banana trade prospects were favourable: bananas were virtually the only fresh fruit available for twelve months of the year at reasonably steady prices<sup>3</sup>. Thereafter, demand was affected by the availability of other fresh fruits. Today in many markets, more fruits have a non-seasonal supply and thus the substitution effect has diminished relative banana demand. Nonetheless, with population increases and expansion of global markets, the banana trade during the 1936-1990 period has expanded (except for a short period in the 1970s). In Colombia, bananas have featured irregularly in the export schedule and in 1990 were the third highest export earner behind coffee and cut flowers. Colombian export-banana production has been concentrated in two regions: Magdalena on the central Atlantic Coast and Urabá located in the Darien Gulf<sup>4</sup>. Magdalena was the leader in Colombian banana exports until 1966 when export levels dropped drastically. At this point exports from Urabá grew so that by 1990 production there represented 63% of national export-banana output<sup>5</sup>. In part I a comparative regional examination of the transformation of export-banana production and aspects of international marketing will be conducted followed by analysis of the Colombian experience in part II. Because the majority of export banana production throughout the period was concentrated in Latin America many of the examples are derived from the continent, though efforts will be made to underline regional divergences and varied production patterns. Growers who cultivated for local

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<sup>3</sup>Arthur, Henry, Houck, James and Beckford, George (1968). Tropical Agribusiness Structures and Adjustments: Bananas. Boston: Harvard University Press, p.13.

<sup>4</sup>See Maps B2.1 and B2.2.

<sup>5</sup>See Appendix B.3.

markets will not be analyzed because of the difficulty in obtaining data. Typically production for domestic markets was dispersed throughout the countryside and often intercropped. Therefore data for individual crops were difficult to disaggregate<sup>6</sup>. Moreover as late as 1970 the majority of bananas were consumed where they were produced<sup>7</sup>. The repercussions of non-export bananas on national economies were distinct in terms of employment of labour, capital requirements, land usage, related institutional support, and of course their impact on the balance of payments. The emergence of new rural environments with the arrival of export-banana production and the effect it had on modernisation will be discussed by analyzing the nature of the crop and the development of markets and institutions. This will be followed by a review of technical changes precipitated by the trade and the cumulative influence it had on labour. This chapter will not discuss labour disputes and social unrest as these issues are not central to the thesis and have been addressed elsewhere<sup>8</sup>. Moreover because TNCs were one of the strongest impulses to the establishment of export banana production they will often be at the centre of discussion. In addition to these issues, concerns specific to the banana industry will be explored. Have TNCs contributed to a region's instability due to their forceful entrance, development and later decline or have they 'kindled the fire' which in later years was to be nurtured by native growers? Did the influence of international trade affect the rate

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<sup>6</sup>See Hill, Polly (1989). Development Economics on Trial. Cambridge: Cambridge University Press, for a discussion of the problem of rural statistics in the tropics.

<sup>7</sup>Grunwald, Joseph and Musgrove, Philip (1970). Natural Resources in Latin American Development. Baltimore: The Johns Hopkins Press, p.364.

<sup>8</sup>For this type of analysis see for example: Kepner, C.D. (1936). Social Aspects of the Banana Industry. New York: Columbia University Press; Bourgois, Philippe I. (1989). Ethnicity at Work: Divided Labor on a Central American Banana Plantation. Baltimore: The Johns Hopkins University Press; The Human Cost of Bananas (1979). Manila: ICL Research Team.

and factor-bias of technical change?

## Part I

### CROP CHARACTERISTICS

Plantains and bananas<sup>9</sup>, cultivated by small producers, have been an integral part of the crop mix for centuries in tropical and semi-tropical areas<sup>10</sup>. Growing conditions require a minimum average monthly rainfall of four inches and a mean temperature of eighty degrees fahrenheit. Soil requirements are diverse as the banana plant can be grown in soil ranging from sand to heavy silt. The root system of the plant is shallow and the above ground rhizome is weak, thus ideal planting areas are those which are protected from harsh winds<sup>11</sup>. Similar to sugarcane, the banana is a rhizome which is harvested on a ratoon basis. Each rhizome produces numerous suckers<sup>12</sup> which are ready for harvesting in 9-12 months and capable of producing consecutive crops over a number of years<sup>13</sup>. This cycle can continue in a profitable manner for five to twenty years if disease does not hit and heavy winds do not

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<sup>9</sup>Plantain is a subspecies of the genus *Musa*, of which the banana belongs. The plantain is larger and is used green as a cooked vegetable, in contrast to the banana which is eaten raw (The Hutchinson Softback Encyclopedia Unabridged (1992) Oxford (2nd edition): Helicon Publishing Ltd., pp.75, 656-657).

<sup>10</sup>Fawcett, William (1921). The Banana: its Cultivation, Distribution and Commercial Uses. London (2nd ed.): Duckworth & Co., pp.15-16. Reynolds, P.K. (1927). The Banana: its History Cultivation and Place among Staple Foods Boston: Houghton Mifflin, pp.34-37; Grunwald, Joseph and Musgrove, Philip (1970), op.cit., p.366; Production and Marketing of Bananas from the Associated African States and Madagascar (1971). Brussels: Commission of European Communities, p.1; Davies, Peter (1990), op.cit., pp.21-25.

<sup>11</sup>Cobley, Leslie S. An Introduction to the Botany of Tropical Crops London: Longmans, pp.258-260; Arthur, Henry, et.al. (1968), op.cit., p.149.

<sup>12</sup>Suckering is defined as, "... reproduction by new shoots arising from an existing root system rather than from seed." The Hutchinson Softback Encyclopedia (1992) Oxford (2nd Ed.): Helicon Publishing, p.792.

<sup>13</sup>See Maingot del Barco, Anthony P. (1991). "La Guerra del Banano en el Caribe: Anticipando Cambios Globales." Foro Internacional, 32(1), p.66; May, Stacy and Galo, Plaza (1958). The United Fruit Company in Latin America. Washington D.C.: National Planning Agency, p.28; Arthur, Henry et.al. (1968), op.cit., p.47.

damage the plant<sup>14</sup>. These characteristics (short gestation period and relatively long productive cycle), make the fruit an attractive selection for the crop mix as it can generate earnings relatively quickly in comparison to many other tropical crops<sup>15</sup>. In the case of other tropical or semi-tropical cash crops such as coffee or cocoa several years must pass before the first harvest.

For the small farmer who often does not possess savings, bananas are a feasible option for the crop mix and for commercialisation<sup>16</sup>. After obtaining access to land, the only vital element needed is suckers. This is particularly true at the beginning of the period when many banana techniques did not necessarily require high levels of capital for input purchases, and techniques were mainly labour using<sup>17</sup>. Bananas are also advantageous for small farmers because the large wide leaves of the plant provide shade for the other crops<sup>18</sup>. Thus they are extensively intercropped with nursery crops such as coffee, cocoa, nutmeg and foodstuffs such as kidney beans or maize.

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<sup>14</sup>Interview with Nestor Guitierrez (Nov.1991), agricultural engineer, UNIBAN, Urabá, Colombia; Arthur, Henry *et.al.* (1968), *op.cit.*, p.47; Ellis, Frank (1983). Las Trasnacionales del Banano en Centroamerica. San José: Editorial Universitario Centroamericana, p.81.

<sup>15</sup>Nutmeg, cocoa, and coffee plants all require several years before a harvest can occur; thus long-term investment must be taken on.

<sup>16</sup>Thomson, Robert (1987), *op.cit.*, p.4.

<sup>17</sup>Discussed below. See Appendix B.1.

<sup>18</sup>Thomson, Robert (1987). Green Gold: Bananas and Dependency in the Eastern Caribbean. London: Latin American Bureau Ltd., p.46.

INSTITUTIONS and MARKETS: International Trade, Producers, Exporters and TNCs

This section will examine the structure of international trade and marketing. The first section will briefly discuss historical antecedents underlining the nature of the market and illustrating its emergence by means of a description of the industry leader, the United Fruit Company (UFCO) and land usage of banana suppliers. This will be followed by an analysis of other actors which formally joined the trade: TNCs, commercial houses, private or public exporters and associate producers. Lastly, TNC theory will be presented which will be followed by evaluation of the costs and benefits of the export trade.

Bananas have been widely traded throughout the twentieth century. The literature claims that the majority of export bananas are traded on open markets<sup>19</sup>. However due to the structure of international marketing, barriers to entry are high, thus making access difficult, and markets less than free. Though preferential agreements exist, banana policy, internally and externally, is not as contentious a political issue as for sugar. Another salient feature of commerce is that only one or two varieties are traded internationally<sup>20</sup>. These varieties are selected for their high yields, robustness to withstand long distance transport, low propensity to bruise and their invariable unblemished appearance.

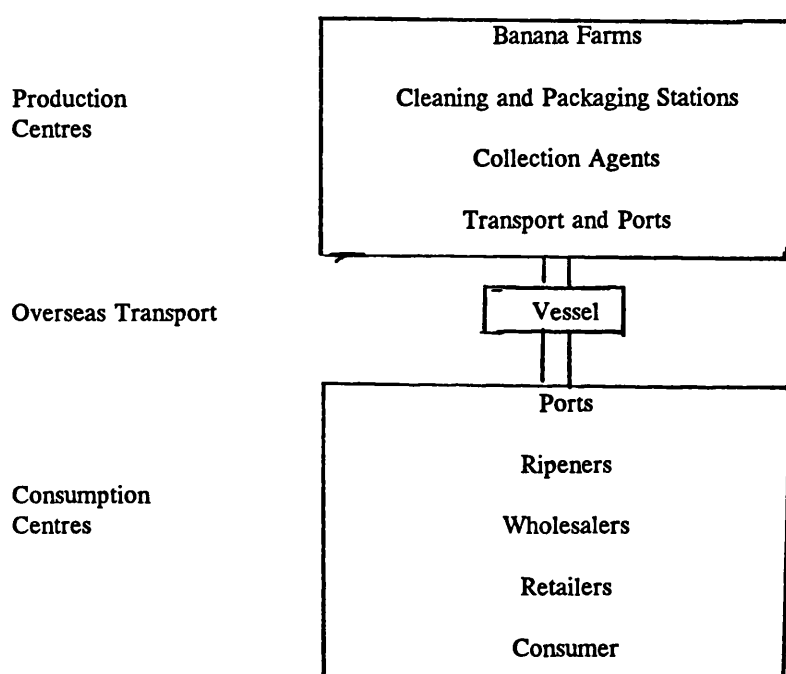
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<sup>19</sup>The World Banana Economy 1970-1984. (1986), Rome: FAO, p.3; Thomson, Robert (1987), op.cit., p.17.

<sup>20</sup>There are more than 200 banana varieties, see The Observer, (25 Oct., 1992), "Lowdown on Bananas".

Figure B1.2 displays a general scheme of the organisation of the banana trade. Though marketing channels have experienced changes over time, this captures the most common stages of production, packaging and distribution. In some cases, one company integrated all these stages. In others, separate firms might be involved in each aspect of the process.

**Figure B1.2**  
Location-Specific Stages of  
Banana Marketing



Source: Constructed from Philp, D.A. (1967). "The Marketing of Bananas." In Warly, T.K. (Ed.) Agricultural Producers and Their Markets. Oxford: Basil Blackwell, pp.286-287; Interviews with Camilo Peñalosa (March 1992) Head of International Marketing for UNIBAN, Bogotá.

Within the producing regions there were four major stages. First, bananas were harvested and moved from the farm to cleaning and packaging stations. These stations were usually located on individual farms, and either organised by the independent farmer, a cooperative, the State or an export agent. From here bananas were moved to port and then shipped to the overseas destination. Within the



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stations were usually located on individual farms, and either organised by the independent farmer, a cooperative, the State or an export agent. From here bananas were moved to port and then shipped to the overseas destination. Within the consuming country the fruit was moved from ports to ripening centres, onto wholesalers, retailers and consumers.

Because bananas are a fresh fruit and highly perishable there are not any trading centres nor commodity markets as for coffee, cocoa, sugar and other commodities. Therefore highly synchronised, direct links must be made with distributors or wholesalers in centres of consumption so that the commodity arrives fresh to markets<sup>21</sup>. In the early years of the trade, links between local growers and export firms were tenuous. Much of the commerce relied upon a ship arriving to port, the summoning of local producers to harvest, and loading of the ship.

According to one historian describing Honduras:

During the 1870s and 1880s most bananas were grown by local farmers or fever-ridden immigrants who worked small plantings in clearings near the mouths of rivers or creeks and sold fruit to a generally erratic clientele of shipmasters and produce firms<sup>22</sup>.

By the turn of the century shippers became involved in production and many companies established plantations. The principal impulses to the trade were technical and entrepreneurial; the development of refrigerated shipping and the activities of Captain Baker and his associates<sup>23</sup>. Captain Baker, after successfully shipping

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<sup>21</sup>Philp, D.A. (1967). "The Marketing of Bananas." In Warley, T.K. (Ed.) Agricultural Producers and Their Markets. Oxford: Basil Blackwell, pp.285-296; Interview with Camilo Peñalosa (March 1992) Head of International Marketing for UNIBAN, Bogotá, Colombia.

<sup>22</sup>Wilson, C.M. (1947). Empire in Green and Gold: The Story of the American Banana Trade. New York: Henry Holt and Company, p.8.

<sup>23</sup>Taylor, J.A. (1967). "World Situation and Outlook for Bananas." In Warley, T.K. (Ed.), Agricultural Producers and Their Markets. Oxford: Basil Blackwell, p.274.

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By the turn of the century shippers became involved in production and many companies established plantations. The principal impulses to the trade were technical and entrepreneurial; the development of refrigerated shipping and the activities of Captain Baker and his associates<sup>23</sup>. Captain Baker, after successfully shipping bananas to the USA for several years, established the United Fruit Company (UFCO) in 1899 with Minor Keith, who was involved in railway construction in Costa

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Rica<sup>24</sup>. The United Fruit Company, was to become involved in all areas of production and distribution. The UFCO purchased tracts of land, organised banana plantations, constructed transport networks within plantations and from plantations to port, purchased ocean liners (later known as the "Great White Fleet"), constructed housing, established water supply systems, owned ripening centres in the USA, and sold bananas directly to retailers<sup>25</sup>. In Honduras banana companies (including the UFCO) were called the octopus (*el pulpo*) because of their omnipresent influence in the economic and political arenas<sup>26</sup>. The growth in the number of banana exporting centres was rapid and by the turn of the century vertical integration of the industry was apparent.

On March 20, 1900, Andrew Preston's cautious report to his 361 stockholders put the "reasonable" value of all United Fruit's tropical investments at 17 million dollars. The new federation of banana firms owned 212,394 acres in Costa Rica, Cuba, Honduras, Jamaica, San Domingo and Colombia, of which 66,000 acres were under cultivation--about half of this in bananas, most of the remainder in sugar-cane fields and coconut groves. United Fruit also owned 11,945 head of cattle, 1,977 horses and mules, 112 miles of light railways with 17 boats, launches, wharfs, and docks, and 10 small steamships<sup>27</sup>.

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<sup>24</sup>For literature on the UFCO see Kepner, C. D. and Soothill, J. H. (1935). The Banana Empire. New York: The Vanguard Press; McCann, Thomas P. (1976). An American Company: The Tragedy of United Fruit. New York: Crown Publishers; Adams, Frederick Upham (1976). Conquest of the Tropics. New York (reprint): Arno Press; Davies, Peter (1990). Fyffes and the Banana: Musa Sapientum a Centenary History 1888-1988. London: The Athlone Press. Heinzen, Barbara (1984). "The United Brands Company in Cameroon: A study of the tension between local and international imperatives." Ph.D. Dissertation, University of London, School of Oriental and African Studies; Posada, Eduardo (1992). "Imperialism, Local Elites, and Regional Development: The United Fruit Company in Colombia Reconsidered, 1900-1945." Paper presented at the Congress of Americanists, New Orleans: Tulane University; "Palmer, Jesse T. (1932). "The Banana in Caribbean Trade." Economic Geography 8 (3), pp.262-273; Wilson, C.M. (1947). Empire in Green and Gold: The Story of the American Banana Trade. New York: Henry Holt and Company; May, Stacy and Galo, Plaza (1958). The United Fruit Company in Latin America. Washington D.C.: National Planning Agency.

<sup>25</sup>Kepner, C. D. and Soothill, J. H. (1935), op.cit., chapters 1,6 and 7; McCann, Thomas P. (1976), op.cit., p.34; Davies, Peter (1990). Fyffes and the Banana: Musa Sapientum a Centenary History 1888-1988. London: The Athlone Press, chapter 2.

<sup>26</sup>See MacCameron, Robert (1983). Bananas, Labour and Politics in Honduras: 1954-1963. Syracuse: Syracuse University, p.13.

<sup>27</sup>Wilson, C.M. (1947), op.cit., p.118.

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The extent of the vertical-control persisted and was also visible through international trade data. For instance until 1956 the UFCO's operations, were integrated such that neither f.o.b. (transport costs: free on board) nor c.i.f. (cost of insurance and freight) statistics could be uncovered for certain trade flows. The first place at which market prices could be observed was at the f.o.r. (free on rail) stage in importing countries<sup>28</sup>.

At first glance, the history of banana companies and their political influence in banana growing regions disguised the fact that many banana suppliers from the onset of the trade in the 1860s until 1990 were small- to medium-scale growers<sup>29</sup>. Throughout the period land tenure patterns were diverse and a strict paradigm cannot be established. First small scale production in the Windward Islands and Ecuador will be examined. This is followed by a review of large scale operations in Honduras.

In the 1930s the Windward Islands started exporting bananas, most of which were cultivated by small growers<sup>30</sup>. From 1956 to 1958, and 1961 the majority of landholding were under 5 ha. with the highest concentration in Grenada<sup>31</sup>. Even in

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<sup>28</sup>The World Banana Economy 1970-1984 (1986), op.cit., p.8.

<sup>29</sup>For accounts of the political clout of banana pioneers see McCann, Thomas (1974), op.cit.; Wilson, C.M. (1947), op.cit.

<sup>30</sup>Davies, Peter (1990), op.cit., p.184.

<sup>31</sup>Persaud, Bishnodat (1966). "An Abstract of West Indian Banana Statistics". University of West Indies, table 3, p.6; Arthur, Henry (1968), op.cit., p.74.

the 1980s production was mainly by smallholder<sup>32</sup>. One of the most prominent banana producers of the twentieth century, Ecuador, also relied mainly on small independent growers. Ecuador was the largest exporter in the 1950s, and obtained most exportable output from small scale production. Small and medium planters still were common in the 1960s and early 1970s<sup>33</sup>. Between 1971 and 1984 cultivated area fell by more than one-half from 124,000 ha. to 50,000 ha<sup>34</sup>. During this period medium and large size farms increased to the detriment of small farms<sup>35</sup>. The section below on associate producers and local commercial houses will explain why these small producers survived.

Large scale production by TNCs was most clearly observed in the Central American republics. Concessions were established with the government in return for the construction of basic infrastructure. Through these arrangements large tracts of land were often acquired; sometimes as much as 500 ha per title<sup>36</sup>. In Honduras local producers supplied TNCs at the onset of the trade. However by 1930 independent producers had disappeared entirely<sup>37</sup>. Yet in the 1950s the UFCO started to stimulate the development of local producers and in the 1960s Standard

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<sup>32</sup>Welch, Barbara Marian (1989). "Institutional Structures as a Factor in Land-Use Decisions: The Impact of Banana Growers Associations in French and Commonwealth islands in the Eastern Caribbean." PhD Dissertation, University of London, University College; Thomson, Robert (1987), *op.cit.*, pp.55,68.

<sup>33</sup>Parsons, James (1957), *op.cit.*, pp.201-216, Arthur, Henry, *et.al.* (1968), *op.cit.*, p.56; For figures of the 1970-72 period see also Production and Marketing of Bananas from the Associated African States and Madagascar (1971), *op.cit.*, table 19, p.50.

<sup>34</sup>The World Banana Economy 1970-1984: Structure, Performance and Prospects. (1986), *op.cit.*, p.16.

<sup>35</sup>*Ibid.*

<sup>36</sup>Karnes, Thomas L. (1978), *op.cit.*, p.29.

<sup>37</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.36; Karnes, Thomas L. (1978), *op.cit.*, p.29.

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Fruit Company followed their lead<sup>38</sup>. This change in corporate strategy will be examined below. At this time (1960) UFCO and Standard Fruit holdings totaled approximately 200,000 ha. of the country's best agricultural land which represented 8% of all land under cultivation<sup>39</sup>. However local growers (who were usually smaller in scale than the TNCs) supplied an average of 50% of export bananas between 1960 and 1977<sup>40</sup>. By 1984, 84% of total hectareage was cultivated by independent growers although the majority of large plantations continued to be dominated by TNCs (Standard Fruit and United Brands)<sup>41</sup>. General tendencies of land tenure patterns are difficult to map as production centres have been shifting and, as indicated, TNC policy has changed dramatically over time<sup>42</sup>.

The term trans national corporation (TNC) will be defined as any enterprise involved in more than one market or producing centre which makes decisions based on global resources and opportunities<sup>43</sup>. The phrases commercial house and export firm will be applied to those exporting from one country and will be used interchangeably.

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<sup>38</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.38.

<sup>39</sup>MacCameron, Robert (1983). Bananas, Labor and Politics in Honduras: 1954-1963. Syracuse: Syracuse University, p.122.

<sup>40</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.37; The World Banana Economy 1970-1984: Structure, Performance and Prospects. (1986), *op.cit.*, p.23.

<sup>41</sup>The World Banana Economy 1970-1984: Structure, Performance and Prospects. (1986), *op.cit.*, p.23. A discussion of TNCs will be provided below.

<sup>42</sup>Taylor, J.A. (1967). "World Situation and Outlook for Bananas." In Warly, T.K. (Ed.) Agricultural Producers and Their Markets. Oxford: Basil Blackwell, pp.273-284.

<sup>43</sup>For debates on the difficulties of definition see Hamilton, F.E.I. (1986). "The Multinationals: Spearhead of Spectre?." In Dixon, D.J. and Drakakis-Smith, D. (Eds.). Multinational Corporations and the Third World. London: Croom Helm, pp.2-3.

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As described above, the trade initially consisted of a few irregular traders. The UFCO was the first major exporter to organise in 1899<sup>44</sup>. Later, the Vacarros Brothers founded the Standard Fruit and Steamship Company in 1923, although their presence in the banana business dated back to the turn of the century. In 1964 fifty per cent of Standard Fruit stock was acquired by Castle and Cooke and by 1968 it became a wholly-owned subsidiary<sup>45</sup>. The UFCO had a more turbulent history. In 1954 the US Attorney-General filed a complaint against the UFCO because of its alleged violations of Sections 1 and 2 of the Sherman Act and Section 73 of the Wilson Tariff Act<sup>46</sup>. The US Supreme Court ruled against the UFCO and forced the company to relinquish some of their control of banana imports. In particular, their 'jobbing' or ripening centres had to be abandoned and they were forced to sell fruit to ripeners and not local distributors<sup>47</sup>. In 1969 the UFCO became involved in a take-over attempt by the AMK Corporation, the resultant company being renamed United Brands<sup>48</sup>. Del Monte Corporation entered in 1966 after it bought the West Indies Fruit Company<sup>49</sup>. Subsequently the US tobacco conglomerate, R.J. Reynolds, acquired Del Monte in 1979<sup>50</sup>. Still by 1990 these were the three major

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<sup>44</sup>The UFCO had many subsidiaries which operated in different countries. For example Elders and Fyffes Ltd. has been a wholly-owned subsidiary since 1913, see Davies, Peter (1990), *op.cit.*, p.216.

<sup>45</sup>Read, Robert A. (1986). "The Banana Industry: Oligopoly and Barriers to Entry." In Casson, Mark (Ed.), *Multinationals and World Trade* London: Allen and Unwin, p.325.

<sup>46</sup>Clairmonte, Frederick F. (1976). "World Banana Economy: Problems and Prospects." *Economic and Political Weekly*, 11(5-7), p.285.

<sup>47</sup>MacCameron, Robert (1983), *op.cit.*, p.51; Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.17; McCann, Thomas P. (1976), *op.cit.*, p.65.

<sup>48</sup>Read, Robert A. (1986), *op.cit.*, p.326.

<sup>49</sup>Ellis, Frank (1983), *op.cit.*, p.105; *Sectoral Study of Transnational Enterprises in Latin America The Banana Industry* (1975), Washington: Organisation of American States, p.2.

<sup>50</sup>Read, Robert A. (1986), *op.cit.*, p.326.

TNCs involved in the trade.

The extent to which the TNCs dominated international markets between 1950 and 1980 is illustrated in table B1.1.

**Table B1.1**  
Share of the Transnational Corporations in World Banana Trade,  
1966-1980.

TNC	1950 (%)	1966 (1000s of tons)	%	1972 (1000s of tons)	%	1980 (1000s of tons)	%
United Brands	80.0	1807	34	1973	30.5	1966	28.7
Castle and Cooke	8.9	652	12.3	1168	18	1451	21.2
Del Monte	--	58	1.1	356	5.5	1053	15.4
Total	88.9	2505	47.2	3497	54	4470	65.2

Source: Constructed from The World Banana Economy 1970-1984: Structure Performance and Prospects, (1986), Rome: FAO, Table 5, p.8; Sectoral Study of Transnational Enterprises in Latin America The Banana Industry (1975). Washington: Organisation of American States, Table 12, p.23.

In 1950 TNCs commanded 88.9% of world trade, the majority of which was controlled by United Brands. However with the entrance of other TNCs, United Brands' share declined. After a sharp drop between 1950 and 1966, TNC share of international markets gradually expanded to 65.2% in 1980. United Brands decreased its participation in world markets but continued to be the prominent TNC. Castle and Cooke nearly doubled its share from 12.3% in 1966 to 21.2% in 1980. Del Monte proved to be even more dynamic, jumping from 1.1% in 1966 to 15.4% in 1980. The dominance of TNCs in world trade was sustained throughout this period, however increasingly banana companies pulled out of production responsibilities.

Not only did TNCs dominate world markets but they also absorbed a large share of the retail price. In a 1976 article, Frederick Clairmonte maintained that 11



or 12 per cent of the retail price accrued to the producing countries although in some countries, where TNCs were absent, the figure was lower<sup>51</sup>. Research conducted by Robert Thomson in the 1980s in the Windward Islands maintained that banana farmers of the Eastern Caribbean received little more than 10% of final retail price. But as costs of inputs and labour must be subtracted from the figure the real incomes were lower<sup>52</sup>. It is widely held that the majority of income received from banana sales was amassed by marketing firms. This could be construed as indicating scale-bias in marketing.

Because of the need to obtain large amounts of bananas to fill ships during a short time period, organisation was crucial to move bananas from field to packaging areas then finally to ports. A similar feature in cane growing (rapid perishability between field and processing centre) in addition to other factors, particularly high capital requirements for modern mill construction, resulted in concentrated industry structures<sup>53</sup>. High levels of investment for converting bananas into a tradeable commodity were also necessary. Thus it is the nature of the commodity, coupled with the fact that bananas were grown in exchange-scarce areas which allowed TNC monopolistic tendencies to arise. Of course, some States challenged these tendencies and in some cases modified TNC behaviour<sup>54</sup>. But in the final analysis in many areas, TNC banana control persisted into the 1980s. For example, as late as 1983,

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<sup>51</sup>Clairmonte, Frederick (1976), *op.cit.*, p.281.

<sup>52</sup>Thomson, Robert (1987), *op.cit.*, p.45.

<sup>53</sup>See Sugar Parts I and II.

<sup>54</sup>For literature on the State *vis-à-vis* banana TNCs see for example: Garnier, Leonardo; Gonzáles, Gladys; Cornick, Jorge (1988). "Costa Rica: Las Vicisitudes de una Política Bananera Nacional" In Cambio y Continuidad en la Economía Bananera. Torres-Rivas, Edelberto and Eckhard Deutscher (Eds.) San José: FLACSO, CEDAL.

bananas (primarily exported by TNCs) continued to represent the largest single foreign exchange earner in Costa Rica<sup>55</sup>.

Yet, alongside TNCs, local commercial houses or marketing bodies were formed. Similar to TNCs, these organisations usually embraced a wide range of functions such as providing technical assistance and credit to growers, collection and packaging fruit, chartering ships and seeking buyers in importing countries. These organisations were either formed by the State, independent collectors or producers. Three examples will be given below to illustrate the diversity of these agents and their responsibilities.

One of the first commercial house was the Jamaica Producer's Association which was organised in 1929 and financed by the British Colonial government<sup>56</sup>. The Association provided centralized export services for over 6,000 small growers<sup>57</sup>. In 1933 the UFCO attempted to force the Association to retreat by purchasing bananas from growers at higher prices than those sold to consumers. State intervention protected the Association and established general guidelines for all exporters<sup>58</sup>. In 1936 an agreement was reached which allocated 25% of the UK market to the Jamaican Producers Association and 75% to Fyffes, a subsidiary of United Brands<sup>59</sup>. After Independence in 1947 the Jamaican Banana Board (now the

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<sup>55</sup>Bourgois, Philippe I. (1989), *op.cit.*, p.18

<sup>56</sup>Davies, Peter (1990), *op.cit.*, pp.145-147; Read, Robert A. (1986), *op.cit.*, p.327; Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.296.

<sup>57</sup>Thomson, Robert (1987), *op.cit.*, p.34.

<sup>58</sup>Davies, Peter (1990), *op.cit.*, pp.148-151; Sealy, Theodore and Hart, Herbert (1984). *Jamaica's Banana Industry* Kingston: The Jamaica Banana Producers Association, chapter 12.

<sup>59</sup>Thomson, Robert (1987), *op.cit.*, p.80.

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Banana Company of Jamaica) was created to provide insurance against losses from hurricanes and administer all banana exports<sup>60</sup>. In the 1960s the Association acquired ripeners. However Jamaica exports were declining as between 1966 and 1984 exports dropped from 200,000 tonnes to 11,000 tonnes<sup>61</sup>. But TNC exports also diminished and by 1984, 60% of Jamaican bananas exported to the UK were controlled by the Association<sup>62</sup>. Nonetheless the history demonstrates that--with official support--the Association was able to confront TNCs and provide a range of services to small growers, enabling them to compete in world markets<sup>63</sup>. This example shows that export activities of local export agents were similar to those of TNCs.

Another major switch to local administration occurred in Ecuador. Although the UFCO established a small plantation in Tenguel during the 1930s, the bulk of exportable fruit was obtained from independent producers<sup>64</sup>. After 1946 due to the opening of the fertile interior, readily-available low-rate shipping and favourable government policy, major growth through expansion in local production by natives was brought about<sup>65</sup>. TNCs established plantations, but the government had restrictive policies on land ownership<sup>66</sup>. Much of the export trade relied on brokers

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<sup>60</sup>For each bunch of fruit a set amount was paid into a fund. See Sealy, Theodore and Hout, Herbert (1984), *op.cit.*, p.93; Read, Robert A. (1986), *op.cit.*, p.327.

<sup>61</sup>Thomson, Robert (1987), *op.cit.*, p.80.

<sup>62</sup>Sealy, Theodore and Hout, Herbert (1984), *op.cit.*, pp.3, 73.

<sup>63</sup>See Thomson, Robert (1987), *op.cit.*, pp.80-81.

<sup>64</sup>Larrea, Carlos (1987). "Auge y Crisis de la Producción Bananera (1948-1976)." In Larrea, Carlos, (Ed.) *El Bananero en el Ecuador* Quito: FLACSO, p.73; Read, Robert A. (1986), *op.cit.*, p.328.

<sup>65</sup>Parsons, James (1957). "Bananas in Ecuador: A New Crop in the History of Tropical Agriculture." *Economic Geography* 33(3), pp.203-204; Read, Robert A. (1986), *op.cit.*, p.328.

<sup>66</sup>Read, Robert A. (1986), *op.cit.*, p.328.

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or middlemen who collected bananas from local growers and sold them to exporters<sup>67</sup>. Though various were formed, the prominent Ecuatorian export agent was the Exportadora Bananera Noboa (EBN)<sup>68</sup>. During the 1950-1990 period the role of the State was fundamental: infrastructure--roads and ports--were modernised, credit was provided to small producers, the land market was regulated to prevent TNCs amassing plantations, wages were controlled, banana prices were fixed and a national shipping line was established<sup>69</sup>. From 1977 increasing amounts of banana were exported solely by the TNCs<sup>70</sup>. Nonetheless, the rise in TNC involvement did not necessarily displace small independent producers<sup>71</sup>. With so much State support, the obvious question is why did TNCs survive? Their survival could be attributed to their ability to establish operations throughout the world which would enable them to spread risks. TNCs also preferred to maintain their links with Ecuador as the country's outlying geographic location was important to ensure a supply of bananas in case of bad weather other parts. This was particularly so as Standard Fruit and the UFCO predominated in Central America throughout the period.

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<sup>67</sup>See Larrea, Carlos (1988). "Los Cambios Recientes en el Subsistema Bananero Ecuatoriano y Sus Consecuencias Sobre los Trabajadores: 1977-1984." In Cambio y Continuidad en la Economía Bananera. Torres-Rivas, Edelberto and Eckhard Deutscher (Eds.) San José: FLACSO, CEDAL, pp.72-29; Parsons, James (1957), op.cit., p.214.

<sup>68</sup>Larrea, Carlos (1988), op.cit., p.165.

<sup>69</sup>Ibid.,

<sup>70</sup>Larrea, Carlos (1987), op.cit., p.76.

<sup>71</sup>Although Carlos Larrea demonstrated an increasing concentration of farms between 1965, 1970 and 1980, small and medium farms were not completely displaced as in 1983, 85% of banana farms averaged 33.6 hectares. However, their participation in export markets was low with 68% of the exportable output originating from large estates (>200 ha.). This may indicate a future displacement of small producers. See Larrea, Carlos (1987), op.cit., pp.166-167; also see Table 1, p.168; Charvet, Paola Sylva (1987). "Los Productores de Banano." In Larrea, Carlos, (Ed.) El Bananero en el Ecuador Quito: FLACSO, p.127; Charvet, Paola Sylva (1987), op.cit., pp.131-132.

A later example was the Windward Islands Banana Growers Association (WINBAN), established in 1958, which was responsible for controlling disease, organising extension services, purchasing export quality bananas from independent growers, boxing, delivering and selling to the exporter (Geest)<sup>72</sup>. This association was only established to negotiate prices between growers and Geest and did not aim to export as in the Jamaican case. It was not intended to become an autonomous marketing body. For instance, Thomson reported that its attitude towards Geest was subservient (and not antagonistic as in other countries): the Association was fearful of Geest pulling out<sup>73</sup>. WINBAN's role as an intermediary gradually diminished and by the 1980s its function had collapsed as the bulk of exported banana were bought through direct contracts with TNCs<sup>74</sup>. But Geest remained closely associated with WINBAN and does not own much land in the Windward Islands<sup>75</sup>. Therefore although a local agency was formed to foment banana production exports remained in the domain of the traditional TNCs and little organisational changes took place.

As stated earlier, local growers in some regions such as Ecuador and the Windward Islands, would also supply TNCs. In yet other areas TNCs would directly stimulate the growth of independent growers, or as denoted by the TNCs, 'associate producers'. One of the regions where the UFCO associate producer programmes

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<sup>72</sup>Thomson, Robert (1987), op.cit., p.34.

<sup>73</sup>Ibid., pp.35-36.

<sup>74</sup>The World Banana Economy 1970-1984: Structure, Performance and Prospects. (1986), Rome: FAO, p.17.

<sup>75</sup>Geest only owned 10,000 acres in 1986. See Thomson, Robert (1987), op.cit., pp.36-38.

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started earliest was Colombia during the 1910s and 1920s<sup>76</sup>. Another early example was on the Pacific Coast in Costa Rica in 1935<sup>77</sup>. Later, by the 1950s and 1960s associate producer programmes became widespread as the UFCO faced problems retaining lands--estates were expropriated in Guatemala, Cuba and Ecuador<sup>78</sup>. Therefore, though programmes were established as early as the 1920s, later TNCs actively fostered the development of associate producers because they aimed to decrease private land holdings, shift production responsibilities (UFCO in the 1950s and Standard Fruit in the 1960s), and also to strengthen and diversify local support for the UFCO<sup>79</sup>.

With regard to associate producer programmes, Frederick Clairmonte took a dependency stance and argues that the system of associate producers reinforced the relationship between "an indigenous caste oligarchy and large corporate power" which would in turn result in an effective type of indirect economic rule<sup>80</sup>. He supports this view by reference to the entrance of Del Monte after the mid-1960s and the eventual sale of UFCO land to Del Monte in Guatemala by 1971, showing that the banana business continued to be dominated by a few, enormous TNCs and regional

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<sup>76</sup>See Banana Part II.

<sup>77</sup>Jones, Clarence F. and Morrison, Paul C. (1952). "Evolution of the Banana Industry of Costa Rica." *Economic Geography* 28(1), p.10. For examples of Standard Fruit see Karnes, Thomas L. (1978). *Tropical Enterprise: The Standard Fruit and Steamship Company in Latin America*. Baton Rouge: Louisiana State University Press, p.9. However due to the outbreak of Sigatoka most exportable bananas were cultivated in UFCO plantations. Sigatoka eradication costs were more difficult to bear for independent producers.

<sup>78</sup>President Arbenz expropriated much of UFCO land during 1951 to 1954; see McCann, Thomas (1976), *op.cit.*, p.61. The UFCO lost \$58 million because of the Cuban Revolution; see McCann, Thomas P. (1976), *op.cit.*, p.78. However the UFCO regained land in Honduras.

<sup>79</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.38.

<sup>80</sup>Clairmonte, Frederick F. (1976). "World Banana Economy: Problems and Prospects." *Economic and Political Weekly*, 11(5-7), pp.285. For the seminal work on dependency see Cardoso, Enrique and Faletto, Enzo (1979). *Dependency and Development in Latin America* Berkeley: University of California Press.

elites<sup>81</sup>. If an analysis is based narrowly on international marketing and distribution aspects, it would be difficult to dispute Clairmonte's claims. However in terms of banana growing itself, small-to medium-growers have been prevalent throughout the history of the trade and in some areas promoted the establishment of other marketing agents. In some cases associate producers were developed as a result of stricter state controls on the TNCs. Moreover the associate producer programme could be considered beneficial as it allowed local planters to obtain capital for estate improvements and disease control.

The banana trade was clearly developed by foreign capital investing in marketing and production centres. TNCs were often denoted as an empire possessing extensive landholdings, railways, ships and ripening centres. However as the trade matured local agents either displaced or competed with TNCs. Therefore it can be argued that TNCs kindled a flame that would in later years be tended by local and foreign investment. Local enterprises were either compliant (as in the case of WINBAN) or competitive (as in the case of Jamaica) agents who substituted or complemented TNC activity. Despite the entrance of local export firms, profits continued to remain concentrated in the hands of marketing firms whether they were TNCs or commercial houses. Since shareholders were usually nationals or native banana growers, it was believed that in conjunction with the changing TNC role, surplus generated by banana exports would be channelled into the domestic economy. Nonetheless, TNCs and commercial houses continued to receive a great majority of the income earned from sales. In other words, most of the retail price accrued to

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<sup>81</sup>Clairmonte, Frederick F. (1976), op.cit., p.285.

either foreign-controlled TNCs of locally-controlled commercial houses.

After discussing the role of TNCs in the banana trade in different regions and periods, this section will school the literature on TNCs. This will be followed by an analysis of the benefits and costs of TNC investment in host countries. With reference to Latin America Rhys Jenkins delineates four schools: developmentalism, economic nationalism, dependency and internationalisation of capital<sup>82</sup>. Of importance to this thesis is the internationalisation of capital. This concept was formulated in the mid-1970s<sup>83</sup>. It intended to take a broader view of the development of capitalism. This framework maintained that TNC involvement was

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<sup>82</sup>Jenkins, Rhys (1984). Transnational Corporations and Industrial Transformation in Latin America. London: MacMillan, pp.4-21. Briefly the first three schools will be discussed. First, in the 1950s and 1960s developmentalism was the mainstream economic view. Developmentalism underlined the beneficial aspects of direct foreign investment (DFI). DFI increased the rate of capital accumulation, allowed imports of machinery which would not have been possible without foreign capital and introduced new technologies, management techniques and therefore benefitted local labour. Although developmentalists recognized that DFI had adverse social consequences, the it was argued that the benefits outweighed the costs. By the 1960s and 70s economic nationalism reemerged. Proponents of economic nationalism concluded that TNCs tended to wield oligopoly power and diffused technical packages which displaced rather than supplemented local labour. Oligopolistic power fundamentally led to replacement of local firms for foreign, and higher profits for TNCs. Therefore the effects of TNCs were damaging. In the late 1960s, as a criticism of developmentalism, dependency theorists also levelled attacks at the TNCs. In this framework TNCs were viewed as pernicious because they shifted investments from traditional sectors to manufacturing which resulted in a long term reliance on foreign capital. Instead of reducing balance of payments deficits, they heightened the vulnerability of host countries. Therefore surplus was essentially drained. For literature on developmentalism see Prebisch, R. (1969). "The System and the Social Structure in Latin America" In Horowitz, J. de Castro and Gerassi, J. (Eds.) Latin American Radicalism. New York: Vintage Books and La CEPAL y el Análisis del Desarrollo Latinoamericano (1969) Santiago de Chile: Editorial Universitaria. For literature on economic nationalism see Caves, Richard E. (1982). Multinational Enterprise and Economic Analysis. Cambridge: Cambridge University Press; Kindleberger, Charles P. (1969). American Business Abroad: Six Lectures on Direct Investment. New Haven: Yale University Press; Hymer, Stephen (1976). The International Operations of National Firms: A study of Foreign Direct Investment. Cambridge: MIT Press. For literature on dependence in general see Cardoso, Enrique and Faletto, Enzo (1979). Dependency and Development in Latin America. Berkeley: University of California Press; Mandel, Ernest (1968). Marxist Economy Theory. New York: Monthly Review Press.

<sup>83</sup>Palloix, C. (1975) las Firmas Multinacionales y el Proceso de Internacionalización. Madrid: Siglo Veintiuno Editores; Vernon, Raymond (1977). Storm Over the Multinationals: The Real Issues. London: MacMillan; Jenkins, Rhys (1984), op.cit., p.16.



an aspect of a global integration of the capitalist economy. The emergence of a unified capitalist system resulted in standardisation of production processes and commodities. Indeed, both local firms and TNCs became involved in this process and aimed to stay competitive and in the black.

It is argued that, TNC investment was an effect of the internationalisation of capital. Similar actions taken by local firms confirm this. Earlier studies of TNC banana operations in Latin America have been described as enclave economies<sup>84</sup>. For this analysis, the use of enclave economy was limiting as it implied that no economic or social change occurred within the region. This research emphasises that social and economic change can result from TNC involvement in commodity production and trade. Was TNC investment desirable?

Initially, the arrival of foreign firms was seen by local governments as a way to obtain foreign exchange, technological know-how, and sometimes infrastructure development. When world trade in bananas began in the nineteenth century, most producing regions were viewed as stagnant, isolated regions of their perspective national economies. One of the most serious obstacles banana entrepreneurs had to face were jungle conditions. Emerging political parties and nascent national governments in most cases were willing to assist these entrepreneurs (because of they

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<sup>84</sup>See for example, Slutzky, Daniel and Alonso, Esther (1980). Empresas Transnacionales y Agricultura: El Caso del Enclave Bananero en Honduras. Tegucigalpa: Editorial Universitaria; Bucheli Gomez, Marchelo (1991). "El Surgimiento y la Caída de un Enclave Agrícola: Estudio de las Zonas Bananeras de Magdalena y Urabá, 1948-1968." Masters Thesis, Universidad de los Andes; White, J. (1978). Historia de una Ignominia. Bogotá: Editorial Presencia Ltda. For studies of enclave economies in general see: Levin, Jonathon V. (1960). Las Economías de Exportación: su Modelo de Desarrollo en Perspectiva Histórica Cambridge: Harvard University Press, pp.165-202; Singer, H.W. (1950). "The Distribution of Gains Between Countries which Invest and Borrow." American Economic Review, Papers and Proceedings, pp.473-485.

benefits they conferred), and thus were amenable to sell land or grant concessions. As Victor Bulmer-Thomas stated, in cost-benefit terms, the opportunity cost of land appeared to be zero, and so it was easy for local governments to allow TNCs to establish operations<sup>85</sup>. Referring to the UFCO MacCameron declared:

They brought ingenuity and capital to an area of Honduras that had stagnated economically throughout the colonial period and had begun only at the end of the nineteenth century to generate pockets of prosperity in the form of independent banana growers<sup>86</sup>.

Theodore Sealy and Herbert Hart maintain this view regarding Jamaica.

The island owes a great deal to the UFCO as well as to other American companies, such as the Atlantic and Standard Fruit Companies, which invested considerable amounts of capital, introduced a great deal of expertise and set a great example both in respect of wages paid to their employees and the quality of the housing provided for them<sup>87</sup>.

Contemporary opinion in the early years of the trade argued that TNC presence was desirable and provided many positive effects in terms of fomenting economic activity and providing favourable conditions for banana workers.

The commencement of export banana sales also promoted settlement. In Costa Rica workers were encouraged to establish themselves along the main line railroad between Palmar and Golfito (two banana growing areas) in 1941<sup>88</sup>. Colonisation was fostered so that extra labour was available for loading operation at the port of Golfito and construction of new plantations and other 'rush activities'<sup>89</sup>. During the dead period settlers would grow food on small plots for themselves and the local

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<sup>85</sup>Bulmer-Thomas, Victor (1987). The Political Economy of Central America Since 1920. Cambridge: Cambridge University Press, p.16.

<sup>86</sup>MacCameron, Robert (1983), op.cit., p.13.

<sup>87</sup>Sealy, Theodore and Hart, Herbert (1984). Jamaica's Banana Industry Kingston: The Jamaica Banana Producers Association, p.71.

<sup>88</sup>Jones, Clarence F. and Morrison, Paul C. (1952), op.cit., p.13.

<sup>89</sup>Ibid.

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market. A permanent polyvalent peasant population appeared to be forming, living from the land and temporary employment obtained from the banana trade. Regarding Ecuador, James Parsons saw the establishment of the banana trade in the late 1940s and throughout the 1950s as beneficial because it opened up areas to colonisation<sup>90</sup>. He attributed easier access to title of public lands (*baldíos*) to the nature of the banana. As settlers had to put 25% of their claim into cultivation within five years, bananas offered a quick return on investments, making them attractive to those wanting to obtain title<sup>91</sup>.

Physical infrastructure construction such as ports railways, roads and irrigation networks, schools and hospitals can also be considered beneficial. Describing the UFCO's establishment of the Golfito Division between 1938 and 1948, Clarence Jones and Paul Morrison stated:

In a decade the United Fruit Company brought the activities of the division up to a high level. It built 246 kilometers of railway lines; constructed modern banana shipping facilities at Golfito, with equipment for loading 4000 bunches of bananas an hour; built a town of some 7000 people, with a modern hospital, stores, construction shops, communication, recreation, and other modern facilities; developed near Golfito a dairy farm with 50 head of cows and a modern pasteurizer; and brought into production thousands of acres of bananas<sup>92</sup>.

In terms of health care during the first half of the twentieth century, the UFCO aimed to increase efficiency by maintaining a healthy work force<sup>93</sup>. The UFCO was actively involved in medical research on tropical disease<sup>94</sup>. As Posada maintained,

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<sup>90</sup>Parsons, James (1957), *op.cit.*, pp. 204, 216.

<sup>91</sup>*Ibid.*, p.204.

<sup>92</sup>Jones, Clarence F. and Morrison, Paul C. (1952), *op.cit.*, pp.12-13.

<sup>93</sup>Posada, Eduardo (1992), *op.cit.*, p.24; Crowther, Samuel (1929). *The Romance and Rise of the American Tropics*. Garden City, N.J.: Doubleday Page & Co., pp.10-12, 199, 315, 354-355; Adams, Frederick Upham (1976), *op.cit.*, p.53.

<sup>94</sup>Wilson, C.M. (1947), *op.cit.*, p.189.

the UFCO "did build and run its hospital, where neither the state nor the private sector had developed a health service"<sup>95</sup>. For several decades, health care improvements in tropical regions was associated with the continuing operations of TNCs<sup>96</sup>. For example in the Atlantic coast of Guatemala the incidence of malaria amongst UFCO personnel declined from 21.9% to .3% between 1929 and 1955<sup>97</sup>. Also, after the 1972 earthquake near Managua, the UFCO organised an assistance programme, Nicaraguan Earthquake Emergency Drive (NEED)<sup>98</sup>.

TNCs, also offered higher than average wages (in some regions, in particular periods) to attract the quality of labour they sought<sup>99</sup>. In 1950 banana workers salaries were three times higher than the agricultural average in Honduras<sup>100</sup>. In the 1950s Ecuatorian banana workers were also paid relatively higher wages<sup>101</sup>. Thomas McCann after visiting El Golfito plantations in Costa Rica argued that the UFCO greatly improved the physical quality of workers existence<sup>102</sup>. In this light, TNCs can be considered as the a vehicle for the penetration of capitalism, creating land and labour markets and building infrastructure. Indeed wages were higher in banana growing regions, although often cost of living was also higher which resulted

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<sup>95</sup>Posada, Eduardo (1992), op.cit., p.25.

<sup>96</sup>In McCann's account of 1957 the UFCO operated hospitals in El Golfito. See McCann, Thomas P. (1976), op.cit., pp.131, 141-142.

<sup>97</sup>May, Stacy and Galo, Plaza (1958), op.cit., p.188.

<sup>98</sup>McCann, Thomas P. (1976), op.cit., pp.205-207.

<sup>99</sup>Lebergott, Stanley (1980). "Returns to US Imperialism, 1890-1929" The Journal of Economic History 40 (2), pp.240-245; Rippey, J. Fred (1976). The Capitalists and Colombia, New York (reprint from 1931): The Arno Press, pp.190-191; Jenks Our Cuban Colony p.301; Kepner, C.D. (1936), op.cit., p.129.

<sup>100</sup>Slutzky, Daniel and Alonso, Esther (1980), op.cit., p.19.

<sup>101</sup>Larrea, Carlos (1988), op.cit., p.176.

<sup>102</sup>McCann, Thomas P. (1976), op.cit., p.142.

in lower standards of living. Nonetheless, real wages over time dropped. This argument will be expanded below in the labour section.

The main costs of TNCs centred around their monopolistic tendencies. As Kindlberger argued, monopoly advantages in goods markets or increasing returns to scale are usually the principal reasons why firms decide to invest in a foreign country<sup>103</sup>. TNCs control of surplus land (more than necessary for commercial operations) was definitely a cost for host countries. In order for TNCs to control production effectively it was necessary to become a large landowner to either mobilize rural labour, or act as a restraint against native banana or foodstuff cultivators. By 1952 the UFCO owned or controlled 3 million acres of land in Central and South America but only 139,000 were planted with banana<sup>104</sup>. Slutzky and Alonso observed similar trends in Honduras (from the onset of TNC establishment until 1950), "Both companies [UFCO and Standard Fruit] controlled property or extensive concessions which only a marginal amount of economic activity developed"<sup>105</sup>. Even in 1960 the UFCO and Standard Fruit Company in Honduras had holdings that totalled approximately 200,000 hectares of the country's best agricultural lands<sup>106</sup>. The companies successfully monopolized large amounts of high quality land.

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<sup>103</sup>Kindlberger, Charles (1969). American Business Abroad: Six Lectures on Direct Investment New Haven: Yale University Press, p.16.

<sup>104</sup>McCann, Thomas P. (1976), op.cit., p.39.

<sup>105</sup>Slutzky, Daniel and Alonso, Esther (1980), op.cit., p.15, (author's translation).

<sup>106</sup>MacCameron, Robert (1983), op.cit., p.122. Although between 1960 and 1977 the land area controlled by both companies reduced nearly one-half from 230,000 ha to 122,000 ha, the amount was still sizeable. See Slutzky, Daniel and Alonso, Esther (1980), op.cit., p.30.

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Another manifestation of monopolistic behaviour was that independent suppliers obtained inputs and credit from the TNC and, in turn, were contracted to sell output to the TNC. For example in the Philippines David Randolph, *et.al.* describes producers as entering into a spiral of indebtedness in the 1970s. They attributed this spiral to fruit companies which extended loans, offered technical assistance, sold inputs and established 'anomalous' prices for output<sup>107</sup>. In the 1980s this can be observed in Somalia, where the private exporter was also the sole importer of agricultural inputs<sup>108</sup>.

Moreover, because supporting activities were organised by TNCs there was no incentive for locals to become entrepreneurs involved in other activities, e.g. foodstuff production, merchant trade, construction<sup>109</sup>. An example of this was the TNC commissary. Goods could only be purchased through coupons, which were issued to workers as part of their pay<sup>110</sup>. Although coupons were often sold illegally to non-company employees at a discount, and did not necessarily coerce workers to buy their goods there, they still forced economic transactions to be made in the commissary. In other words the commissary did not function *vis-à-vis* Adam Smith's invisible hand. Kepner and Soothill and Lebergott maintained that commissaries replaced monopolistic local merchants and protected workers from their

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<sup>107</sup>See David, Randolph S. *et.al.* (1983), *op.cit.*, pp.53-76.

<sup>108</sup>Samatar, Abdi Ismail (1993). "Structural Adjustment as Development Strategy? Bananas, Boom and Poverty in Somalia." *Economic Geography* 69 (1), p.27.

<sup>109</sup>For example independent exporters in the Atlantic Coast of Costa Rica started exporting in 1943. See Jones, Clarence F. and Morrison, Paul C. (1952), *op.cit.*, p.7.

<sup>110</sup>Karnes, Thomas L. (1978), *op.cit.*, p.48.

exploitation<sup>111</sup>. This may be true in some areas. However in others where monopolistic merchants did not exist, they did little to expand the market for competitors. In fact, TNC commissaries had a competitive advantage over small merchants because of their ability to buy in bulk as well as their easier access to railways, ports and international markets<sup>112</sup>. In many cases they antagonised local merchants by offering higher quality goods, lowering prices or pushing out local competition<sup>113</sup>. In terms of encouraging domestic activity this can be viewed as detrimental. The lack of the development of enduring economic activity is also visible by observing figures of banana bank establishment. Throughout Central and South America there was only one bank that was created based on income generated from the banana trade<sup>114</sup>. TNCs did most transactions outside the banana producing country and financial interaction with the domestic economy was very limited, except of course for the credits extended to native banana planters.

A general analysis of the costs and benefits of the entire banana trade is difficult as regional experiences were diverse. But some tentative conclusions will be drawn. First, the presence of TNCs was favourable because it activated market formation (factor and product) and transformed some areas into competitive actors on the international market. This is observed through prosperous independent producers

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<sup>111</sup>Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.319; Lebergott, Stanley (1980), *op.cit.*, pp.244-247.

<sup>112</sup>There is dispute as to whether commissaries undercut local merchants prices--this occurred in some areas but not in all. See Ripsey, J. Fred (1976), *op.cit.*, p.182; Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.320.

<sup>113</sup>Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.320; Ripsey, J. Fred (1976). *The Capitalists and Colombia*. New York (reprint from 1931): The Arno Press, p.182.

<sup>114</sup>Bulmer-Thomas, Victor (1987), *op.cit.*, pp.7-8.

and the establishment of domestic producers association and export agents. Furthermore TNCs positively contributed to regional development through infrastructure construction, payment of high wages and indirect promotion of settlement. The costs of TNCs were mainly related to their monopoly power and the resultant constraint on local initiative. Also, it can be argued that they often displaced local entrepreneurs through their involvement in the establishment of physical infrastructure, commissaries and foodstuff production, further hindering internal market establishment. Moreover social difficulties that were not examined in this mainly economic analysis also illustrate other costs. It is argued that changes that took place were a result of the rapid internationalisation of capital--a process in which the banana trade was largely stimulated by the involvement of TNCs. It will be seen in part II that TNC or local investment mainly resulted in qualitatively similar modernisation paths.

#### TECHNICAL CHANGE: indicators, production-biases and patterns of diffusion

This section discusses the types of organisations and institutions that have been responsible for research, development and technical diffusion. First, an examination of the indicators of agricultural transformation will be provided. Secondly, the existence of technology- and scale-bias will be considered. Thirdly, a discussion of the effects the export market had in technique selection will be analysed. This discussion is related to themes addressed above as production technology and the diffusion of technology are influenced by relations between banana growers and export agents, and patterns of land usage.



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Throughout this century technical change occurred in all stages of banana cultivation, transportation and marketing. As with sugarcane, frequently a technical change in one area of the production-distribution chain motivated changes throughout the rest of the links<sup>115</sup>. The most important change of the twentieth century was varietal switch from Gros Michel to Cavendish. This set off a chain reaction in the production process. Varietal change occurred as early as the 1940s in some plantations and as late as the 1970s in others<sup>116</sup>. Upon switching to this variety, not only were entire plantations uprooted, but new irrigation and drainage canals had to be constructed, methods of transport redesigned and materials for new packing methods had to be manufactured. Therefore when technical changes are discussed, it is necessary to consider related change in other areas of the production process. When variety switch occurred in one region, it can be assumed that the region also modified infrastructure so that production methods could effectively absorb the innovation<sup>117</sup>. Though many changes were country specific, over time they spread to other banana growing regions.

Setting up a plantation involved land clearing, construction of irrigation and drainage ditches (if necessary), initial planting, and the organisation of weed and pest control. Irrigation also enabled banana farmers to time harvests sequentially. A

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<sup>115</sup>Stewart, Frances (1977), *op.cit.*, pp.58-59. See Sugar Part II.

<sup>116</sup>See Ellis, Frank (1983), *op.cit.*, pp.88-89; Standard Fruit Company started replacing Gros Michel variety with Cavendish due to the destruction caused by Panama Disease. In some areas such as Urabá the switch to Cavendish did not occur until the 1970s. This is not necessarily a sign of slow technical adoption. Rather, the zone had never been affected by Panama Disease thus there was no reason to switch to a more resistant variety.

<sup>117</sup>Appendix B.1 summarises technical changes that occurred in banana production during the 1936-1990 period.

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continual banana harvest could be effected throughout the year when irrigation was carefully monitored. This was in contrast to sugar where in most areas an annual or biannual *zafra* (harvest) existed<sup>118</sup>. Good drainage was of paramount importance since banana roots will rot if covered by water for more than three days<sup>119</sup>. The extent of irrigation and drainage systems was in turn determined by rainfall levels and soil type. While most plantation tasks were initially performed by hand, machines in some regions came to predominate. Large TNC-owned plantations often used machinery for land preparation and excavating drainage and irrigation ditches. By the late 1960s machinery was also used to uproot Gros Michel plants<sup>120</sup>.

Bananas cultivated for export, unlike cane-sugar have undergone one major variety switch. Gros Michel was the traditional variety cultivated in Latin America. The advantages of Gros Michel were numerous: it ripened uniformly, survived rough handling and a lengthy transport period, and had a longer shelf life than other varieties<sup>121</sup>. However due to the infection and devastation of plantations with Panama Disease, growers switched to disease-resistant Cavendish<sup>122</sup>. As can be observed in table B1.2 Cavendish was generally land saving in comparison with Gros Michel. In some regions Cavendish became the dominant variety as early as the

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<sup>118</sup>See Sugar Part I.

<sup>119</sup>Wylie, Kathryn (1942). *The Agriculture of Colombia*. Washington, D.C.: Foreign Agriculture Bulletin No. 1, United States Department of Agriculture, p.68.

<sup>120</sup>Interview with Juan Guillermo Villada (Nov 1991), Director of Statistics, UNIBAN, Medellín, Colombia.

<sup>121</sup>Arthur, Henry, *et.al.* (1968), *op.cit.*, p.50.

<sup>122</sup>Ellis, Frank (1983), *op.cit.*, p.87; Grunwald, Joséph and Musgrove, Philip (1970), *op.cit.*, p.368. Panama Disease will be discussed below.

1950s.

**Table B1.2**  
Planting Density According to Variety, 1962

Variety	Number of Plants per Hectare
Gros Michel	400
Giant Cavendish	360
Dwarf Cavendish	730
Valery Cavendish	1,300

Source: Constructed from Valles, Jean-Paul (1968). The World Market for Bananas, 1964-1972: Outlook for Demand, Supply and Prices. New York: Praeger Publishers, Table 38, p.114, citing J. Champion, Le Bananier (1963). Paris: C-P Maisonneuve et Larsoe.

Innovations developed later in the period made the new variety hardier. In the 1960s and 1970s suckers were soaked in pesticides before planting to make them resistant to nematodes and borers<sup>123</sup>. During the 1980s, experiments were conducted on different cross-breeding techniques aimed at the genetic breeding of banana suckers (meristems). Genetic breeding, if successful, would allow a myriad identical disease-resistant suckers to be produced<sup>124</sup>.

The most damaging diseases to the plant were Panama Disease and Sigatoka<sup>125</sup>. Panama disease is an anaerobic fungus which penetrates the plant through roots and fibres of the stem<sup>126</sup>. Panama Disease first appeared in Bocas del Toro plantations in Panama in 1903<sup>127</sup>. From 1903 to the 1950s disease control was

<sup>123</sup>Thomson, Robert (1987), op.cit., p.47; Interview with Oswaldo Jaramillo (Nov.1991), disease-control and input applier, UNIBAN, Urabá, Colombia.

<sup>124</sup>Interview with Nestor Guitierrez (Nov.1991), agricultural engineer, UNIBAN, Urabá, Colombia; Soto, M. (1985). Bananos, Cultivo y Comercialización. San José: Litografía e Imprenta, p.187.

<sup>125</sup>Moko is the third threat to plants but easier to control than the other two. See Ellis, Frank (1983), op.cit., p.89 and Parsons, James (1957), op.cit., p.211.

<sup>126</sup>Jones, Clarence F. and Morrison, Paul C. (1952). "Evolution of the Banana Industry of Costa Rica." Economic Geography 28(1), p.6; Ellis, Frank (1983), op.cit., p.87.

<sup>127</sup>Ellis, Frank (1983), op.cit., p.87.

effected by relocating plantations as no methods were developed to disinfect the soil. Plots were then left fallow to de-disease the land<sup>128</sup>. This process required large amounts of capital outlay for heavy hydraulic work needed for ditch construction, as well as large tracts of land for fallow and new plantings. There were examples in the literature where entire plantations were literally picked up (including entire railway networks) and moved to another location<sup>129</sup>. Finally, the most effective method of disease control was varietal switch to Cavendish. Standard Fruit started planting Cavendish in 1955<sup>130</sup>. Later in the 1960s and 1970s most plantations were cultivated with Cavendish.

Yellow Sigatoka (first appeared in the 1920s and 1930s in Central America) and Black Sigatoka (first appeared in 1972 in Honduras) are airborne spores that attack the leaves of the plant<sup>131</sup>. This results in spots and can quickly destroy entire plantations<sup>132</sup>. Since the late 1930s Bordeaux mixture was applied to eradicate the fungus<sup>133</sup>. Either it was applied manually with a knapsack pump or distributed by airplane dusting<sup>134</sup>. Because airplane dusting was inefficient specially constructed pipelines were placed throughout the plantation which effected distributed Bordeaux

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<sup>128</sup>Jones, Clarence F. and Morrison, Paul C. (1952), op.cit., pp.5-6, 18.

<sup>129</sup>Acker, Alison (1988), op.cit., p.66.

<sup>130</sup>Ellis, Frank (1983), op.cit., p.89; Arthur, Henry, et.al., (1968), op.cit., p.140.

<sup>131</sup>Larrea, Carlos (1987), op.cit., table 6, pp.80-81.

<sup>132</sup>Grunwald, Joséph and Musgrove, Philip (1970), op.cit., p.366.

<sup>133</sup>Ellis, Frank (1983), op.cit., p.91; Jones, Clarence F. and Morrison, Paul C. (1952), op.cit., pp.16-17.

<sup>134</sup>Airplane dusting however was not successful because the substance did not adhere easily. For manual methods see Arthur, Henry et.al. (1968), op.cit., pp.140-142.

mixture<sup>135</sup>. From the mid-1950s a petroleum based mixture was applied through low volume aerial dispersion<sup>136</sup>. This method was used first on large-scale plantations<sup>137</sup>. Eradication of Black Sigatoka has not been perfected and has resulted four times more costly than that for Yellow Sigatoka<sup>138</sup>. Aerial dispersion of fungicides has been the principal technique.

Throughout the 1936-1990 period, plantation harvesting consisted of a sequence of tasks: removal of bananas from the stalk, transport to sorting and cleaning areas and then loading onto wagons and ships. Initially movement from stem to the point of embarkation was conducted by mules or oxen. On many plantations this was replaced by light railways as early as the late nineteenth century. Between 1947 and 1952 tractors replaced mules on the plantation<sup>139</sup>. This was clearly a capital-using, labour-saving technical change but tractors had adverse effects because they compacted the soil<sup>140</sup>. Between 1965 and 1970 tractors were replaced by a suspended cable system which eliminated these negative side-effects. Harvested bunches were hung on hooks suspended from cables, then connected together and

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<sup>135</sup>Ellis, Frank (1983), *op.cit.*, p.90. Research on the treatment of Sigatoka Disease was conducted by the United Fruit Company throughout Central America and Bordeaux solution was invented by W.C. Dunlap of the UFCO, see Valles, Jean-Paul (1968), *op.cit.*, p.111.

<sup>136</sup>Ellis, Frank (1983), *op.cit.*, p.91; Arthur, Henry, *et.al.* (1968), *op.cit.*, p.142.

<sup>137</sup>Small farmers often had access to this method if they were able to pay the per hectare fee. Interview with Oscar González (Nov. 1991), Director of Urabá Operations, UNIBAN, Urabá, Colombia.

<sup>138</sup>Larrea, Carlos (1987). "Empresas Exportadoras y Concentración Económica." In Larrea, Carlos, (Ed.) *El Bananero en el Ecuador* Quito: FLACSO, pp.80-81.

<sup>139</sup>Ellis, Frank (1983), *op.cit.*, p.181.

<sup>140</sup>A problem that is also facing sugarcane growers who mechanise a large proportion of cultivation tasks. For problems with soil compaction see Binswanger, Hans and Donovan, Graeme (1987). *Agricultural Mechanization: Issues and Options*. Washington, D.C.: The World Bank.

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pulled manually or by a small-sized tractor to the cleaning and packaging areas<sup>141</sup>.

Bananas were originally transported on the stalk and sold according to piece, not weight. At this time, sorting and cleaning was done at the point of embarkation in order to observe all possible damages to the fruit. However transportation by stalk was inefficient on many counts. First, quality control was wasteful in that if a stalk did not meet the minimum number of hands standard, the bunch could not be shipped<sup>142</sup>. Secondly, the entire harvest was cumbersome: banana stalk requirements were usually nine hands per bunch, which resulted in an almost unwieldy stem<sup>143</sup>. Thirdly, this type of shipment was inefficient as the stem itself accounted for 7-8% of total weight and unprotected bunches were easily bruised<sup>144</sup>. As the trade expanded, bananas were sold by weight. However, changes in shipping methods did not universally occur. Sometimes bananas were sold in prepackaged containers, others were transported in crates. Shippers switched to boxed bananas in 1956 and by 1960 the first packing plants in Honduras and Costa Rica were established<sup>145</sup>. By this time, sorting and cleaning tasks were also modified and re-located to the banana farm proper. Here, bananas were washed, sorted, stickers applied, packed in plastic bags then placed in boxes. Banana cleansing was not

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<sup>141</sup>Interview with Nestor Gutiérrez (Nov.1991), agricultural engineer, UNIBAN, Urabá, Colombia.

<sup>142</sup>Interview with banana stevedore in Urabá, Manuel Arias, Nov. 1991. He also complained that banana bunches were much more cumbersome and work was not as systematic as with banana boxes and pallets. Valles, Jean-Paul (1968), *op.cit.*, p.128.

<sup>143</sup>Interview with Camilo Peñalosa (March 1992) Head of International Marketing for UNIBAN, Bogotá, Colombia.

<sup>144</sup>May, Stacy and Galo, Plaza (1958), *op.cit.*, p.36.

<sup>145</sup>Soto, M. (1985), *op.cit.*, p.371.

always conducted; it was only necessary when the fruit was sprayed for Sigatoka<sup>146</sup>. By 1990 bananas were almost always washed due to the intense use of chemical inputs<sup>147</sup>.

Because bananas can be tainted easily during the growing season due to insect damage and the elements, special care must be taken to protect the fruit. During the early period (1936-1960) international standards of quality and size were not demanding but were still important. Shipment in boxes facilitated quality control and stickers were affixed to differentiate bananas. The UFCO introduced the "Chiquita banana" in order to distinguish their produce from the rest<sup>148</sup>. This was the first step towards quality control and brand loyalty.

In the 1960s, polyethylene sleeves were introduced to the cultivation process<sup>149</sup>. Sleeves were placed on the developing bunch to protect the fruit throughout the growing season. Some were coated with insecticides while others were simply used as physical barriers against pests. Plantations usually used a mix of both types in order to lower costs (those coated with pesticides were more expensive)<sup>150</sup>. This method introduced more waste into production. Many times sleeves were inappropriately disposed of and resulted in ecological problems. Not only was polyethylene a non-biodegradable material but the chemicals coating these bags also posed considerable ecological threat and endangered the health of banana

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<sup>146</sup>Jones, Clarence F. and Morrison, Paul C. (1952), *op.cit.*, p.7.

<sup>147</sup>Interview with Oswaldo Jaramillo (Nov.1991), disease-control and input applier, UNIBAN, Urabá, Colombia.

<sup>148</sup>Read, Robert A. (1986), *op.cit.*, pp.323-324; McCann, Thomas P. (1976), *op.cit.*, pp.74-75.

<sup>149</sup>*The World Banana Economy 1970-1984* (1986), *op.cit.*, p.61.

<sup>150</sup>Nestor Guitierrez (Nov.1991), agricultural engineer, UNIBAN, Urabá, Colombia.

workers and inhabitants of the region<sup>151</sup>.

The different incentives that faced small and large producers in banana cultivation were clear and the existence of capital-bias is also evident. Large units utilised comparatively higher levels of capital whereas smaller units used more labour, showing capital-bias in large units. For instance, fixed costs on large plantations accounted for a very large share of operating costs. Evidence from plantations in La Ceiba, Honduras demonstrated that about two-thirds of annual operating charges derived from fixed costs in the 1960s<sup>152</sup>. In the case of small growers, bananas were intercropped and farm costs were dependent on the nature of the other commodities. For example in Jamaica and the Windward Islands, successful banana cultivation was related to the ability to intercrop with other staples and cash commodities with low capital requirements.

Other crops. . . such as arrowroot, cocoa, nutmeg, limes and bananas were more suited to islands' smaller estates and required less capital investment from the owners who could not compete with large capital intensive operations in other colonies<sup>153</sup>.

Thus it is argued that production size determined techniques and capital-use. Small farms tended to use low-cost techniques and large farms employed capital intensive methods.

Empirical evidence suggested that economies of scale existed. Arthur Henry

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<sup>151</sup>Discussed below.

<sup>152</sup>These fixed costs included setting up plantations and infrastructure networks. See Arthur, Henry, Houck, James and Beckford, George (1968), *op.cit.*, pp.53-54.

<sup>153</sup>Thomson, Robert (1987), *op.cit.*, p.2.



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observed, "production costs tend to be lower on large than small banana farms"<sup>154</sup>. Another study stated, "Among Latin American countries Costa Rica has the lowest [costs of production] and Ecuador the highest costs", adding that scale-bias influences other factors which included labour costs and material prices, business structure, organisation and cooperation, and cultivation techniques thereby affecting production costs<sup>155</sup>. Therefore due to scale-bias small businesses were increasingly dropping out of the export business in the 1960s<sup>156</sup>. Regarding production and marketing bias Read states: "For the large plantation based banana companies scale economies existed not only in production, but also in shipping and in the final market in ripening and distribution facilities"<sup>157</sup>. Moreover, in the absence of official support, small and medium scale growers were driven out of production as fruit companies established a dominant position through control of transport and marketing<sup>158</sup>. Davies, researching Jamaican producers, also emphasized the monopolistic nature of banana firms in conjunction with the possibilities that bananas cultivated by small growers were of a lower quality:

It was felt that the very strong position occupied by the one, large, producer and buyer enabled it to effectively control the terms of sale. This was undoubtedly true, but the underlying reason for the moderate prices received by Jamaican growers was that better quality bananas were being produced in Central America and in Colombia where costs

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<sup>154</sup>Arthur, Henry *et.al.* (1968), *op.cit.*, p.72; see also Adams, Frederick Upham (1914). Conquest of the Tropics. New York: Doubleday, Page and Company, p.80-- he discusses the necessity of economies of scale for banana production before 1914.

<sup>155</sup>Production and Marketing of Bananas from the Associated African States and Madagascar (1971). Brussels: Development Aid Series No.4., pp. 24, p.37.

<sup>156</sup>*Ibid.*, pp.46-47.

<sup>157</sup>Read, Robert A. (1986), *op.cit.*, p.321.

<sup>158</sup>Slutzky, Daniel and Alonso, Esther (1980). Empresas Transnacionales y Agricultura: El Caso del Enclave Bananero en Honduras. Tegucigalpa: Editorial Universitaria, pp.36, 40.

were extremely low<sup>159</sup>.

These examples show that small producers were at a disadvantage both in terms of production costs and market structures controlled by international firms. This suggested that scale-bias existed with regard to export-banana production. Yet despite the disadvantages suffered by small producers, they produced significant amounts of bananas for the export market<sup>160</sup>. Were economies of scale a simplistic economic explanation for the decline of small producers? Or did the prevalence of small producers demonstrate their ability to survive adverse conditions and overcome conditions of scale-bias?

First, the low-cost nature of technical change in banana growing during the early part of the century enabled small producers, less likely to receive credit, to keep pace with technical change and expand production<sup>161</sup>. The importance of labour in many areas of production, allowed small farmers to capitalize on their ability to use family labour. Family labour, as with sugarcane, proved particularly adroit for delicate tasks that could only be efficiently performed by motivated manual labour<sup>162</sup>. Thus, the implications of the continual importance of labour made bananas advantageous for small producers who were short of capital and had limited access to credit. Enormous drainage and irrigation networks were not necessary

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<sup>159</sup>Davies Peter (1990). Fyffes and the Banana: Musa Sapientum a Centenary History 1888-1988. London: The Athlone Press, pp.81-82.

<sup>160</sup>See above.

<sup>161</sup>For different accounts of credit scale-bias see Bharadwaj, Krishna (1985). "A View on Commercialisation in Indian Agriculture and the Development of Capitalism." Journal of Peasant Studies, 12(4), pp.7-25; El-Ghonemy, M. Riad (1990). The Political Economy of Rural Poverty. London: Routledge.

<sup>162</sup>See Sugar Parts I and II.

because the plot was manageable and could be watered by hand if necessary. Ester Boserup signalled this as a feasible low-cost technique; water control could be effected by labour intensive operations<sup>163</sup>. Investment in seeds was also unnecessary since the banana is a perennial and only two major exportable varieties existed in the twentieth century. Moreover, into the 1980s employment of manual pest control was high in some areas, for example Dominica<sup>164</sup>. Regarding soil care, weeds must be controlled. They could either be eliminated through herbicide application or slashing with a machete. The first method was both labour- and capital-using while the second was clearly labour-using. Usually the small farmer who did not have sufficient levels of capital resorted to the second<sup>165</sup>. As Boserup argued, low-cost techniques for weed control could be prevented by repeated manual weeding, and the removal of parasites by hand were low-cost methods of weed and pest control<sup>166</sup>. Most fertilizer application methods and weed control (whether it be with a machete or chemical inputs) until the 1960s were applied by hand. Some areas used the shovel method (for fertilizer) or a hand-held pump (for fertilizer and insecticides). These low-cost techniques were important for maintaining independent banana producers in the business.

In areas where there was less involvement of the State and non-TNC export agents, scale-bias was evident. Scale and capital bias did exist as large plantations operated with economies of scale and had easier access to capital. In extreme

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<sup>163</sup>Boserup, Ester (1981). *Population and Technology*. Oxford: Basil Blackwell, p.25.

<sup>164</sup>Approximately 60% was conducted manually, see Thomson, Robert (1987), *op.cit.*, p.49.

<sup>165</sup>*Ibid.*, p.48.

<sup>166</sup>Boserup, Ester (1981), *op.cit.*, p.24.

circumstances, when TNCs monopolized the market small producers had to retreat. In other areas favourable policy (TNC and State) and the ability to employ competitive low-cost techniques allowed small producers to survive. The concept of scale-neutrality does not recognize these points, as statistically it may appear that small and large units have similar output levels, yet the mechanisms work differently. Small producers tended to use low-cost techniques while large producers employed capital-intensive techniques.

The nature of the crop influenced the organisation of technical change. Kindleberger maintained that annual crops encouraged agricultural experimentation by individual farmers, whereas, perennial crops took a long time to bear their first harvest making it difficult for individual farmers to finance research<sup>167</sup>. Research facilities did exist in banana-growing regions, although these centres were created with foreign capital, usually equipped with foreign experts, with research aimed at improvements in export-banana cultivation. It can be argued that this type of technology was exactly what LDCs needed. However the effect of recruiting foreign personnel for these tasks not only stimulated few multiplier effects within the country but also could be responsible for generating some of the social unrest common to banana producers areas. Stewart maintained:

The shortage of local people and the need to import people from advanced countries together make for an escalation in salaries of skilled people, so that differences between skilled and unskilled tend to be higher than those in the advanced countries<sup>168</sup>.

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<sup>167</sup>Kindleberger, Charles (1965). Economic Development. New York: McGraw Hill, p.77.

<sup>168</sup>Stewart, Frances (1977). Technology and Underdevelopment. London: The Macmillan Press,Ltd., p.76.

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In a general sense in agriculture, many discoveries did not necessarily need large amounts of public expenditure<sup>169</sup>. Often local craftsmen and mechanics could build machines or adapt and fabricate improved tool design<sup>170</sup>.

Moreover, many export-banana techniques were not appropriate for local growers and new innovations were typically applied only within export-banana growing areas and seldom diffused to banana cultivators who supplied domestic markets. According to a World Bank study:

The creation of privately supported crop research institutes for export-crops, sugarcane, coffee and banana, has been an acceptable alternative, but since basic research by and large is a "public good" it remains to be seen whether private efforts will be adequate<sup>171</sup>.

Clearly privately support export-banana research did not benefit growers not involved in the trade. For instance banana discoveries were aimed at pristine banana appearance. This was achieved through applying higher dosages of chemical inputs and covering bunches with polyethylene bags to protect the growing fruit. These innovations, were only applied on TNC land or were diffused to independent producers, supplying bananas to export markets. These methods were highly sophisticated, capital-intensive and unnecessary as such high quality produce was not essential for internal consumption.

Because of the higher receipts earned from banana production, has it pushed out the production of foodstuffs? Some empirical studies such as those of Steven

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<sup>169</sup>See Binswanger, Hans (1986). "Agricultural Mechanization, a Comparative Historical Perspective." The World Bank Research Observer, 1(1), pp.50.

<sup>170</sup>See sugar section for various examples of local craftsmen's innovative contributions to field and factory processes.

<sup>171</sup>Colombia: Economic Development and Policy Under Changing Conditions (1984) Washington D.C.: The World Bank, p.108.

Sanderson, J.M Marie, A.H.J. Helmsing, Jorge García, Gabriel Montés and Salomon Kalmanovitz emphasized that export agriculture often displaced the production of domestic staples. A country that specialized in export production frequently used foreign exchange for food imports<sup>172</sup>. Bulmer-Thomas argued:

"...that the development of export specialization in Central America in the half century up to 1930 had led to the neglect of agriculture for domestic use and food imports in 1929 represented some twenty per cent of the import bill"<sup>173</sup>.

Later, in areas such as the Windward Islands, and the Philippines the presence of export banana growing clearly pushed out foodstuff production. In the 1970s in the Philippines domestic foodstuff production was also limited as TNCs did not allow independent producers to intercrop<sup>174</sup>. Therefore this made small planters and workers more dependent on imports or plantation shops for basic foodstuffs. In the 1980s Thomson stated that in the Windward Islands domestic food production was the most disadvantaged agricultural sector characterized by a chronic lack of financing as most resources were channelled into export commodities<sup>175</sup>.

As in the case of sugarcane foreign capital was intrinsic to the development of export-banana production. For sugarcane many field technical changes were low-cost and made for local diffusion, allowing most of the capital expenditure to be concentrated in the mill. Furthermore as the sugarcane agroindustry matured,

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<sup>172</sup>Sanderson, Steven E. (1986). The Transformation of Mexican Agriculture. Princeton: Princeton University Press; Marie, J.M. (1979), op.cit., pp.19,21,40-41,51; Helmsing, A.H.J.(1986). Firms, Farms, and the State in Colombia. Boston: Allen and Unwin, Inc.; Kalmanovitz, Salomon (1974), op.cit., p.143. For a discussion of competitive agricultural imports turning the terms of trade against domestic agriculture see García, Jorge and Montes, Gabriel (1989). Trade, Exchange Rate and Agricultural Pricing Policies in Colombia. Washington, D.C.: The World Bank, pp.25-26.

<sup>173</sup>Bulmer-Thomas, Victor (1985), op.cit., p.143.

<sup>174</sup>David, Randolph S., et.al. (1983), op.cit., p.56.

<sup>175</sup>Thomson, Robert (1987), op.cit., p.62.

reliance on foreign technology diminished<sup>176</sup>. A different experience was witnessed in export-banana production. Low-cost techniques were crucial to small producers however technical change in banana production continued to be imported by producing countries (such as eradication of Sigatoka disease, varietal switch, disease control through polyethylene bags, and banana boxing) throughout the twentieth century exerting little impetus to internal technical change. As J.M. Marie rightly argued for Dominica between 1961 and 1970, there were high intra-industry transactions and few inter-sectoral transactions<sup>177</sup>. As has been argued above and will be elaborated below, because of the relative abundance of capital available to some producers, it was often ineffectively employed.

Access--or denial of access--to credit influenced production techniques. Easy access to capital may have led TNCs to over use chemical inputs<sup>178</sup>? While differences in efficiencies resulted from small producers restricted access to capital and land. After 1950 the Ecuatorian industry, which mainly relied on small producers, was often considered inferior because of low input application levels (i.e. producers did not have enough capital)<sup>179</sup>. In the 1950s small producers in Cameroon were not able to use ecologically sound methods because of cash restraints, and their short term outlook of the domestic trade. Small- to medium-sized producers viewed banana growing as a quick method to earn easy income and then abandon

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<sup>176</sup>See Sugar Parts I and II.

<sup>177</sup>Marie, J.M. (1979), *op.cit.*, p.40.

<sup>178</sup>For literature on sustainable development see Redclift, Michael (1987). Sustainable Development: Exploring the Contradictions. London: Methuen; and Pearce, David, Barbier, Edward and Markandya, Anil (1990). Sustainable Development: Economics and Environment in the Third World. London: Earthscan.

<sup>179</sup>Parsons, James (1957), *op.cit.*, pp.209-211.

production when the high return, low investment period expired, Heinzen described this as a 'rapid mining technique'<sup>180</sup>.

Second, land usage arrangements were also a barrier to utilizing ecologically sound practices. Small producers in the Windward Islands were considered environmentally harmful due to the soil erosion they caused by planting on rocky mountain slopes in the 1970s<sup>181</sup>. Banana cultivation on slopes was an ecological risk because of the banana plant's shallow root system and the resultant threat of soil erosion. This pattern of land tenure was also observed in the French Islands in the Eastern Caribbean<sup>182</sup>. This was also an outcome of the imperfect land tenure structures where small producers, because of their lack of capital, political clout, or inability to defend their plot, were pushed into undesirable areas. Thus in order to obtain ecologically sound methods proper incentives must be established to adjust inefficient land markets and socio-political bias<sup>183</sup>.

Third, pest control methods must be considered. Analysts examining the Philippines argued that the frequent use of pesticides and insecticides on large-scale banana plantations drove pests to nearby non-banana growing areas, thereby causing negative externalities<sup>184</sup>. Moreover, TNCs tended to favour the most

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<sup>180</sup>See Heinzen, Barbara (1984), *op.cit.*, pp.29, 36.

<sup>181</sup>Thomson, Robert (1987), *op.cit.*, p.73.

<sup>182</sup>Welch, Barbara Marian (1989). "Institutional Structures as a Factor in Land-Use Decisions: The Impact of Banana Growers Associations in French and Commonwealth islands in the Eastern Caribbean." PhD Dissertation, University of London, University College, p.534.

<sup>183</sup>For a detailed study of the influence of institutions on banana production see Welch, Barbara Marian (1989), *op.cit.*

<sup>184</sup>David, Randolph S.; Rivera, Temario C.; Abinales, P.N. and Teves, Oliver G. (1983). "Transnational Corporations and the Philippine Banana Export Industry." In *Political Economy of Philippine Commodities*. Quezon City: University of the Philippines, p.54.



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technologically advanced techniques and, in effect, forced small producers to employ similar methods so that banana quality was homogeneous. For example Sigatoka control was conducted by the marketing firm, or cooperative organisation as early as the 1950s in Jamaica and Ecuador. Some agents charged on a hectare basis, while others charged a technical service fee per box, thereby penalizing those with higher productivity levels<sup>185</sup>. There have been studies conducted regarding the safety of manual banana input application in the 1980s. In many countries, safety regulations were not fully followed and/or plantations were located in geographically unsuitable areas which resulted in lethal chemical run offs into the ground water, causing sterility or birth defect in future generations<sup>186</sup>. For instance in the 1970s in the Philippines the most common illness on plantations was allergic reaction to chemicals used in production<sup>187</sup>. The same report also recorded that baggers acquired lung infections from polyethylene bags coated with chemicals<sup>188</sup>.

Despite these differing practices, on a very general level TNCs tended to be more generous with fertilizer and pesticide application because they viewed banana cultivation as a long-term venture. Thus it was in their interest to take optimal care of their banana plantation, however this was often to the detriment of regional ecosystems. Small producers faced different ecological problems with their

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<sup>185</sup>David, Randolph S., *et.al.* (1983), *op.cit.*, p.44.

<sup>186</sup>Pettifer, Julian (1993), "Banana Wars," *BBC Assignment Tonight.; Country Report, First Quarter 1994 Costa Rica, Panama* London: Economist Intelligence Unit, p.14. For a discussion of the inappropriate chemical inputs (e.g. the use of pesticides in LDCs some of which were banned in the USA) by TNCs in LDCs see Burbach, Roger and Flynn, Patricia (1980). *Agribusiness in the Americas*. New York: Monthly Review Press, pp.115-118.

<sup>187</sup>*The Human Cost of Bananas* (1979). Manila: ICL Research Team, pp.41, 42, 94.

<sup>188</sup>*Ibid.*, p.42.

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production methods as access to land and capital was difficult but because they had to meet banana exporter's standards, they also became involved in ecologically damaging techniques associated with TNCs. Low-cost techniques were crucial to small producers. Although the data on production size varied, it is posited, as in the case of sugarcane, that capital-intensive techniques pushed out small producers<sup>189</sup>. Technical change in banana production continued to be imported by producing countries throughout the twentieth century exerting little impetus to local experimentation in contrast to sugarcane and potato. Because of the centralized structure of exports (akin to that of cane milling) production practices often became homogeneous as the agribusiness modernised. This further illustrated the process of the internationalisation of capital.

#### LABOUR: the effect of technical change

First, the influence technical change and the consequent increase in task specialization had on labour will be analysed. Did labour specialization, induced by technical change, improve worker welfare? The second issue to be discussed is the qualitative changes in labour's well-being. How did the profit structure of the trade affect workers standard of living<sup>190</sup>? Throughout the discussion it is important to state that the conditions of bananas workers were diverse and often there were differences amongst TNC- and locally-employed workers.

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<sup>189</sup>This will be examined in Banana Part II.

<sup>190</sup>Lipton, Michael and Longhurst, Richard (1985). Modern Varieties, International Agricultural Research and the Poor. Washington, D.C.: The World Bank, p.4.

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As stated earlier, the general trend was labour and land saving technical change. Nonetheless, labour continued to be used extensively. Land clearing and railway construction were conducted by both labour and capital using techniques. Initial banana plantings were carried out by labour and continued to be so in 1990. Other notable techniques included banana plant care which consisted of proper pruning of suckers sprouting at the stem of the plant, and construction of irrigation and drainage networks. There was very little precise scientific control of the cultivation process and technical advances in varietal selection and input application for disease and pest control occurred post-1930. In the 1940s and 50s (later in some regions) the most significant change was varietal switch which affected man hours demanded per hectare. New varieties could be planted closer together which increased man hours per hectare<sup>191</sup>. In addition, the corresponding change to boxed bananas increased labour absorption in Honduras and other parts of Central America<sup>192</sup>. In some areas packing plants accounted for 25% of total workforce in banana divisions<sup>193</sup>. Labour was needed to apply banana stickers, vacuum-pack bananas and load them onto pallets or trucks. One researcher claimed that with new varieties, labour costs increased less than proportionally, and as payment was mainly piece-rate, concluded that this effected an increase in labour productivity in the mid 1960s in Ecuador<sup>194</sup>.

The International Labour Organisation estimated that the introduction of cables

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<sup>191</sup>See Table B1.2.

<sup>192</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.33; Ellis, Frank (1983), *op.cit.*, p.181.

<sup>193</sup>Ellis, Frank (1983), *op.cit.*, p.190.

<sup>194</sup>See Valles, Jean-Paul (1968), *op.cit.*, p.120.

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in the 1960s and 1970s in the plantation for harvesting, reduced labour demand by 50% in Panama<sup>195</sup>. This method was one of the most labour saving technical changes to occur in banana cultivation although it could not be implemented universally--it was only economically viable on large flat plantations. Moreover, manual pulling was detrimental to the workers. Instead of operating tractors which transported bananas, labourers were responsible for pulling rows of fastened bunches through muddy plantations, a task that was physically demanding and represented a decrease in the quality of work. Irrigation and drainage tasks could either be labour- or capital-using, depending on plot size and capital availability. If the technique was labour-using then labour was usually only demanded temporarily for the specified period of time required to re-design the plantation. After irrigation networks were constructed, labour was needed to maintain canals clean and free of debris. Thus the intermittent nature of this work increased instability in banana growing regions.

Despite aseasonal harvests, job instability was common to banana production. This was attributed to patterns of production characterized by many specialists and few divergences in quality<sup>196</sup>. As Henry Arthur observed:

There are no significant by-products or variations in processing and handling and favour sideline industries. Almost all operations, from grower down to ripener-wholesaler, are carried on with specialized facilities by banana specialists<sup>197</sup>.

After the formative phase, plantation labour became differentiated. It can be argued that it was more specialized than for any other agribusiness at the time. For example,

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<sup>195</sup>Situación y Perspectivas del Empleo en Panama (1974) Geneva: International Labour Organisation, p.68.

<sup>196</sup>Parsons, James (1957), op.cit., p.204.

<sup>197</sup>Arthur, Henry et.al. (1968), op.cit., p.161.

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in 1900 the UFCO demanded stevedores, plantation workers, banana planters, banana harvesters, railway workers, administrative posts, etc. In later years some of labour's tasks were replaced with capital-using techniques, while other manual jobs surfaced and labour composition became more heterogeneous with the entrance of each new technique. Heterogeneity ranged from the semi-skilled labourer who checked leaves for Sigatoka spots to the stevedore responsible for quality control<sup>198</sup>. As a result of specialization, wage differentials and the number of payment methods also increased. Employees (white-collar workers) were paid monthly, banana harvesters according to stems picked, railway workers on a flat weekly rate and unskilled labour would receive daily or hourly wages<sup>199</sup>. Differentiation was clearly observed from Windward Island wage rates compiled by Bishnodat Persaud who found 23 different systems of payment<sup>200</sup>.

Alain De Janvry posited that with the introduction of new techniques, new positions were created which affected and sometimes induced social change<sup>201</sup>. As divisions occurred, fragmentation resulted in more tensions in the countryside. However this analysis overemphasizes the role of social structures and failed to take into account overall economic conditions. For example, job specialization did not

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<sup>198</sup>For a further discussion of labour specialization see MacCameron, Robert (1983), *op.cit.*, p.14.

<sup>199</sup>*Ibid.*, p.14.

<sup>200</sup>Persaud, Bishnodat (1966), *op.cit.*, table 14, p.21. For another example of the considerable division of labour see The Human Cost of Bananas (1979), *op.cit.*, Appendix A, pp.120-124 displays 26 different tasks.

<sup>201</sup>de Janvry, Alain (1984). "The Political Economy of Rural Development in Latin America: An Interpretation." In Eicher, Carl and Staatz, John (Eds.) Agricultural Development in the Third World. Baltimore: Johns Hopkins University Press, p.92. See labour section for further discussion.

result in tension and conflict among sugar workers in the Cauca Valley<sup>202</sup>. Furthermore, as stated earlier, the nature of the erratic demand for labour also introduced added instability. If the work force is one which is geographically concentrated with few opportunities in other sectors of the economy this differentiation can make labour relations tenuous.

As stated above, extensive infrastructure (including hospitals, schools, housing) was often established by TNCs both to grow bananas and attract labour. Nonetheless, most accounts of export banana regions have stressed the poor conditions of banana workers. First, because of unpleasant conditions of potential bananas growing areas (i.e. high levels of humidity, rainfall and temperature) they were usually not densely populated. For example in Honduras most of the population was located on the more pleasant mountain slopes<sup>203</sup>. In sunny, tropical areas disease was endemic. In the early years of the trade, the arrival of fruit companies was associated with improved tropical living conditions<sup>204</sup>. However, as the trade matured, investment in workers well-being diminished. In addition to declining real salaries mentioned above, living conditions were unsatisfactory. Poor living conditions were often characteristic of TNC banana producing regions post-1950<sup>205</sup>.

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<sup>202</sup>See Sugar Part II.

<sup>203</sup>Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.18.

<sup>204</sup>See above.

<sup>205</sup>For accounts of poor living conditions see: Thomson, Robert (1987), *op.cit.*; Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*; Sierra Botero, Diego Miguel (1986). "Urabá Banano y Bienestar Social." *Revista Augura*. 12(2), pp.39-45; MacCameron, Robert (1983), *op.cit.*; Larrea, Carlos (1988). "Los Cambios Recientes en el Subsistema Bananero Ecuatoriano y Sus Consecuencias Sobre los Trabajadores: 1977-1984." in *Cambio y Continuidad en la Economía Bananera*. Torres-Rivas, Edelberto and Deutscher, Eckhard (Eds.), FLACSO, CEDAL: San José; Flores Valeriano, Enrique (1979). *La Explotación Bananera*

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A consultant to the UFCO in 1964 stated, "[A banana plantation]. . . is a poor place to live unless you're a banana."<sup>206</sup>. According to The Sunday Times in 1978 living conditions were described as: "drab and stark. . . less than ten square feet. The cooking facilities are primitive. There is no running water, there is no electricity. There are not sanitation facilities"<sup>207</sup>. However Bourgois study of UFCO workers in the 1980s in Costa Rica concluded that ". . . children of banana workers were considerably healthier than those of the peasants on the periphery of the plantation"<sup>208</sup>. Therefore the nature of the conditions of TNC and non-TNC workers is contestable and can only be determined by the time and place of production.

Secondly, because of the unappealing conditions, high relative wages were at first imperative to lure migrants to producing regions<sup>209</sup>. In later years, high wages continued to be an important element to the banana trade, although infrastructure construction was abandoned. Despite high wages, according to a New York Times article of 1954, the standard of living of Honduran banana workers declined dramatically between 1932 and 1954<sup>210</sup>. Other evidence from Honduras corroborated that wages did not keep pace with inflation.

Average fruit workers' salaries had been maintained at a maximum of \$1.50 per day for more than twenty years <1934-1954>. Meanwhile the price of consumer goods had

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en Honduras. Tegucigalpa: Editorial de la UNAM.

<sup>206</sup>Bourgois, Philippe (1989), op.cit., p.3, citing consultant's report to the United Fruit Company by Laidlow & Co. (1964); see chapter 14 for a complete review.

<sup>207</sup>The Sunday Times (13 Aug. 1978).

<sup>208</sup>Bourgois, Philippe I. (1989), op.cit., p.38.

<sup>209</sup>Ibid.

<sup>210</sup>New York Times (22 May 1954), p.14.

increased appreciably"<sup>211</sup>.

Larrea also documented a 39% decrease of real purchasing power in unskilled Ecuatorian banana workers wages from 1952 to 1984<sup>212</sup>. Apparently, as more actors entered the business, competitive forces motivated management to lower costs. For instance, a method used in the Philippines by Del Monte was *kabit* (attached worker). In this method essentially two workers were hired for the price of one. One of the workers would sign his name and subsequently appear on the payroll to receive all the wages and benefits. The agreement between the two workers was such that wages were to be shared<sup>213</sup>.

Lastly, in the literature there were many accounts of the exploitative nature of banana companies. MacCameron and Slutzky and Alonso refer to numerous strikes as indicators of labour dissatisfaction. Philippe Bourgois, Robert Thomson and the ICL Research Team attributed exploitation to arduous working conditions common to banana growing areas and poor living conditions coupled with the above<sup>214</sup>. Deplorable conditions were reported in the 1970s for UFCO plantations in the Philippines. Men and women lived in bunkhouses consisting of 24 people per room (8 sets of 3 tiered bunks with no mattresses) that were so crowded that only one

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<sup>211</sup>MacCameron, Robert (1989), *op.cit.*, p.22.

<sup>212</sup>Larrea, Carlos (1988), *op.cit.*, table 6, p.177.

<sup>213</sup>See David, Randolph S., *et.al.*, pp.47-48.

<sup>214</sup>See MacCameron, Robert (1983), *op.cit.*, pp.21-29; Bourgois, Philippe I. (1989), *op.cit.*; Slutzky, Daniel and Alonso, Esther (1980), *op.cit.*, p.28; *The Human Cost of Bananas* (1979), *op.cit.*, p.95. Furthermore, some studies show that banana work became more difficult. In Dominica one woman commented that new packaging system was less efficient and harder than previous boxing arrangement see Thomson, Robert (1987), *op.cit.*, p.76.



small desk and two chairs could fit<sup>215</sup>. Bourgois observed that throughout the history (until 1989) of the banana trade workers tended to be less educated and more easily 'exploitable' in Costa Rica<sup>216</sup>. The ICL Research Team in Manila reported unfair methods of luring workers. According to their study migrant workers were deceived into obtaining jobs and were promised much higher salaries (almost double of what they actually received)<sup>217</sup>. The changing conditions of the labour force have been such that workers were initially offered housing and other benefits while later TNCs competed for methods to make abundant labour cheap. This trend is also evident in the case of sugarcane with the increased use of labour contracting<sup>218</sup>. Thus, with both crops, instead of conforming to stricter labour regulations *vis-à-vis* the developing State, recruiting methods were introduced to circumvent worker protection legislation.

The arrival of the banana trade signified rapid changes to the labour force. The introduction of technical change resulted in a highly stratified, erratically-demanded work force. Many were attracted to unpleasant tropical areas by high wages and favourable living conditions. As the trade progressed these conditions often became less desirable. However the experiences among different regions were distinct and labour was subject to different experiences. Banana companies sometimes offered higher than average wages. Nonetheless, subsequently real wages

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<sup>215</sup>The Human Cost of Bananas (1979), *op.cit.*, p.95.

<sup>216</sup>See Bourgois, Philippe I. (1989), *op.cit.*, chapter 13.

<sup>217</sup>The Human Cost of Bananas (1979), *op.cit.*, p.34. They were promised 8 pesos/day and only received an average of 4.75 pesos/day during the first year. After the first year payment was increased to 5.25 pesos/day.

<sup>218</sup>See Sugar Parts I and II.

appeared to have decreased. The banana trade had conflicting effects on labour. Although in many areas they started a process of internationalisation of capital by monetizing the economy, often wages were so low that accumulation was difficult. Also, in some regions long term effects such as infrastructure construction was often abandoned in later years and living conditions deteriorated.

## CONCLUSION

TNCs clearly started a process in banana producing countries and represented an early initiative to the internationalisation of capital. The presence of TNCs sometimes resulted in the emergence of a competitive local producers association and stimulated the construction of physical infrastructure, the promotion of colonisation, the establishment of higher than average wages and the provision of worker's housing, schools and hospitals. However, over time, these conditions eroded. Moreover, due to the monopolistic practices of TNCs there were clearly costs. In some host countries the knock-on effects were minimal resulting in little capital deepening. In the long-run the lack of local initiative, stifled by TNC monopolistic tendencies, distorted market mechanisms and slowed-down what might have been a gradual development of internal markets. In other regions the development of export agents resulted in more local enterprise. Evidence ranges from the wide use of independent suppliers to the involvement of export agents in disease eradication, plantation insurance and exporting. However, because most of the profits accrued to the export agent, the influence land usage and production levels had on agricultural accumulation to supply capital to the industrial sector were less than proportional.

### *Part I: Banana*

Unlike sugarcane, variety change was limited, with only two prevailing throughout this century. Most technical change was related to varietal switch which impulsed transformations throughout growing and marketing processes. The existence of capital bias was clear with large TNCs. But scale bias, was period specific and the practices of TNCs. Scale-neutrality simply did not exist in a neoclassicals sense. Although small producers were a major supplier of bananas, their survival was related TNC and state policy. If monopolistic tendencies were not regulated, small producers withdrew. If TNC activities were monitored and a suitable insitutional framework was organised, independent growers endured.

Because the influence these companies had on techniques, many production decisions were made from the top (TNCs) and trickled down to the producers. Particularly in later years, this situation favoured the use of capital and resulted in less than optimal production patterns, which were often ecologically unsound. Independent producers faced monopsonistic buyers and had little potential for internal market sale. They were forced to follow international guidelines and could not resort to other marketing channels. This was not the case of sugarcane which could be sold to a nearby mill, or the producer could transform it into panela and sell the imperishable product on the internal market. Or the case of the "democratic" potato in which high yields could be achieved on relatively small plots of land and marketed internally.

Labour continued to be an important aspect of banana production. This can be observed in the areas of cultivation, input application, and packaging. Labour was particularly important factor of production for the small-to medium-sized producer

*Part I: Banana*

who was able to use low-cost, labour-intensive techniques and keep pace with technical levels of larger capital-intensive plantations. With many methods labour was needed for a particular period of time, thereafter the plantation was updated and labour became redundant. Sporadic demand resulted in instability in banana regions. Though wage-labour might have benefitted from the establishment of TNC plantations, without the accompanying development process, when the labourer lost his job, there were usually no regional alternatives. The standard of living of labour was contentious as some accounts clearly showed deteriorating real wages while others demonstrated that TNC banana workers, in relative terms, experienced superior conditions. To properly weigh the costs and benefits of the modernisation of the world banana economy during the 19360-1990 period would be facetious with only secondary sources. However some issues were analysed that will be expanded in the Colombian case study.

## **Part II: Santa Marta and Urabá Export Bananas**

Plantains have been grown in Colombia for centuries by small commodity producers dispersed throughout the countryside. In recent decades bananas have come to signify the 'arrival' of foreign capital<sup>1</sup>. How this 'arrival' has affected and shaped agricultural transformation in Colombia will be analyzed below. At the turn of the century, the establishment of a large banana plantation complex in the Santa Marta region was hailed as a sign of progress. Subsequently the consolidation of plantation production in the region was held to be responsible for large-scale socio-economic strife. Later similar problems arose in the 'new' banana area, the Urabá Gulf. Why has a crop that has led to frontier settlement and generated foreign exchange since the turn of the century fail to promote economic development in these regions?

Santa Marta export bananas experienced a boom in the late 1920s which then tapered off until the United Fruit Company (UFCO) relocated activities to Urabá in the 1960s. A period of export expansion ensued into the 1980s which was accompanied by substantial changes in organisational patterns. In this section, the transformation of banana growing in Colombia will be analyzed during the 1936-1990 period. Magdalena banana growing in 1936 was on the wane, thus an examination of its evolution will be provided in order to place the development of Urabá in context with previous transformations. The general discussion in part I also provided a context from which Colombian trends can be compared.

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<sup>1</sup>Kalmanovitz, Salomon (1988). Economía y Nación: una breve historia de Colombia. Bogotá: Siglo Veintiuno Editores, p.251.

## *Part II: Santa Marta and Urabá Export Bananas*

### INSTITUTIONS, MARKETS and TECHNOLOGY: Modernisation in Santa Marta

This section will give a description of location of production and export trends. Secondly, State response to the UFCO will be examined. Thirdly, the importance of independent local growers as a source of exportable bananas will be investigated. Fourthly, technical change in the region will be discussed until the late 1960s when productivity levels surged in Urabá. Lastly, an assessment of the benefits and costs of the trade will be presented.

Banana growing in Colombia is highly heterogeneous because a large number of small, medium and large-sized producers cultivate bananas. Since it is a traditional crop, changes over time have been complex, and several modes of production have coexisted. This implies different technologies and production techniques. According to a 1990 survey by the Ministry of Agriculture, plantation bananas are primarily an export crop. Dispersed production on small- to medium-sized plots is principally directed towards the domestic market and there is also much subsistence production<sup>2</sup>. But this dichotomy is often overdrawn and research indicates that for the greater part of the period studied small- and medium-sized growers produced both for domestic consumption and export.

The commencement of export banana production was largely impulsed by foreign and domestic investments in 1891<sup>3</sup>. A North American company, The

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<sup>2</sup>El Desarrollo Agropecuario en Colombia, Tomo I. (1990) Bogotá: Ministerio de Agricultura and Departamento Nacional de Planeación, p.129. See also Américo Castillo, José (1967). Notes on Recent Developments in Colombian Agriculture. Cali: Universidad del Valle, p.14.

<sup>3</sup>Wylie, Kathryn (1942), The Agriculture of Colombia. Washington, D.C.: Foreign Agriculture Bulletin No.1, United States Department of Agriculture, p.66.

## *Part II: Santa Marta and Urabá Export Bananas*

Colombian Land Company (predecessor of the UFCO), bought land in the Santa Marta area in 1894 on which bananas were cultivated for export<sup>4</sup>. The banana growing region, which will be denoted as Santa Marta, actually extends from a northern boundary twelve miles north of Santa Marta and stretches southward to Fundación<sup>5</sup> (see Map B2.1). The UFCO gradually transformed Santa Marta into one of the largest producers of export bananas in the world. Prior to the arrival of the UFCO coastal agriculture was diversified, cattle ranching, cane-panela, banana and cocoa being the prominent activity<sup>6</sup>. Between 1900 and 1929 growers expanded banana production<sup>7</sup>. The region experienced much success and by the 1920s the boom years had been reached. In 1929 Colombia was only surpassed in world exports by Jamaica and Honduras<sup>8</sup>. The value of banana exports figured prominently in Colombia's diversified export schedule from 1905 to 1935 which also featured coffee, petroleum (later in the period), tobacco, hides, gold and platinum (see Appendix B.4).

Between 1936 and 1990 the share of bananas in Colombian exports decreased

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<sup>4</sup>LeGrand, Catherine (1994). "Notary Records and the Formation of the Santa Marta Banana Zone: Part II." Unpublished article, pp.4-5.

<sup>5</sup>DOT (1925). "Report on the Commercial and Economic Situation in the Republic of Colombia." p.57; Estudio Sobre las Condiciones del Desarrollo de Colombia. (1958) Bogotá: Presidencia de la República, Comité Nacional de Planeación, p.136.

<sup>6</sup>LeGrand, Catherine (1994), op.cit., pp.8-11.

<sup>7</sup>The early expansion of the trade in Santa Marta was a complex process. For accounts of this see LeGrand, Catherine (1994), op.cit., part II."; Herrera Soto, Roberto and Castañeda, R. (1979). Zona Bananera del Magdalena, Historia y Léxico. Bogotá: Instituto Cano y Cuervo, chapter 2; Posada, Eduardo (1992), "Imperialism, Local Elites, and Regional Development: The United Fruit Company in Colombia Reconsidered, 1900-1945.", Paper presented at the Congress of Americanists, New Orleans: Tulane University; White, J. (1978). Historia de una Ignominia. Bogotá: Editorial Presencia Ltda.

<sup>8</sup>LeGrand, Catherine (1984). "Colombian Transformations: Peasants and Wage-Labourers in the Santa Marta Banana Zone." Journal of Peasant Studies, 11(4), p.179.

## *Part II: Santa Marta and Urabá Export Bananas*

but continued to play an important subsidiary role. On the world scene, however Colombia has sporadically been an important participant (see Appendix B.2). Colombia maintained a 5-10% participation in world trade throughout the 1936-1990 period, and during the 1980s the proportion exhibited a slow increase, indicating a new export boom. With the entrance of Urabá into world markets in 1964 Colombian participation in the global scene became less volatile and it was characterized by a gradual increase. This could be explained by more favourable international market conditions as opposed to the vicissitudes characteristic of the 1910-1950 period, induced by World Wars I and II and the Great Depression, in addition to promising local conditions.

The lesser prominence of bananas in the export schedule shaped the trajectory of production in Colombia and made the role of the commodity quite distinct from that in the Central American 'banana republics'<sup>9</sup>. Although reticent after the loss of Panama in 1903, government policy favoured foreign capital in banana cultivation, and like many Latin American countries, viewed it as a way to obtain investment, enter foreign markets, and diversify export revenues<sup>10</sup>. Policy-makers also feared too great a reliance on coffee. The conservative president, Rafael Reyes (1904-1909), after the economically-damaging War of 1000 Days, hoped to put the country back

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<sup>9</sup>May, Stacy and Galo, Plaza (1958), *op.cit.*, p.175; Pettifer, Julian (1993), "Banana Wars," BBC Assignment Tonight.

<sup>10</sup>See Bushnell, David (1993). The Making of Modern Colombia. Berkeley: University of California Press; Bucheli Gómez, Marcelo (1991). "El Surgimiento y la Caída de un Enclave Agrícola: estudio de las zonas bananeras de Magdalena y Urabá, 1948-1968." Masters Thesis, Bogotá: Universidad de los Andes, p.48; Rippey, J. Fred (1976), *op.cit.*, chapter 16.



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on its feet. One of the instruments was to promote and protect export activities such as coffee and banana and subsidize capital and primary good imports<sup>11</sup>. As well, development of banana growing regions was fomented by State financial assistance directed at establishing plantations<sup>12</sup>. From the mid-1910s the UFCO also persuaded independent growers to establish plantations through contracts which offered loans. Credit was aimed to assist new producers with start-up costs or established growers to recuperate plantations damaged by blow-downs<sup>13</sup>. Until 1928 the State was not active in promoting independent planters nor supporting labour and in many conflicts, sided with the UFCO<sup>14</sup>.

In later years government policy changed to active protection of workers and local growers. The turning point for State protection of labour is widely considered to be the banana strike of 1928. This thesis does not attempt to analyze the factors which precipitated this strike nor any direct repercussions it had on the banana economy in Magdalena. Many other sources have dealt with this topic and are listed below<sup>15</sup>. An event of this sort was not to transpire again, at least until 1990. The

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<sup>11</sup>Bejarano, Jesus Antonio (1991). "El Despegue Cafetero (1900-1928)" In Ocampo, Jose Antonio, (Ed.) (1991). Historia Económica de Colombia. Bogotá (3rd edition): Siglo Veintiuno Editores, pp.174-177.

<sup>12</sup>Pardo P., Alberto (1972). Geografía Económica y Humana de Colombia. Bogotá: Editorial Tercer Mundo, pp.303-304; Herrera Soto, Roberto and Castañeda, R. (1979), op.cit., pp.7-8.

<sup>13</sup>Posada, Eduardo (1992), op.cit., p.13.

<sup>14</sup>Notwithstanding Law Number 30 of 1931 which further tied independent producers to sell bananas to the UFCO see Kepner, C. D. and Soothill, J. H. (1935), op.cit., pp.292-294.

<sup>15</sup>See Herrera Soto, Roberto and Castañeda, R. (1979), op.cit.; White, J. (1978), op.cit.; Cortés Vargas, Carlos (1979). Los Sucesos de las Bananeras Bogotá (2nd edition): Editorial Desarrollo (originally published in 1929).; Castañeda, R (1981). "La Zona Bananera del Magdalena". In Arango, C. (Ed.). Sobrevivientes de las Bananeras; Fonnegra, Gabriel (1980). Bananeras Testimonio Vivo de una Epopeya. Bogotá: Ediciones Tercer Mundo; Gaitán, Jorge Eliecer (?). La Masacre en Las Bananeras Documentos Testimonios Bogotá: Ediciones Los Comuneros; Gilhodés, Pierre, (1967). "La Colombie et l'United Fruit Company", Revue Francaise de Science Politique 17 (11), pp.307-317; LeGrand, Catherine (1986).

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significance of the event for this research lies in the activation of less favourable attitudes towards foreign capital and more State awareness and intervention in support of workers and farmers involved in the banana trade. Nonetheless, Santa Marta and Urabá have been plagued with intense economic and social difficulties throughout the period. The commencement of a Liberal regime in 1930 gave momentum to the decline of the company's highly vertically-integrated operation in Magdalena. State policy supported labour movements and established more stringent employment laws. The "revolución en marcha", a government programme implemented by President Alfonso López Pumarejo (connected with his 1934-1938 term), was aimed at putting social and economic reform on the national agenda<sup>16</sup>. In this general context, the State became a stronger actor within the export-banana sector. The banana strike was an important event, but was only one of many in Colombia which triggered a shift of government policy to become more involved in social reform, one of the main areas were modifications to labour legislation. Moreover, this change was also part of a larger Latin America trend towards increased government intervention in general in the economy.

Due to the damage inflicted on their operations in the 1928 strike, the world

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Frontier Expansion and Peasant Protest in Colombia, 1830-1936. Albuquerque: University of New Mexico Press; Botero, Fernando and Guzmán Barney (1977). "El Enclave Agrícola en la Zona Bananera de Santa Marta." Cuadernos Colombianos No.11, pp.313-317; Gilhodés, Pierre (1970). "Agrarian Struggles in Colombia" In Stavenhagen, Rodolfo, Agrarian Problems and Peasant Movement in Latin America. New York: Anchor Books; Melo, Jorge Orlando (1978). "The Conservative Republic." In Arrubla, Mario, et.al. (Eds.), Colombia Hoy. Bogotá: Siglo Veintiuno Editores, p.97.

<sup>16</sup>Abel, Chris and Palacios, Marco (1991). "Colombia 1930-1958." In Bethell, Leslie (Ed.) Cambridge History of Latin America Vol. VII, Cambridge: Cambridge University Press, p. 597; Tirado, Alvaro (1981). Aspectos Políticos del Primer Gobierno de Alfonso López Pumarejo, 1934-1938. Bogotá: Siglo Veintiuno Editores; Pécaut, Daniel (1987). Orden y Violencia: Colombia 1930-1954, Vol.1. Bogotá: Siglo Veintiuno Editores, chapter 2.

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economic recession, and less favourable State policy, the UFCO started to scale down its activities. As the UFCO withdrew, the State stepped in. With each extension of government initiatives the company further was encouraged to depart. This process can be observed in four areas: banana growing, fruit buying, credit and technical assistance. The UFCO started withdrawing from cultivation, and in 1931 supplied only one-third of total production from its own estates. This enabled the Company to control price, while shifting the burden of risk onto independent producers<sup>17</sup>. By 1938 the UFCO had further decreased land ownership and retained only 20% of total banana hectareage<sup>18</sup>. To compensate for their reduced output, the UFCO increased the proportion of fruit purchased from native growers who were still largely financed by the UFCO<sup>19</sup>. As the crisis deepened, the State responded more forcefully to growers' complaints and in 1932 compelled the Company to implement a more equitable system of banana contracts<sup>20</sup>. A year later when the UFCO was unable or unwilling to extend credits, the State organised a producer cooperative to finance growers<sup>21</sup>. Later in 1936 a more formal arrangement resulted. A bill was passed to transfer full control of Santa Marta fruit production to a quasi-official agricultural

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<sup>17</sup>PRO, Foreign Office (23 March 1937). "Colombia: Annual Report for 1936." Registry Number A2851/2851/11, FO371.20624; Jiménez, Margarita and Sideri, Sandro (1985). Historia del Desarrollo Regional en Colombia Bogotá: CEREC, p.140.

<sup>18</sup>DOT (1938). "Report on Economic and Commercial Conditions of the Republic of Colombia." p.17.

<sup>19</sup>PRO, Foreign Office (18 May 1937). "Economic Section of Annual Report on Colombia for 1935." FO371.20624, Registry Number A4084/2851/11.

<sup>20</sup>May, Stacy and Plaza, Galo, op.cit., p.12. Herrera Soto, Roberto and Castañeda, R. (1979), op.cit., p.11. Another example of government pressure on the Company in 1932 was ceding of the Santa Marta Railway. Ownership of the line was transferred to the government but it was leased back to the UFCO until 1947.

<sup>21</sup>Kepner, C. D. and Soothill, J. H. (1935), op.cit., p.291. The Cooperative extended loans to planters at an interest rate of 6% which were financed through 25% deduction of the value of each banana shipment.

## *Part II: Santa Marta and Urabá Export Bananas*

credit bank in association with the planters themselves (Cooperative Bananera de Magdalena). Planters no longer had to rely on the UFCO for credit<sup>22</sup>. Further legislation--laws 1 and 125--followed in 1937 which also served to curb the monopolistic power of the UFCO. These statutes regulated land adjudication, producer credit and export contract terms for independent planters as well as health care for workers and water supply<sup>23</sup>. Specifically, Law 1 formalized the establishment of the Cooperativa and sanctioned various social measure<sup>24</sup>. Law 125 concentrated on combating Sigatoka disease which struck in 1936 and 1937<sup>25</sup>. A Mexican technical mission was contracted in 1937 to analyze the situation. In the long run, half of total eradication costs were borne by the Government<sup>26</sup>. The cumulative effect of increasing government intervention was that from 1934 the UFCO's subsidiary, the Magdalena Fruit Company, gradually pulled out of production and abandoned its financial and technical services to independent producers<sup>27</sup>.

Thereafter the situation for the UFCO worsened. There was a general decline

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<sup>22</sup>PRO, Foreign Office, (23 March 1937). "Annual Economic Report on Colombia for 1936." FO371.20624, Registry Number A2851/2851/11.

<sup>23</sup>PRO, Foreign Office (11 April 1938). "Annual Economic Report on Colombia for 1937." FO371.21444, Registry Number: A3465/152/11; DOT (1938). "Report on Economic and Commercial Conditions of the Republic of Colombia." p.17; Arango, Mario Aurelio (1938). Memoria de Agricultura 1938. Bogotá: Imprenta Nacional, p.29.

<sup>24</sup>Arango, Mario Aurelio (1938), op.cit., pp.21, 29. The Cooperativa was authorized to issue twenty-year loans at 8% per annum. Provision was also made for medical services: facilities had to be provided by operators employing more than five workers.

<sup>25</sup>Ibid., p.33.

<sup>26</sup>DOT (1938). "Report on Economic and Commercial Conditions of the Republic of Colombia", p.17; Wylie, Kathryn (1942), op.cit., p.69.

<sup>27</sup>Herrera Soto, Roberto and Castañeda, R. (1979), op.cit., p.11.

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in exports due to the ravages of Sigatoka, repeated wind damage and the Second World War which in the early 1940s virtually paralysed trade (see Appendix B.2). And critically for the Company relations with the government continued to deteriorate. This is illustrated by a 1938 British Foreign Office report:

Colombian organisation is subject to official investigation on charges of corruption, i.e. distribution of surreptitious funds in order to maintain the monopoly of banana export trade. The manager of the local company, a US citizen, was arrested and held in prison for over one month<sup>28</sup>.

Given these circumstances the UFCO's subsidiary had virtually ceased banana operations in Colombia. This contrasted with the the position of independent growers who were estimated to have 10,000 hectares in production in 1941<sup>29</sup>. With the aid of the State, national growers persevered, attempting to sustain exports while at the same time diversifying their activities. Law 152 of 1942 set up the Compañía Agrícola de Magdalena Ltda. (CAM), to replace the Cooperativa Bananera<sup>30</sup>. The aim was to diversify Magdalena agriculture. The CAM was comprised of 230 associates involved in cane-sugar, banana and coffee production<sup>31</sup>. In 1947 the Compañía Agrícola de Magdalena shipped bananas with the West Indies Fruit Co. to Miami<sup>32</sup>. Another initiative followed in 1950 with the foundation of the Federación

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<sup>28</sup>PRO, Foreign Office (11 April 1938). "Annual Economic Report on Colombia for 1937." FO371.21444, Registry Number A3465/152/11.

<sup>29</sup>PRO, Foreign Office (11 June 1947). "Annual Economic Report on Colombia for 1946." FO371.61271, Registry Number: AS3769/446/11.

<sup>30</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.11.

<sup>31</sup>PRO, Foreign Office (30 Dec. 1943) "Situation in Colombia 1943." FO371.38043, Registry Number AS393/195/11; Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.11.

<sup>32</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.12.

## *Part II: Santa Marta and Urabá Export Bananas*

de Exportadores de Bananeros to systematise exports<sup>33</sup>. These were amongst the first successful export efforts by local producers. Earlier attempts had been largely frustrated by the UFCO. For example, in the early 1930s three independent companies connected with Colombian growers, attempted to break the UFCO export monopoly<sup>34</sup>. The first two failed to make any shipments and the third only succeeded briefly, before its activities were foiled by the UFCO<sup>35</sup>.

By the late 1940s and early 1950s considerable export recovery had taken place<sup>36</sup>. The outlook appeared to be upbeat and further State infrastructure investment was promised while organisational structure was strengthened<sup>37</sup>. In 1954 the Federación de Exportadores de Banano split into the Federación de Productores de Banana and the Consorcio Bananera<sup>38</sup>. By 1957 over 70% of exported bananas were obtained from local producers growing under contract<sup>39</sup>. Finally, a local banana bank was established in 1959, the Banco Bananera de Magdalena. It was to

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<sup>33</sup>Ibid.

<sup>34</sup>Kepner, C. D. and Soothill, J. H. (1935). *The Banana Empire*. New York: The Vanguard Press, pp.287-289.

<sup>35</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.10; Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.189.

<sup>36</sup>See Appendix B.2; PRO., Foreign Office, (12 Sept.1949). "Colombia: Economic Report Period July and August 1949." FO371.74676, Registry Number: AS5163/1101/11; PRO, Foreign Office, (11 June 1947). "Annual Economic Report on Colombia for 1946." FO371.61271, Registry Number: AS3769/446/11.

<sup>37</sup>PRO, Foreign Office (22 Jan. 1951). "Colombia: Economic Report Period December 1950." FO371.90805, Registry Number AL1101/2. For example port modernisation and the construction of a new quay were mentioned.

<sup>38</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.12.

<sup>39</sup>May, Stacy and Galo, Plaza (1958), *op.cit.*, p.175.

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defend and develop local producers<sup>40</sup>. This clearly demonstrated the decline of UFCO cultivation, extent of government support and the fortitude of Colombian banana farmers.

Nonetheless, despite progress made by local growers, the UFCO continued to be the largest exporter. In 1947 the Seville Fruit Company (another subsidiary of the UFCO) replaced the Magdalena Fruit Company, with the object of sustaining the Company's export presence<sup>41</sup>. By the 1950s the UFCO had re-established banana growing operations in Colombia, the Seville Fruit Company had 4,000 hectares under cultivation and also began to export bananas purchased from the Federación and the Consorcio<sup>42</sup>. But this recovery was temporary. In 1966, with the loss of a substantial portion of UFCO-owned plantations, ha. due to a hurricane, the Company withdrew from Colombia<sup>43</sup>. When the Seville Fruit Company pulled out, 2,400 ha. of banana and 800 ha. of unproductive land (*potreros*) were sold to the Federación, the remaining were transferred to the Instituto Colombiano de Reforma Agraria (INCORA)<sup>44</sup>. As the UFCO had once again become the main agent responsible for

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<sup>40</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.12.

<sup>41</sup>*Ibid.*

<sup>42</sup>*Ibid.*

<sup>43</sup>*Ibid.*, pp.12-13.

<sup>44</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.13. This thesis will not analyze the land reform policy of 1961 as this has been exhausted by others. Only policies that directly affected crop modernisation will be reviewed. For literature on the land reform see Adams, D.W. and Montero, L. (1965). "Land Parcelization in Colombia." *Inter-American Economic Affairs* 19 (3), pp.67-72. Adams, D.W. and Schuman, S. (1967). "Minifundia in Agrarian Reform: A Colombian Example." *Land Economics* 43(3), pp.274-283; Felstehausen, Herman (1968). "Local Government and Rural Service Barriers To Economic Development in Colombia." Madison: Land Tenure Center Paper No. 57; Franco, Barbier (1962). "Distribución de Tierras y Reforma Agraria." *Revista del Banco de la República* 35 (421), pp.1371-1376; Hirschman, Alfred O. (1974). "La Tenencia de la Tierra y la Reforma Agraria en Colombia." In *Estudios Sobre Política Económica en América Latina*. Madrid: Aguilar, pp.106-181;

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technical assistance and input distribution their exit left a significant gap in the organisational structure<sup>45</sup>. This produced yet another response by the State which again tried to replace UFCO activities.

Once again the State became involved in providing financial and technical assistance to growers. In response to the ravages of the hurricane and Panama Disease the INCORA imported 50,000 Cavendish cuttings in 1966. One year later the Federación and Consorcio Bananera imported 53,000 cuttings from Ecuador and Martinique<sup>46</sup>. By 1968 the INCORA established a programme to regenerate the banana zone and subsidized the switch to Cavendish with grants of 12,000 pesos/ha.<sup>47</sup>. Technical assistance for seed imports and extension and improvement of canal network and other infrastructure was also planned. In addition, the Central Bank through Resolution number 65 of 1968 opened a special credit line for loans to restore banana lands and diversify agriculture either through Caja Agraria or Commercial Banks loans<sup>48</sup>. Possibly banana growers were encouraged to restore plantations by Decree 444 of 1967 which directly promoted exports by granting a tax credit of 15% of exports redeemable within one year (Certificado Abono Creditario

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Tenencia de la Tierra y Desarrollo Socio-Económico del Sector Agrícola (1966), Washington: Comité Interamericano de Desarrollo Agrícola; Arroyo, M.A. (1954). "El Origen de la Propeided de la Tierra en Colombia." Economía Colombiana 3(8), pp.351-354; Havens, Eugene A. and Flynn, William (1970) Internal Colonialism and Structural Change in Colombia New York: Praeger Publishers, chapter 1; Reforma Agraria y Desarrollo Rural en Colombia. (1979) Bogotá: INCORA; Ospina Gloria R. (1981) "Policy Implementation in Developing Countries: The Colombian Agrarian Reform Law of 1961." PhD Dissertation, Georgetown University.

<sup>45</sup>Crédito y Fomento (1969), op.cit. p.180.

<sup>46</sup>Ibid., p.181.

<sup>47</sup>Ibid., p.84.

<sup>48</sup>Revista del Banco de la República. 41 (493), pp.1496-1497; Crédito y Fomento (1969), op.cit., pp. 85,181.



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(CAT))<sup>49</sup>. However expectations appeared to be low as in 1969 only 3,000 hectares of land were under banana, located principally in Riofrio and Orihueca<sup>50</sup>. In 1972 the Compañía Exportadora de Banano Ltda., with 65 affiliates was organized to, as indicated by the name, to export bananas<sup>51</sup>.

This period saw renewed TNC interest in banana cultivation. The UFCO (Seville Fruit Company) once again re-entered the Santa Marta in 1973 and Standard Fruit (Baltim de Colombia, S.A.) entered in 1976<sup>52</sup>. Nonetheless, from the 1970s onwards Santa Marta only supplied a small share of bananas to the export market<sup>53</sup>. As early as the late-1950s the UFCO recognized the advantages of switching operations to Urabá, a region of higher and more regular rainfall than Santa Marta and which was effected less by hurricanes.

This course of events shows how TNC strategy evolved over time, how government became increasingly involved in regulation and promotion, and how local producers responded new institutional arrangements and economic opportunities. It shows the dynamics of interactions amongst foreign corporations, government and local interest groups. As in other regions of the world the UFCO was initially drawn to Colombia by favourable government policies. However with the passage of time

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<sup>49</sup>For more information on Decree 444 see for example, Bejarano, Jesús Antonio (1978). "Industrialization and Economic Policy 1950-1976" In Arrubla, Mario, *et.al.* (Eds.) *Colombia Hoy* Bogotá: Siglo Veintiuno Editores, pp.242-249; Kalmanovitz, Salomon (1988), *op.cit.*, pp.439-442. The CAT was implemented largely to promote non-traditional exports, nonetheless bananas were included.

<sup>50</sup>*Crédito y Fomento* (1969), *op.cit.*, p.180.

<sup>51</sup>Herrera Soto, Roberto and Castañeda, R. (1979), *op.cit.*, p.14.

<sup>52</sup>*Ibid.*, p.14.

<sup>53</sup>See Appendix B.2.

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those policies and the nature of the UFCO's activities changed. While the nature of its activities evolved the Company always retained control of the most profitable aspect: marketing and distribution. The way in which the UFCO operated in Colombia created and at the same time limited opportunities available to local producers. These opportunities were influenced by State policy, particularly after the 1920s. For example, although Colombian planters tried to gain a foothold in the trade, the UFCO maintained a monopoly over exports in the region until the early 1980s. As discussed in part I this was because they controlled international markets and owned crucial elements of transport and irrigation. The State, was a reluctant participant before 1928, but later it took a more active role. Therefore it is seen that government policy was not the principal force which influenced the exit of the UFCO. State policy was initially reactive. When the UFCO began to curtail its operations, official organisations were set up to support local producers. Later government policy became proactive which further encouraged the UFCO to reduce the scale of its operations in Colombia. Nevertheless, the success of independent planters, arguably due to government initiatives, created a favourable environment for the survival of TNC operations in the areas of marketing and distribution. But other factors such as adverse climatic conditions and disease made the region unattractive for all producers.

During the first years of the UFCO's operations in Santa Marta the Company pursued expansionary policies, investing heavily in transport networks from plantations to port, general communications, irrigation systems and commercial and

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credit outlets so as to gain control of the banana business. The UFCO acquired large tracts of land, the majority of which remained underdeveloped and served as a means to monopolize productive lands<sup>54</sup>. Their establishment in the area was gradual, and with assistance of local capital and planters, output rose.

The distribution of output, as hinted above, was mainly dominated by Colombians. For example, in 1908, 283 non-UFCO owned banana farms accounted for 75% of the total production<sup>55</sup>. However data for banana farms and growers from Santa Marta in 1908 demonstrate that land ownership was highly skewed (Table B2.1).

**Table B2.1**  
Santa Marta Land Tenure Data, 1908  
Break-down of Growers and Farm Size and Respective Percentages

Size (Ha)	Number of Growers	%	Total Hectares	%
1-5	173	60.9	482	9.7
5-20	74	26.1	724	14.6
20-50	19	6.7	661	13.4
50-100	12	4.2	847	17.1
100-500	5	1.8	1107	22.4
< 500	1	.4	1129	22.8
Total	284	100	4950	100

Source: Posada, Eduardo (1990), *op.cit.*, p.76, citing Colombia Misión de Rafael Reyes, pp.45-49.

\*Percentages do not add up to 100 due to rounding.

Large estates ( > 100 hectares) represented over 45% of banana growing land. But large-scale plantation owners accounted for only 2.2% of the total number of growers. Small planters (1-5 ha.) constituted 60.9% of the planters which comprised

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<sup>54</sup>LeGrand, Catherine (1984), *op.cit.*, p.184.

<sup>55</sup>Posada, Eduardo (1990). "The Colombian Caribbean: A Regional History: 1870-1950." D.Phil Thesis, Oxford University, p.75.

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only 9.7% of the banana land. In addition there were a large number (266) of small-to medium-sized (1-50ha) farms, the bulk of which were less than five hectares. In the 1920s, Company ownership remained lower than in the Central American republics. In 1925, 20,235 hectares were planted with banana, 55% of which were owned by the UFCO and the remaining by private individuals<sup>56</sup>. By 1929 Santa Marta was comprised of 650 plantations with a total area of 24,000 ha., 43% of which were owned by the UFCO<sup>57</sup>. This demonstrates a decline in UFCO land planted with banana from 11,129 ha. to 10,320 ha. and a further expansion of local growers.

Within the context of State and TNC activity it is argued that independent local growers were a vital element to the Colombian banana trade. From the data in the table, most of the producers must have been small (87% of planters cultivated plots of less than 20 ha.) and the sheer numbers involved would appear to indicate that small-sized cultivators must have been successful (table B2.1). The numbers would seem to confirm debates in the theoretical literature about the ability of small-scale producers rather than capitalist producers to prevail in the case of adverse conditions<sup>58</sup>. Small independent growers did not have the advantage of TNCs to spread risks throughout different countries but because banana plants mature relatively rapidly (returns on banana plants materialize within 9-12 months) small producers can

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<sup>56</sup>DOT (1925) "Report on the Commercial and Economic Situation in the Republic of Colombia." p.57.

<sup>57</sup>DOT (1930). "Republic of Colombia Commercial Review and Handbook 1929", p.119.

<sup>58</sup>For the survival of small commodity producers in the face of adverse conditions see for example, Chayanov, Teodor (1966). *The Theory of Peasant Economy*. Manchester: Manchester University Press.; Sen, Amartya (1968). *Choice of Techniques*. Oxford: Basil Blackwell Ltd.

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gain quick returns on their investment. Moreover small producers appeared to be surviving despite difficulties obtaining land title. The literature argues that producers often led a precarious existence as they were sometimes squatters (*colonos*), not owning legal title to land<sup>59</sup>. Some squatters were pushed off the land when the UFCO arrived and as T. Lynn Smith describes the UFCO continued to exert pressure on them:

During the decades preceding 1947, though, the problem of squatters or "colonos" was pre-eminent. From the banana zone, near the Caribbean Coast on the north, where the invasions of the highly developed banana plantations paralysed banana operations . . .<sup>60</sup>.

Thus it emerges that small- to medium-sized producers were a strong element in banana growing during at least the first half of the century. They could be considered a risk takers (i.e. they were profit-oriented) though in some cases they did not have legal title to land. Regardless of title, a squatter was willing to bear risk if there were possibilities of generating income. Second, the literature shows that squatters would cultivate banana on UFCO property because it was the only way to gain access to land. Third, it was also feasible for small producers to cultivate since banana start-up costs did not require as much capital during this time, and therefore legal land title was not necessary to gain credit.

Other arguments for the survival of small scale producers relate to low-cost labour-intensive techniques. Because of the perceived scarcity of labour on the

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<sup>59</sup>According to Posada, small growers were not necessarily landowners, sometimes they were sharecroppers, renters, or squatters see Posada, Eduardo (1990), *op.cit.*, p.76.

<sup>60</sup>LeGrand, Catherine (1986). *Frontier Expansion and Peasant Protest in Colombia, 1930-1936*. Albuquerque: University of New Mexico Press, p.115; LeGrand, Catherine (1984), *op.cit.*, p.184. For more discussion of private appropriation of public lands see Palacios, Marco (1980). *Coffee in Colombia, 1850-1970*. Cambridge: Cambridge University Press, chapter 8; Smith, T. Lynn (1967). *Colombia: Social Structure and Process of Development*. Gainesville: University of Florida Press, p.85.

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Colombian coast it was difficult for large plantations to obtain sufficient amounts of labour to achieve adequate yields<sup>61</sup>. Small to medium-sized farmers could more intensively cultivate because of their access to family labour and closer links with rural labour markets<sup>62</sup>. The application of more man hours per hectare would result in higher yields. Further evidence proves that sophisticated agricultural techniques were isolated in the export sectors of banana farming (located in Northern Magdalena) and cattle ranching (located to the South) whereas the production of foodstuffs received little care<sup>63</sup>. Labour, because of its scarcity, was applied only to lucrative activities. In a 1929 article Clarence Jones reported:

In contrast to excellent methods of banana production, subsistence crops, including corn, cassava and beans show primitive conditions. Planted in small scattered patches cleared of brush and unplowed, crops received no attention except cropping of weeds<sup>64</sup>.

The use of labour-intensive techniques in banana production on the coast was detrimental to foodstuff production. The displacement of local foodstuff production was evidenced in part I. Moreover one cannot sustain the argument that little attention was given to other crops because of the lack of technical sophistication. Below it will be proven that in potato production output-augmenting techniques such as variety diversification, manuring, and weeding were used at least as early as the

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<sup>61</sup>Many historians emphasize the scarcity of labour in rural areas during the beginning of the century, see LeGrand, Catherine (1986). Frontier Expansion and Peasant Protest in Colombia, 1830-1936. Albuquerque: University of New Mexico Press, p.38; Kalmanovitz, Salomon (1988). *op.cit.*, p.285; Ocampo, Jose Antonio, (Ed.) (1991). Historia Económica de Colombia, Bogotá (3rd edition): Siglo Veintiuno Editores.

<sup>62</sup>Taussig, M. (1982). "Peasant Economies and the Development of Capitalist Agriculture in the Cauca Valley, Colombia." In, Harriss, John (Ed.) Rural Development. London: Century Hutchinson Ltd.

<sup>63</sup>DOT (1925). "Report on the Commercial and Economic Situation in the Republic of Colombia." p.57.

<sup>64</sup>Jones, Clarence F. (1929). "Agricultural Regions of South America." Economic Geography 5(4), p.410.

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1920s<sup>65</sup>.

Finally, government efforts to substitute UFCO assistance and capital also encouraged local growers to stay in production as well as protected them against market fluctuations through crop diversification promoted by the State from the 1930s onwards. Therefore, it is evident that because of the labour-intensive production methods and labour scarcity, small producers had an advantage over TNCs. Moreover producers appeared to be risk-averse as planters without title to land also cultivated bananas.

The zenith of UFCO production in Colombia was in the 1920s. A period when most techniques were land and labour using<sup>66</sup>. Although irrigation networks had been constructed, the use of inputs appeared to be minimal. Soil exhaustion and blight in the 1930s and 1940s could be considered a result of failure to fertilize in previous decades<sup>67</sup>. When Sigatoka hit plantations in the mid-1930s, eradication was conducted through spraying. The initial costs of spraying machines, fungicides and wages and salaries of those on the campaign were paid by the State, demonstrating the importance of State support and the absence of UFCO assistance<sup>68</sup>. The area also benefitted from the late arrival of Panama Disease in 1956, therefore plantation

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<sup>65</sup>See Potato Part II.

<sup>66</sup>See Banana Part I.

<sup>67</sup>LeGrand, Catherine (1984), *op.cit.*, p.191.

<sup>68</sup>Arango, Mario Aurelio (1938). *Memoria de Agricultura 1938*. Bogotá: Imprenta Nacional, p.34.

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relocation was not necessary until that time<sup>69</sup>. As indicated above, recovery of plantations in the 1950s and 1960s was done with the assistance of the Consorcio Bananero and the Seville Fruit Company. Spraying against Sigatoka was carried out under contract<sup>70</sup>. Chemical fertilizers were also used by the 1960s<sup>71</sup>. However these efforts appeared to be inadequate as an official US report stated in 1966 that, ". . . the application of adequate fertilizer, and the control of 'Sigatoka' have been used only to a limited extent"<sup>72</sup>. Nonetheless, the use of pesticides demonstrated high relative levels in 1965. In 1965, of the total pesticide consumption in Colombian agriculture, bananas represented the crop with the highest percentage.

**Table B2.2**  
Consumption of Pesticides in Colombia  
for the Crops with the Highest Consumption, 1965  
(Metric Tonnes)

Crops	Insecti-cides	Fungicides	Herbicides	Total Pesticides	% of Total
Potatoes	18	1424	--	1442	129%
Bananas	--	3580	--	3580	320%
Cotton	2536	--	99	2635	23.6%
Rice	790	81	396	1267	11.3%
Sugarcane	12	--	390	402	3.6%
Agricultural Total	3889	5603	1692	11184	100

Source: "Estudio Sobre el Mercado de Fertilizantes en Colombia", (1966) Instituto de Investigaciones, Mimeo, Tibaitatá: ICA, p.28.

Thirty-two percent of total pesticide consumption was dedicated to banana growing.

It can be assumed that most of the fungicides were used in export banana production

<sup>69</sup>DOT (1938). "Report on Economic and Commercial Conditions of the Republic of Colombia", p.17.

<sup>70</sup>Krogzemis, James R. (1967), *op.cit.*, p.38.

<sup>71</sup>Ibid.

<sup>72</sup>Agricultural Development in Colombia (1966) Bogotá: USAID Rural Development Staff, p.62.



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and not for domestic commercialisation for three reasons explained in part I. First, export bananas demand higher levels of inputs than those grown for internal consumption. Second, producers not located in export banana regions do not have access to sophisticated techniques. Third, fungicides were primarily aimed at the treatment and prevention of Sigatoka Disease.

Between the 1930s and the 1960s harvesting was conducted by manual labour which carried bananas to the edge of plantations and placed bananas on oxen pulled cars which transported them to the railway. Harvesting was by hand and modes of transportation were diverse. Either human, animal or mechanical power moved bananas from the field to plantation borders. From here bananas were either loaded onto the railway, barges in the Magdalena River, or continued to be transported by oxen. By the 1960s tractors moved bananas from border of plot to farms loading station along the Magdalena River<sup>73</sup>.

New technologies of the 1960s in areas such as pest control and transportation--polyethylene bags, cables and banana boxing--were not used in Santa Marta. This demonstrates a significant lag in technical adoption in the region. Only later were these technologies disseminated by the UFCO or official agencies which obtained them from abroad. The lag was due to production instability, primarily brought about by unstable external markets and adverse weather which resulted in weak organisation consolidation. Within this context research and development in the region was not established and producers hoped to obtain technology either from State or TNC initiative which imported innovations from abroad. This is in contrast to

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<sup>73</sup>Krogzemis, James R. (1967), *op.cit.*, p.38.

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Colombian sugar producers who mainly sold to bouyant internal markets (until the 1960s) and experienced early organisational consolidation.

The increased involvement of independent producers probably inhibited the trend towards homogeneous practices associated with the internationalisation of capital. This, coupled with the reduction in hectarage and exports in the 1930s and 1940s and the gradual withdrawl of the UFCO most likely contributed to a decrease in the availability of new technology. According to James Krogzemis, after the boom years many farmers pulled out of production altogether. Other cultivators attempted to diversify production, still devoting an area of farms to export banana. Yet others continued banana monocropping<sup>74</sup>. Frequent blow downs also encouraged cultivators to switch production to more profitable, less risky crops<sup>75</sup>. Moreover, producers tended to rely on technologies imported from abroad---a trend that was also witnessed in part I and continued in Santa Marta, and will be seen in Urabá.

Within the Colombian banana literature, Bucheli and Rippy take an imperialist stance, describing banana production as an enclave which resulted in few internal effects<sup>76</sup>. Others such as LeGrand concentrate on transformations that occurred as a result of foreign capital, implicitly addressing the changes brought about by the trade<sup>77</sup>. Posada also foceses on the wider-economic implications of the trade,

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<sup>74</sup>Krogzemis, James R. (1967). "A Historical Geography of the Santa Marta Area, Colombia." Ph.D. Dissertation, University of California, Berkeley, pp.37-44.

<sup>75</sup>Iturralde, José M. (1965). "Mal de Panama" Medellín, p.12.

<sup>76</sup>Bucheli, Marcelo (1991), op.cit.; Rippy, J. Fred (1976), op.cit.

<sup>77</sup>LeGrand, Catherine (1984), op.cit., pp.178-200.

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aiming to show its long-term economic effects<sup>78</sup>. It is argued that the UFCO enabled locals to become involved in banana cultivation; and the establishment of local hospitals (1913-1914), schools and railways enhanced regional welfare. Other activities may have appeared advantageous at the onset such as colonisation, farm infrastructure, provision of housing for workers, credit extension for Colombian growers and a local commissary to provide food staples and clothing for workers<sup>79</sup>. However in the long run these proved to be detrimental. The UFCO operated unfairly in matters such as credit extension, land adjudication and exports which had long-term negative effects on the region.

What were the positive and negative effects? According to the Department of Trade the Santa Marta Railway was one of the best equipped, adding that if it were not for banana cultivation, the region would be devoid of modern transport facilities<sup>80</sup>. Physical infrastructure such as irrigation was advantageous as the UFCO would charge lower prices to planters than public services in the 1920s<sup>81</sup>. Also, the provision of health care was desired as many workers migrated to the areas to receive proper medical attention and medicine<sup>82</sup>. Quantitatively, in terms of the range of services available, labour appeared to have better treatment than other Colombian workers during the first third of the century, ". . . labourers of banana regions were

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<sup>78</sup>Posada, Eduardo (1992), *op.cit.*

<sup>79</sup>Rippy, J. Fred (1976), *op.cit.*, p.182.

<sup>80</sup>DOT (1930). "Republic of Colombia Commercial Review and Handbook 1929", p.44.

<sup>81</sup>Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.290.

<sup>82</sup>LeGrand, Catherine (1984), *op.cit.*, p.186. For more on the benefits of health care see Posada, Eduardo (1992), *op.cit.*, pp.24-25.

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probably better paid than any workers in Colombia"<sup>83</sup>. Even Rippy has to admit that UFCO wages were generally above the standard wage paid by the government in 1931<sup>84</sup>. However in absolute terms, wages were low.

In terms of regional development, Posada argues that the UFCO was beneficial in many aspects, bringing forest land into agricultural usage, giving opportunities to local planters, attracting labourers from other regions, monetizing the economy, construction of physical infrastructure, and increased cattle ranching on the Coast activated by increased population in Santa Marta<sup>85</sup>. These transformations took place, however most were time-specific occurring before the 1930s.

Yet the UFCO created few lasting developmental effects with the immediate area, for it crowded out local investment. For instance, Krogzemis reported that despite wealth in Ciénaga during the boom, since then nothing has happened<sup>86</sup>. A prime example of this was the substitutive effect (primarily with foodstuffs) of the UFCO commissaries. There were first set up by the company in 1916 and continued until 1962<sup>87</sup>. The system of commissaries meant that backward linkages were limited and that the UFCO was less involved with the national economy<sup>88</sup>. For

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<sup>83</sup>DOT (1930), "Republic of Colombia Commercial Review and Handbook 1929", p.120.

<sup>84</sup>Rippy, J. Fred (1976), *op.cit.*, p.191.

<sup>85</sup>Posada, Eduardo (1992), *op.cit.*, pp.18-28.

<sup>86</sup>Krogzemis, James R. (1967). "A Historical Geography of the Santa Marta Area, Colombia." Ph.D. Dissertation, University of California, Berkeley, pp.32-33.

<sup>87</sup>Jiménez, Margarita and Sideri, Sandro (1985), *op.cit.*, p.139.

<sup>88</sup>Bucheli Gómez, Marchelo (1991), *op.cit.*, p.74.

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example returning banana boats were stocked with cheap foodstuffs<sup>89</sup>. This was a way to keep food prices down, hence reduce the cash wage bill. Quantitative data of 1926 corroborates this as a significant amount of food in this area was imported<sup>90</sup>.

. . . outside of the UFCO, who, through their chain of commissaries are the biggest distributors, the merchants do not have sufficient turnover to be able to purchase large quantities of goods<sup>91</sup>.

Clearly, this demonstrates the difficulty local merchants had in competing with the UFCO.

Local food production was discouraged. Due to cheaper imported foodstuffs, it was difficult for the small commodity producer to compete. This explanation does not tell the whole story as it has been documented by LeGrand that many small commodity producers arrived in the area in response to increased population levels of the Santa Marta area primarily due to in-migration<sup>92</sup>. Commissaries not only created tension with those involved in the banana trade, but also antagonized small commodity producers by undercutting food prices<sup>93</sup>.

Overall, the effects of colonisation--much vaunted in the banana literature--were negative. According to Le Grand, "Many of the local dominant classes ransacked family trunks for old property title, while others applied for public land

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<sup>89</sup>LeGrand, Catherine (1984), *op.cit.*, p.185.

<sup>90</sup>Posada, Eduardo (1983), *op.cit.*, p.48.

<sup>91</sup>DOT (1925). "Report on the Commercial and Economic Situation in the Republic of Colombia." p.58.

<sup>92</sup>LeGrand, Catherine (1984), *op.cit.*, p.182.

<sup>93</sup>Ibid., p.185.

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grants from the government or simply fabricated new property claims"<sup>94</sup>. Posada underlines the increased demand for land by the UFCO and locals during the 1900s and 1910s<sup>95</sup>. Although the UFCO activated land markets and locals also participated in the titling boom, vague title demarcation and confusion of title records later led to rural conflict.

Another cost, as alluded to above, was the monopolistic control of banana marketing<sup>96</sup>. In 1925 banana growers had little leverage when negotiating with the UFCO. The UFCO had a vertical monopoly over the banana industry<sup>97</sup>. Inevitably, all fruit steamers were chartered by the UFCO<sup>98</sup>. Kepner and Soothill describe efforts made by the Company to maintain its maritime transport monopoly, challenging in the English courts attempts by independent Colombian producers to ship bananas with the Leyland Line<sup>99</sup>. Rippy also underlines that during the 1920s and early 1930s the company was able to buy bananas from independent producers at a monopoly price<sup>100</sup>. Possibilities to sell poorer quality output on regional markets were negligible since rural commercial networks in general were weak at this

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<sup>94</sup>LeGrand, Catherine (1984), *op.cit.*, p.183.

<sup>95</sup>Posada, Eduardo (1992?), *op.cit.*, p.9; Posada, Eduardo (1990). "The Colombian Caribbean: A Regional History: 1870-1950." D.Phil Thesis, Oxford University, St. Antony's College, p.106.

<sup>96</sup>See Banana Part I. For accounts of the 1920s and 1920s see Posada, Eduardo (1992?), *op.cit.*, pp.14-15.

<sup>97</sup>D.O.T. (1925) "Report on the Commercial and Economic Situation in the Republic of Colombia." p.31.

<sup>98</sup>*Ibid.*, pp.57-58.

<sup>99</sup>Kepner, C. D. and Soothill, J. H. (1935), *op.cit.*, p.189.

<sup>100</sup>Rippy, J. Fred (1976), *op.cit.*, p.181.

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time (pre-1950), and urban centres were difficult to reach<sup>101</sup>. In addition to monopoly of exports, the UFCO also controlled credits and the water supply. Because the UFCO had distributed credit to growers, the company could take or leave as much of the crop as it found convenient in relation to world market requirements<sup>102</sup>. Given a control of irrigation, it is reported that the company would flood independent planters' plots if they rebelled<sup>103</sup>. The extent of UFCO dominance was widely recognized.

The United Fruit Company against which the banana law is aimed has been in business in Colombia for very many years and has become all powerful in the banana districts. It is difficult to separate rumour from fact regarding the actions of this company but it is certain that by financial assistance to planters, control of water supply, ownership of docks and cold storage ships, etc. it has attained an influence which has made competition by other entities difficult if not impossible<sup>104</sup>.

Nevertheless, as indicated above, the company gradually pulled out of production in the 1940s but retained control of exports during the 1950s and 1960s<sup>105</sup>.

Lastly, notwithstanding the literature which points to relatively high wages in the banana sector, worker welfare was deficient in Santa Marta. Working conditions were poor, there were many strikes the most notable are those of 1918, 1928, 1934 and 1949 and there were many complaints against the labour contract system, critics

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<sup>101</sup>For a discussion of poor communication between regions see McGreevey, William Paul (1971). An Economic History of Colombia 1845-1930. Cambridge: Cambridge University Press, chapter 10. Interregional transport difficulties are also discussed in Sugar Part II and Potatoes Part II.

<sup>102</sup>DOT (1930). "Republic of Colombia Commercial Review and Handbook 1929".p.16

<sup>103</sup>Herrera Soto, Roberto and Castañeda, R. (1979), op.cit., p.24.

<sup>104</sup>PRO, Foreign Office (24 Jan.1938), "Annual Report on Colombia for 1937", FO371.21447, Registry Number: A1267/1267/11.

<sup>105</sup>Herrera Soto, Roberto and Castañeda, R. (1979), op.cit., p.12.

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argued that the Company failed to comply with Colombian labour law<sup>106</sup>. Further evidence of poor working conditions is provided by the inadequacy of housing. Qualitatively, despite modest periodic improvements, housing in Santa Marta appeared to be generally unsatisfactory throughout the period<sup>107</sup>. An official document from 1958 states that plantation housing, including UFCO worker barracks, and was cramped and insanitary<sup>108</sup>.

Hence it can be seen that many positive transformations resulted from the development of the banana trade. But, it is argued that transformations most likely would have been far-reaching if the UFCO had not monopolised factors of production. The UFCO crowded out local investment, limiting the development of what otherwise might have been the growth of strong internal markets. Obviously, without the presence of the UFCO the trade were never have existed. But the monopolistic behaviour of the Company must have inhibited local entrepreneurial formation, the availability of which was demonstrated by the experiences of the 1930s and 1940s--when the UFCO started pulling out local businesses thrived. At this point it was national and local organisations that extended credit, fostered the recovery of production and trade, and promoted agricultural diversification in Santa Marta. It could be that adverse regional conditions were not so much the responsibility of the

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<sup>106</sup>Cortés Vargas, Carlos (1979). Los Sucesos de las Bananeras Bogotá (2nd edition): Editorial Desarrollo (originally published in 1929), pp.32-34.

<sup>107</sup>For instance, immediately after the strike of 1928 the UFCO constructed two emergency hospitals, adopted a weekly pay day, abolished scrip (for the commissary) and constructed a few schools. See Rippy, J. Fred (1976), op.cit., p.188; citing Cortés Vargas, pp.149-150. For examples of poor conditions see Fonnegra, Gabriel (1980). Bananeras Testimonio Vivo de una Epopeya. Bogotá: Ediciones Tercer Mundo pp.51-59.

<sup>108</sup>Estudios Sobre las Condiciones del Desarrollo de Colombia (1958). Bogotá: Aedita Editores, p.136.



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UFCO as the nature of the industry. Further research must be conducted on the later investments of the early banana capitalists to assess whether the export trade stimulated long term accumulation on the coast. Also, the implications of the internationalisation of capital on regional development needs further examination. As will be shown in the section below, the strength of local initiative combined with State support resulted in "export-led modernisation". However was local initiative necessarily more desirable than TNC?

### INSTITUTIONS, TECHNOLOGY and LABOUR: late modernisation in Urabá

The Urabá export banana area extends from Chigorodó until Turbó which is located in the northern parts of the department of Antioquia<sup>109</sup>. By 1990 the central axis of banana growing region was in the municipios of Apartadó, Chigorodó, Turbó and Carepa<sup>110</sup>.

Due to the tropical climate, and insalubrious conditions Urabá has not been a highly populated region. In 1903, the loss of Panama brought more attention to this border area. To facilitate access to the prospective Panama Canal, the development of the "highway to the sea" (which was to traverse Urabá) was promoted by Departmental and National Governments. Nonetheless, only in the 1950s did significant growth occur. During the 1960s growth was bolstered primarily by the

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<sup>109</sup>Canasta Bananera, (1983), Medellín: Augura, p.11. See Map B2.2.

<sup>110</sup>"Urabá al Borde de la Parálisis." (26 July 1992), El Tiempo.

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introduction of export-banana production<sup>111</sup>. What factors can account for the sustained success of banana exports since 1966?<sup>112</sup> An easy answer was the establishment of the UFCO in Urabá. The UFCO's subsidiary, the Seville Fruit Company, promoted the establishment of banana plantations. However the explanation is more complex. First, the institutional support in Urabá will be analyzed. Secondly, an examination of colonisation and land distribution will be conducted. Thirdly, patterns of technical change will be reviewed. Lastly, the affect these transformations had on labour will be discussed.

The first signs of a proactive State in the region was the arrival of a branch of the INCORA in 1963<sup>113</sup>. INCORA was the agency responsible for administering the agrarian reform that was established by laws 135 of 1961 and law 1 of 1968. The main objectives were to redistribute land, grant title to those who were already involved in economic exploitation or to peasants who did not possess title, extend credit, and support colonisation<sup>114</sup>. In 1968 the Corporación del Desarrollo de Urabá (CORPOURABA) was established to face growing problems of fast development such as the provision of public services<sup>115</sup>. The objective was to

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<sup>111</sup>An early attempt to cultivate bananas in 1909 by Germans failed; in 1914, when the first bananas were ready for export, WWI had just broken out and there were no German vessels to ship the bananas. See "A History of Turbana and UNIBAN in Banana Growing in Colombia." (1989), Bogotá: TURBANA, p.9.

<sup>112</sup>See Appendix B.2.

<sup>113</sup>Botero Herrera, Fernando (1990), *op.cit.*, p.76.

<sup>114</sup>*Reforma Agraria Colombiana*. (1970). Bogotá: INCORA, pp.9-11.

<sup>115</sup>Vellinga, M. Nd Kruijt, D. (1982). *Industrialization and Regional Development in Colombia*. Bogotá: CEDLA, p.126.

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implement an integral development plan for the region. However due to CORPOURABA's low budget little was seen until the late 1970s<sup>116</sup>.

In 1962 foreign investors arrived to develop African palm and banana production<sup>117</sup>. In 1963 the UFCO, with the aid of the Corporación Financiera de Bogotá, hoped to set up a successful export-banana growing region<sup>118</sup>. By the end of 1963 Colombian investors also quickly consolidated their position, creating the Asociación de Agricultores y Bananeros de Urabá (AUGURA) to defend their interests<sup>119</sup>. Because the Company did not renew its original contracts in 1965 the UFCO's position weakened. This stimulated the establishment of the first commercial house, Unión Nacional de Bananeros (UNIBAN) which was set up by of 197 landowners and fruit producers in 1966<sup>120</sup>.

UNIBAN, as other export houses, was to become involved in forward and backward commercialisation. Backward commercialisation involved the extension of credit, technical assistance and sale of inputs and tools to growers. Forward commercialisation consisted of international transport and marketing<sup>121</sup>. Local export agents became a substitute for and/or complementary to UFCO activities until 1983 when the UFCO and Standard Fruit completely withdrew. UNIBAN either sold

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<sup>116</sup>Ibid.

<sup>117</sup>Ramírez, Margarita (1983). "Consolidación de la Actividad Bananera de Urabá." *Revista Augura*, 9(2), p.79; Botero Herrera, Fernando (1990), *op.cit.*, p.35.

<sup>118</sup>Ramírez, Margarita (1983), *op.cit.*, p.79; Bucheli Gómez, Marchelo (1991), *op.cit.*, pp.76-77.

<sup>119</sup>"Producción, y Comercialización del Banano." (1986), *op.cit.*, p.118.

<sup>120</sup>*Uniban: 1966-1989*. (1989), Medellín: Editorial Colina S.A, p.9.

<sup>121</sup>Interview with Camilo Peñalosa (March 1992) Head of International Marketing for UNIBAN, Bogotá.

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bananas at FOB (international) prices to the UFCO or, unlike its predecessors, marketed bananas overseas<sup>122</sup>. In 1970 Turbana Corporation was created as a subsidiary of UNIBAN to direct marketing in the USA, and signified further autonomy<sup>123</sup>. A second commercial house, Bananeros Colombianos S.A. (BANACOL), was organized in 1981. In 1983 Promotora de Banano S.A. (PROBAN) was established.

The success of Colombian export agents in establishing a foothold in international markets was apparent by the 1980s. Figures from 1986 show that UNIBAN marketed 9% and BANACOL and PROBAN were responsible for 4% and 2% of world trade, respectively<sup>124</sup>. Furthermore UNIBAN extended operations internationally, operating banana farms in Costa Rica<sup>125</sup>. The evolution of Colombian banana marketing between 1964 and 1987 is illustrated in table B2.3. The UFCO dominated exports until 1981.

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<sup>122</sup>Interview with Camilo Peñalosa (March 1992) Head of International Marketing, UNIBAN, Bogotá, Colombia.

<sup>123</sup>Uniban: 1966-1989. (1989), op.cit., p.9.

<sup>124</sup>Botero, Fernando (1990), op.cit., p.104.

<sup>125</sup>Interview with Arturo Hernández (March 1992), Vice-President for Planning and Development in UNIBAN, Medellín, Colombia.

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**Table B2.3**

Colombian Banana Exports According to Commercial House, 1964-1987.

Years	UNIBAN	UFCO	BANACOL	PROBAN	Standard Fruit Company
1964-68	--	100	--	--	--
1969-77	46.4	53.6	--	--	--
1978-81	64.4	37.7	--	--	15.8
1982-83	48.8	31.2	12.2	--	7.8
1984-85	55	--	23.0	22.0	--
1987	55.8	--	23.1	21.2	--

Source: "Producción y Comercialización del Banano", (1986) *Revista Augura*, Year 12(2), p.128; Rey de Marulanda, Nohra and Cordoba, Juan Pablo (1988). "El Sector Bananero de Urabá: Perspectivas Económicas Actuales y de Mediano Plazo." Bogotá.

However, by 1982 and 1983 UNIBAN exports exceeded those of the UFCO. If this table is compared to appendix B.5 a decrease in the UFCO export share since 1970 in Urabá is observed. Although between 1974 and 1976 the UFCO exported the bulk of bananas, the remaining years were dominated by Colombian commercial houses. The decision of the UFCO to pull out of Colombia was most likely due to their lack of monopolistic control in the area, a result of the control of local commercial houses. Evidence in part I and in the section on Santa Marta proves that the UFCO was anxious to maintain monopolistic control of marketing. However in Urabá they were unable to achieve this so they pulled out.

As in other countries, marketing and distribution was the area where most profits were generated. According to Fernando Botero, for each banana sold abroad 11% was received by the producing country and the remaining 89% were absorbed in transportation, export and commercialisation<sup>126</sup>. UNIBAN states a higher percentage, for each banana sold abroad, 30% of the price was received by the

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<sup>126</sup>Botero, Fernando (1990), *op.cit.*, p.86.

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producing country and 70% was shared by the companies that make up the distribution and marketing chain<sup>127</sup>. The percentage received by the producing country specified by UNIBAN is higher than those presented in Part I. This can be explained by the fact that UNIBAN was initially a cooperative organised by local growers who obtained most of the profits. Nonetheless, the Colombian initiative to become involved in the marketing aspect has not effected any significant changes in the labour force nor in patterns of production. More of the profits remain in the hands of the few who established these commercial houses and the increasingly large scale planters<sup>128</sup>. Hence the dominance of a large-scale, concentrated structure of distribution and marketing remains. As was argued in part I and will further be seen below, foreign capital has been replaced with domestic. Now to examine the influence export banana production had on land usage.

Colonisation had a major impact on patterns of land usage and distribution. In-migration played an important role in increasing the Urabá population. The War of 1000 Days impulsed the migrations of many Liberal veterans and people from coffee-growing areas to Urabá<sup>129</sup>. Other notable migrations were those of the Sinu Indian tribes, attracted to the lumber industry which demanded manual labour. Later migrations caused by the *violencia* of the 1948-1958 period stimulated movements to

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<sup>127</sup>Uniban: 1966-1989. (1989), Medellín: Editorial Colina S.A., p.25.

<sup>128</sup>See below.

<sup>129</sup>Bucheli, Marcelo (1991), op.cit., p.30.

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colonisation areas to escape the violence<sup>130</sup>. The completion of the Carretera al Mar to Turbó in 1954 and the subsequent decision of the UFCO to assist in the establishment of export banana production opened the way for settlers<sup>131</sup>.

Population growth in the banana zone increased rapidly after the 1950s and accelerated between 1964 and 1973. Parsons data for Turbó (a municipality in Urabá) may be used as a proxy for the region as a whole. Turbó had a growth rate of 31.9% between 1938 and 1951, and between 1951 and 1964 population grew at 172.6% compared with approximately 230% for Urabá<sup>132</sup>. Extrapolating from Parsons' data and table B2.4, it becomes clear that the region experienced the fastest growth after the 1950s.

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<sup>130</sup>Zamosc, Leon (1986). The Agrarian Question and the Peasant Movement in Colombia. Cambridge: Cambridge University Press; See Sugar Part II for sources on *la violencia*.

<sup>131</sup>Parsons, James (1968). Antioqueño Colonization in Western Colombia. Berkeley (revised edition): University of California Press, p.93.

<sup>132</sup>Parsons, James (1968), op.cit., table 4, p.93.

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**Table B2.4**  
Absolute Population and Population Density in the Urabá Region  
and Total of Colombia, 1951-1988.

Year	Urabá Population	Urabá Population Density (People/km <sup>2</sup> )*	Total Colombia Population	Total Population Density (People/km <sup>2</sup> ) *
1951	15,739	1.57	11,548,000	10.1
1964	49,207	4.90	17,485,000	15.35
1973	83,838	8.34	22,487,000	19.74
1985	150,650	14.83	n.a.	n.a.
1988	168,991	16.81	31,000,000	27.21

Source: Constructed from Botero Herrera, Fernando (1990), *op.cit.*, p.82, from DANE census cited by Marulanda, Rey and Córdoba, J.P.; Helmsing, A.H.J. (1990). Cambio Económico y Desarrollo Regional. Bogotá: CEREC, Table A5.2, p.226; Colombia Censo 1985. (1986) Bogotá: DANE, p.24.

\*Population Density calculated from 1,138,915 km<sup>2</sup>. total for Colombia based on Colombia Censo 1985 (1986).

Rates of growth slowed thereafter but nonetheless population continued to expand.

But relative to total Colombian population densities, Urabá remained under-populated.

The effects of colonisation were both positive and negative. Colonists who were attracted to the area, before the arrival of the UFCO, initiated foodstuff production for the domestic market. For instance coconut and livestock activities expanded in the 1950s in response to the establishment of African Palm Oil (a joint Dutch-Colombia venture)<sup>133</sup>. At this time other crops grown in the zone were mainly traditional staples--cocoa, rice, maize and plantains<sup>134</sup>. Most of these crops could be grown by colonists and temporary banana workers because of the low levels of capital investment required<sup>135</sup>. This shows that foodstuff production predates

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<sup>133</sup>Parsons, James (1968), *op.cit.*, p.95.

<sup>134</sup>Botero Herrera, Fernando (1990), *op.cit.*, p.30.

<sup>135</sup>Plan de Desarrollo de Urabá: Diversificación y Bienestar Hacia la Industrialización. (1984), Medellín: CORPOURABA, pp.105-108.



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export-banana cultivation. Moreover the arrival of banana production did not displace foodstuff production, rather it was accompanied by increased levels of population and food production. In 1989, 11 % of total national maize production derived from this region and plantain and cocoa were also important crops<sup>136</sup>.

In addition to export bananas, the development of export-plantain production was established as UNIBAN and BANACOL initiated plantain exports to the USA<sup>137</sup>. Unlike export banana production in the region, plantain production has opened up opportunities for small commodity producers<sup>138</sup>. For example 70% of UNIBAN plantain exports derived from farms of less than 10 hectares in 1990<sup>139</sup>.

As stated above, the UFCO and State agents offered credits to those who agreed to clear land, construct appropriate drainage ditches, and produce bananas for the company. Indeed, this entrance of foreign capital would appear to be beneficial to small commodity producers in the area<sup>140</sup>. However, a prerequisite for obtaining credit was ownership of legal land title<sup>141</sup>. This proved discriminatory towards small producers and the combined effect was the absence of squatters in production and the increased land concentration of banana production.

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<sup>136</sup>Borrero, Camilo (1989). "Urabá: Banano y mucho más: la huelga bananera obliga nuevamente a probar soluciones de fondo para la región." *Cien Días Vistos por el CINEP* 2(8), p.20. For further discussion of small producers in Urabá see Cárdenas, Hector (1984). "Tres Productos que Sustentan la Monetización de la Pequeña Explotación Parcelaria en Urabá." *Revista Augura* 10(2), pp.41-46.

<sup>137</sup>Arango, Mariano, *et.al.* (1991), *op.cit.*, p.91.

<sup>138</sup>For a review of export-plantain sector in Urabá see Arango, Mariano; Mesa, Saúl; Rhenals, Remberto and Velásquez, Jaime (1991). *Una Nueva Visión de la Economía Campesina Colombiana*. Medellín: Universidad de Antioquia, pp.90-95.

<sup>139</sup>Interview with Humberto Uribe (Nov. 1991), Head of Operations for UNIBAN, Urabá, Colombia.

<sup>140</sup>Arthur, Henry, *et.al.* (1968), *op.cit.*, p.55.

<sup>141</sup>Botero, Fernando (1990), *op.cit.*, p.73.

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Before the commencement of export banana cultivation, population density was low so there was less need to title land (Table B2.4). The people who resided in Urabá at this time would have had difficulty titling land and/or receiving credit due to the absence of the State and other modernising forces. Therefore commercial agriculture was either financed by urban land owners who could receive credit in urban areas or foreign investors. However the dearth of legal titles cannot be the explanatory variable for the lack of agricultural transformations. In the case of Urabá, land titling was associated with the development of export banana production. In later years, with the increasing importance of capital for plantation establishment, and input purchases, land became increasingly more valuable as a source of collateral for loans. Thus in a situation of production characterized by capital-intensive techniques, legal land ownership was difficult for the squatter to circumvent. The *colono* could no longer rely upon his capability to procure labour, but now needed capital for plantation construction and input purchases. The situation in Urabá supports Villamizar's findings in that capital/ha is higher on titled land. This does not necessarily signify that if more land is titled in LDCs increased in capital/ha will follow. Rather it is possible that land titling occurs as a result of agents in the region which will provide credit, technical assistance and therefore effect a demand for legal titles. Legal land title does not necessarily push forward transformational changes, but is a consequence of the formation of credit markets, input markets, and the like.

Yet, as in Santa Marta, the costs appeared to have outweighed the benefits. First, export banana production often displaced peasants. Prior to the 1960s colonisation was characterized by spontaneous, peaceful land invasions. The arrival

## *Part II: Santa Marta and Urabá Export Bananas*

of export commodity production and the necessity of land title legalisation signalled the commencement of the second phase of colonisation. Fernando Botero argues that that Colombian Land Reform of 1961 was more beneficial to large-scale farmers entering the region to cultivate bananas than to the established colonists. According to his research based on the Medellín newspaper, El Colombiano, the easier access to land meant that enterprising businessmen were more agile at obtaining title than the residents. Agents of the UFCO and other entrepreneurs divided up large estates into smaller plots and posed as colonists so that title could be obtained more rapidly<sup>142</sup>. By 1964 title fraud was rampant: fifty people were convicted of holding illegally obtained land titles. Most of these convictions were subsequently revoked<sup>143</sup>. Most of the original colonists thought their case was futile so they abandoned their rights and according to Parsons many colonists ended up as peons in their own farms<sup>144</sup>.

Secondly, because of banana activity, farm infrastructure significantly expanded, but social physical infrastructure such as hospital and school construction was absent from TNC and State strategy. Once again corroborating the trends towards internationalisation of capital, and showing that there was little qualitative difference in TNC and domestic investment. Moreover until the mid-1980s no signs of this type of initiative were present<sup>145</sup>.

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<sup>142</sup>Botero Herrera, Fernando (1990), op.cit., p.38.

<sup>143</sup>Ibid., pp.37-38.

<sup>144</sup>Parsons, James (1961). La Colonización Antioqueña en el Occidente de Colombia. Bogotá: Banco de la República, p.97.

<sup>145</sup>See below.

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In the initial period in Santa Marta in-migrants were largely responsible for banana production, but as Krogzemis documents by the 1960s many had become absentee landowners<sup>146</sup>. The development of export banana production in Urabá had less permanent effects on settlement. The evidence suggests that the majority of the owners of banana plantations did not reside in the region<sup>147</sup>. According to data, producers who resided in Urabá were mainly medium-sized property owners with an average farm size of 43 ha. In other regions the average farm size was 119 ha.

**Table B2.5**  
Residences of Urabá Export-Banana Growers, 1987.

	Urabá	Other Regions	Total
Number of Producers	28	143	171
Number of Hectares	1,192.5	19,144.5	20,337.0
% of Producers	16.4	83.6	100
% of Hectares	6.0	94.0	100

Source: Ramírez, Margarita and Henao, Ricardo (1988), *op.cit.*, p.88, Table 6.

This offers an explanation why construction of public goods was still absent in 1990. There was no rising middle class in the area that would invest in basic public goods nor organize and pressure governments to do so. Moreover, according to CORPOURABA in 1984, the high economic growth rates that coincided with the arrival of the export banana in the 1960s reached their peak during that decade<sup>148</sup>. And, the multiplier effects it had in the region in construction declined after the late

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<sup>146</sup>Krogzemis, James R. (1967), *op.cit.*, p.42.

<sup>147</sup>Interviews with Ricardo Vargas (May 1992), Advisor to the Minister of Agriculture, Bogotá, Colombia and see table B2.5.

<sup>148</sup>*Plan de Desarrollo de Urabá: Diversificación y Bienestar Hacia la Industrialización*. (1984), *op.cit.*, p.38.

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1970s and early 1980s<sup>149</sup>. Lastly, the fast colonisation post-1950 and the lack of public services in the region probably fueled guerilla groups. According to Kalmanovitz, colonising populations constituted the most important social base for guerilla movements in Colombia<sup>150</sup>.

Table B2.6 also indicates that there was a dynamic market for farms under export-banana production and land concentration has remained relatively low. A study conducted by the Departamento Administrativo Nacional de Estadística (DANE) in 1971 calculated Lorenz curves on three different levels: one for the Urabá banana zone, the region of Urabá, and Colombia as a whole. According to the study, the banana zone had the lowest land concentration of the three<sup>151</sup>. An obvious explanation for this is purely statistical. Because of the desolate nature of the region (see Table B2.4), there was more land to distribute, in relation to population thus land distribution could perhaps appear more equitable.

In the mid-1960s, Urabá farm sizes ranged from 12-750 acres with an average size of 110-125 acres, comparatively larger than those of Santa Marta<sup>152</sup>. Apart from the initial land acquisitions in the mid-1960s, a trend of increasing concentration of banana farms is observed between 1977 and 1986.

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<sup>149</sup>Ibid.

<sup>150</sup>Kalmanovitz, Salomon (1978). "Capitalist Development in the Colombian Countryside." In Arrubla, Mario (Ed.) Colombia Hoy. Bogotá: Siglo Veintiuno Editores, p.274. For more on this aspect of colonization see Martin, Gerard (1986). Desarrollo Económico Sindicalismo y Proceso de Paz. Bogotá: Universidad de los Andes; Pecaút, Daniel (1987). Crónica de dos Décadas de Política Colombiana 1968-1988. Bogotá: Siglo Veintiuno Editores, pp.177-178.

<sup>151</sup>Plan de Desarrollo de Urabá: Diversificación y Bienestar Hacia la Industrialización. (1984), op.cit., p.112 citing DANE (1971).

<sup>152</sup>Arthur, Henry, et.al. (1968), op.cit., p.55.

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**Table B2.6**  
Number of Banana Farms in Urabá According to Area (Ha),  
1977-1986.

	1977 (#)	1980 (#)	1986 (#)	1977 (%)	1980 (%)	1986 (%)
> 10	16	5	2	5.9	2.3	.7
10.1-30	74	42	34	27.2	18.8	12.8
30.1-60	94	83	102	34.6	37.2	38.5
60.1-90	41	33	37	11	14.8	19.3
90.1-120	30	33	37	11	14.8	14
120.1-150	6	7	22	2.2	3.1	8.3
< 150	11	20	n.a.	17	4.0	6.4

Source: "Producción y Comercialización del Banano", (1986) *Revista Augura*, Year 12(2), p.121.

During the 1977-1986 period the number of small (0-30ha) producers has been declining and medium and large sized producers appear to be gaining ground, particularly those plots between 30-60, 90-120 and 150ha and above. By the mid-1980s there were twenty-two properties owned by individuals or societies that controlled one-half of the planted area in Urabá<sup>153</sup>.

The decline of small farms was due to several factors. First, inadequate credit services, insecurity in the region, or the appeal of high land prices motivated small owners to sell land. The expansion of medium to large sized growers could also be due to enlargement of small and medium sized farms. Or to other businessmen, after witnessing satisfactory performance, accumulated more capital and entered into the business. A corollary would be that because capital needed to establish a large banana farm was relatively high, it would be reasonable to assume that those entering the banana business were already established entrepreneurs or farmers with capital.

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<sup>153</sup>Castellanos, Camilo (1988). "La encrucijada de Urabá." *Cien Días Vistos por CINEP* 1(2), p.6.

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Moreover, in the late 1960s fertilizer in Colombia was in short supply, and because of the high demand of land tax authorities were making land more expensive by valuing the plantations upwards, thereby increasing plantation expenses<sup>154</sup>. Only in later years when profits were generated were planters able to expand plantations.

Secondly, it appears that during the 1977-1990 period there has been a land concentration process in Colombia as a whole. Explanations from this range from violence and guerrilla warfare to the land concentration in general that characterized the Colombian countryside of the 1980s. The narco-dollars that flowed into the country in the late 1970s and 1980s were to a large extent invested in land<sup>155</sup>. The increased demand pushed up land prices and land became a feasible investment for only the very rich. According to the Caja Agraria, by 1990 approximately 80% of the country's best land was owned by drugs traffickers<sup>156</sup>. Furthermore, many small producers opted to leave the area than risk harm caused by paramilitary or guerrilla groups. Thus, land concentration in Urabá was not necessarily related to the nature of the structure of export-banana enterprise, but rather structural elements of the national economy.

The absence of domestic private or public initiatives prior to the UFCO indicate the weakness of both these sectors to influence the transformation to export-

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<sup>154</sup>"A History of Turbana and Uniban and Banana Growing in Colombia." (1989), Bogotá: Turbana, p.13.

<sup>155</sup>Interview with Ricardo Vargas, (March 1992) Advisor the the Minister of Agriculture, Bogotá, Colombia; Castellanos, Camilo (1988), *op.cit.*, p.7; Ospina Gloria R. (1981) "Policy Implementation in Developing Countries: The Colombian Agrarian Reform Law of 1961." PhD Dissertation, Georgetown University.

<sup>156</sup>Servill, Michael (1994) "Is it the Last Battle?" *Time* 144(6), p.20.

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oriented production. The State's presence was seen in the establishment of INCORA and CORPOURABA in the 1960s. However their effectiveness in administering titles and regulating expansion was negligible. The presence of commercial houses was qualitatively similar to TNC involvement of the period. After the 1960s TNCs participated to a much lesser extent in social physical infrastructure, as were commercial houses. Although export agents did not enjoy monopoly power in the area, they also did not become actively involved in infrastructure construction and the prevalence of absentee farm owners led to a situation of temporary settlement. It appears that the colonisation which occurred, was independent, or at least indirectly impelled by banana production in the region. Commercial houses may represent, at face value, a positive Colombian initiative, but similar to other trends of banana production centres later in the period, they were unwilling to invest in substantial infrastructure investment and further indicated the rapid internationalisation of capital in export banana production.

Initially in Urabá there were not any basic research centres. Of importance to the Urabá case, was the existing stock of technology in Magdalena which could be easily transferred. However, some of the techniques in Urabá were different<sup>157</sup>. Technology, as in Santa Marta, was also obtained from banana growing areas in Central America, the Caribbean and Ecuador<sup>158</sup>. In later years minor research and

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<sup>157</sup>"Reseña Semestral del Departamento de Magdalena." (1964) Revista del Banco de la República 37 (444), p.1288.

<sup>158</sup>Rosero Ruano, Alvaro (1983). "Sistema de Evaluación para Determinar la Eficiencia en la Ejecución de Prácticas Culturales en una Finca Bananera." Revista Augura, 9(5); Crédito y Fomento (1969), *op.cit.*, p.181.



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development facilities were established by independent commercial houses<sup>159</sup>. Data in this section derives from UNIBAN. Farm level data, similar to that researched in Manuelita were not available. UNIBAN will serve as an appropriate case study as many farms relied virtually exclusively on their commercial house for technology and inputs<sup>160</sup>. As argued earlier, advances in one area of production impulsed changes in the rest of the operation. Secondly, technical change of export banana production was mainly stimulated by innovations in other regions therefore were induced externally, thereby exacerbating the reliance on external markets. First to discuss sectoral trends which will be followed by an examination of technical changes.

Technical change, conventionally defined can most directly be observed through changes in total factor productivity (Figure B2.1). Banana exports per hectare increased markedly between 1964 and 1990, from 3.87 MT/ha. to 35.06 MT/ha<sup>161</sup>.

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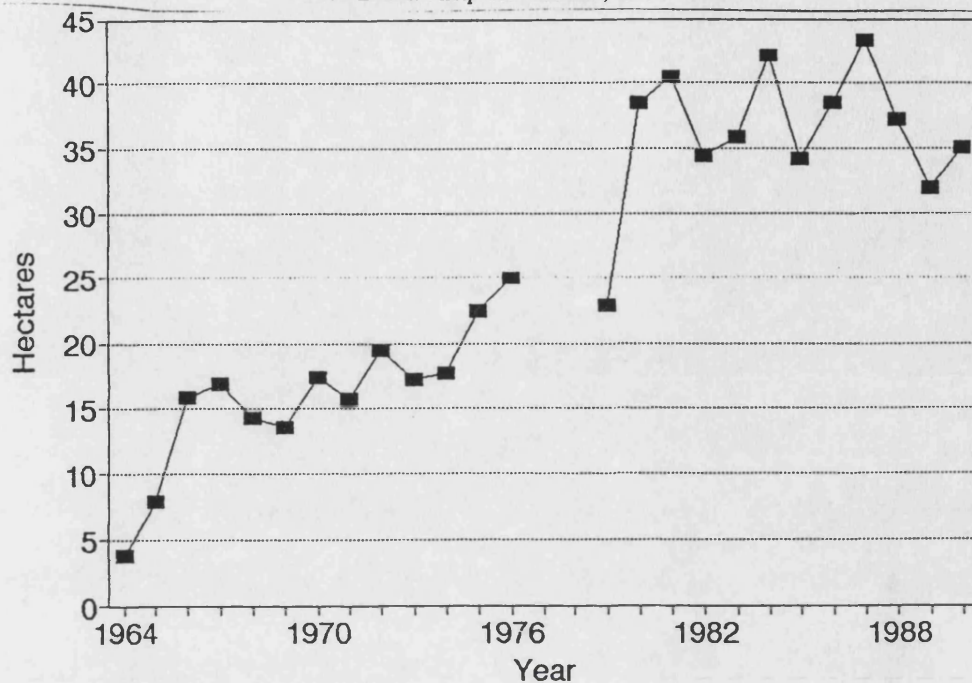
<sup>159</sup>Interview with Marta Cecilia Ramírez Arboleda (March 1992), Director of Planning, AUGURA, Medellín; *Crédito y Fomento* (1969), *op.cit.*, p.181; *Ministerio de Agricultura Programas Agrícolas 1976* (1975), Bogotá: Ministerio de Agricultura, p.41.

<sup>160</sup>Descriptions of technical changes will only be provided if the method diverges from standard practices already discussed above in part I and illustrated in Appendix B.1.

<sup>161</sup>See Appendix B.3.

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**Figure B2.1**  
Urabá Banana Exports MT/Ha, 1964-1990



Source: See Appendix B.3.

In addition, the figure illustrates that technical change was land intensive as tonnes/ha. increased almost nine-fold. The vicissitudes of the export market, and not lagging technical diffusion, can explain the erratic levels which are visible since 1982<sup>162</sup>.

Despite the emergence of Colombian commercial houses, concerted institutional organisation for research and development has been lacking. In 1966 USAID reported that effective agricultural extension, credits, infrastructure construction and market facilities could make the area competitive<sup>163</sup>. Later, research and development efforts were organised within each commercial house

<sup>162</sup>Interview with Marta Cecilia Ramírez Arboleda (March 1992), Director of Planning, AUGURA, Medellín.

<sup>163</sup>Agricultural Development in Colombia (1966), *op.cit.*, p.63.

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however these centres were not responsible for substantial discoveries<sup>164</sup>. Even as late as the 1970s and 1980s, when exports were booming, Lazaro Mejía Arango continued to criticize the sector for lack of local research and development initiatives<sup>165</sup>. Mejía Arango argued that commercial houses did not advance research and development, he maintained that TNCs had contributed to the region in earlier decades and that their action was slow and diffuse<sup>166</sup>. This analysis supports the argument that techniques induced externally resulted in a less internal multiplier effects and ended in the use of less than optimal techniques.

The only indication of internal research and development was the selection of plantation location. Due to favourable soil conditions in Urabá fertilizers have not played a large role. Instead of seeking appropriate fertilizers, planters employed the Instituto Geográfico Agustín Codazzi to locate optimal soils for plant until the 1970s<sup>167</sup>. Thus in some of the areas where national institutional was involved the application method appropriate to Colombian climatic and geographical conditions were promoted. Initially, the only fertilizer applied was urea<sup>168</sup>. An official report from 1968 stated that in some farms productivity was very low because of the lack of fertilization and bagging of fruit<sup>169</sup>. However practices tended towards

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<sup>164</sup>Interview with Juan Guillermo Villada (Nov 1991), Director of Statistics, UNIBAN, Medellín.

<sup>165</sup>Mejía Arango, Lázaro (1986). "Algunas Consideraciones Sobre la Política de Promoción de las Exportaciones Agrícolas en Colombia (el caso bananero)." *Revista Augura* 12(1), pp.12-13.

<sup>166</sup>Ibid.

<sup>167</sup>Botero, Fernando (1988), *op.cit.*, p.69.

<sup>168</sup>"Producción, y Comercialización del Banano." (1986), *op.cit.*, p.119.

<sup>169</sup>Plan Cuatrienal para las Exportaciones de Algodón, Azúcar, Banano y Tobacco 1968-1971 (1968) Bogotá: Ministerio de Agricultura, p.11.

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homogeneity as in the 1970s and 1980s inputs were applied to a similar extent due to the system of commercial houses which promoted and diffused optimum techniques.

Similar to other parts of the world, the strongest impulse to technical change was the replacement of Gros Michel with Cavendish in 1970<sup>170</sup>. Data from 1974 show that 9,800 ha. were planted with Cavendish and 3,300 with Gros Michel in Urabá<sup>171</sup>. By 1975, 90% of the planted area was dedicated to Cavendish<sup>172</sup>. As in other regions, varietal switch resulted in significant changes to the production process. The new strain required substantial modifications in the drainage systems which were previously designed for Gros Michel<sup>173</sup>. Canal re-excavation continued throughout the 1970s<sup>174</sup>. With the introduction of Cavendish, bananas were shipped in boxes. To accommodate this change, UNIBAN purchased tugboats, barges and conveyors to load banana boxes onto the ships in the early 1970s. This investment was made possible by loans from the Instituto de Fomento Industrial (IFI)<sup>175</sup>. In 1977 UNIBAN, again with government loans, invested in a cardboard box plant to supply growers with all packaging materials: boxes, stickers, plastic bags, etc.<sup>176</sup>.

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<sup>170</sup>"Producción, y Comercialización del Banano." (1986), op.cit., p.119.

<sup>171</sup>Ministerio de Agricultura Programas Agrícolas 1976 (1975), op.cit., table A.1, p.40.

<sup>172</sup>"Producción, y Comercialización del Banano." (1986), op.cit., p.119.

<sup>173</sup>Because Urabá has an abundance of rainfall and there is little need for irrigation, rather drainage is the more important aspect.

<sup>174</sup>"Producción, y Comercialización del Banano." (1986), op.cit., p.120.

<sup>175</sup>"A History of Turbana and Uniban and Banana Growing in Colombia." (1989), Bogotá: Turbana, p.18.

<sup>176</sup>Interview with Arturo Hernández (March 1992), Vice-President for Planning and Development in UNIBAN, Medellín.

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The importance of this progression is the impact a technical change in one area had on the entire production process which motivated changes through the agribusiness. Also, domestic private initiative substituted what might have been TNC investment.

The use of chemical inputs was present in 1965; and production structures of the 1980s demonstrate that they have been integrated into the process to a wider extent<sup>177</sup>. Many banana farms purchased a high percentage of inputs from commercial houses<sup>178</sup>. Black Sigatoka penetrated the region in 1981<sup>179</sup>. Eradication costs increased ten-fold from 10,000 pesos per ha. (for Yellow Sigatoka) to 100,000 pesos/hectare<sup>180</sup>. The lack of pioneering research and development in the region has resulted in lower competitive levels, as eradication costs are very high.

Transportation within banana farms has changed substantially for the harvest. Initially, bananas were transported from farms to packaging areas by oxen carts and later tractors were employed<sup>181</sup>. In 1968 plans were made to finance the construction of cables and to intensify the research on Cavendish<sup>182</sup>. Finally aerial cable systems, installed during the 1972-1975 period<sup>183</sup>. The first two modes of

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<sup>177</sup>See Canasta Bananera, (1983), Medellín: AUGURA, pp.32-33.

<sup>178</sup>*Ibid.*, p.11.

<sup>179</sup>*Ibid.*

<sup>180</sup>*Ibid.*

<sup>181</sup>Plan Cuatrienal para las Exportaciones de Algodón, Azúcar, Banano y Tabaco 1968-1971 (1968) Bogotá: Ministerio de Agricultura, p.12; "Producción, y Comercialización del Banano." (1986), op.cit., p.119.

<sup>182</sup>Plan Cuatrienal para las Exportaciones de Algodón, Azúcar, Banano y Tabaco 1968-1971 (1968), op.cit., pp.12,69,71.

<sup>183</sup>Interview with Nestor Gutiérrez (Nov.1991), Agricultural Engineer, UNIBAN, Urabá, Colombia; Botero, Fernando (1990), op.cit., p.106; "Producción, y Comercialización del Banano." (1986), op.cit., p.119.

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transport proved slow, troublesome, and more damaging to the plantation as described in part I.

Banana growing in Urabá became less and less dependent on the UFCO for its survival. Credit was granted by State Agrarian Banks and the domestically-owned commercial houses offered technical and financial assistance. Despite these investments, concerted efforts towards research and development within the region have been inadequate, with most techniques obtained from abroad. The nature of export-oriented banana production and the non-"free" nature of the international market led to a situation where government policy and the oligopolistic control of international markets dictated transformational decisions.

Urabá has faced labour difficulties and social strife; conflicts which range from the dubious methods of land acquisition in the 1960s to widespread guerilla warfare of the 1980s<sup>184</sup>. For example between January and March of 1988 there were more than 100 assassinations in the Urabá area<sup>185</sup>. This section will discuss the affect technical change had on labour analysing changes in total banana employment, the direct effects of technical change, and the increased division of labour and its repercussion on wage rates. This will be followed by a discussion of the qualitative changes.

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<sup>184</sup>For a detailed review see Botero Herrera, Fernando (1990). Urabá: Colonización, Violencia y Crisis del Estado. Universidad de Antioquia: Medellín, pp.133-194.

<sup>185</sup>Matayas Camargo, Eduardo (1988). "Genocidio, no sólo en Urabá." Cien Años Vistos por CINEP. 1(1), p.15; "Ciénaga Entre la Euforia y el Miedo." (7 Oct. 1991), El Tiempo; "Urabá al Borde de la Parálisis." (26 July 1992), El Tiempo.

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Although a number of capital using technological processes have been implemented, manual labour remains an important factor to production. Regardless of many capital using technical changes, the demand for labour between 1979 and 1986 has increased<sup>186</sup>. Total employment has risen both in terms of direct and indirect work force. Permanent workers comprised the bulk of the work force. In 1979 they represented 68% and in 1986, 63%.

**Table B2.7**  
Employment in the Urabá Banana Zone, 1979 and 1986.

	1979	1986
Permanent Workers	11,100	12,240
Occasional Workers	1060	1,224
Direct Employment	12,160	13,460
Middle Management Personnel	1,740	1,632
Total Direct Employment	13,900	15,096
Indirect Employment	2,340	4,300
Total Banana Employment	16,240	19,396

Source: Ramírez, Margarita and Henao, Ricardo (1988), *op.cit.*, Table 2, p.81 citing Augura and Universidad de Antioquia: Centro de Estudios Económicos.

The proportion of indirect work force increased from 14% to 22% between 1979 and 1986. This can be explained by improvements in cultivation techniques. Though this table spans only seven years it appears that as technical change progressed in Urabá, the proportion of permanent workers declined as in other regions. Indeed, a factor which enforced the mobile character of the work force.

Technological changes such as advanced irrigation systems and subterranean drainage have resulted in labour saving techniques. Initially these techniques were

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<sup>186</sup>Ramírez, Margarita and Henao, Ricardo (1988), *op.cit.*, p.80.

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labour using however recently in Urabá land excavation has been mechanised<sup>187</sup>. Once canal re-excavation was completed (to accommodate changes in varietal switch) a drop in the demand for labour was precipitated<sup>188</sup>. The introduction of the new variety impulsed the use of boxed bananas, which created new job opportunities, such as banana boxers, vacuum packers and pallet loaders. The bunches connected to cables in most of Urabá farms were pulled by manual labour to the preparation and packaging areas<sup>189</sup>. Qualitative data shows that banana production appears to be capital intensive.

Technical change, as illustrated in part I, also resulted in increasing division of labour and stratification of wage rates. Table B2.7 illustrates the stratification of the work force in Urabá. Not only are different types of jobs paid in a different fashion but within jobs such as cleaning of primary, secondary and tertiary irrigation canals there were wage rate differences. The table also illustrates the highly variable wages rates between semester I and II. For instance, banana packer's wages varied up to 80%.

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<sup>187</sup>Interview with Oscar González (Nov. 1991), Director of Urabá Operations, UNIBAN, Urabá, Colombia.

<sup>188</sup>Interviews with Oscar González (Nov. 1991), Director of Urabá Operations, UNIBAN, Urabá, Colombia; Marta Cecilia Ramírez Arboleda (March 1992), Director of Planning, AUGURA, Medellín, Colombia; See also Banana Part I.

<sup>189</sup>Interviews with Marta Cecilia Ramírez Arboleda (March 1992), Director of Planning, AUGURA, Medellín, Colombia; Humberto Uribe (Nov. 1991), Head of Operations for UNIBAN, Urabá, Colombia.



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**Table B2.8**  
Wages and Types of Payment of Banana Workers  
In Urabá, 1987 (Colombian Pesos)

Task	Unit of Payment	I Semester \$/unit	II Semester \$/unit	% Variation
De-leaving excess leaves on banana plant	Ha.	68	102	50
Removal of flower at base of banana bunch	Ha.	58.73	79.3	35
Re-Planting	Plant	14.26	22.11	55
Fertilization	Bag of Fertilizer	108.9	181.73	67
Placement of Protective Bags on Banana Bunches	Ha.	87.63	144.01	64.3
Cutting banana bunches from plant (harvest)	Banana bunch	7.41	14.03	89
Banana Packing	Box	12.09	21.82	80.5
Cleaning of Irrigation Canals I	Metre	6.66	9.0	35
Cleaning of Irrigation Canals II	Metre	5.14	6.85	33.3
Cleaning of Irrigation Canals III	Metre	3.68	4.94	34.2
Re-digging Portions of Irrigation Canal I	Metre	20.40	28.45	39.5
Re-digging Portions of Irrigation Canal II	Metre	16.62	23.22	40
Re-digging Portions of Irrigation Canal III	Metre	14.69	16.45	12

Source: Constructed from Ramirez, Margarita and Henao, Ricardo (1988), *op.cit.*, Table 5.

This variation not only demonstrates the changing demand of tasks needed on banana farms but also the relative difficulty in finding labour for certain jobs during particular semestres.

Regarding the stratification of the work force Alderman and Sahn theorised:

Techniques that increase peaks in seasonal labour demand will not only drive up wages but will also encourage employers to enter into contracts which will smooth the flow of income to poor households<sup>190</sup>.

The the case in Urabá was conflicting. Increases in seasonal variations were

<sup>190</sup> Alderman, Harold and Sahn David (1989). "Understanding the Seasonality of Employment, Wages and Income." In Sahn, David (Ed.), *Seasonal Variability in Third World Agriculture*. Baltimore: Johns Hopkins University Press , p.86.

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positively correlated to more marked increases in pay. There was not enough data to investigate whether contracts smoothed the flow of income to poor households. However from the evidence presented in table B2.10 it appears that workers did not remain in the area. If banana companies were to smooth the flow of income to households this would also imply that there would be adequate infrastructure to keep people in the region.

In light of the information presented above: temporary jobs, and increased stratification of labour and methods of payment, why did workers migrate to Urabá? As in Santa Marta, the answer lies in high relative wage rates. High wages are a significant factor that can pull in labour temporarily. Throughout the 1970s wages had been higher than the national average to compensate for the adverse conditions of the region<sup>191</sup>. In more recent years from 1984 onwards, a massive process of collective negotiations had been started which resulted in comparatively higher wages in banana-growing than in other agricultural or industrial and business activities<sup>192</sup>. Between January 1983 and 1986 the wage rate of direct and indirect workers nearly doubled<sup>193</sup>. Improved information flows of changes in wage rates in comparison to those of the beginning of the century has resulted in easier recruitment of workers.

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<sup>191</sup>Ramírez, Margarita and Henao, Ricardo (1988), *op.cit.*, p.82.

<sup>192</sup>Ibid. For more information on labour unions see Sierra Botero, Diego Miguel (1986). "Urabá Banano y Bienestar Social." *Revista Augura*. 12(2), p.42.

<sup>193</sup>

**Table B2.96**  
Index of Production Costs, 1983 and 1986.

	1983	1986
Indirect	114.44	214.33
Direct	118.77	240.46

Source: *Canasta Bananera*, (1983), *op.cit.*, table 7, p.29.

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Labourers need not be lured by hospitals and schools. Banana cultivators have learned from the mistakes made in Magdalena and now only invest in plantation improvements and infrastructure. The sugarcane agroindustry in the Cauca Valley was characterized by a long tradition of hiring labour and maintaining payrolls. In the banana agribusiness this was not so.

Besides the ability of export banana farmers to offer higher wages, are there any other explanations for high wages in the area? Another factor that may affect the wage rate is the contraband that started passing through the port at the mouth of the Atrato River in the early 1960s<sup>194</sup>. A decade later this contraband was in the form of marijuana exports. Therefore banana farmers have been forced to offer higher wages in order to compete with cultivators of illegal crops.

Although the Urabá zone did not experience substantial levels of migration until the late 1950s and early 1960s, development since this time has not shown marked improved and in some aspects standard of living has declined. First, the work force in Urabá is highly mobile. Figures from UNIBAN demonstrate that after almost thirty years of operation, the majority of workers have been employed for under five years (Table B2.10).

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<sup>194</sup>McRae, Patricia B. (1991). "The Illegal Narcotics Trade and the National Front, 1958-1974." *Secolas Annals* 22, p.26.

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**Table B2.10**  
Length of Time Workers Employed in UNIBAN, 1986-1991.

Number of Years	1986	1987	1990	1991
0-5	72%	73%	75%	67%
6-10	23%	22%	18%	25%
11-15	4%	4%	5%	6%
16-20	1%	1%	2%	2%

Source: Constructed from UNIBAN Informe Social, (1987, 1988, 1991, 1992), Appendix, Table 4 (of all years).

According to UNIBAN figures turnover rate is high, the number of workers employed two years or less with a commercial house represent 56.4% of the banana work force<sup>195</sup>. It appears that many families migrate into the zone and live in the transitory housing provided on the farms. After making some money, they leave the area.

Secondly, banana production in 1984 constituted 62% of the gross domestic product in the Urabá region, yet investment in infrastructure, health and educational facilities was meagre. Not until 1985 did commercial houses commence hygiene programmes such as providing potable water and improving housing and social conditions in the camps<sup>196</sup>. AUGURA started programmes of construction of sewerage systems, increased access to potable water and construction of improved living areas since 1985 as well<sup>197</sup>.

Thirdly, public services in the Urabá area continue to be problematic. Electricity coverage is concentrated in the principal municipal centres though there

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<sup>195</sup>"Indicadores Sociales." (1986), op.cit., p.139. See also UNIBAN, Informe Social (1989).

<sup>196</sup>"Producción y Comercialización del Banano." (1986) Revista Augura, 12(2), p.140; Plan de Desarrollo de Urabá: Diversificación y Bienestar Hacia la Industrialización, (1984), op.cit., p.32.

<sup>197</sup>"Indicadores Sociales." (1986) Revista Augura, 12(2), p.140.

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is a great variance among the different centres. In 1985 the qualitative deficit of housing in the Urabá area reached 80%<sup>198</sup>. Deficit is defined as units that require partial or total improvements. In the same year seventy-nine percent of workers and families lived in farm camps, a transitory living area that the company offered<sup>199</sup>.

They lived here either because a) they know the job will only be short-term which does not merit investment in housing or b) there is no other option, housing in the area is extremely limited. Furthermore, educational levels in the Urabá area are deficient. In 1985 twenty-five percent of the people working in the banana agroindustry were illiterate and 50% of this population were functionally illiterate<sup>200</sup>. The level of instruction was extremely low and resources for education for those older than fifteen years are very limited. In addition to poor levels of education, infant mortality rates were the highest within the Department of Antioquia<sup>201</sup>. Malaria rates in the banana region are higher in the Urabá banana zone than in Colombia and South America combined<sup>202</sup>. According to Franco, malaria has a bio-social nature. Though the climatic conditions are conducive to breeding the malaria disease, social conditions also assist in its propagation or prevention. It is a social phenomena that can be

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<sup>198</sup>See also Sierra Botero, Diego Miguel (1986), *op.cit.*, pp.43-44.

<sup>199</sup>"Indicadores Sociales." (1986) *Revista Augura*, 12(2), pp.139-144.

<sup>200</sup>"Indicadores Sociales." (1986), *op.cit.*, p.140. However the percentage of illiterate people in 1985 in the Urabá region was 36%, exceeding that of those involved the banana agroindustry. See Franco, S. *et. al.* (1987), *op.cit.*, p.23.

<sup>201</sup>"Indicadores Sociales." (1986), *op.cit.*, p.141.

<sup>202</sup>Franco, S. *et. al.* (1987). "Malaria, Economía, Cultura y Vivienda en Urabá." *Revista Augura*, 13,(1), p.21.

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correlated with the form of presentation and distribution of the disease<sup>203</sup>. High population mobility, low levels of education, deficient living conditions: inadequate sewerage systems, and unhygienic consumption patterns facilitate the spread of the disease and hinder the development and welfare of the people who work in the banana farms.

The situation of the work force in Urabá qualitatively has deteriorated. The internationalisation of capital has resulted in more temporary recruitment of with jobs becoming increasing more stratified, accompanied by increased wage variances. Wages remained higher in Urabá than in other agricultural sectors--this is the method commercial houses have employed to lure labour. Unfortunately commercial houses did not kindle any flame of economic development. In part I it was argued that TNCs monopolistic behaviour stifled the growth of an internal economy. However in Urabá the absence of infrastructure contruction by export agents resulted in unsatisfactory working conditions and proved that local initiative did not automatically step in. Unpleasant climatic conditions cannot be the explanation as was seen in part I, infrastructure construction was able to lure peasants from the mountains to the banana producing areas. Hence, in Urabá the State and commercial houses did not create the appropriate conditions and incentives to attract a permanent population. It must be underlined also that the continual dependence of production on external markets for technology, inputs, and trade resulted in few intersectoral transactions.

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<sup>203</sup>Franco, S. et.al. (1987), op.cit., p.22.

## CONCLUSION

For centuries, many varieties of plantains and bananas have been grown by small producers. Only after the 1890s were bananas in Santa Marta produced for export. This area was dominated by foreign capital and, in contrast to the situation in Urabá, the UFCO came to control banana operations. The position of the company in Colombia never paralleled Central American operations and small and medium sized Colombian banana producers were a lasting and vital element to the Santa Marta trade. Changes in government policy, labour problems, and inclement weather proved sufficient grounds for withdrawal. In the 1930's the company began pulling out and gradually abandoned production, concentrating on technical assistance and exports. The UFCO relocated to Urabá in 1963 however their exports were surpassed by local initiative as early as 1972. In 1983 the UFCO and Standard Fruit completely withdrew, leaving exports to locals.

Bananas grown for export purposes are organized under a highly capital-intensive system of production. Small- and medium-sized producers also have a role in providing bananas for export markets. In Magdalena, because of the UFCO's dominance in many aspects of banana growing, the Company was able to monopolise exports and some aspects of production such as transport and irrigation for the entire period. In addition, because of its outward oriented structure few links within other sectors of the Colombian economy were established. Though the structure of the banana trade changed in Urabá due to the rise of domestic commercial houses, concurrent changes in impulsing transformations to occur within the internal economy did not follow. The new structure allowed Colombians more involvement with the

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banana trade and eventually they were able to organise and force the UFCO and Standard Fruit to depart. However conditions for workers and growers remained lacking and maybe worse because the infrastructure that the UFCO constructed in Magdalena such as schools and hospitals did not occur in Urabá. In addition the commercial houses--as TNCs in earlier decades--retained most of the profits.

In the 1960s when banana production for export first materialised in Urabá substantial population growth ensued. Prior to this, the area was sparsely inhabited, land acquisition was conducted relatively peacefully and the region did not have a history of violence as other regions in Colombia. Export banana production changed the countenance of the region. With their arrival, the presence of State institutions was necessary to grant land titles so that inhabitants would have collateral with which to secure loans, enter into contracts with the UFCO, or simply to claim their land legally. Despite State presence, land disputes broke out amongst colonists, banana businessmen, and indigenous populations. Though laws were passed in order to grant colonists land, businessmen managed to gain most of the productive land. After more than twenty-five years of banana growing, the distribution of land in the banana growing region demonstrated a tendency of increased concentration and small landowners gradually faded from the panorama. Though commercial houses were not directly in charge of production, they provided technical assistance, sold agricultural inputs, and were responsible for the entire process of transport, marketing and distribution. Most transformational changes were impelled by varietal switch, similar to trends observed in part I. Thus technical change did not occur in a progression but were once-and-for all changes which affected all areas of production. What could be



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an explanation for the decline of small- to medium-sized producers?

Urabá is plagued with high levels of violence originating from guerrilla groups, paramilitary groups, and labour conflict. The banana labour force is extremely mobile which exacerbates the region's instability. Over fifty percent of the banana workers do not last more than two years in the area. Living conditions are poor: potable water, an extensive functional sewerage system, and suitable living quarters scarce. Other public services such as education and hospitals are also lacking and as can be expected, of the inhabitants in the zone, fifty percent are functionally illiterate. The area also has one of the highest incidence of malaria in Latin America. Since the quality of life is so deficient and because of the violence, many of the landowners do not live in the region but hire *mayordomos* to guard their land. This further dampens the possibilities for infrastructure establishment. Under these circumstances, recruits for paramilitary or guerrilla groups are not difficult to find. And, a small to medium-sized producer can easily be threatened to leave his plot of land. In these conditions, only those who can defend themselves and their land will survive: those with large amounts of capital who can afford investment in security measures.

Working and living conditions are insufferable. Though many of the "underdeveloped" conditions of Urabá could be attributed to low population density and malevolent climate, they need not be the overriding feature. Particularly after almost thirty years of a booming export commodity which has generated important amounts of foreign receipts since its inception. Though banana workers earn high wages, the area proves difficult for habitation on a permanent basis due to the lack

*Part II: Santa Marta and Urabá Export Bananas*

of housing, adequate sewerage systems, accessible educational facilities and hospitals.

These variables, in turn, make the region a promising situation for guerrilla and paramilitary violence.

## Potato

Among major food crops, potatoes currently have the highest rate of productivity growth in many LDCs<sup>1</sup>. This either demonstrates slow technical change in the past, recent technological discoveries, improved technical diffusion, land extension, or a combination of all four. The value of this crop per hectare exceeds that of most other food crops in developing countries<sup>2</sup>. Potatoes can be cultivated under less favourable conditions than other crops such as wheat, maize, or rice<sup>3</sup>. The virtue of the potato also rests in its rich nutritive content: high in vitamins, minerals, protein, and a good source of calories<sup>4</sup>.

As in previous chapters, part I will survey the secondary literature and underline important issues related to potatoes in Colombia. First, the nature of the crop and world yields and growth rates will be discussed. Secondly, explanations for disparate world output levels and an examination of potato markets will be provided. Lastly, an analysis of the conditions of nineteenth century Ireland will be presented to illustrate the circumstances which resulted in wide-scale domestic production and consumption. Examples from this case will be drawn upon in part II. Part II will focus on Colombia, specifically the prominent producing regions, Boyacá and Cundinamarca.

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<sup>1</sup>Potatoes for the Developing World. (1984). Lima: Centro Internacional de la Papa (CIP), p.13.

<sup>2</sup>Horton, Douglas (1987). Potatoes: Production, Marketing and Programs for Developing Countries. Boulder: Westview Press, p.24.

<sup>3</sup>Potatoes for the Developing World. (1984), *op.cit.*, p.13.

<sup>4</sup>Salaman, Redcliffe N. (1985). The History and Social Influence of the Potato. Cambridge: Cambridge University Press, pp.101-125.

## Part I

### CROP CHARACTERISTICS and TECHNOLOGY

The most salient qualities of the semestral potato are its high yields, short cycles and flexibility it can be consumed by man and beast <sup>5</sup>. Another distinct feature is that the potato is also the only cheap food which can sustain life if it is the only article of a diet<sup>6</sup>. Rich, fertile land is not imperative for successful harvests as the potato can tolerate a wide variety of soils and will grow on poor land not adequate for grain or grazing <sup>7</sup>. Because high levels of output can be achieved on poor agricultural land, the potato is often selected by small marginalized producers. These producers normally sell the higher quality output and consume the remaining non-saleable tubers within the household. Household consumption can extend for a few months as the potato can be stored moderately well with traditional methods<sup>8</sup>.

The potato does have its handicaps. It is considered a high risk crop. High risk because of its reliance on high amounts of inputs, and relative temperature sensitivity during cultivation and after the harvest. In addition potatoes are troublesome as compared to grains or pulses for two main reasons. First, potatoes have a higher water content than either grains or pulses which makes them more difficult to store and transport, though not as difficult as fruits or vegetables<sup>9</sup>.

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<sup>5</sup>O'Gráda, Cormac (1993). Ireland Before and After the Famine: Explorations in Economic History, 1800-1925. Manchester (2nd Ed.): Manchester University Press, p.12.

<sup>6</sup>Davidson, Stanley and Passmore, R. (1965). Human Nutrition and Dietetics, Baltimore (2nd edition): Williams and Wilkins, p.285.

<sup>7</sup>Green, E.R.R. and Litt, B. (1956). "Agriculture" In Edwards, R. Dudley and Williams, T. Desmond, The Great Famine: Studies in Irish History 1845-52. Dublin: Browne and Nolan Limited, p.103; Potato Production and Consumption in Developing Countries (1991), Rome: FAO, p.5.

<sup>8</sup>For example in Ireland storage was mainly contained in pits or clamps covered with straw. See O'Gráda, Cormac (1989). The Great Irish Famine. Houndsmills: MacMillan, p.27.

<sup>9</sup>O'Gráda, Cormac (1993), op.cit., p.11, Potato Production and Consumption in Developing Countries (1991), op.cit., p.6.

Secondly, vegetative reproduction, characteristic of the potato, makes planting the tuber more convenient, but breeding seed more difficult. Though seed potatoes exist, they are more expensive to multiply and distribute than those of cereals, pulses and oilseeds<sup>10</sup>.

The crop was attractive to small producers because increased output was less dependent on ownership of sophisticated machinery and extensive areas of land. This was in contrast to other crops which were characterized by lower yields per hectare, hence needed more land to maintain subsistence, e.g. wheat and corn<sup>11</sup>. More important factors for successful cultivation were access to high quality inputs and labour. This made production land saving and either labour or capital using. Land ownership was important in that it made access to credit, machinery and land rental easier. But ownership of large expanses of land was not vital for output *per se*. According to studies on pre-famine Ireland many potatoes were grown on small plots for subsistence. An acre (.42 ha) under potatoes provided enough food in an average year to feed four people<sup>12</sup>. During the twentieth century in subsistence areas, usually less than a quarter of a hectare was planted which on average, yielded over a ton of potatoes and was usually enough to meet household requirements<sup>13</sup>.

Farming systems that cultivated potatoes generally employed methods of

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<sup>10</sup>Horton, Douglas (1987), *op.cit.*, p.49; For an extensive analysis of the history of potato varieties see Salaman, Redcliffe N., (1985) *op.cit.*, chapter 10.

<sup>11</sup>Atkinson, Jay (1970), *op.cit.*, p.92. Within the Irish potato literature the opportunity costs between wheat and potato cultivation are commonly discussed. See Mokyr, Joel (1985), *op.cit.*, chapter 2; O'Gráda, Cormac (1989), *op.cit.*, chapter 1.

<sup>12</sup>O'Gráda, Cormac (1989), *op.cit.*, p.62 citing Mokyr, Joel and O Gráda, Cormac (1984). "New Developments in Irish Population History, 1700-1845." *Economic History Review* Vol. 47.

<sup>13</sup>Horton, Douglas (1987), *op.cit.*

diversification: in crop composition and livestock<sup>14</sup>. Because chemical, material and labour inputs strongly affected output, small scale farming could compete with large scale enterprises since machinery and high-cost technology were not requisites for high yields. Thus as with bananas and cane-sugar low-cost technologies kept these small-scale producers competitive, however the lack of organized collection, transport and distribution networks resulted in a slower development of the market for the potato. These bottlenecks existed for the small producer because they were usually located on less favourable geographic areas and produced less potatoes<sup>15</sup>. Smaller potato stocks dispersed throughout the countryside were more difficult to collect and reach markets than those grown extensively on large plots. Furthermore small farmers were usually more dependent on the potato as a foodstuff and thus had less output to sell<sup>16</sup>. These characteristics resulted in distinct development paths as compared to bananas or cane-sugar. In many areas, potato cultivation was limited to small scale production. Large scale cropping only occurred in the twentieth century in capital-rich countries and to a lesser extent after 1950 in LDCs. With sugar, plantations were present as early as the sixteenth century and by the late nineteenth century bananas were beginning to be cultivated on a large scale.

The indicators of modernisation were increased fertilizer and pesticide application, planting of high quality tubers and, later, mechanisation. Technique

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<sup>14</sup>Horton, Douglas (1987), op.cit., p.114.

<sup>15</sup>For discussions on the general belief that most small scale producers in Latin America own land in less desirable geographic conditions than large landowners due to the colonization process see de De Janvry, Alain (1981). The Agrarian Question and Reformism in Latin America. Baltimore: The Johns Hopkins University Press. Barraclough, S. (Ed.)(1973). Agrarian Structure in Latin America. Lexington Books.

<sup>16</sup>In pre-famine Ireland commercialisation was the lowest in the West where farms were the smallest and the dependence on potato was the greatest. See O'Gráda, Cormac (1993), op.cit., p.61.

choice depended on a myriad of factors: accessibility to credit and inputs, quality of seeds and tubers, infrastructure and transport facilities, climatic and geographic conditions, technical diffusion, storage facilities, labour availability and land tenure. Furthermore the diverse temperature and soil conditions under which healthy tubers could be produced multiplied the number of techniques and varieties that could be selected<sup>17</sup>. In high altitude conditions there were usually fewer pests, though with crop intensification this advantage soon disappeared. In hot dry climates insect attack was more probable and hot, wet climates fostered fungal and bacterial attack<sup>18</sup>. If pesticides were used, sometimes water scarcity in remote areas restricted application<sup>19</sup>. Moreover, technical diffusion of new varieties was more problematic since the large, bulky tubers must be transported instead of the smaller seed. Given these variables, how did world yields and production growth rates behave?

#### MARKETS and INSTITUTIONS: expansion, product markets and pre-famine Ireland

Yields and growth rates were computed for a sample of countries (Tables P1.1 and P1.2). Countries were selected to represent both industrialised and developing countries and among these countries certain characteristics were selected. Yields will be used as a proxy for modernisation so that a sense of technical levels can be obtained. Venezuela and Ecuador were chosen to illustrate trends of countries bordering Colombia which have somewhat similar climatic, topographic, and

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<sup>17</sup>Prain, Gordan; Uribe, Fulgencio and Scheidegger, Urs (1992). " 'The Friendly Potato': Farmer Selection of Potato Varieties for Multiple Uses." In Moock, Joyce Lewinger and Rhoades, Robert E. (Eds.) Diversity, Farmer Knowledge and Sustainability. Ithaca: Cornell University Press, pp.52-68.

<sup>18</sup>Potato Production and Consumption in Developing Countries (1991), *op.cit.*, p.18.

<sup>19</sup>Horton, Douglas (1987), *op.cit.*, p.120.

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economic conditions. Traditional (Peru and Ireland) and non-traditional (Argentina and Canada) producers were selected to show yield differences between 'old' and 'new' producers and the possibility of technical "catch-up" by the new producers.

**Table P1.1**  
World Potato Yields For Selected Countries, 1948/50-1985.  
(Tonnes/hectare)

Country	1948/50	1955	1960	1965	1970	1975	1980	1985
Ecuador*	3.8	8.4	6.8	8.9	11.5	12.6	10.6	11.6
Colombia*	9.3	10.3	12.1	11.5	10.9	12	12.2	13.7
Venezuela*	2.5	4.5	7.3	8.4	8.7	10.8	11.3	13.6
Peru*	5.9	5.9	5.5	6.2	6.6	6.5	7.1	8.4
Argentina*	6.1	6.3	8.6	12.2	12.3	12.2	13.9	17.5
Ireland	20.7	18.6	19.3	23.4	25.8	25.1	21.2	22.9
Canada	12.6	14.2	16.4	17.3	19.5	20.7	23.2	25.5

Source: Constructed from World Crop and Livestock Statistics, 1948-1985. (1987) Rome: FAO, pp.151-168.

\*LDCs

Throughout the period yield trends were disparate and volatile. Generally potato yields demonstrated an erratic upward trend except for Ireland. Less developed countries (\*) exhibited the lowest yields and appeared to have difficulty catching-up (except Argentina). Ecuador and Venezuela did not demonstrate yields comparable with Colombia. Both countries had lower yields for the entire period except for 1970 and 1975 when Ecuadorian exceeded Colombian yields. Traditional producers (Peru and Ireland) demonstrated divergent trends with Peru maintaining low yields and Ireland showing a cyclical trend. Therefore a traditional producer was not characterized by high yields. Non-traditional producers (Canada and Argentina) also showed divergent trends. Both demonstrated rapid increases in yields. Colombia mainly had the highest yields of selected LDCs throughout the period, but did not



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manage to achieve comparable yields to developed countries. Colombian potato yields lagged behind with other LDCs, in contrast to Colombian cane-sugar which achieved the highest world yields in 1990. In terms of production expansion, table P1.2 demonstrates that during the 1948/50-1985 period Colombia was the only country that consistently had positive five-year growth rates.

What are explanations for the slow increases in yields and the fluctuating growth rates? The variance of the other countries can be attributed to the fact that the potato is a semestral crop and its cultivation can be quickly displaced for another more profitable commodity.

**Table P1.2**  
Five-year Potato Growth Rates for Selected Countries, 1948/50-1985.

Country	1948/50-1955	1955-1960	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985
Ecuador	188	-24	95	37	-9	-35	31
<b>Colombia</b>	<b>26</b>	<b>13</b>	<b>17</b>	<b>20</b>	<b>45</b>	<b>31</b>	<b>10</b>
Venezuela	67	198	1	-8	-3	-18	65
Peru	17	0	12	21	-14	-16	15
Argentina	27	35	34	-6	-42	16	28
Ireland	-29	-15	-10	-11	-31	-14	-22
Canada	-7	6	7	20	-12	12	19

Source: Growth rates calculated from production statistics in World Crop and Livestock Statistics, 1948-1985, (1987) Rome: FAO, pp.151-168.

In addition because demand for the potato has a low income elasticity, developed countries can be expected to have lower growth as when supply meets demand, production will level off. As development proceeds, relative prices fall and food

habits in many LDCs change to include more potatoes in the diet<sup>20</sup>. The negative growth in other LDCs demonstrates the volatility of production and also underlines the success of Colombian producers.

Varied consumption patterns also contribute to the explanation. The potato is the main course of meals in Andean regions, is served as an accompanying vegetable in the Far East, and sometimes consumed as an additional starch in Central America. As stated above potatoes can also be consumed by livestock. In pre-famine Ireland less than half of consumption was destined towards humans and the rest was fed to pigs and hens<sup>21</sup>. In LDCs today the majority is consumed by humans or saved for seed--livestock consumption accounts for only 10% of total demand<sup>22</sup>. How did international markets affect commercialisation?

International markets for potatoes were not nearly as organized nor extensive as those for cereals, pulses, bananas and sugar. The reasons were manifold. First, the potato's bulkiness and high water content made transport and storage more difficult<sup>23</sup>. Secondly, the expense of shipping usually exceeded the value, thereby making long-distance trade unprofitable<sup>24</sup>. For many LDCs, often characterized by

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<sup>20</sup>Horton, Douglas (1987), op.cit., p.215. As a crop becomes modernised relative prices of the commodity drop. For a complete review on the role of agriculture in economic development see Timmer, C. P. (1988). "The Agricultural Transformation." In Chenery, H. and Srinivasan, T.N. (Eds.) Handbook of Development Economics, Vol.1. Amsterdam: Elsevier Science Publications; Ghatak, Subrata and Ingersent, Ken (1984). Agriculture and Economic Development. Brighton: Wheatsheaf Books Ltd.

<sup>21</sup>O'Gráda, Cormac (1993), op.cit., p.12.

<sup>22</sup>Ibid.

<sup>23</sup>O Gráda, Cormac (1993). "Health, Work and Nutritional Status in Pre-Famine Ireland." unpublished paper, p.2. For a fuller version see O Gráda, Cormac (1994). Ireland: A New Economic History, 1780-1939. Oxford: Oxford University Press.

<sup>24</sup>Potato Production and Consumption in Developing Countries (1991), op.cit., p.118.

## *Part I: Potato*

mild to tropical climates, proper transport required refrigerated shipping. This was a technological advance which was not common in these regions. Thirdly, more than one-hundred varieties of potatoes existed in contrast to less than ten for cereals<sup>25</sup>. This made harmonization and international standards more easy to establish for cereals and other commodities<sup>26</sup>. Lastly, because the potato is a tuber, often countries restricted or prohibited their importation because they could carry disease. Due to these characteristics international trade was limited and international potato monopolies were absent<sup>27</sup>.

Nineteenth century Ireland has been alluded to in the above discussion. Below an examination of the Irish countryside before the famine will be provided to contrast the developments in Colombia. The causes and effects of the Irish famine will not be considered, only issues of direct relevance for Colombia will be reviewed<sup>28</sup>. Foremost, the literature stresses the reliance on the potato as it was the backbone of the Irish diet and was widely fed to animals<sup>29</sup>. According to Cormac O'Gráda, one-

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<sup>25</sup>Prain, Gordan; Uribe, Fulgencio and Scheidegger, Urs (1992), *op.cit.*, p.53.

<sup>26</sup>Two varieties of banana are primarily internationally traded. Variety is irrelevant for cane-sugar as sugar is traded according to grades of the processed sugar (e.g. refined, crude, molasses).

<sup>27</sup>As late as 1990 only 2.6% of world production was imported (world imports=7024301 MT, world production=268390000 MT). See FAO Quarterly Bulletin of Statistics Vol.4 (1991), Rome: FAO, table 43, p.55; FAO Trade Yearbook 1990 (1991), Rome: FAO, table 49, p.143.

<sup>28</sup>See O' Gráda, Cormac (1993). Ireland Before and After the Famine: Explorations in Economic History, 1800-1925. Manchester (2nd Ed.): Manchester University Press; O' Gráda, Cormac (1994). Ireland: A New Economic History, 1780-1939. Oxford: Oxford University Press; Mokyr, Joel (1985). Why Ireland Starved: A Quantitative and Analytical History of the Irish Economy, 1800-1850. London: George Allen and Unwin; McDowell, R.B. (1956). "Ireland on the Eve of the Famine." In Edwards, R. Dudley and Williams, T. Desmond, The Great Famine: Studies in Irish History 1845-52. Dublin: Browne and Nolan Limited; Salaman, Redcliffe N. (1985). The History and Social Influence of the Potato. Cambridge: Cambridge University Press; Cullen, L.M. (1972). An Economic History of Ireland from 1660. London: Batsford.

<sup>29</sup>See Mokyr, Joel (1985), *op.cit.*, chapter 1; Bourke, P. M. A. (1965). "The Agricultural Statistics of the 1841 Census of Ireland, A Critical Review" Economic History Review, 13(2), pp.376-379.

third of all tilled land was cultivated with potato<sup>30</sup>. Why was the potato so popular?

Economically, Ireland was primarily agricultural, benefitting from comparative advantage and importing industrialised goods from England. Ireland principally exported wheat, flour, oats and oatmeal<sup>31</sup>. In this light, O'Gráda underlines the inability of Ireland to industrialise and its resultant economic reliance on agriculture. O'Gráda believes that a significant cause of the famine to be the lack of development in the industrial sector<sup>32</sup>. This This suggests that the delay in industrial development, often considered the engine to growth, resulted in a less productive agricultural sector. For instance, in 1845 agricultural methods lagged behind those of England with output per worker half that of Britain<sup>33</sup>. Another aspect of the argument was that of resource constraints, namely the lack of capital and land<sup>34</sup>. Thus, not only was the country dependent on agriculture, but relied on highly unproductive techniques. The potato was a crop that could be grown with little capital under adverse geographic conditions and low technical levels.

Population growth rates were high although were waning since 1810<sup>35</sup>.

Demographic and geographic conditions of rural areas were disparate with the West

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<sup>30</sup>O'Gráda, Cormac (1989), *op.cit.*, p.24.

<sup>31</sup>Green, E.R.R. and Litt, B. (1956). "Agriculture" In Edwards, R. Dudley and Williams, T. Desmond, *The Great Famine: Studies in Irish History 1845-52*. Dublin: Browne and Nolan Limited, pp.99-101.

<sup>32</sup>Salaman proclaims that there was little industry, see Salaman, Redcliffe N., (1985), *op.cit.*, p.309. However O'Gráda witnesses a period of de-industrialisation post 1810 for his argument see, O'Gráda, Cormac (1989), *op.cit.*, chapter 1.

<sup>33</sup>McDowell, R.B. (1956), *op.cit.*, pp.3-10; O'Gráda, Cormac (1989), *op.cit.*, p.30.

<sup>34</sup>O'Gráda, Cormac (1989), *op.cit.*, p.30.

<sup>35</sup>For discussion on the Malthusian argument that population pressure eventually would exceed the means of subsistence and result in famine see: Malthus, Thomas R. (1826). *An Essay on the Principle of Population*. London (6th ed.): Murray; Connell, K.H. (1950). *The Population of Ireland, 1750-1845*. Oxford: Clarendon Press; Mokyr, Joel (1985), *op.cit.*, chapter 3; O'Brien, George A.P. (1921). *The Economic History of Ireland from the Union to the Famine*. London: Longmans, Green.

primarily characterized by lower quality land, and high amounts of small producers and population. This was in contrast to the East which accounted for more trade with England<sup>36</sup>. Due to these and other factors out-migration was low as mobility of any kind (rural-rural and rural-urban) was negligible with the majority of the population located in rural areas<sup>37</sup>. Moreover until the famine, unemployment levels were on the rise<sup>38</sup>. These two conditions, unproductive agricultural techniques and high population growth rates characterised many LDCs in the twentieth century. In Colombia, population growth of the twentieth century resulted in the reverse outcome: the increase in potato land under cultivation and later, more productive methods.

In addition to the economic stagnation described above, land usage was highly concentrated. Since the beginning of the eighteenth century land was owned by a small class of Protestants<sup>39</sup>. According to E.R.R. Green and B. Litt estate owners concentrated on letting out land and invested little capital<sup>40</sup>. This rigid system of land ownership led to the subdivision of many of leased plots. By 1843 this left the majority (81.4%) of tenants confined to units of under 15 acres<sup>41</sup>. Furthermore during the early nineteenth century there was intense conflict among landlords and

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<sup>36</sup>Green, E.R.R. and Litt, B. (1956). "Agriculture" In Edwards, R. Dudley and Williams, T. Desmond, The Great Famine: Studies in Irish History 1845-52. Dublin: Browne and Nolan Limited, p.110.

<sup>37</sup>O'Gráda, Cormac (1989), op.cit., chapter 1, p.65. Mokyr states that in 1841 only three per cent of the population lived in counties other than where they were born. See Mokyr, Joel (1985), op.cit., p.45. However in terms of emigration, between 1815 and 1845 Ireland provided one-third of all wilful trans-Atlantic movement, see O'Gráda, Cormac (1989), p.15. Furthermore by 1841, over 400,000 of Irish-born residents lived in England, see McDowell, R.B. (1956), op.cit., p.4. Rural areas were not necessarily so bad if one bears in mind the availability of cheap food and fuel (primarily in the form of peat) here. See Mokyr, Joel (1985), op.cit., p.8; O'Gráda, Cormac (1989), op.cit., p.30.

<sup>38</sup>For a full explanation see O'Gráda, Cormac (1993), op.cit., pp.38-40.

<sup>39</sup>Green, E.R.R. and Litt, B. (1956), op.cit., p.91.

<sup>40</sup>Ibid. For a review of this see O'Gráda, Cormac (1993), chapters 1 and 2.

<sup>41</sup>For disaggregated farm size data see Mokyr, Joel (1985), op.cit., table 2.4, p.19.

tenants which drove landlords to evict tenants, rearrange landholdings and convert land to pasturage<sup>42</sup>. This resulted in yet greater land concentration. Traditional relations of production and rural violence which led to a consolidation of landholdings will be observed in Colombia, particularly for the 1936-1950 period. Although this applies to Colombia in general, the change to modern methods of production will be observed in potatoes<sup>43</sup>.

In relation to the land tenure system, there was little wage-labour as cottier or conacre rent was common. Cottier tenure was characterized by under-tenants which paid their rent to the landowner with their labour<sup>44</sup>. Conacre rent involved a situation in which the farmer provided the land, tilled it and left it ready for sowing<sup>45</sup>. The person involved in conacre was then responsible for all other cultivation tasks. Rent was paid from the income obtained from the commercialised surplus or by money wages which were proffered only regularly by the gentry<sup>46</sup>. Thus it can be seen that small producers were usually tenants trying to obtain enough output for subsistence and that the economy was not widely monetized<sup>47</sup>. Traditional forms of tenancy were also observed in the Colombian potato economy.

In addition to a skewed distribution of land and the low extent of monetization, there also was a clear credit-bias. According to the earliest list of

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<sup>42</sup>Mokyr, Joel (1985), *op.cit.*, chapter 5.

<sup>43</sup>In Sugarcane and Banana Part II this transformation was also discussed.

<sup>44</sup>Green, E.R.R. and Litt, B. (1956), *op.cit.*, pp.91-97.

<sup>45</sup>Salaman, Redcliffe N., (1985), *op.cit.*, pp.247-248.

<sup>46</sup>Green, E.R.R. and Litt, B. (1956), *op.cit.*, pp.91-97.

<sup>47</sup>For further discussion on the extent of monetization see Mokyr, Joel (1985), *op.cit.*, pp.20-24.

account holders at the Bank of Ireland's Sligo branch, professionals dominated with only a marginal amount of farmers<sup>48</sup>. This, like land tenure, was undeniably another indication of the skewed distribution of wealth<sup>49</sup>. Credit to invest in new tools, better inputs and marketing routes was not available to the potato farmer.

Given the biological characteristics discussed above, high levels of population, land scarcity, and varying levels of land quality the potato was an obvious crop choice. The inability of the Irish economy to accumulate capital resulted in an economic slow-down. There was limited labour and capital mobility, and insufficient capital accumulation occurred or was directed into the agricultural sector. The main causes can be attributed to institutional constraints (land tenure and its resultant effect on income distribution) and trading patterns which discouraged the development of an industrial sector and jeopardised the subsistence of small growers. Implicitly, credit-bias also existed but occurred against much of the agricultural sector and towards industry. Many of the reasons behind potato production conditions in Colombia during the 1930-1950 period were comparable, however the improvement in yields and output levels after 1950, particularly from the 1970s onwards, were due to very different reasons. Why and how did production expand in Colombia?

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<sup>48</sup>The distribution of those which had signed the account book in 1846 was as follows: Merchants: 220; Professional: 46; Manufacturers, builders: 49; Farmers, agents: 17; Other: 16. See O'Gráda, Cormac (1993), *op.cit.*, p.33.

<sup>49</sup>For a chart of distribution of families by classes in 1841 see Mokyr, Joel (1985), *op.cit.*, table 2.3, p.18.

## **Part II: Boyacá and Cundinamarca Potatoes**

The departments of Cundinamarca and Boyacá were grouped together because they produced the largest output. However this categorisation may be misleading. The capital city, Bogotá, is located in Cundinamarca which is advantageous to growers because of proximity to credit, technical inputs, labour and commodity markets. In contrast Boyacá is more remote from urban centres and their amenities, making access to inputs troublesome. Boyacá is also almost three times larger than Cundinamarca occupying 63,884 Km<sup>2</sup> and Cundinamarca 22,300 Km<sup>21</sup>. Both departments are in a difficult position for international commerce as they are located inland, with difficult access to low-cost international trade routes. These factors further exacerbate marketing and commercialization problems. The main navigable river is the Magdalena, which is difficult to reach from some areas of Cundinamarca and many areas of Boyacá<sup>2</sup>. Also, both departments are characterized by diverse topography and some areas of very high altitudes (over 2,500 metres). Throughout the analysis these factors should be borne in mind. Early on, parallels with these departments can be drawn to nineteenth century Ireland. For instance these were areas where international trade was insignificant. Like the rest of Ireland, Boyacá was remote. In this part, markets and distribution channels will first be examined. Secondly, land usage will be analyzed. Thirdly, patterns of technical change and the importance of credit and the existence of credit-bias will be presented. Lastly, labour will be analyzed.

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<sup>1</sup>Geografía Económica de Colombia: Boyacá (1936). Bogotá: Contraloría General de la República, p.19.

<sup>2</sup>Ibid., p.10.



## *Part II: Boyacá and Cundinamarca Potatoes*

### MARKETS and INSTITUTIONS: the development of domestic markets and organisations

Similar to cane-panela, bananas and plantains, potatoes were commonly intercropped by small growers throughout the countryside during the twentieth century<sup>3</sup>. However, unlike the previous crops there was little large scale production. Between 1936 and 1950 the potato was cultivated primarily by traditional methods. With the increasing use of capital-intensive techniques, such as input application and mechanisation, after 1950 it was classified as a "mixed crop". Mixed crops are those defined as cultivated with traditional or modern methods and having cultivators from diverse socio-economic backgrounds<sup>4</sup>. Other examples of mixed crops in Colombia were corn, tobacco, and wheat<sup>5</sup>. Another salient feature was that the potato was primarily consumed by humans and had few by-product uses. But in the 1960s intermediate processing became important and by 1975 it comprised 36.3% of the gross value of production<sup>6</sup>. This was much higher than the Colombian agricultural average of 11.5% in 1975<sup>7</sup>.

Production expansion was directly linked to the internal market. Only

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<sup>3</sup>Potato production in Colombia dates back to at least 2,000 years before the Spanish Conquest. The potato was believed to be one of the first crops in the tablelands of Colombia. When migrant populations managed to gain a stronghold on these areas, they started intercropping with maize. Gradually, with the introduction of new crops, potatoes were intercropped with many other commodities. See Streeter, Carrol (1972). Colombia: Agricultural Change: The Men and the Methods. New York: The Rockefeller Foundation, p.47. For a comprehensive examination of potatoes in South America before the Spanish Conquest see Salaman, Redcliffe (1985), op.cit., chapters 1,2 and 3.

<sup>4</sup>Kalmanovitz, Salomon (1974). "La Agricultura en Colombia, 1950-1972." Boletín Mensual de Estadística, No. 276, pp.125-129.

<sup>5</sup>Ibid.

<sup>6</sup>Campo, Octavio, et.al. (1979). "La Economía de la Papa en Colombia." Revista de Planeación y Desarrollo, 11(1), p.71.

<sup>7</sup>Ibid.

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marginal amounts (less than 3% of total production) of raw potatoes and crisps were exported to Ecuador, Venezuela and Caribbean countries between 1960 and 1990<sup>8</sup>. Because trade was limited, Colombian growers did not have to face competition from foreign producers. Output expansion was clearly dependent on the domestic market. But was it sufficient to promote efficient production?

Per capita consumption figures were not available before 1960. But the importance of the potato in the Colombian diet is affirmed by official publications during the 1936-1950 period which frequently contained production information about potatoes as well as other staples like beans, potato, cocoa, maize, bananas, and coffee<sup>9</sup>. Furthermore there was an indication that potatoes were in short supply as imports were recorded during the 1936-1946 period (except for 1943) and again in 1954<sup>10</sup>. Table P2.1 demonstrates that consumption per capita more than doubled from 34 kg/year in 1960 to 62.5 kg. in 1990<sup>11</sup>. Will per capita consumption levels continue to rise?

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<sup>8</sup>Ministerio de Agricultura Programas Agrícolas 1973 (1972). Bogotá: OPSA, p.135; Cifras del Sector Agropecuario 1980 (1981). Bogotá: Ministerio de Agricultura, table 10, p.13; Anuario de Comercio Exterior (until 1973). Bogotá: DANE; Silva, Alvaro (1991). "La Apertura Económica: Amenazas y Oportunidades para los Papicultores." Revista Nacional de Agricultura, No.896, table 3, p.99.

<sup>9</sup>PRO, Foreign Office (18 May 1937). "Economic Section of Annual Report on Colombia for 1935", FO371.20624, Registry Number A4084/2851/11; (25 July 1950), "Economic Report on Colombia May-June 1950", FO371.81494, Registry Number A1101/11; (12 Sept. 1952), "Economic Report No.4, July-Aug.1952", FO371.97530, Registry Number AL1101/5; Geografía Económica de Colombia: Boyacá (1936), *op.cit.*, pp.496-508.

<sup>10</sup>Vaila Martínez, Raúl (1949). Boletín de la Economía Agrícola de Colombia. Bogotá: Ministerio de Agricultura, p.125; Estudio Sobre Las Condiciones Del Desarrollo de Colombia. (1958). Bogotá: Presidencia de la República, Comité Nacional de Planeación, p.148.

<sup>11</sup>It must be emphasized that these are aggregate figures and throughout Colombia consumption was varied. Producing regions such as Cundinamarca was characterized with a per caput consumption of 130 Kg./year, whereas the Atlantic Coast only registered 8.4 Kg./year in 1972. See Campo, Octavio *et.al.* (1979), *op.cit.*, table 18, p.91.

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**Table P2.1**  
Potato Consumption Per Capita in Colombia, 1960-1990.  
(Kg./year)

Year	Consump- tion	Year	Consump- tion	Year	Consump- tion	Year	Consump- tion
1960	34.0	1968	38.4	1976	48.6	1984	51.4
1961	28.0	1969	33.5	1977	50.7	1985	53.8
1962	42.0	1970	35.1	1978	49.3	1986	55.2
1963	27.0	1971	32.6	1979	48.8	1987	60.6
1964	38.4	1972	30.0	1980	53.5	1988	70.5
1965	33.3	1973	36.6	1981	64.3	1989	66.8
1966	32.4	1974	34.9	1982	64.2	1990	62.5
1967	33.2	1975	44.1	1983	64.2		

Source: 1963-1980 figures from Campo, Octavio *et.al.* (1979), *op.cit.*, table 20, p.93, based on calculations by National Planning Department, Agrarian Studies Unit; 1980-1990 data was based on SAC calculations, see Silva, Alvaro (1991), *op.cit.*, p.99.

Ministerio de Agricultura projections from 1971 indicated determined that there would be a potato deficit in the diet during the 1971-1980 period<sup>12</sup>. Data from industrialized countries confirm this view. Figures from industrialized countries such as Western Germany, Denmark and Austria show an average per capita consumption of potatoes and other starchy foods of 112 Kg./ year during the 1961-1962 period<sup>13</sup>. Colombian consumption levels are unlikely to reach such levels given that tubers are substitutes in the Colombian diet while potatoes are the principal tuber consumed in industrialized countries<sup>14</sup>. Nonetheless production can be expected to rise.

<sup>12</sup>"Proyecto de Ley por la Cual Introduce Modificaciones a las Leyes 200 de 1936, 135 de 1961 y 1a. de 1968" (1971). Bogotá: Ministerio de Agricultura y el Banco Ganadero, Annexes G1-G10, pp.46-54.

<sup>13</sup>*Production Yearbook 1962* (1963). Vol.16, Rome: FAO, table 96A, p.246. For disaggregated data on household expenditure as a percentage of per caput consumption see Smit, C.P.G.J. (1962). "International Comparison of Food Consumption Data." *Monthly Bulletin of Agricultural Economics and Statistics* 11 (12), table 2, p.5.

<sup>14</sup>Gerding, G. (1965). "Posibilidades de Almacenamiento de Papa en Silos Semi-subterráneos en el Departamento de Boyacá." Bogotá: Instituto de Mercadeo Agrícola, p.3.

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A considerable bottleneck has been commercialisation. Because of the large numbers of disparate producers, collection difficulties, lack of storage facilities, and high transport costs the development of organised trade networks has been difficult<sup>15</sup>. These variables often resulted in price volatility<sup>16</sup>. This was also a feature of nineteenth century Ireland<sup>17</sup>. Lack of suitable storage facilities and the dearth of futures markets or production information contributed to the sharp price changes. Regional demand, seasonal output and relative input prices dictated producer earnings. The main season *año grande* in Boyacá-Cundinamarca is July-September and the smaller *mitaca* season is during December-March<sup>18</sup>. However the increase in production in the coffee zones resulted in a decrease in price fluctuations as harvests were conducted on a complementary schedule<sup>19</sup>.

Despite the commercialisation bottleneck, potatoes were an important commercialized good since the beginning of the period in both departments. They were commonly sold in open markets which resulted in direct trading from producer to consumer since at least 1936<sup>20</sup>. As the country urbanized more and more were

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<sup>15</sup>Echavarria, Gustavo (1940), *op.cit.*, p.18; Currie, Lauchlin (1950). *The Basis of a Development Program for Colombia*. Baltimore: The Johns Hopkins Press, published for the IBRD, p.77; Silva, Alvaro (1991). "La Apertura Económica y Oportunidades para los Papicultores." *Revista Nacional de Agricultura*. No.896, p.99. The agrarian reform policy of 1961 emphasized the problems of small cultivators in general. See *Reforma Agraria Colombiana* (1970). Bogotá: INCORA, pp.9-10; Interview with Augusto del Valle (June and July 1992), Manager of FEDEPAPA, Bogotá, Colombia. For a recent study about commercialisation see Vallejo, SAC (to do).

<sup>16</sup>*Estudio Sobre Las Condiciones Del Desarrollo de Colombia* (1958), Bogotá: Presidencia de la República Comité Nacional de Planeación, p.148.

<sup>17</sup>In Ireland Cormac O'Gráda noted a sharp seasonality which rose 30% from trough to peak. See O'Gráda, Cormac (1989), *op.cit.*, p.27.

<sup>18</sup>Ministerio de Agricultura Programas Agrícolas 1973 (1972). Bogotá: Oficina de Planeamiento del Sector Agropecuario, Ministerio de Agricultura, p.135; Campo, Octavio *et. al.* (1979), *op.cit.*, p.100.

<sup>19</sup>Campo, Octavio, *et. al.* (1979), *op.cit.*, p.100.

<sup>20</sup>Currie, Lauchlin (1950), *op.cit.*, p.78.

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sold in cities such as Bogotá, Cali, Medellín, Cucuta and Barranquilla. Four types of markets emerged: open markets (*plazas*), small stores, cooperatives and later in the period, supermarkets. During the 1940s the Instituto Nacional de Abastecimiento (INA) was established to purchase output and support price<sup>21</sup>. This was one of the first State initiatives to organise commodity markets. The INA was a State wholesaler which facilitated distribution to cities as there was a general concern of inadequate urban food supply<sup>22</sup>. This general policy was a crucial organisational element to potato marketing as small producers had difficulty getting their commodity to market. In the late 1960s storage facilities were constructed by the State to offset seasonal price fluctuations. However the design was inappropriate and resulted in unsuccessful storage<sup>23</sup>. A benchmark development in distribution networks was the establishment of Centrales de Abastos (CORABASTOS) in Cali, Medellín and Bogotá<sup>24</sup>. CORABASTOS, similar to the INA, was established to improve marketing of foodstuff in cities, and was eventually to replace INA activities. Public investment began in 1970 and by 1972 CORABASTOS opened in Bogotá<sup>25</sup>. CORABASTOS was a wholesaler with an installed capacity of 20,000 tons with facilities to move and sell potatoes, and maintained a daily system of prices<sup>26</sup>. CORABASTOS became

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<sup>21</sup>Ibid., pp.78-81.

<sup>22</sup>Helmsing, A.H.J. (1986), *op.cit.*, p.210.

<sup>23</sup>Interview with Ricardo Vargas, Ministerio de Agricultura (May 1992), Consultant to the Agriculture Minister, Bogotá, Colombia. See Gerding, G. (1965). "Posibilidades de Almacenamiento de Papa en Silos Semi-subterráneos en el Departamento de Boyacá." Bogotá: Instituto de Mercadeo Agrícola. For a later study see Ministerio de Agricultura Programas Agrícolas 1976 (1975). Bogotá: Ministerio de Agricultura, p.151.

<sup>24</sup>Silva, Alvaro and Albornoz, Roberto (1979). "El Comercio de Alimentos en Colombia." Revista de Planeación y Desarrollo 11(1), p.58.

<sup>25</sup>Ministerio de Agricultura Programas Agrícolas 1973 (1972), *op.cit.*, p.137.

<sup>26</sup>Ibid.

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increasingly more important as by 1975, 89% of production was commercialised here<sup>27</sup>. Furthermore in conjunction with CORABASTOS efforts in cities, the Federación Colombiana de Productores de Papa (FEDEPAPA) organised a network of storage facilities in rural areas since the late 1970s<sup>28</sup>. As of 1985 thirteen FEDEPAPA storage centres were in operation throughout the country<sup>29</sup>. All of these centres resulted in a reduction of physical losses, a decrease in transport costs and an improvement in price formation conditions<sup>30</sup>. This demonstrates that well-organised public sources were important to stimulate the development of marketing networks. Primarily general State policies encouraged the potato cultivation, however it was not until the 1970s when the producer's association was formed to foster improved production methods as well as assist in marketing and distribution. However, State efforts have been inadequate as the majority of potatoes continued to be marketed in traditional networks. For instance, the volume commercialised in markets and small stores was considerably higher than integrated retail chains or supermarkets throughout the period<sup>31</sup>. This demonstrates the continued predominance of traditional commercial networks in the potato trade. The switch to modern chains of marketing was disjointed: in some areas new systems functioned while in others exchange continued on a traditional basis.

Data from 1935 demonstrate that potatoes were the second largest agricultural

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<sup>27</sup>Silva, Alvaro and Albornoz, Roberto (1979), *op.cit.*, table 10, p.49, citing "Pérdidas Físicas en la Comercialización de Productos Agrícolas." (1975) CNP-UEA-DC Mimeo.

<sup>28</sup>See below for a discussion of FEDEPAPA.

<sup>29</sup>FEDEPAPA, *Boletín Informativo*, (1985), #70, p.3.

<sup>30</sup>Silva, Alvaro and Albornoz, Roberto (1979), *op.cit.*, p.58.

<sup>31</sup>Ocampo *et.al.* (1979), *op.cit.*, p.97.

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shipment in terms of weight and third largest in terms of value on the railways in Boyacá<sup>32</sup>. Data from Cundinamarca in 1936 show a slightly different trend as potato weight and value was fifth<sup>33</sup>. Although potato freight was clearly not the most important on these railways, their presence evidences early commercialisation. The transport of other commodities such as wheat and maize can be attributed to their importance as foodstuffs (like potato) and coffee movement can be explained by its significance on international markets<sup>34</sup>. Although there was no data on potato shipments by road, this was also a probable mode of transport. This was particularly so in Cundinamarca as it was characterized by the most extensive road network in Colombia, a total of 1628 km. in service in 1935<sup>35</sup>. Boyacá had only half that

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**Table P2.2**  
Movement of Rail Freight  
in Cundinamarca (1936) and Boyacá\* (1935)

Shipment	Cundinamarca (Metric Tonnes)	Cundinamarca (Value in Pesos)	Boyacá (Metric Tonnes)	Boyacá (Value in Pesos)
Fruits, Legumes and Vegetables	5861	10139	3166	8980
Potato	3078	4102	16006	61604
Wheat	4081	6682	25207	100505
Maize	12562	21667	4127	11485
Coffee	10591	53672	2425	9630
Other Agricultural Products	3441	9777	2701	9747

Source: Constructed from *Geografía Económica de Colombia: Boyacá* (1936). Bogotá: Contraloría General de la República, pp.501, 508; *Anuario General de Estadística 1936* (1937). Bogotá: Contraloría General de la República, p.174.

\*Includes Ferrocarril de Nordeste and Ferrocarril del Norte.

<sup>33</sup> *Anuario General de Estadística 1936* (1937). Bogotá: Contraloría General de la República, p.174; see footnote

70.

<sup>34</sup> Unlike the potato, it was worthwhile to ship coffee overseas.

<sup>35</sup> *Ibid.*, p.512. For a discussion on State involvement in road construction see pp.512-530.

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extension, 847 km of roads in 1935<sup>36</sup>. Potatoes were seldom shipped by river as this mode of transport was not well developed in 1935 in these departments due to the lack of combustibles<sup>37</sup>. During the 1940-1980 period railway and land transport continued to be used, and within official documents persistent criticism was levelled at poor transport routes<sup>38</sup>. Even as late as the 1980s serious transport problems remained. In 1986, there were complaints from Boyacá-Cundinamarca producers of poor road conditions and the lack of jeeps and pick-up trucks<sup>39</sup>. According to a study by COLFECAR, the stock of cargo vehicles was deficient with the majority (92 %) comprised of double axle vehicles and lorries with a cargo capacity of less or equal to ten tons in 1987<sup>40</sup>. Gabriel Martínez's analysis also echoes the complaints of Boyacá-Cundinamarca producers stating that traditional agriculture was usually disarticulated with transport networks<sup>41</sup>. Thus, despite efforts of organisations such as INA, CORABASTOS and FEDEPAPA, effective links between producers and consumers had not been made as late as the 1980s. Moreover market failure clearly occurred as there was a demand for improved transport networks however market mechanisms did not induce the supply of these services.

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<sup>36</sup>Ibid.

<sup>37</sup>Ibid., p.490.

<sup>38</sup>Plan de Boyacá: Inversiones 1954-1958 (1953) Bogotá: Banco de la República, p.22; Currie, Lauchlin (1950), op.cit., p.80.

<sup>39</sup>FEDEPAPA, Boletín Informativo (1986), #85, p.3. Martínez confirms this, stating that traditional agriculture used small lorries which often had to travel on narrow roads which many times were not paved. See Martínez, Gabriel (1988) "Transporte y Desarrollo Agrícola en Colombia." Revista Nacional de Agricultura. No.882, pp.87, 94.

<sup>40</sup>"Transporte Público Terrestre de Carga" (1987), unpublished printout, Bogotá: COLFECAR and Departamento de Planeación.

<sup>41</sup>Martínez, Gabriel (1988), op.cit., p.94.



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In addition to raw potato marketing, agroindustrial processing into crisps and chips was established late. Colombia experienced an agroindustrial boom during the 1920s and 30s, although in most accounts chip and crisp factories were not mentioned<sup>42</sup>. Considering land under potato cultivation dropped by 58% between 1925 and 1937 from 116,390 ha to 67, 446 ha it is probable that most of the processing activities did not commence until the 1940s<sup>43</sup>. According to Mariluz Cortés, most of the potato enterprises in the 1940s were small scale and regional in nature<sup>44</sup>. Between 1966 and 1974 the industry showed little expansion as the demand for potatoes for industrial processing was virtually the same (2276 MT and 2342 MT respectively)<sup>45</sup>. A surge of these enterprises did not occur until the 1970s<sup>46</sup>. Firms were created by the cooperation of local traders and raw material producers<sup>47</sup>. By 1976 only three medium-sized industries existed with many others still functioning on a cottage-industry level<sup>48</sup>. The potato industry of the 1980s consisted of 4 or 5 large enterprises and many small ones. In Bogotá alone there were fifty plants<sup>49</sup>. Technology in these plants ranged from manual and semi-mechanised

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<sup>42</sup>Ocampo, José Antonio (1991), *op.cit.*, p.239; Helmsing, A.H.J. (1986). *Firms, Farms and the State in Colombia* New York: Allen and Unwin, p.115.

<sup>43</sup>Productivity only slightly expanded during this period therefore increased output/ha. did not compensate for the reduction in hectareage. See Helmsing, A.H.J. (1986), *op.cit.*, table 5.7, p.123.

<sup>44</sup>Cortés, Mariluz, Albert Berry and Ashfaq Ishaq (1987). *Success in Small and Medium Scale Enterprise: the evidence from Colombia*. World Bank: Washington D.C.

<sup>45</sup>Campo, Octavio (1979), *op.cit.*, table 24, p.96, citing *Encuesta Manufacturera*.

<sup>46</sup>For instance, in 1972 Jacks's Snaks de Colombia S.A. de Bogotá applied for import licenses for potato factory machinery. See *Ministerio de Agricultura Programas Agrícolas 1973* (1972), *op.cit.*, p.134.

<sup>47</sup>Cortés, Mariluz, Albert Berry and Ashfaq Ishaq (1987), *op.cit.*, p.187.

<sup>48</sup>Interview with Augusto del Valle (June and July 1992), Manager of FEDEPAPA, Bogotá, Colombia; Campo, Octavio (1979), *op.cit.*, p.95.

<sup>49</sup>Cortés, Mariluz, Albert Berry and Ashfaq Ishaq (1987), *op.cit.*, p.192.

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methods to fully integrated systems. Semi-mechanized methods consisted of the most basic machines for cutting and peeling, and pulleys that transported fried potatoes<sup>50</sup>. The low technical levels and slow growth of crisp manufacturing points to low levels of capital investment which slowed down the growth of this activity. Both Alvaro Silva and Octavio Campo indicated that the crisp industry was only in its early stages and there was room for growth in the 1970s and 1980s<sup>51</sup>. Increased output could supply both domestic and export markets<sup>52</sup>.

Much of the potato expansion occurred under the wings of private initiative. However, the government supported production by means of fragmented policies such as subsidized credit, infrastructure improvements, and the establishment of INA and CORABASTOS. Additional public initiative included experimental farms. The first potato research centre was established in Cundinamarca in 1927<sup>53</sup>. By 1935 four experimental farms were in operation in the towns of Toca, Duitama, Moniquirá, and Jenesano in Boyacá<sup>54</sup>. Much of the improved seeds in Colombia were bred in these farms, and represented one of the most significant advances in yield improvements<sup>55</sup>.

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<sup>50</sup>Ibid.

<sup>51</sup>Silva, Alvaro (1991), *op.cit.*, p.103; Campo, Octavio (1979), *op.cit.*, p.95.

<sup>52</sup>Ibid.

<sup>53</sup>Interview with Luis Alberto Zamora (May 1992), Subdirección de Análisis Política, Ministerio de Agricultura, Bogotá, Colombia. *Estudio Sobre las Condiciones del Desarrollo de Colombia* (1958), *op.cit.*, p.132. An experimental farm aimed at potato research was initially established in Picotá, but later was transferred to Tibaitatá where it was located in 1990.

<sup>54</sup>*Informes de los Señores Gobernadores, Intendentes y Comisarios Especiales 1930 a 1934* (1934), Bogotá: Imprenta Nacional, p.22; *Geografía Económica de Colombia: Boyacá* (1936), *op.cit.*, p.414.

<sup>55</sup>*Roots, Tubers and Plantains in Food Security: in Sub-Saharan African, in Latin American and the Caribbean, in the Pacific* (1989). Rome: FAO, p.35.

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Public credit agencies such as the Caja Agraria had also been present in the region since at least 1932 and supervised credit schemes were initiated since 1964 by the INCORA<sup>56</sup>. But integrated support was not organised until 1975 with the establishment of FEDEPAPA. FEDEPAPA was involved in the dissemination of technical knowledge, government lobbying, improvement of distribution networks and as a source of general information for producers<sup>57</sup>.

As indicated above, production expansion has taken place since 1936, both in raw potato marketing and crisp manufacturing. Consumption was mainly based on domestic output. Post-1960 a small portion was exported, although domestic demand remained buoyant. Production exhibited positive growth rates after the 1950s. However growth clearly occurred under adverse conditions of distribution, marketing and storage. The modernisation of these facilities came late for potatoes, in contrast to banana and cane-sugar agroindustries which organised much earlier. Both of these crops had easier access to capital and institutional support at regional and national levels. Although internal demand was buoyant, sufficient levels of investment for effective commercialization were not present which hindered potato modernisation. What were the other factors that contributed to constrained growth?

### LAND USAGE: land distribution and tenancy

This section will examine potato land usage. First, further examination of the potato expansion and prominent producing departments will be provided. Secondly,

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<sup>56</sup>*Reforma Agraria Colombiana* (1970). Bogotá: INCORA, p.28. See section on credit for further discussion.

<sup>57</sup>Interview with Augusto del Valle (June 12, 1992), Fedpapa's Manager, FEDEPAPA, Bogotá, Colombia.

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potato farm size and land distribution will be analyzed. Thirdly, types of tenancy over time will be examined. Were twentieth century Colombian producers different from those in nineteenth century Ireland?

During the early twentieth century the departments of Cundinamarca-Boyacá and Nariño (the easternmost and westernmost cordilleras in Colombia) were the prominent producers<sup>58</sup>. As population expanded, production extended into Antioquia and Caldas (the middle cordillera). Most cultivation was located on the Andean Cordillera. The only exception being Cundinamarca, where in some areas production was situated on the tablelands. Production has grown considerably, with the fastest growth occurring in Boyacá and Cundinamarca. In 1937 Nariño had almost the same share of land under potato as Boyacá and Cundinamarca combined (37% and 38% respectively) (Table P2.3). However by 1959, Boyacá-Cundinamarca extended land under cultivation and represented 61% of the total. In 1968, 1980 and 1988 this percentage was 55%, 61%, and 57%, respectively.

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<sup>58</sup>Helmsing, A.H.J. (1986), *op.cit.*, table 5.7, p.123. See table P2.3.

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**Table P2.3**  
Percentage Distribution of Land Under Potato,  
1937-1938, 1959, 1968, 1980, 1988.

Year	1937-38		1959		1968		1980		1988	
Department	Ha.	%	Ha.	%	Ha.	%	Ha.	%	Ha.	%
Cundinamarca	14402	21	37674	30	26534	29	32000	23	54400	34
Boyaca	11721	17	38039	31	27382	26	39500	28	37800	23
Nariño	25252	37	14454	12	3393	16	30000	21	26400	16
Cauca	803	1	3601	3	1143	2	2950	2	5100	3
Antioquia	5021	7	8569	7	5984	9	14220	10	18600	12
Tolima	3293	5	4581	4	4592	4	6900	5	6000	4
Caldas	2529	4	5581	5	4728	7	6200	4	1800	1
Santander	1977	3	6154	5	8674	3	2300	2	4600	3
N. de Santander	966	1	3729	3	2822	3	4600	3	4400	3
Total Potato Growing Land in Colombia	67546		123652		N.A.		141970		161350	

Source: Constructed from Anuario General de Estadística Colombia 1937 (1938). Bogotá: Contraloría General de la República, p.134; Censo Agropecuario 1960 Resumen Nacional (1961), Bogotá: DANE, p.270; "Muestra Agropecuario 1968 in Memoria del Sector Agropecuario 1954-1974 Bogotá: DANE, pp.392-406; Cifras del Sector Agropecuario 1980 (1981), Bogotá: Ministerio de Agricultura, p.134; Anuario Estadístico del Sector Agropecuario, (1990) Bogotá: Ministerio de Agricultura, pp.2,12,19,21,33,43,46,51,55.

\*Percentages do not add up to 100 because negligible areas of production are excluded (departments, *comisarias* and *intendencias*).

Most of the percentual displacement occurred from the departments of Nariño to Antioquia. The share of output producers in other department hardly changed.

The below land usage tables, as those used in sugar, represent usufruct land rights<sup>59</sup>. The small-sized farm is defined as less than three hectares, medium-sized is between 3-10 hectares and the large farm is more than 10 hectares. Because of potato's minifundia nature farm size definitions were reduced. For the other two crops the established categories were larger. Has the distribution of potato farm size

<sup>59</sup>See Sugar Part II for a full definition.

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remained the same over time?

First, data show that average farm size nearly doubled between 1937 and 1976, nonetheless plot size remained very small. Average farms sizes for the following years were as follows: 1937-38, .87 ha; 1959, 1.14ha; and 1976, 1.76 ha.<sup>60</sup> One of the reasons for the preponderance of small plots was the high incidence of plot subdivision<sup>61</sup>. Due to the existence of land fragmentation it is possible that the figure for 1976 may be smaller as increasing population pressure may have resulted in further plot subdivision<sup>62</sup>. A similar situation was described in reference to Irish land census as land was frequently divided, and census data was often inaccurate as owners would not declare subdivisions. Moreover, it is possible that plots larger than 10 ha. in 1959 might have contained other crops but nonetheless were classified as "potato". Whereas in later surveys classification methods were restricted only to land under potato. In any case, it appears that average farm size did not change substantially, remaining small in scale.

Secondly, in terms of land area share according to plot size, table P2.4 displays national potato data for 1959 and 1976.

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<sup>60</sup>In 1937-38 there were 77,051 farms comprised of 67,546 ha. Anuario General de Estadística 1936 (1937). Bogotá: Contraloría General de la República, p.134; Memoria del Sector Agropecuario 1954-1974 Bogotá: DANE, p.254; Campo, Octavio (1979), op.cit., table 2, p.111.

<sup>61</sup>Producción Nacional (1955), op.cit., p.xxxviii.

<sup>62</sup>Campo, Octavio, et. al. (1979), op.cit., footnote 7, p.77.

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Table P2.4  
Per Cent Distribution of Total Potato Area  
Cultivated by Farm Size 1959 and 1976 in Colombia

Farm Size	Small (< 3 ha)		Medium (3-10 ha)		Large (> 10 ha)		Total
	Total Has.	%	Total Has.	%	Total Has.	%	Total for all plots
1959	24679	20.0	37801	30.6	61172	49.4	123652
1976	69340	55.5	32395	25.9	23215	18.6	124950

Source: Constructed from: *Memoria del Sector Agropecuario 1954-1974* Bogotá: DANE, p.254; Campo, Octavio, et. al. (1979), *op.cit.*, table 2, p.111.

\*Percentages do not always add up due to rounding.

The table shows that small and medium farms ( $1 > 10$  ha) expanded between 1959 and 1976, while those greater than ten hectares contracted. Small plots increased in hectareage gaining a large percentage of the land area under cultivation between 1959 and 1976. The contraction of large farms can be explained by the expansion of commercial agriculture and their shift to more profitable large scale crops. However it must be noted that the data for 1959 is flawed as the total land area under cultivation did not change between 1959 and 1976. This could be because data collectors had a difficult time separating the hectareage for mixed cropping. Therefore it is possible that plots larger than 10 ha in 1959 might have contained other crops as total hectares in 1959 and 1976 were similar, whereas land under potato expanded during this time<sup>63</sup>.

Thirdly, as can be observed by gini coefficients, as compared with the total for agriculture, land concentration in potato production was low in 1970, markedly lower than gini coefficients presented earlier for the Cauca Valley.

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<sup>63</sup>See Table P2.2.

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**Table P2.5**  
Concentration Indices for Selected Crops in Colombia, 1970.

Category	Gini Coefficient
Agriculture	.862
Coffee	.586
Rice (dry)	.387
Rice (irrigated)	.593
Potato	.510

Source: Triana, Augusto and Prieto, Fabio (1984), p.79, citing National Planning Department Calculations based on the Colombian Agricultural Census 1970, Coffee Federation data, and CIAT estimates for rice.

Land was more equally distributed for potato than coffee which was traditionally considered a crop dominated by small- to medium-sized producers<sup>64</sup>. Therefore, like coffee, because of the broad base of potato producers, the commodity can be considered beneficial to economic development in general. The only crop with lower gini coefficients was dry rice. Dry rice, like potato, was another crop grown by small producers characterized by little capital investment in contrast to the large-scale commercial counterpart of irrigated rice. Therefore the data evidences that potato farms mainly remained small and was one of the least concentrated crops in Colombia (probably for the entire period).

For an example of lower land concentration in potato production 1963 data

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<sup>64</sup>Coffee is often regarded as an exemplary crop for development in Colombia. Primarily because small to medium producers characterized the majority of coffee cultivators in Colombia. This group generated strong internal markets which in turn resulted in very successful regional (Antioquia) development during the twentieth century. See for example: McGreevey, William Paul (1971). *An Economic History of Colombia, 1845-1930* Cambridge: Cambridge University Press; Arango (1977), *Café e Industria, 1850-1930* Bogotá: Carlos Valencia Editores; Palacios, Marco (1980), *Coffee in Colombia, 1850-1970* Cambridge: Cambridge University Press; Kalmanovitz, Salomon (1988). *Economía y Nación: una breve historia de Colombia*. Bogotá: Siglo Veintiuno Editores. Revisionist literature however argues that coffee production was not so democratic as collection agents were highly monopolized, see: Berquist, Charles (1986). *Labor in Latin America* Stanford: Stanford University Press, pp.279-304. Felipe Jaramillo argues that the distribution of the proceed was not democratic, remaining largely in the pockets of regional collectors, see Jaramillo, Carlos Felipe (1989). "Supply Response and Optimal Pricing for a Perennial Crop: The Case of Colombian Coffee." Ph.D. Dissertation, Stanford University.



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from Ventaquemada, a municipio within Boyacá, will be used<sup>65</sup>. Although this table is from 1963 it can still be compared with later data as it has been observed that average farm size did not change significantly throughout the period and the majority of producers have remained small scale.

**Table P2.6**  
Distribution of Total Agricultural Production Units  
and Potato Farms which receive Credit  
in Ventaquemada, 1963.

Size of Agricultural Production Units (Ha)	Number of Farms	% of Total	Size of Potato Farms (Ha)	Number of growers which receive credits	% of Total
<3.2	29	29	<.63	23	23
3.2 to 6.3	36	36	.64 to 1.27	45	46
6.4 to 9.5	15	15	1.28 to 1.91	8	8
9.6 to 12.8	8	8	1.92 to 2.56	10	10
> 12.8	12	12	>2.56	13	13
Total	100	100	Total	99	100

Source: Gerding, G. (1965). "Posibilidades de Almacenamiento de Papa en Silos Semi-subterráneos en el Departamento de Boyacá." Bogotá: Instituto de Mercadeo Agrícola, citing INCORA, p.13.

Assuming that all potato growers received credits (hence are included in this table), the data illustrate that potato farms were substantially smaller than others in the municipality. The overwhelming majority of potato producers cultivated on farms of less than 2.56 hectares. The information also evidence that credit was extended to very small farms. According to the study, the bulk of producers also owned land<sup>66</sup>.

Data from Paipa and Duitama in 1963, other municipios in Boyacá, also corroborated

<sup>65</sup>On a departmental level Ventaquemada contributed 6% to total departmental production. See Gerding, G. (1965). "Posibilidades de Almacenamiento de Papa en Silos Semi-subterráneos en el Departamento de Boyacá." Bogotá: Instituto de Mercadeo Agrícola, p.7.

<sup>66</sup>Ibid., p.16. See also Appendix P.3.

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these trends<sup>67</sup>.

Departmental Boyacá and Cundinamarca data confirm the small scale nature of agriculture in general. Table P2.7 evidences that the most common agricultural production unit was composed of 1 to 5 hectares in 1954 and 1988. However by 1988 the share of farms of less than 5 ha. declined from 73.8% to 61% in Boyacá and from 64.4% to 61.4% in Cundinamarca. On a national level, in 1988 plots between 1 and 3 hectares comprised a larger share in Boyacá and Cundinamarca, occupying 29.4% and 28.4% respectively, as opposed to a national average of 21.5%<sup>68</sup>. This demonstrated a higher concentration of small producers in the dominant potato growing regions.

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<sup>67</sup>Ibid., pp.13-14, tables 1a, b, c, and d.

<sup>68</sup>Primera Encuesta Nacional Agropecuaria: Total Departamentos (1990). Bogotá: Ministerio de Agricultura, p.36.

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**Table P2.7**

Break-Down of Land Distribution of Agricultural  
Production Units (APU) in Boyacá and Cundinamarca, 1954 and 1988

Size of APU (ha)	Boyacá: Distribut % ion of APU		Boyacá: % of land total (ha)	Cundin amarca Distribut % ion of APU		Cundinamarca: % of total land (ha)
	1954	1988		1954	1988	
0 > 1	24.6	14.5	.8	24.1	17.6	.9
1 > 3		29.4	5.5		28.4	4.6
3 > 5*	49.2	17.1	6.5	40.3	15.4	5.0
5 > 10	13.3	17.3	12.1	17.0	16.7	10.0
10 > 20	6.9	11.1	15.5	9.2	11.1	13.3
20 > 50	3.7	7.3	22.5	5.2	7.1	18.5
50 > 100	1.3	2.3	15.5	1.0	2.0	12.3
100 > 200	.7	.7	9.9	.9	1.1	13.5
200 > 500	.2	.3	8.3	.2	.5	12.4
500 and up	.8	0	3.4	.2	.1	9.5

Source: Constructed from Muestra Agropecuario Nacional (1954), Bogotá: DANE, table 7, p.22; Primera Encuesta Nacional Agropecuaria: Boyacá, (1990), Bogotá: Ministerio de Agricultura, table 2, p.34. Primera Encuesta Nacional Agropecuaria: Cundinamarca (1990), Bogotá: Ministerio de Agricultura, table 2, p.34.

\*Data for 1954 was only available for 1 > 5 ha.

Cundinamarca data illustrated that larger plots of land were used by fewer landowners. In Boyacá the percentage of total plots characterised by more than five hectares was more evenly distributed amongst the different sized landholdings. Therefore lower land concentration can be related to regional characteristics of potato growing areas. This is similar to the general trend toward banana and cane-sugar farm concentration. It also confirms the arguemt in sugar that small scale producers were often displaced to less desireable areas.

What were the different types of land ownership? At the beginning of the period there was a crisis of the agricultural work force because many were tied to the

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land through rental or sharecropping arrangements<sup>69</sup>. According to data collected by the Contraloría General del República in 1937 in cotton and rice production 51% and 53% were owners, the rest of the agricultural sector being involved in rental arrangements<sup>70</sup>. In wheat production land ownership was higher at 82% and can be considered an indication of the transition to modern forms of production and the increased use of wage-labour. By 1964 INCORA reported an insignificant portion of land in Boyacá occupied by renters and sharecroppers<sup>71</sup>. Therefore between 1937 and the early 1960s there appeared to be an acceleration of land titling. The changes in land tenancy in 1960, 1970 and 1988 can be observed below.

**Table P2.8**  
Land Tenancy in Boyacá (B) and Cundinamarca (C)  
Number and Area of Plots, 1960, 1970, and 1988

column		i		ii		iii		iv		v		vi			
Year	Departmetn	Owners		Renters		Unutilized Land		Share Cropping		Other Forms		Under than more one form		Total	
		No.	Ha.	No.	Ha.	No.	Ha.	No.	Ha.	No.	Ha.	No.	Ha.	No.	Ha.
1960	B	112182	2214977	285672	201962	6383	769657	n.a.	n.a.	2129	101092	20021	473928	169282	3761616
	C	950302	1106282	282163	140083	1898	74867	n.a.	n.a.	3546	33554	16313	170325	145003	1525111
1970-71	B	132614	2503166	8226	45038	5355	980389	7138	23933	8262	214424	15518	231886	177113	3998836
	C	106244	1206501	12814	91572	1872	24193	6102	21238	10469	79371	14227	184228	151728	1607103
1988	B	166287	1620644	4798	28040	73	3053	4595	39403	7274	115099	8538	77419	191565	1883658
	C	161305	1927085	9624	94943	547	5898	1463	6721	16009	123267	9788	120402	198736	2278316

Source: Constructed from *Censo Agropecuario 1960 Resumen Nacional* (1961), Bogotá: DANE, p.22; *Censo Agropecuario 1970-71* (1970), In *Memoria del Sector Agropecuario 1954-1974* Bogotá: DANE, table 8, p.433; *Primera Encuesta Nacional Agropecuaria: Boyacá*, (1990), Bogotá: Ministerio de Agricultura, tables 3 and 4, pp.36-37; *Primera Encuesta Nacional Agropecuaria: Cundinamarca* (1990), Bogotá: Ministerio de Agricultura, tables 3 and 4, pp.36-37. For disaggregated data according to plots size for Boyacá and Cundinamarca in 1988 see Appendix P.3.

The 1960 Agricultural Census showed that 66% and 65% of total plots were farmer

<sup>69</sup>See labour section.

<sup>70</sup>*Anuario General de Estadística Colombia 1937*, (1938). Bogotá: Contraloría General de la República.

<sup>71</sup>*Plan de Crédito Supervisado Para el Departamento de Boyacá* (1964), *op.cit.*, p.34.

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The 1960 Agricultural Census showed that 66% and 65% of total plots were farmer owned in Boyacá and Cundinamarca. The share of owned plots increased over time in both departments. The number of plots were always higher in Boyacá. Columns ii, iii, iv, v demonstrate the extent to which traditional forms have deteriorated. They comprised 34% and 35% of total plots in 1960 in Boyacá and Cundinamarca. Thereafter they steadily declined however did not disappear. Their stronger presence in Cundinamarca may indicate that landowners preferred traditional forms in order to maintain land. It also may be another hint of urban "farmers". In other words, many landowners in Cundinamarca lived in Bogotá or other urban centres and let their land<sup>72</sup>. In Boyacá this practice was more difficult to maintain as urban centres were located far away. Moreover in Boyacá land might be considered less desirable as many commercial crops were not cultivated in this region (i.e. cut flowers, and strawberries). These commercial crops expanded since the late 1960s in Cundinamarca<sup>73</sup>. Thus as with commercial banana and sugar production, as land became more valuable, owners were more inclined to maintain or expand landholdings.

Were twentieth century Colombian producers different from nineteenth century pre-famine Ireland? Similar to Ireland, throughout the period average farm size remained small and transition to large scale production hardly occurred. Therefore production remained in the domain of small units. Initially, as in Ireland, traditional tenancy forms prevailed. Land ownership was skewed with many involved in rental

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<sup>72</sup>See Sugar and Banana Part II.

<sup>73</sup>Interview with Daniel Vargas (Nov. 1991), Manager of Hosa farm (flowers), Bogotá, Colombia.

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arrangements. However, by the 1960s, land ownership in Colombia 1960s became common. Nonetheless traditional forms persisted: to a greater extent in Cundinamarca. It appears that modernisation of land usage in potato growing regions experienced a spurt between 1936 and 1960. Change thereafter continued, but at a slower pace. The production of potato was a result of the more equally distributed land in these regions. Because of the absence of export crops, land was not highly contested. Therefore it was easier for peasants to maintain small plots and survive. However, different from Ireland, potatoes were sold as a commercial good. The nature of potato production and the difficulty of marketing and storage contributed to this slow modernisation. Below technical change will be discussed.

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### TECHNICAL CHANGE: expansion, adaption and credit

Technical change is difficult to analyse in the framework set forth for bananas and sugarcane. As technical change has not involved the adaption of a series of innovations in methods of production and processing, the discontinuous nature of change is less apparent. The pace of change was disparate as some regions quickly adapted while other lagged behind. This was evident with substantial differences in yields within departments even as late as the 1979-1990 period (Appendix P.2). After World War II more investment in agriculture in the form of irrigation and infrastructure construction took place<sup>74</sup>. Economic historians such as Kalmanovitz, Ocampo and Tirado take the 1945-1950 period as the benchmark for the shift to modern methods of production in agriculture<sup>75</sup>. Clearly, for bananas and cane-sugar this did not happen. It is also difficult to fit potatoes into this periodization as many technical advances were utilized pre-1945-50 and later technical changes were often slow to adopt in particular areas. Advances such as variety diversification were present before the period commenced. Post-1945-50 more extensive application of inputs and machinery took place, but technological transfer among regions was uneven with lags often lasting decades. In the discussion below, changes will be examined when they first appeared. First, to analyse aggregate area under production and yields which will be followed by a discussion of technical adaption and credit

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<sup>74</sup>Fals Borda, Orlando (1982). Historia de la Cuestión Agraria en Colombia. Bogotá: Carlos Valencia Editores, p.104; Debate Agrario: Documentos (1971), Bogotá: DANE, p.19.

<sup>75</sup>Kalmanovitz, Salomon (1988). Economía y Nación: una breve historia de Colombia. Bogotá: Siglo Veintiuno Editores; Ocampo, José Antonio (1991). Historia Económica de Colombia. Bogotá (3rd edition): Siglo Veintiuno Editores; Tirado, Alvaro, (1977). Introducción a la Historia Económica de Colombia. Bogotá (7th ed): La Carreta.

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markets.

Productivity levels were not as high as those in industrialized countries, nonetheless productivity has climbed<sup>76</sup>. Aggregate production levels, land area and yields are displayed in table P2.9. The complete data are shown in Appendix P.1. Colombian data is collected on an aggregate level so a complete series of productivity differences between different-sized plots cannot be compared. However, because the bulk of potatoes continue to be produced by small growers, these statistics should not be distorted upwards towards large producers which usually use higher levels of machinery and inputs thus achieve higher levels of productivity.

**Table P2.9**  
Potato Production, Area and Yields in Colombia, 1934-1990.

Year	Production (1000s of Tonnes)	Area (1000s of Hectares)	Yield (Tons/Ha)
1934*	225	27	8.3
1937-38**	285	67	4.2
1946***	460	96	9.0
1950	360	39	9.2
1955	580	56.2	10.3
1960	653	79.6	8.2
1965	760	90.7	8.4
1970	913	106.1	8.6
1975	1,320	110.0	12.0
1980	1,727	142.0	12.2
1985	1,880	153.1	12.3
1990	2,464	161.4	15.3

Source: See Appendix P.1.

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<sup>76</sup>See Table P1.2.



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During the 1934-1990 period productivity almost doubled from 8.3 ton/ha to 15.3 in 1990. Land extension appeared to have effected higher production levels than output increasing technical change as areas under cultivation increased by almost six times and yields did not double. Production increased nearly eleven-fold while area planted increased six-fold between 1934 and 1990. Yields experienced their fastest increase during the 1970s and to a lesser extent in the 1980s. Thus it appears that most technical change was absorbed in the 1970s and 1980s. However qualitative evidence shows that application of increased amounts of fertilizer and pesticide, and variety diversification were present since the beginning of the period<sup>77</sup>. The sustained increase in the 1970s and 80s can be explained by more balanced technical diffusion, regardless of plot location and size.

Productivity differences according to plot size illustrate divergences in techniques.

**Table P2.10**  
Potato Productivity Differences According  
to Plot Size in Colombia, (Tonnes/Hectare), 1966 and 1980.

Year	Small (0-2 ha)	Medium (2-10 ha)	Large (> 10 ha)
1966	4	4.5	8.8
1980	11.4	12.9	16.8

Source: Constructed from Atkinson, Jay (1970). *Agricultural Productivity in Colombia*, table 7, pp. 24-25. Data from 1980 data derived from "Un análisis de productos agrícolas no transables." (1982). Bogotá: National Planning Department, Agrarian Studies Unit, mimeo with information from Fedepapa, Ministry of Agriculture-OPSA/ICA.

The table demonstrates that in both 1968 and 1980 large-sized potato growers had the highest levels of productivity for both years. Small and medium producers lagged behind in 1968, obtaining roughly one-half the yields of large units. However in

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<sup>77</sup>Discussed below.

## *Part II: Boyacá and Cundinamarca Potatoes*

1980 the productivity gap between small and medium producers narrowed to approximately 28%. Therefore it shows that production scale-bias existed in potato production.

Earlier it was stated that the potato was traditionally grown on the slopes of the Andes and was frequently intercropped with maize and other commodities. However a trend of increased monocropping in the twentieth century was observed. By 1954 of the total Boyacá-Cundinamarca production only 11% was intercropped<sup>78</sup>. Furthermore in 1979 Octavio Campo did not mention the presence of intercropping and reported that in Boyacá and Cundinamarca small farmers usually *rotated* potato production with other commodities such wheat, barley, maize, pasture land<sup>79</sup>. Therefore most potato producers since at least 1954 primarily commercialised output only a marginal amount was consumed on the farm. This is in contrast to nineteenth century Ireland where potatoes were mainly grown by small family farmers to be consumed within the household.

Qualitative information evidences that variety diversification was prevalent throughout the 1936-1990 period<sup>80</sup>. In 1935 the most common varieties grown in Boyacá were Sabanera, Paramuna, Tuquerreña, and Tocana<sup>81</sup>. By the 1960s the

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<sup>78</sup>Memoria del Sector Agropecuario 1954-1974 Bogotá: DANE, table 5, p.198.

<sup>79</sup>Campo, Octavio *et.al.* (1979), *op.cit.*, p.79.

<sup>80</sup>Geografía Económica de Colombia: Boyacá (1936), *op.cit.*, p.421; Echavarría, Gustavo (1940). Cultivo de la Papa. Bogotá: Imprenta Nacional, p.6; Gerding, G. (1965), *op.cit.*, pp.14-15.

<sup>81</sup>Geografía Económica de Colombia: Boyacá (1936), *op.cit.*, p.421. However throughout Colombia varieties were diverse. In other departments popular varieties included: Argentina, Guata, Manzana, Morada, Pamba, Extranjera, Careta, and Colorado see Anuario General de Estadística Colombia 1937 (1938). Bogotá: Contraloría General de la República.

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most popular varieties in Boyacá remained Tocana, Tuquerreña, and Pardo Pastusa entered into the mix<sup>82</sup>. Different varieties were cultivated in separate sections of the plot and were selected to reduce risks from adverse weather conditions and disease and pests, further demonstrating a high degree of technical sophistication<sup>83</sup>. Improved seed, combined with a mix of varieties also spread the risk and increased productivity. Better seed tolerated disease and increased the returns on other inputs<sup>84</sup>. By 1975 there was a convergence in the cultivated varieties in contrast to the array cropped during the 1936-1970 period. For instance, Parda Pastusa and ICA Guantiva accounted for 60% of total production in Colombia in 1975<sup>85</sup>. Thus, as seed varieties improved in local experimental farms, the need for diversification (to reduce disease incidence) within the plot diminished.

Data of the area planted with certified seed was gathered for the 1959-1990 period. The highest percentage of land planted with certified seed occurred in 1959. There were no evident trends in figure P2.1; the early 1960s were a period with very little use of certified seed and the late 1970s experienced the most stable use of certified seed, and sharp fluctuations took place in the interim period<sup>86</sup>.

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<sup>82</sup>Gerding, G. (1965), *op.cit.*, pp.14-15.

<sup>83</sup>Interview with Luis Alberto Zamora (May 1992), Subdirección de Análisis Política, Ministerio de Agricultura, Bogotá, Colombia.

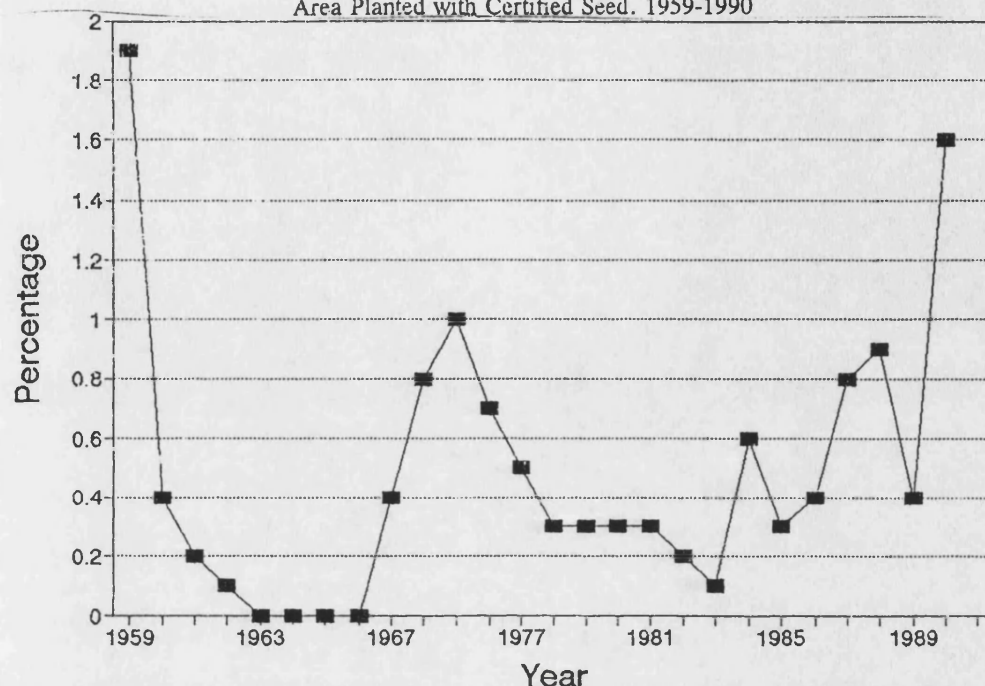
<sup>84</sup>Triana, Augusto and Prieto, Fabio (1984). "Aspectos Económicos del Desarrollo del Cultivo y la Agroindustria de la Papa en Colombia, 1950-1982." Bogotá: Departamento Nacional de Planeación, Unidad de Estudios Agrarios, p.25.

<sup>85</sup>"Evaluación Económica de las Inversiones Estatales en la Investigación Sobre el Cultivo de Papa" (1976) *Boletín Investigativo* No.45, Bogotá: ICA.

<sup>86</sup>According to the ICA, .3% of land was planted with certified seed in 1971; see Kalmanovitz, Salomon (1974c). "La Agricultura en Colombia, 1950-1972." *Boletín Mensual de Estadística*, No.278, p.128.

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Figure P2.1  
Area Planted with Certified Seed. 1959-1990



Source: Atkinson, Jay (1970), *op.cit.*; Campo, Octavio, *et.al.* (1985), *op.cit.*; Silva, Alvaro (1991), *op.cit.*

Disregarding the 1959 high, another peak for certified seed was reached in 1990. This peak only comprised 1.6 per cent of the total cultivated area. However, when the expense and difficulty in producing seed is considered this should not be surprising<sup>87</sup>.

A more illuminating factor, is the extent to which high and low quality tubers were used in cultivation. In Boyacá there were reports in 1936 that seed-potato disinfection was conducted<sup>88</sup>. Disinfection involved the soaking of tubers in solutions of formalene or copper sulfate immediately before planting<sup>89</sup>. During the 1950-1990 period the majority of small producers stored their tubers for next season's

<sup>87</sup>See above.

<sup>88</sup>*Geografía Económica de Colombia: Boyacá* (1936), *op.cit.*, p.420; Echavarría, Gustavo (1940), *op.cit.* p.11.

<sup>89</sup>Echavarría, Gustavo (1940), *op.cit.*, p.11.

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harvest or acquired them through distribution intermediaries<sup>90</sup>. On average, one ton of small tubers per hectare were planted during the 1970-1990 period<sup>91</sup>. Medium- to large-sized cultivators sometimes produced their own seed-potatoes. If they purchased tubers, they were inclined to select medium-sized tubers and plant two tons per hectare<sup>92</sup>. The difference in the ability to choose tubers and plant more per hectare demonstrates that in this case technical change for the later period was linked to plot size and credit availability. Small producers were unable to afford large tubers for planting, and because of their marginalized geographic location and inability to purchase adequate amounts of inputs, the tubers they produced were not of as high quality as those produced in medium- to large-sized plots<sup>93</sup>. Price fluctuations dictated whether producers reserved the large tubers for the next season or sold them on the higher priced potato market for instant returns<sup>94</sup>. What remained for the next season were the smaller (unsaleable) tubers of low quality that were often infested with virus and other illnesses<sup>95</sup>.

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<sup>90</sup>Plan de Crédito Supervisado Para el Departamento de Boyacá (1964), *op.cit.*, pp.64-65; Fedepapa, Boletín Informativo, (1991) #138, p.3. In 1972 the Ministerio de Agricultura reported that there were low levels of sold seed and most producers used their own tubers, see Ministerio de Agricultura Programas Agrícolas 1973 (1972), *op.cit.*, p.133.

<sup>91</sup>Echavarría, Gustavo (1940), *op.cit.*, p.27; Silva, Alvaro (1991), *op.cit.*, p.99.

<sup>92</sup>Estudio Sobre las Condiciones del Desarrollo de Colombia (1958) Bogotá: Presidencia de la República, Comité Nacional de Planeación, p.130; Fedepapa, Boletín Informativo, (1991) #132, pp.3-4.

<sup>93</sup>See the introduction for a general discussion of land distribution. The literature tends to emphasize that small producers were located on lower quality land.

<sup>94</sup>Echavarria, Gustavo (1940), *op.cit.*, p.27; Interview with Augusto del Valle (June and July 1992), Manager of Fedepapa, Bogotá, Colombia.

<sup>95</sup>Estudio Sobre las Condiciones del Desarrollo de Colombia (1958), *op.cit.*, p.130; After reviewing Fedepapa's monthly Boletín Informativo that dates back to 1975, one can assume that low quality tubers were still being planted due to a large extent to the constant notifications of this problem; Triana, Augusto and Prieto, Fabio (1984), *op.cit.*, p.26; "Mejoramiento de la Papa" (1957). Revista Nacional de Agricultura No.632, p.55.

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Despite the disparate nature of producers and the logistic difficulties in diffusing technology, potatoes were one of the few crops that have a history of more than forty years of regular fertilizer use<sup>96</sup>. The importance of fertilizer in generating multiplier effects in the agricultural and industrial sectors of the economy has been highlighted by many economists<sup>97</sup>. Fertilizer also contributed to regional economic development because it was land saving and labour using. Labour using methods were considered beneficial as they generated employment opportunities and also indirectly created internal markets as wage-labourers would spend their wages in exchange for goods. Small- and medium-sized producers used a great amount of organic material such as animal byproducts and waste in order to regenerate the land and give it the necessary acidity throughout the period<sup>98</sup>. Lime, which is abundant in Boyacá, has been traditionally applied by nearly all peasants<sup>99</sup>. Data between 1949 and 1951 show the increased potato grower's purchases of copper sulfate from the Caja Agraria<sup>100</sup>. During the 1960s, commercial fertilizer consumption by potato

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<sup>96</sup>Producción Nacional (1955), *op.cit.*, p.xxxviii; Colombia: Síntesis Económica y Financiera No.2 (1967). Buenos Aires: Oficina de Estudios Para la Colaboración Económica Internacional, p.54; Atkinson, Jay (1970), *op.cit.*, p.70; Economic Growth of Colombia (1970). Baltimore: The Johns Hopkins University Press, p.287.

<sup>97</sup>Johnston, B. and Kilby, P. (1975). "Backward Linkages: Fertilizer and Farm Equipment." In Agriculture and Structural Transformation. Oxford: Oxford University Press. They argue that fertilizer can represent the one largest backward linkage in agriculture.

<sup>98</sup>Echavarría, Gustavo (1940), *op.cit.*, pp.12-13; Triana, Augusto and Prieto, Fabio (1984), *op.cit.*, p.27. Organic fertilizer was often not as beneficial as commercial nutrients because sufficient amounts of feed was not given to animals. This resulted in lower yields because lower quality fertilizer diminished the effectiveness of higher quality insecticides and fungicides.

<sup>99</sup>Plan de Crédito Supervisado Para el Departamento de Boyacá (1964). Bogotá: Incora, p.64.

<sup>100</sup>PRO, Foreign Office (10 April 1952), "Economic Report No. 1, Jan-Feb. 1952." FO371.97530, Registry No. AL1101/2. The Kg. of copper sulfate sold to potato growers were as follows: 1949=1,213,000; 1950=1,132,000; 1951=2,232,000.

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growers represented one-third of national consumption<sup>101</sup>. In 1975, of the total compound fertilizers used in Colombia, 31% were dedicated to potato growing<sup>102</sup>. However by 1984 data demonstrate that a smaller share of fertilizer was utilized by producers. At this time potato, coffee and rice accounted for two-thirds of all fertilizer consumed<sup>103</sup>. From the 1960s onwards it is evidenced that potato producers used considerable amounts of fertilizer, further stimulating factor market formation.

The use of fertilizer was varied. Some municipalities applied solely chemical fertilizer, while in others both chemical and organic fertilizers were used<sup>104</sup>. Insufficient fertilization can be explained by the fact that small-sized farms usually did not have easy access to capital nor did they receive technical assistance<sup>105</sup>. They also did not have indispensable agricultural equipment or animals and often had to rent these services from medium-sized cultivators<sup>106</sup>. In 1985 approximately 1,200 kg/ha of fertilizer were used on small farms. The situation of medium farms changed drastically. These households contracted workers and had easier access to

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<sup>101</sup>Atkinson, Jay (1970), *op.cit.*, p.65. State support of fertilizer production will not be discussed. However there has been fragmented State policies. The internal industry has been declining since 1980. See Thomas, Vinod (1986), *op.cit.*; García García, Jorge and Gabriel Montes Llamas (1989), *op.cit.*, see appendix P.4 for aggregate fertilizer consumption data.

<sup>102</sup>Campo, Octavio, *et.al.* (1985), *op.cit.*, p.104.

<sup>103</sup>Colombia: Economic Development and Policy Under Changing Conditions (1984). Washington, D.C.: The World Bank, p.107.

<sup>104</sup>Gerding, G. (1965), *op.cit.*, pp.10-18.

<sup>105</sup>Interview with Ricardo Vargas (Sept. 1991), Advisor to the Minister of Agriculture, Ministerio de Agricultura, Bogotá, Colombia. For further discussion see de Janvry, Alain (1981). The Agrarian Question and Reformism in Latin America. Baltimore: The Johns Hopkins University Press, p.90.

<sup>106</sup>Robles, Isabel (1986). Cambio Tecnológico y su Efecto en Dos Areas Representativas de la Agricultura Colombiana. Bogotá: ICFES and Fundación Universitaria Autónoma de Colombia, pp.76-80.

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credit. This was evidenced through the application of higher amounts of fertilizer per hectare: 1,400 kg/ha<sup>107</sup>. Large farms owned their land and often divided it up to let. These cultivators were defined as agri-businessmen. They had easy access to credit and were considered for technical assistance programmes funded by public and private agencies. Fertilizer dosage was the highest: between 1,800 and 2,000 kg/ha<sup>108</sup>.

What can explain such early input use? Table P2.11 displays returns to fertilizer.

**Table P2.11**  
Crop Profitability in the Use of Fertilizer  
for the Most Fertilizer-Responsive Crops in Colombia, 1964.

Crop	Yield of check plot without fertilizer (MT/ha)	Yield with fertilizer (MT/ha)	Value of increased yield (pesos)	Cost of fertilizer (pesos)	Returns over cost of fertilizer* (pesos)
Potatoes	15	25	2400	731	1669
Corn	1.0	3.0	1180	402	778
Alfalfa	7.0	17.5	7350	845	6505
Wheat	1.0	2.0	830	402	428
Barley	1.6	2.5	792	402	390

Source: *El Uso de Fertilizantes en Colombia*, (1964). Rome and Bogotá: FAO and CEPAL.

\*Returns = the value of the improved fertilized commodity minus fertilizer costs.

Of the crops studied, potatoes had the highest returns next to alfalfa, although yields did not increase with the same magnitude as corn or wheat. Given these returns, the

<sup>107</sup>Robles, Isabel (1986), *op.cit.*, pp.76-80.

<sup>108</sup>*Ibid.*, p.77.



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advantages of fertilization was clear.

Table P2.12 illustrates pesticide use by crop in 1965. Apart from potato, all other crops in the table were mainly those which were characterized as capitalist enterprises, employing wage-labour.

**Table P2.12**  
Consumption of Pesticides in Colombia  
for the Crops with the Highest Consumption, 1965 (metric tons)

Crops	Insecticides	Fungicides	Herbicides	Total Pesticides	% of Total
Potatoes	18	1424	--	1442	129%
Bananas	--	3580	--	3580	320%
Cotton	2536	--	99	2635	23.6%
Rice	790	81	396	1267	11.3%
Sugarcane	12	--	390	402	3.6%
Agricultural Total	3889	5603	1692	11184	100

Source: "Estudio sobre el mercado de fertilizantes en Colombia" (1966). Mimeo. Tibaitatá: Instituto de Investigaciones, ICA.

Potatoes had the highest pesticide consumption next to cotton and bananas. This demonstrates that during a time of chemical diffusion (1960s) traditional and modern producers (potatoes are a mixed crop) were as inclined to adopt this technical improvement as medium and large scale commercial farmers, such as those typically involved in banana, sugarcane and cotton farming. The use of organic and commercial fertilizer and pesticides demonstrate the early extent of technical diffusion. It shows that the most important elements to potato modernization (input use) were adopted early and used to a great extent.

Mechanisation was the least visible indicator of technical change. As evidenced in sugar, mechanisation was initiated by entrepreneurs of Cauca, Tolima,

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and Cundinamarca<sup>109</sup>. By 1990 Boyacá was still not considered a department with high levels of mechanization<sup>110</sup>. Cundinamarca mechanization statistics did not necessarily serve as a proxy for potato growers in this department due to the wide variety of agricultural products that were cultivated in this department, i.e.: wheat, vegetables, fruits, sorghum, and in later years flowers. Thus, the relevance of extrapolating mechanisation statistics for potato growing in this region is somewhat dubious. Particularly because of the low socio-economic status of a great portion of growers and their lack of capital. Therefore tractor purchases were less likely. Generally, production was either manual or semi-mechanized. Technique choice was dependent on the socioeconomic characteristics of the producer and farm size. In the main, large farms normally semi-mechanised cultivation<sup>111</sup>. Semi-mechanisation indicated that machinery was used for cultivation and sometimes the harvest.

Machinery was first used for land preparation. Mechanized techniques were recorded in large-scale potato farms in Cundinamarca in the 1950s<sup>112</sup>. However at this time most Boyacá producers used primarily manual techniques<sup>113</sup>. Later machinery was used for input application and harvesting. A 1981 FEDEPAPA cost structure showed that in Boyacá the majority of ploughing was done with oxen<sup>114</sup>. Machinery used in soil preparation had not been technologically improved and the

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<sup>109</sup>See Sugar Part II; Fals Borda, Orlando (1982), *op.cit.*, p.104.

<sup>110</sup>Interview with Ricardo Vargas (Sept. 1991 and May 1992), Advisor to the Minister of Agriculture, Bogotá, Colombia; see also Sugar Part II.

<sup>111</sup>*Ibid.*

<sup>112</sup>*Producción Nacional* (1955), *op.cit.*, p.xxxviii.

<sup>113</sup>Currie, Lauchlin (1950), *op.cit.*, p.376; Within the Boyacá cost structure machinery rental continued to comprise only a minority of total costs, see *Producción Nacional* (1955), *op.cit.*, pp.xxxviii-xxxix, 54.

<sup>114</sup>FEDEPAPA, *Boletín Informativo* (1982), No.50, p.3.

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same type of tractor used in 1976 was still used in 1990<sup>115</sup>. Moreover, the trend during the 1975-1990 period displayed a decrease in percentual costs of land preparation. This indicated low levels of machinery investment in general.

In addition, production has two characteristics which made mechanization redundant. First, because the majority of potatoes were cultivated on the hilly slopes mechanization was virtually impossible<sup>116</sup>. Secondly, since many small producers do not have access to massive amounts of credit, it was economically more rational to employ manual techniques. Lower amounts of credit were witnessed indirectly in production costs (Table P2.13)<sup>117</sup>. It is observed that traditional techniques were characterized by lower production costs. The gap between the two methods of cultivation narrowed slightly only between 1982 and 1984. This demonstrates that capital-bias hardly diminished during a large portion of the 1980s.

**Table P2.13**  
Production Costs Per Hectare  
for Traditional and Modern Cultivation, 1982-1988.  
(current pesos)

Method	1982	1983	1984	1985	1986	1988
Technified	137716	153067	232721	232721	303508	475966
Traditional	88145	136646	163684	163684	212515	333702

Source: Ministerio de Agricultura (1990), computer print out, unpublished material.

Assuming that traditional methods were employed by small farmers, table P.13 demonstrated that costs of traditional methods of cultivation were substantially lower

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<sup>115</sup>It can be observed in the FEDEPAPA *Boletín Informativo*, that land preparation is described as the same process for the entire decade (1980s). If there were some type of technological change, i.e improved machinery, this would have been noted in the footnotes as was done for fertilizer and pesticide usage.

<sup>116</sup>Interview with Augusto del Valle (June and July 1992), Manager of FEDEPAPA, Bogotá, Colombia; Currie, Lauchlin (1950), *op.cit.*, p.62.

<sup>117</sup>For the earlier years see also Echavarría, Gustavo (1940), *op.cit.*, pp.13-15.

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than those of technified plots. Moreover, because most technified producers cultivated on larger plots of land, the data showed a definite capital-bias towards large producers. This does not demonstrate that traditional producers were less willing to adapt modern techniques. Rather, they were using their resources as efficiently as possible. As Horatio Townsend stated regarding small potato farmers,

. . . A thorough knowledge of the Irish occupier's means, and an inspection of his domestic premises, would not only remove all feeling of surprise for the inferiority of his crops, but would procure for him great credit for the amount of valuable produce which under such circumstances he is able to elicit<sup>118</sup>.

Comparatively, the *Boyacense* potato farmer was not as bad off as the small Irish sub-tenant, however in relation to the resources available to other farmers in Colombia, he was certainly at a disadvantage. Now to explore credit.

The use of credit has been implicit to the arguments presented above. Both in banana and sugar production credit played a secondary role as modernization was not necessarily stifled because of its scarcity. However in bananas it was witnessed that the UFCO used its position as creditor to become involved in unfair practices. Because of the necessity of inputs in potato growing, credit was an important factor for all growers, although its relative weight was not as high. In the case of banana and sugar perennials credit was most needed during the plantation construction phase e.g., construction of irrigation systems and initial plantings. In Magdalena and Urabá initial capital was supplied in the main by TNCs or concerted institutional (domestic public and private) support. In the Cauca Valley the mills that desired credit either were or became large landowners (*capitanes de hacienda* or *capitanes de industria*)

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<sup>118</sup>O' Gráda, Cormac (1993), op.cit., pp.66-67 citing Horatio Townsend.

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thus with their status were able to obtain credit<sup>119</sup>. Moreover independent sugar growers could receive credit from the mill as extension of credit was stipulated in their contracts. Small-to medium sized potato growers did not have any of these advantages. First to describe the most important agents which extended credit to potato growers. This will be followed by an analysis of their lending patterns.

The majority of credit was obtained through the Caja Agraria, INCORA and another portion was loaned by the Fondo Financiero Agropecuario (FFAP). The Caja Agraria was created in 1931 primarily with the support of the Coffee Federation. It was designed as an instrument of the government to channel credit to traditional agriculture with a particular emphasis towards small producers, to support foodstuff production, particularly those commodities with the largest weight in the family basket of goods<sup>120</sup>. INCORA was established in 1961 as the formal agency to foster the agrarian reform. Relevant aspects of the reform for potato producers was its to promotion of agricultural production through the construction of infrastructure networks, disbursement of credits to small producers, and redistribution of land<sup>121</sup>. Later to complement the Caja Agraria's activities, the FFAP was created by Law 5 of 1973 (March 29) to stimulate investment in the agricultural sector by granting

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<sup>119</sup>See Sugar Part II.

<sup>120</sup>Arango, Mariano; Mesa Saúl; Rhenals, Remberto and Velásquez, Jaime Alberto (1991). Una Nueva Visión de la Economía Campesina Colombiana Medellín: Universidad de Antioquia, p.202; Thomas, Vinod (1986). Macroeconomía y Política Agropecuaria. Bogotá: Banco de la República; El Desarrollo Agropecuario en Colombia, Tomo I. (1990) Bogotá: Ministerio de Agricultura and Departamento Nacional de Planeación, p.309.

<sup>121</sup>Reforma Agraria Colombiana (1970). Bogotá: INCORA, pp.5-37; Ocampo, José Antonio; Bernal, Joaquín; Avella, Mauricio and Errázuriz, María (1991). "La Consolidación del Capitalismo Moderno." In Ocampo, José Antonio (Ed.) Historia Económica de Colombia. Bogotá (3rd edition): Tercer Mundo Editores, p.295. For more sources on the reform of 1961 see footnote number 41 in Banana Part II.

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loans at subsidized interest rates. It was operated by the Central Bank and was to become the principal organism for granting agricultural loans<sup>122</sup>. For example, \$763.5 million pesos were loaned by the Caja Agraria, and the FFAP loaned \$135.3 million pesos in 1977<sup>123</sup>. The most important subsidy was the difference between market interest rates and subsidized development credits for production<sup>124</sup>. Law 16 of 1990 created FINAGRO to establish a national system of credit. Before the creation of FINAGRO credit was allocated by the monetary junta of the Central Bank. The creation of FINAGRO shifted credit resources to the Agriculture Ministry which was to be the sole body in charge of agricultural credit<sup>125</sup>.

Although the initial objective of Caja Agraria credit was to support coffee producers, slowly the direction of credit shifted to large scale commercial agriculture and cattle ranching. In the early years most of the capital went to the coffee sector. Data showed that loans by the Caja Agraria were primarily in small amounts in 1936<sup>126</sup>. Between 1932 and 1938 coffee growers received more than 70% of the

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<sup>122</sup>For a complete description of the law see Revista del Banco de la Republica (April 1973), pp.466-475. Decree Number 1778 of 1990 liquidated the funds of the FFAP in order that Finagro could be established as the national credit agency, see Revista del Banco de la República (Aug. 1990), pp.43-45. Finagro was established under law 16 of 1990 (Jan. 22). Finagro was created to become the national system of agricultural credit. For a full description of the law see Revista del Banco de la República (Jan. 1990), pp.48-54.

<sup>123</sup>Campo, Octavio (1985), op.cit. p.105.

<sup>124</sup>Bustamente de Henao, Raquel (1983), op.cit., pp.9-12.

<sup>125</sup>Tobón, Santiago (1991), op.cit., pp.121-122.

<sup>126</sup>

**Table P2.14**  
Loans Granted by Caja Agraria 1936

Amounts	Number	Total Value
up to 2,000 pesos	29,754	13,701,802.71

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credits<sup>127</sup>. In 1937, 1938 and 1939 potato growers only received 1%, 2% and 3% of total Caja Agraria loans, respectively<sup>128</sup>. However in later years it appeared that the Caja Agraria increasingly extended larger volume loans to large scale agriculture. For instance, the first year cattle credits exceeded coffee was in 1938. The proportion of cattle credit rose to 43% and those for coffee dropped to 35%<sup>129</sup>. This trend was to persist<sup>130</sup>. By 1942 cattle ranching comprised 53% of total credits<sup>131</sup>. Nonetheless, in the 1950s potato growers received an increased share as compared to the late 1930s. In 1953 and 1958, 9% of total agricultural credit from the Caja Agraria was allocated to potato producers<sup>132</sup>. In 1965 of the total credit disbursed by Caja Agraria and INCORA, potato producers received 2% and 7% respectively<sup>133</sup>. In 1966, 80% of the number of 'minor' credits absorbed 33% of the value in the Caja Agraria. Inversely 9% of 'major' credit benefitted with 51%

2,001-5,000 pesos	1,553	5,327,457.96
More than 5,000 pesos	513	4,702,871.73

Source: PRO, Foreign Office (23 March 1937). "Colombia: Annual Economic Report for 1936." FO371.20624, Registry Number A2851/2851/11.

<sup>127</sup>Machado, Absalon (1986). Políticas Agrarias en Colombia 1900-1960. Bogotá: Universidad Nacional de Colombia, p.42.

<sup>128</sup>Anuario General de Estadística Colombia 1939 (1940). Bogotá: Contraloría General de la República, table 142, p.153

<sup>129</sup>Anuario General de Estadística Colombia 1939 (1940). Bogotá: Contraloría General de la República, table 142, p.153.

<sup>130</sup>For 1939-1942 figures see Anuario General de Estadística Colombia 1942 (1944). Bogotá: Contraloría General de la República, table 152, p.160. For a more recent discussion of the bias of spending policy see also Martínez, Astrid (1987). "Colombia: Effects of the Adjustment Policy on Agricultural Development." Cepal Review No.33, pp.98-100.

<sup>131</sup>Anuario General de Estadística Colombia 1942 (1943). Bogotá: Contraloría General de la República, table 154, p.163.

<sup>132</sup>Anuario General de Estadística Colombia 1953 (1955), op.cit., table 199, pp.208-209.

<sup>133</sup>"Distribución de las Tierras en Colombia" (1968). In Debate Agrario: Documentos Bogotá: DANE, table 36, p.13; Franco, Alberto (1968), op.cit., table 7, p.23

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of the value of the total budget<sup>134</sup>. Minor credits were those which were low in value and were extended to many, major credits were the inverse<sup>135</sup>. From 1970 to 1981 the credit that derived from the Caja Agraria fell from 1,675 million pesos to 315 million pesos (in 1970 pesos)<sup>136</sup>. Institutional credit doubled between 1970 and 1981, though agricultural credit grew only 15.6% during the entire period<sup>137</sup>. In 1986 preferential treatment for small producers was established which designated them a proportion of credit<sup>138</sup>. Nonetheless despite this preferential treatment there was still a greater increase in credit towards large producers (34.4% in contrast to 32.9% for small producers from 1990-1991)<sup>139</sup>.

The existence of capital-bias is clearly presented in table P2.15.

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<sup>134</sup>See Anuario General de Estadística Colombia 1953 (1955). Bogotá: Contraloría General de la República, pp.288-289; Anuario General de Estadística Colombia 1958 (1959). Bogotá: Contraloría General de la República, pp.473-481; Franco, Alberto (1968). "Aspectos del Crédito Agropecuario Institucional en Colombia." mimeo, Bogotá: Ministerio de Agricultura, p.21-22. Franco also believed that credit-bias was stronger in private banks than in Incora and the Caja Agraria. For a disaggregation of credit to agriculture, commerce, mining, cattle ranching, construction and official entities see also Anuario General de Estadística Colombia 1958 (1959). Bogotá: Contraloría General de la República, table 262, p.473.

<sup>135</sup>Franco, Alberto (1968), op.cit., pp.21-22.

<sup>136</sup>Bustamente de Henao, Raquel (1983). Política de Crédito Agropecuario 1970-1981. Bogotá: Ministerio de Agricultura, OPSA, IICA, p.6.

<sup>137</sup>Ibid., p.13.

<sup>138</sup>Tobón, Santiago (1991). "Finagro y la Política de Crédito Agropecuario." Revista Nacional de Agricultura. No. 894, p.124.

<sup>139</sup>Ibid., p.126.



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**Table P2.15**  
Approved Credit through FFAP according to type of crop and  
producer size: semestral crops, 1980-1990 ('000 pesos).

Year	Small	% to small	Medium and Large	% to medium and large	Total	% of Total Finagro Credit
1980					6799.6	50.9
1981					6886.6	51.0
1982					7110.2	48.4
1983					8299.3	48.6
1984					8984.2	48.6
1985					9376.2	51.2
1986					9486.7	49.7
1987	653.4	7	8656.4	93	9309.8	50.7
1988	1421.4	15	7911.9	85	9333.2	51.8
1989	1591.1	15	8623.2	85	10314.4	53.5
1990	2164.1	23	7439.6	77	9603.7	50.5

Source: Ministerio de Agricultura, computer print out.

1/Prices deflated to 1978 by consumer price index.

2/Percent of total is total loans, the other types of crops included in original table include: semiannual crops, infrastructure investment, agricultural machinery, cattle raising activities, and commercial farm purchases.

Throughout the decade a consistent fifty percent of FFAP credit was directed towards semestral crops. It can be observed that the greater part of this credit fell into the hands of medium and large producers (an average of 85%). In recent years credit still did not reach small producers. This suggests that from 1936 to 1938 when commercial agriculture was less developed credit went to coffee growers and other traditional producers. When commercial agriculture and cattle ranching expanded, resources were directed towards this sector, to the detriment of traditional, and usually small scale agriculture. Furthermore credit also appeared to have a crop bias. Potato received the vast majority of credit from public sources whereas other

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activities such as cattle ranching received high levels of private credit<sup>140</sup>. How have potato producers fared?

Although a complete series on credit to potato growers was not available other evidence given above proved that potato growers received credit since 1936. Table P2.6 also documents that credits were extended to small producers in 1963. In the early 1970s virtually all potato farms received credits from the Caja Agraria, INCORA or the FFAP. However only 67% of growers received credits by 1976<sup>141</sup>.

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<sup>140</sup>Franco, Alberto (1968), op.cit., p.22.

<sup>141</sup>Campo, Octavio (1985), op.cit., p.105.

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**Table P2.16**  
National Total of Potato Area Planted and Financed  
by Caja Agraria and FFAP, 1971-1985.

Year	Area (1000s of Hectares)	Index	% of Total Area Financed*
1971	87.4	100	99
1972	89.0	101.8	99
1973	72.6	83.0	74
1974	79.0	90.3	86
1975	90.7	103.7	82
1976	79.8	91.3	64
1977	78.7	90.0	61
1978	77.5	88.6	55
1979	97.3	111.3	64
1980	71.2	81.4	50
1981	96.2	114.4	60
1982	81.1	92.8	50
1983	81.6	93.4	51
1984	68.8	78.7	42
1985	56.6	64.6	37

Source: Constructed from FFAP, Caja Agraria, Bulletins and Reports; Ministry of Agricultura: Anuario Estadístico del Sector Agropecuario (1985); Robles, Isabel (1986), *op.cit.*, p.101.

\*Percentages calculated from Appendix P.1.

Data for the 1971-1985 period demonstrate that in terms of the percentage of area financed, absolute levels fell during the 1971-1985 period (Table P2.16). Despite this drop, production continued to expand throughout the 1970s and 1980s (Appendix P.1). Thus, despite the inadequacy of state subsidized credit, producers managed to augment production. This could be explained by market maturation. State credit was vital to these producers when they first entered into commercial agriculture. However as the market matured and producers accumulated capital, private sources of credit became more accessible. Therefore State support was crucial to initiate the

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process of modernisation, thereafter private enterprise could replace State support. Another line of argument would be that small producers did not increasingly obtaining more credit but converted back to different methods of payment such as exchange of labour or land subdivision, similar to what occurred in Ireland<sup>142</sup>. This is possible given that average plot size did not change substantially and traditional forms of tenancy persisted (see Tables P2.4 and P2.8).

Total potato credit disaggregated according to department in 1978 (Table P2.17) illustrates that the department which received the highest value and land area of credit was Cundinamarca.

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<sup>142</sup>See labour below.

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**Table P2.17**

Potato: Total Credit Financed by the FFAP and Caja Agraria  
According to Department, 1978.

Department	Total Hectares Financed (semester A + semester B)	Value (1000s of pesos)	Pesos per Hectare
Antioquia	6935	91823.6	13241
Boyaca	17639	211405.2	11985
Caldas	1814	24165.7	13322
Cundinamarca	27869	310675.8	11148
Nariño	15924	99728.9	6263
N. de Santander	2265	28335.6	12510
Santander	2826	36760.5	13008
Tolima	3723	33142.2	8902
Valle	1971	19871.6	10082

Source: Constructed from *Cifras del Sector Agropecuario, 1980* (1981). Bogotá: Ministerio de Agricultura, table 114, p.135, citing Fondo Financiero Agropecuario and Caja Agraria.

Boyacá came second in both of these categories. However the distribution of credit throughout Colombia was not equal among departments in terms of credit per hectare. Thus it appears that there is also a geographic bias, with Nariño and Tolima receiving disproportionately lower levels of credit. The quantitative data presented earlier suggests the existence of credit-bias. Without a longer series of disaggregated data a concrete conclusion cannot be reached for the entire period. Nonetheless qualitative evidence on technical change also points strongly to the existence of production scale-bias.

The existence of credit bias during the 1938-1990 period may have resulted in lower levels of profitability for small farmers. Profitability statistics for 1975, 1976, 1981, and 1982 (Table P2.18) demonstrate that higher profitability levels were achieved in medium and large farms. Given the easier accesss to credit for large

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farms, and the importance of inputs for increased output, it is possible that they also achieved higher levels of profitability in the earlier period.

**Table P2.18**  
Profitability\* of Potato Production According to  
Plot Size, 1975, 1976, 1981, 1982.

Plot size	1975 (%)	1976 (%)	1981 (%)	1982 (%)
Small	37.5	6.5	13.5	46.4
Medium	67.8	13.6	32.8	50.2
Large	59.6	8	38.9	58.6

Source: Triana, Augusto and Prieto, Fabio (1984), *op.cit.*, p.38, National Planning Department statistics based on data from FEDEPAPA, ICA, Banco de la Republica, Caja Agraria, FFAP and OPSA (Ministry of Agriculture).

\*Profitability calculated with the following formula:  $(\text{Price/Ton} - \text{Cost/Ton}) / \text{cost/ton} \times 100$ .

Small producers had lower profitability levels during these years, however by 1982 the gap between medium to large, and small producers virtually disappeared. The narrowing of the gap can be explained by increased capital accumulation by small producers.

Above, it was observed that producers were mainly dependent on low-cost techniques. Technical change was not a significant bottleneck as variety diversification, fertilization and use of commercial inputs were all observed early in the period. These factors indicated the early presence of modernising factors. These trends further illustrate that the effectiveness of a technique was often the most important influence to adoption and not farm size. In addition to transport and commercialization deficiencies described above, low levels of capital were a significant factor that reduced profitability for producers. Moreover, increasingly credit has been diverted from small scale agriculture to large scale commercial enterprises and cattle ranching. This has discriminated against small growers and

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resulted in fragmented modernisation with many of the gains only received by large scale producers. Now to examine labour.

### LABOUR: Characteristics of, and the effect of technical change

Greater equity in land distribution and disparate rates of technical adoption resulted in a complex labour market. Complete proletarianization in the main did not occur as many wage-labourers also rented or owned land. Because the sector was diverse it was nearly impossible to follow the transition of potato labourers throughout the period. However there were many hints underlying the diversity of the development of labour markets in the potato economy. Below the nature of the labour market will be discussed, which will be followed by an analysis of the changes in the share of labour in the production process relative to other factors of production due to the adoption of technical change.

In 1936 one of the chief barriers to agricultural modernization was that labour was tied to land, often by precapitalist production relations<sup>143</sup>. In later years changing patterns of land tenure and increased capital and technical levels resulted in diverse methods of procuring labour. Methods ranged from traditional forms of exchange (family labour and regional exchanges of labour for labour or payment in goods) to wage-labour. Therefore labour was not fully proletarianized in contrast

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<sup>143</sup>In the 1930s and 40s there was a crisis of the agricultural work force because many were tied to land through rental or sharecropping arrangements. See Kalmanovitz, Salomon (1978). Desarrollo de la Agricultura en Colombia, Bogotá: Editorial La Carreta pp.23-38; Bejarano, Jesús A. (1979). El Régimen Agrario de la Economía Exportadora a la Economía Industrial, Bogotá: La Carreta. For a more recent example of this see Arango, Mariano; Mesa Saúl; Rhens, Remberto and Velásquez, Jaime Alberto (1991). Una Nueva Visión de la Economía Campesina Colombiana Medellín: Universidad de Antioquia, pp.65-67.

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with bananas and cane-sugar which employed mainly proletarianized labour throughout the 1936-1990 period. Indications throughout the period demonstrate that other forms of payment were used besides wage-labour, similar to the Irish case.

Three broad types of labour existed and continue. First, traditional forms of labour tied to the land through sharecropping and rental arrangements. Secondly, small scale landowners who used family and community labour--these producers also entered the labour market to supplement income. Lastly, others were completely proletarianized in large scale potato production and other agricultural activities.

First, traditional relations of production, renters or sharecroppers persisted throughout the period. Over time, traditional tenancy arrangements slowly faded. In 1960 they comprised approximately 24% of the tenancy arrangements in Boyacá and Cundinamarca (Table P2.8). However in 1970-71 and 1988 the share had declined considerably to 10% and 5%. The persistence of these forms continued to tie labour to land and stifled the formation of a rural proletariat.

Secondly, an example of the use of family and community labour is provided below. In Colombia the exchange of labour was commonly denoted as *a brazo suelto* or *cambio de brazo*.

Work defined as *a brazo suelto* or *cambio de brazo* is frequent, it consists of working a few days in a friend's parcel and then the friend would return this service by working in the other's plot<sup>144</sup>.

In addition to this type of exchange, often "wages" were paid partly in cash. According to a study conducted by the INCORA in 1964 payment was based half in

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<sup>144</sup>Plan de Crédito Supervisado Para el Departamento de Boyacá (1964). Bogotá: INCORA, (author's translation), pp.66-67.



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kind and half in cash<sup>145</sup>. Daily wages from 1966 include food<sup>146</sup>. During the 1970s and 1980s FEDEPAPA evidence shows that wages were one aspect of remuneration and that workers received food and precarious housing<sup>147</sup>. These patterns of payment were also observed in pre-famine Ireland, although the organization of labour was different because it was tied to land through conacre rents.

Moreover, due to the inability to accumulate sufficient amounts of capital, polyvalency became prevalent for land owners<sup>148</sup>. In addition to tending their own plot employment was also found in other sectors. Often the head of the family worked in the coal mines of the region, and females temporarily migrated to urban areas for work in domestic service<sup>149</sup>. According to a study by Luis Ignacio Aguilar and Juan José Perfetti the largest concentration of poverty was in rural households whose prime activity was in the agricultural sector<sup>150</sup>. This would confirm the need to supplement household income.

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<sup>145</sup>Ibid.

<sup>146</sup>Manual de Costos (1967). Bogotá: Caja de Crédito y Minero.

<sup>147</sup>FEDEPAPA, Boletín Informativo (1985) Costos de Producción Boyacá-Cundinamarca, p.3.

<sup>148</sup>For a general review of polyvalency in the peasant sector see Samper, Armando and Ardila, Jorge (1991). "Estrategias para el Desarrollo Agropecuario de Colombia." Revista Nacional de Agricultura No.894, p.135.

<sup>149</sup>Interview with Augusto del Valle (June and July 1992), Manager of FEDEPAPA, Bogotá, Colombia.

<sup>150</sup>Aguilar, Luis Ignacio and Perfetti, Juan José (1987). "Distribución del Ingreso y Sus Determinantes en el Sector Rural Colombiano." Coyuntura Económica 17 (1), p.144. For other surveys of rural poverty see Londoño, Juan Luis (1990). "Income Distribution during the Structural Transformation: Colombia 1938-1988." Ph.D. Dissertation, Harvard University; "El Problema Laboral Colombiano: Diagnóstico, Perspectiva y Políticas" (1986) Economía Colombiana Separata No.10. For earlier periods this was also true as average incomes were lower for smaller farmers, see Debate Agrario: Documentos (1970) Bogotá: DANE, table 3, p.8.

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Lastly the situation of pure potato proletariats was limited<sup>151</sup>. According to FEDEPAPA's Boletín Informativo, only the administrators received the official minimum salary. Workers were paid according to the specific tasks by piece rates<sup>152</sup>. Wage-labourers were hired on the large-scale commercial potato farms most of which were located in Cundinamarca<sup>153</sup>. Therefore workers could not earn enough by solely selling their labour. Again, labour was seasonal therefore workers would follow the harvests of potatoes and other crops. In this case migrant characteristics developed similar to banana labour. Therefore potato workers either worked part-time and had to find additional employment in rural or urban sectors.

Data from 1988 confirm the trends described above. Most of the agricultural workers in Boyacá and Cundinamarca were land owners (97.6% and 95.2% respectively).

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<sup>151</sup>Mariano Arango *et.al.* emphasized the difficulty for peasants to obtain full-time agricultural salaried work because the labour generated by commercial agriculture was not sufficient. Possibilities for commercial agriculture were limited as the majority of available land in the 1980s could not be mechanized due to rough terrain. See Arango, Mariano; Mesa Saúl; Rhenals, Remberto and Velásquez, Jaime Alberto (1991), *op.cit.*, p.65. Furthermore underemployment in the agricultural sector is believed to be one of the main problems in the agricultural sector. See "El Problema Laboral Colombiano: Diagnóstico, Perspectivas y Políticas" (1986) *Economía Colombiana* Separata No. 10, p.46.

<sup>152</sup>FEDEPAPA, *Boletín Informativo*, #125, p.4.

<sup>153</sup>Interview with Augusto del Valle (June and July 1992), Manager of FEDEPAPA, Bogotá, Colombia.

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**Table P2.19**

Agricultural Workers: Break down by property size  
or those that do not own land, Boyacá and Cundinamarca, 1988.

	Boyacá	Boyacá	Cundinamarca	Cundinamarca
Size of APU (ha)	Number of APU	%	Number of APU	%
APU without land	3495	2.4	7965	4.8
APU with land (ha)	191480	97.6	198579	95.2
0 > 1	27690	13	35003	16.9
1 > 3	56367	27.2	56438	25.6
3 > 5	32755	16.6	30434	15.0
5 > 10	33104	18.5	33124	17.6
10 > 20	21271	12.2	22047	10.6
20 > 50	14029	7.1	14137	6.4
50 and greater	6264	3	7396	3.1

Source: Primera Encuesta Nacional Agropecuaria: Cundinamarca, Primera Encuesta Nacional Agropecuaria: Boyacá, (1990), Bogotá: Ministerio de Agricultura, table 20, p.52; Primera Encuesta Nacional Agropecuaria: Boyacá, Primera Encuesta Nacional Agropecuaria: Boyacá, (1990), Bogotá: Ministerio de Agricultura, table 20, p.52.

The largest share of agricultural work force were owners of smallplots--polyvalent peasants, working thier own plot and selling their wage-labour. Labour derived priamrily from small plots. These results conform with Dixon's argument presented above which claimed that the abundance of small holdings implied a reduction of the use of wage-labour<sup>154</sup>. This was witnessed in particular periods as the share of labour in the cost structure decreased. Often labour was used extensively yet was not paid money wages. Thus a system of traditional and modern methods of payment was employed.

Data for the 1936-1950 period on labour use were unavailable. Given the

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<sup>154</sup>See Sugar Parts I and II.

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traditional land usage patterns and low levels of mechanization it can be presumed that labour was widely used. Appendix P.6 shows that manual methods were used comparatively to a much wider extent in 1955 than during the 1975-81 period. This can be expected because of the lower share of inputs and mechanization. According to appendix P.5, labour costs occupied 16-18% of the cost structure during the 1975-1991 period and between 1982 and 1984 labour costs absorbed a much higher percentage in the cost structure and after 1982 declined.

**Table P2.20**  
Man-days per Hectare Used in Potato Production, 1967-1991.

Year	Man-Days
1967	255
1981	126
1982	118
1984	125
1986	112
1991	108

Source: FEDEPAPA, Boletín Informativo, Caja Agraria, Manual de Costos, 1967.

Per hectare labour figures during the 1967-1991 period, demonstrated a period high in 1967 with 255 man-days per hectare which was then followed by a drop. Almost a fifty percent decline occurred between 1967 and 1981. However between 1981 and 1991 the decrease of man days/ha from 126 to 108 was much slower than that for the previous period. Therefore though technical change was conspicuous since the 1930s, significant labour saving techniques were not integrated until the 1970s.

Table P2.21 displays potato wages in comparison with land rents in Boyacá and Cundinamarca. Daily wages were compiled from FEDEPAPA data. The daily wage between 1982 and 1990 comprised approximately 13% of planting costs.

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However the percentage of planting within total labour costs fluctuated. Between 1982 and 84 planting costs represented 5-6% of total labour costs and during the 1985-1990 period planting costs diminished to 2-3% relative to other labour costs. Thus, there appears to be labour saving techniques in planting. This is consistent with qualitative evidence that showed increased average use of machinery. The index that compares potato wages and land rents in Boyacá-Cundinamarca illustrates the rapid increase in wages as compared to land rents.

**Table P2.21**  
Potato Wages and Land Rents in Boyacá-Cundinamarca, 1975-1990.

Year	Land Rental/Ha/Season (Current Pesos)	Index	Daily Potato Wage (Current Pesos)	Index
1975	2120	100	29	100
1982	10000	472	250	862
1983	13000	613	320	1103
1984	13000	613	360	1241
1985	13000	613	452	1559
1986	13000	613	560	1931
1988	15000	708	855	2948
1990	24000	1133	2000	6897

Source: Caja Agraria (1967), *Manual de Costos*, Bogotá: Caja de Crédito y Minero. FEDEPAPA *Boletín Informativo* various issues.

A similar trend was witnessed with cane-sugar in the Cauca Valley<sup>155</sup>. Rational economic behaviour would dictate labour saving practices. However above it was determined that capital was scarce and production increases were more related to increasing land under cultivation than increasing yields (land saving). This is in contrast to the situation in the Cauca Valley where some tasks were mechanized early

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<sup>155</sup>See Sugar Part II.

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and mechanization became more widely employed in fertilization, pesticide application and aspects of the harvest since the 1970s. Now to analyse real wages.

Despite the shortcomings of wage data due to the diversity of labour force data from the 1980s indicate an increase of real wages. Real wages in Boyacá Cundinamarca fluctuated substantially during the 1983-1988 period. During this time there was a net increase in real wages of 10% (Table P2.22).

**Table P2.22**  
Daily Wages for Potato Production with Food  
for Boyacá-Cundinamarca, 1982-1990.

Year	Wage in Current Col. Pesos	% Increase	Inflation Rate	Real Wage Increase (% increase- inflation rate**
1982	250	--	--	--
1983	320	28	16.7	11.3
1984	360	13	18.3	-5.3
1985	452	26	22.7	3.3
1986	560	24	20.7	3.3
1987	800	43	24.6	18.4
1988	855	7	28.1	-21.1
1989	--	--	26.1	--
1990	2000	134	32.4	75.5*

Source: FEDEPAPA, *Boletín Informativo*, various years.

Inflation Rate= Annual percentage variation of the consumer price index for manual workers, Banco de la República, *Revista del Banco de la República*, various issues.

The wage for 1966 was taken from the average wage of Boyacá-Cundinamarca in Caja Agraria, *Manual de Costos*, Caja de Crédito y Minero. Colombia, 1967

\*The real wage increase was computed for 1988-1990.

Note: Changes in real wages were computed by subtracting the inflation rate from the yearly percent increases of potato worker's wages.

Most real gains were achieved in the middle of the 1980s. This could be due to increased output and a decrease in man-days (Table P2.20). Particularly, with the introduction of technical change, productivity increased and this was accompanied by an increase in real

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wages.

Potato producers mainly followed a path of external proletarianization. Peasants were able to gain title to land and work the land independently. This was witnessed by the prevalence of small units. They were able to acquire the necessary tools and inputs to adopt technical changes. Potatoes were the only example of the crops discussed in which this occurred. The trends of the agricultural work force in Boyacá-Cundinamarca were distinct from those in the Cauca Valley and in Urabá. Most agricultural workers owned land and were to a certain degree tied to the land. Remuneration for labour was also different, using less wage-labour and combining wages with other forms of payment. Traditional methods tended to maintain regional stability whereas commercial agriculture resulted in a transient, mobile work force. In these areas labour quickly proletarianized and moved into urban centres. Potato labour was not entirely proletarianized. Land tenure changed dramatically from 1936 to 1960 as by 1960 the majority of rural cultivators owned their land. However by 1990 pockets of renters and sharecroppers existed.

## CONCLUSION

Historically potatoes have been cultivated by subsistence farmers or small commodity producers who would sold surplus in local markets. Because of the long history of potato growing, low-cost techniques such as variety diversification and manuring were common. Later technical innovation and diffusion, included chemical inputs, a process that started in the 1940s and 1950s. It was observed that innovations were quickly adapted despite the traditional nature of many of the growers. Most of the changes that took place were related to intensification of input application. Irrigation and more sophisticated harvesting methods

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were not as important. This is in contrast to banana and sugar production in which capital-intensive methods were vital to certain areas of production and marketing.

Furthermore most production was located in areas of difficult terrain and the vast majority of small producers became land owners. This is contrary to the situation in Urabá and less so in the Cauca Valley where small holders were often displaced by large units. As potato growing land was not as valueable, title was readily proffered and not seized by large capitalist enterprises. Given these circumstances, it was not surprising that land tenure was the least skewed of all the crops discussed, and almost of all other commodities in Colombia.

Since potatoes were a crop produced almost exclusively for the internal market, international standards were not imposed upon these cultivators. Some output was sold in neighbouring countries, however no lucrative export earnings were gained. Technical change was induced internally and there was also early initiative to establish experimental farms. Despite the absence of international influence, producers slowly improved cultivation techniques. However the lack of capital for commercialisation restrained modernisation. Yields increased slowly and positive production growth rates can be observed between 1950 and 1990. What were factors that determined this growth?

Producers took advantage of agricultural credit although availability contracted in recent years. Despite drops in relative and real amounts of credit, increases in extension and productivity were registered. Smaller units tended to use less inputs, lower quality tubers, and usually did not employ semi-mechanized techniques. In contrast large producers were inclined to have more and better quality inputs as well as utilize machinery for land preparation. Furthermore credit within Colombia tended to be directed towards lucrative



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large scale commercial crops such as rice, cane-sugar and banana. This shows that small-to medium-sized producers were able survive and expand production despite decreasing levels of credit and the existence of credit-, scale- and crop-bias. Also, small scale processing plants started to appear in potato regions, however development has been stagnant. The lack of markets was not a contributing factor for this. A more tenable explanation was the dearth of credit for these operations.

Despite the absense of sufficient levels of credit, what were other factors that contributed to the success of producers? First, in the case of Boyacá-Cundinamarca, despite the poor systems of distribution and marketing, proximity to markets facilitated commercialisation. Secondly, because only short term loans were needed, huge amounts of credit were not necessary to achieve efficient methods of production. Thirdly, the labour-intensive nature of the crops made it possible for small- and medium-sized producers to compete with large growers. This, as with banana and sugar, evidenced that, with the absence of intervention, only low-cost technology can maintain smaller producers competitive with large.

Labour was difficult to separate from the producers themselves. In some cases family labour was often used, and in others seasonal labour was acquired. There were also hints that wage-labour was not always used in periods of capital scarcity and other methods of payment were applied. Furthermore many producers were polyvalent peasants, involved in many different economic pursuits, or became kulaks, commericalising potatoes and other commodities contained within the plot.

Producers have demonstrated the ability to adopt technological change and produce under less favourable government policies in terms of credit, and land tenure. Distribution

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and marketing remain slow to modernise with traditional methods predominating. By 1990 the majority continued to be sold in open markets with only a small percentage retailed in supermarkets. This clearly illustrates the low levels of sectoral organization. In order to give producers more opportunities for future development, capital deepening would be beneficial in order to continue and contribute to the stability characteristic to this zone. A gradual path of agricultural development has contributed to a firm social base. The absence of large commercial enterprises and lucrative exports has also allowed small producers to obtain land titles and productively pursue their economic livelihood.

## **Conclusion**

This thesis has contributed to several areas of the study of agrarian modernisation. The analysis has centred on a historical, economic and institutional examination of the evolution of three crops in Colombia, comparing them with larger international trends. The findings of the central questions to the thesis and its contribution to theory will be presented below.

The maturation of factor markets was clearly observed with bananas and sugar. After sufficient domestic capital was accumulated and political institutions were established, the location of production, processing and the control of the export trade shifted. However market imperfections such as the monopolistic control of TNCs restrained this process. The internationalisation of capital was most clearly witnessed with bananas and had a profound effect on production decisions and regional development in general. This, combined with the export nature of the trade led to little initiation of local economic activity. However in some respects the evidence was inconclusive and more research needs to be conducted on long-term investments of local banana growers and other business people involved with the trade. In the Colombian case, the presence of export banana production, whether controlled by foreign or local capital, was detrimental to economic development in general. The close link of bananas with external markets stifled growth because there was little intersectoral transfer of resources. For instance, technology and capital mainly originated from abroad, the product was sold overseas, and labour was increasingly used less in the production process.

It was proved that product markets were not so perfect and institutional constraints impeded their functioning. Production expansion was either linked to

### *Conclusion*

increased internal or external market demand. Increases in international trade, were largely due to non-free trading patterns which were either dominated by TNCs or trade agreements. Moreover, international product markets were subject to fluctuations whereas domestic markets were stable and sometimes increasing sources of demand. Larger disruptions such as those induced by the World Wars or the Great Depression threatened trade. Instability in the sugar and banana markets was related to different mechanisms, determined by their distinct trading patterns.

International sugar markets have been highly protected at least since 1900, consequently the emergence of sugar producers was sometimes related to political relationship with importing countries. However throughout the twentieth century sugar producers who supplied domestic markets have become more common and after 1970, these producers have accounted for the largest impetus to output expansion. This was the situation for Colombia throughout the twentieth century and, as has been demonstrated, modernised production methods predated large scale growth in exports. This trend was also observed in Central America. An element intrinsic to entrance into markets was State institutional support for negotiation into protected world markets. Therefore institutional change and initiative were precursors or accompanied the push to modernise in the sugar sector, which occurred largely before exports. This is in contrast to export-banana production which modernised exclusively for export, and sometimes did so without significant state support or intervention.

The monopolisation of international trade by TNCs throughout the twentieth century, made it difficult for banana producers to gain a foothold in product markets.

### *Conclusion*

Although as early as the 1930s producer's organisations started exporting, TNC share consistently commanded the majority of world exports throughout the twentieth century.

The evolution of a commodity which expanded exclusively to meet domestic demand was the potato. Potato markets were quite different. First, potato markets, product and factor, were primarily domestic. Therefore they received little international stimulus and expansion relied solely on domestic capital. Nonetheless buoyant internal markets provided sufficient incentive for producers to augment production despite deficient access to inputs and inconsistent state support, particularly in marketing and distribution. These shortcomings underline market failure, and show that stronger institutions were needed to further encourage modernisation.

Closely connected to the restraints of the market were those of institutions--whether formal or informal, public or private. Institutions were crucial to gain access to international markets, regulate monopolistic practices of TNCs, support production on regional and national levels, organise research and development centres and coordinate marketing and transport. Informal organisations facilitated Cauca Valley landowners access to foreign technology. Formal organisations played a fundamental role in the expansion of the sugar sector in the Cauca Valley and sectoral consolidation. Institutional and organisational support in Magdalena was strong however did not necessarily result in a smooth path of modernisation. Because of TNC involvement, unstable external market conditions and unfavourable climate expansion was erratic. Later, in Urabá, the rise of commercial houses and the

## *Conclusion*

accompanying institutional and organisational support paved the route to more domestic involvement in modernisation. The research also emphasized the vitality of small producers. In Colombia it can be argued that because of their survival (assisted by State support) the UFCO would not have continued to return to Santa Marta. The investigation of small producers *per se* shifts traditional discussions of TNCs to other actors which were intrinsic to the trade, but often neglected in the literature.

It was evidenced that land ownership was often highly correlated to the ability to acquire other agricultural resources. Areas dominated by commercial agriculture were those which were characterized by higher concentrations of land. Large landowners such as those in the Cauca Valley easily obtained the latest technology and achieved rapid sectoral modernisation. In contrast, farmers located in areas characterized by small plots often had more difficulty obtaining capital and were more likely to commercialise only a portion of output. Boyacá and Cundinamarca had much lower land concentrations than the regions of the Cauca Valley and Urabá, and were characterized by comparatively less commercial activity. Nonetheless, Colombian potato growers did have limited access to modern technology and credit and potatoes were commercialised since the beginning of the period. Progressively, increased technical levels and capital per hectare were observed in the region. This phenomena suggests, not a causation but a closer correlation between access to land and access to other agricultural resources in general. Thus it follows that the concentration of land intrinsically restricted the opportunities for efficient market signals and improvements in income distribution.

Following this result, unequal land distribution and rigid land titles (in some

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areas) were argued to have adverse effects on wide-scale sectoral production expansion. In the cases of sugar and bananas it was proven that because growers mainly had easy access to land, inefficient production decisions were made. For sugar in Colombia early mechanisation occurred despite relative capital scarcity and labour abundance. A better use of scarce capital would be to direct it towards fundamental output expanding components such as improved seed and input purchases. In banana production large-scale land ownership either pushed out foodstuff production and/or monopolised irrigation water. These were all detrimental to an economically and socially efficient modernisation. Capital- and land quality-bias towards large producers in all crops was another aspect of this argument--small scale producers were clearly disadvantaged. In some regions this meant ecologically unsound cultivation practices. In others it impeded the sufficient use of important inputs such as fertilizer or pesticide. In yet others it resulted in small producer proletarianization. However it was evident that farmers, whatever their resource constraints, tended to employ efficient production methods within their means. This implies that easier access to capital throughout the agricultural sector would most likely have resulted in improved production techniques and output.

Closely connected to land tenure arrangements were contractual agreements. For banana exporters and sugar mill owners contractual arrangements arose to secure a specified amount of the commodity for a particular period of time. It allowed banana exporters and sugar mill owners to shift the risk of cultivation to farmers and also expand capital investment in other areas such as milling, packaging and/or transport. The benefits of contractual arrangements were that they diffused profits

## Conclusion

from the traditional banana TNCs or sugar mill owners. Although terms of exchange favoured TNCs and mill owners, the introduction of new techniques also made production less risky for small contracted producers (assuming security of tenure). Obviously, a preferred, more equitable system would allow the direct participation of growers in processing and commercialisation activities, however contractual arrangements appeared to be an imperfect solution to imperfect market structures.

Another institutional issue is property rights. In the literature titled land was found to have higher levels of capital applied per hectare. However in Urabá it was seen that increased title *per se* did not necessarily boost output, a result which refutes theoretical debate. Rather it was other elements which stimulated the demand for titles such as credit facilities or the transformation to capitalist relations of production, and/or increased use of capital-intensive production techniques. In earlier years when capital using techniques were not as important (such as in Santa Marta) title to land could be bypassed as it was not needed for collateral, and export crops were cultivated. This trend was seen with the existence of squatters in Santa Marta. The entrance of agents who established capital-intensive production impulsed the demand for land titles. It was not the institutionalisation of land titling which motivated this change.

The organisation of fair titling of land was a formidable obstacle for LDC governments. The difficulty with titling implementation affected production scale and regional development. In both areas of banana growing rapid colonisation, vague demarcation and titling confusion in general led to rural unrest as peasant farmers were denied land and were displaced by capitalist production. Colonisation can be



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beneficial because it opens up previously non-exploited land. However due to the size of many LDCs, poor cadastral surveys and strong independent landowners, land titling is difficult to enforce.

Another trend was the increasing urban nature of large landowners. This was observed with absentee estate owners in the Cauca Valley and large scale banana plantation holders in Santa Marta as early as the 1960s, and later in Urabá after the mid-1960s. Large landowners increasingly tended to live in urban areas and manage their estate from a distance. This often resulted in the discouragement of infrastructure improvements and in some areas, unsafe rural conditions. Although causation is difficult to ascertain, areas of colonisation in Colombia in later years were also characterised by high levels of violence and guerilla activity.

In Colombia the effect agrarian policies had on farm-level decision were profound. Though State policy fluctuated between protecting either small or large producers the long-term outcome was that the expansion of capitalist agriculture largely harmed small farmers. For instance land reform laws which aimed to protect peasants, *colonos* and other traditional producers resulted in negligible land expropriation and peasants farming untitled land were usually expelled by large landowners. Although the Caja Agraria was originally founded to foster small scale production with credits and technical assistance, the patterns of lending rapidly came to favour large scale agriculture and cattle ranching. An apparent bias towards large scale production evidently exists as large landowners had political influence and consequently obtained lower transaction costs in capital and land markets which conferred them higher levels of profitability. Given the large numbers of rural

### *Conclusion*

population in many LDCs, the efficiency of small scale production and their positive market creation effects, this bias should be readjusted to favour a larger base of farmers in the agricultural sector.

An outcome of the workings of markets and institutions was patterns of technical adoption. Technical change followed a discontinuous pattern with all three crops. It was evident that major adoptions such as new varieties and mechanisation resounded in enormous structural changes to production. What were the sources of new techniques? The origins and diffusion of technical change were distinct for all three crops. For Colombian sugar, foreign technology was vital during the establishment of modern milling, however new techniques were increasingly innovated internally. This was attributed to the stability of production (primarily due to secure internal market demand), the quick establishment of institutional support within the region, and centralised production centres which resulted in high learning externalities. For Colombian export banana throughout the period, technology was diffused from abroad and continual reliance on imported innovations and sophisticated inputs was the trend. Moreover unstable market conditions pre-1950 were not conducive to sectoral consolidation. Technical change for potato producers originated mainly from internal sources with the first experimental farms dating back to the 1920s. Inconsistent State policy sporadically influenced production decisions and homogeneous production patterns were only vaguely identified in the 1970s and by the 1980s comparable technical levels throughout farms were beginning to be observed. The disproportionate pace of technical adaption was related to capital-bias, as small producers did not have the cash to obtain inputs. Moreover it was seen that

## *Conclusion*

in periods of capital shortages, small producers would switch back to more labour intensive techniques and use cash only for input purchases and continue to employ a system of labour exchange. It was proven for all three crops in Colombia that modern methods of production clearly occurred before the 1950s, the decade denoted by most economic historians as the commencement of the era of commercial cropping.

The patterns of technical diffusion in the three different crops suggest a close relationship between technical diffusion and orientation of commercialisation. More contact to international markets quickly led to the internationalisation of factor markets, production techniques and the use of externally-induced technologies. This heavy reliance on externally induced technology was also related to the organisation of research and development which for the bulk of the period was dominated by external sources. In the case of commodities marketed domestically and abroad, farmers appeared to have more space to adopt new techniques either from local discoveries or imports of innovations from abroad. This was due to internal investments in research centres, the diffuse nature of research world-wide and the early maturity of mill technology. Lastly, a commodity that producers cultivated only for domestic markets employed techniques innovated externally and internally and techniques among producers were diverse.

It was evidenced that organisational bases were crucial for the establishment of research and development. The nature of the crop and processing were found to be elements which guided technical change and in some cases diffusion. Growers of large-scale capital-intensive crops could more easily organise due to their size and

## *Conclusion*

capital endowments. Crops which were diffuse in terms of number of producers and location experienced more obstacles in establishing research centres. Although in Colombian potato research farms established by the State existed as early as the 1920s, technical adoption appeared to be an individual choice as heterogeneous production patterns were prevalent until the 1970s, the time at which the potato producer's association was formed. In the other two crops, strong organisational support from producer's associations usually resulted in improved techniques. With potatoes this also seems plausible as producer's associations were able to influence production decisions and notify cultivators of recent technological breakthroughs as well as marketing channels through their monthly bulletin.

In general, low-cost techniques were crucial to modernisation. Given resource constraints, they were vital to accommodate other innovations in the production process. For example, changes in plot design in the 1960s which allowed for faster cane harvests, manual pest removal for small Windward Island banana producers or manual weeding for potato growers were all important for successful cultivation. These findings demonstrated that labour can and has been substituted for capital with no compromise to efficiency. Moreover low-cost techniques were not biased towards any size producer thereby stimulating a broader base of development.

Related to the use of low-cost techniques was the existence of capital-bias towards large units with all three crops. This bias, often affected technological adaption and scale of production. Capital-bias clearly pushed small producers out of processing and cultivation. During the twentieth century the increasing use of capital-intensive techniques in agriculture accelerated the pace of small producer

displacement.

Finally, this leads to the influence the above factors had on labour. Labour in the capitalist crops (bananas and sugarcane) in the long term was proletarianized. With the transformation to proletarians, labour was often migrant in regions of seasonal harvests. In Colombia where cane harvests were aseasonal, labour initially was proletarianized and lived in rural areas. However later it was observed that labourers relocated to urban centres and commuted to the fields. Therefore it is seen that with agricultural modernisation, in conditions of stable employment, workers will migrate to urban areas. Another general trend was that temporary labour migrated primarily to supplement their earnings and not as a source of permanent income. This shows that modernisation in the long term tended to push peasants and proletarians to become involved in a number of activities (not only agricultural) to survive.

Proletarianization did not occur with potato production and polyvalency was the rule. The reasons for polyvalency can be attributed to two factors: 1)the small scale nature of production which relied on family labour, labour exchange and sometimes wage-labour; and 2)the inability of wage-labourers to earn enough money on potato farms for subsistence. If potato farms become large-scale, proletarianization is likely, however with labour abundant and capital in short supply in the departments of Boyacá and Cundinamarca, small producers seem to be using resources efficiently.

Did agricultural modernisation improve conditions for labour? Without a macroeconomic study, a complete explanation cannot be given. However within the

## *Conclusion*

particular crop general tendencies can be underlined. Because of the stability of cane growers in the Cauca Valley (mainly due to strong internal demand and rigid land titles) mill owners were initially able to give secure employment to workers. But following technical changes later in the period, an increased use of short term methods of recruitment (contracted work) was observed. The increased use of contracted work was also apparent in banana production as TNCs progressively hired labour temporarily for specific tasks, during particular periods in the banana life-cycle. Therefore instead of witnessing improved conditions for labour during the modernisation process, it was observed that temporary hiring increased. The introduction of technical change also resulted in an increasingly stratified work force.

Quantitative changes in labour were diverse for all three crops. Moreover living conditions for agricultural workers world-wide were distinct with some areas characterized by a marked decline, yet in others satisfactory conditions remained. However, after analysing the Colombian data, it was seen that the proportion of social security benefits for sugar workers decreased. Wages for banana workers were not compiled however inadequate living conditions point to diminished welfare throughout the period. These trends show that labour received few of the benefits of technical change.

These trends in general point to disarticulated agricultural development with the strong growth only in sectors with easy access to capital. Paradoxically, the only crop which exhibited long term links with the regional economy was that with limited capital availability, potatoes. Both capitalist crops became increasingly large scale and obtained more access to productive resources. This was a result of market

### *Conclusion*

preferences towards large units and weak institutions, that despite policy were mainly unable to reverse or create conditions for more participation in modernisation which would create more room in domestic markets for demand in general. When small producers can fully participate in the modern agricultural sector, they will be able to share, not only the costs but also its benefits and contribute to and stimulate economic growth in general.

**Appendix S.1**  
**BIASES OF TECHNICAL CHANGE IN SUGARCANE PRODUCTION,**  
**WITH REFERENCE TO MANUELITA S.A., 1926-1990.**

Year	Category	Innovation	Land Saving, Capital Using	Labour Saving, Capital Using	Land Saving, Labour Using	Internally Induced	Externally Induced
1921	1	Soil preparation, Fowler machinery assisted in plowing	X		X		X
1929	2	Introduction of seed variety, POJ 2878.			X		X
late 1940s	2	18 new seed varieties introduced in Colombia.			X		X
1936-1950	1,2,3,4.	Most innovations during this period were capital and labour using. A period of agricultural frontier extension and a general systematisation of cultivation techniques.	X	X	X		
1950s	2	Length of time between cuts has become more scientific due to higher mill capacity and diffusion of knowledge.			X	X	
1956	3	First well dug in Manuelita.		X	X	X	
late 1950s	4	Disease control introduction of pesticides 2-4-D and TCA.			X		X
1960	2	Canal Point seed variety introduced.			X		X
1960-63	4	Fertilization with nitrogen.			X		X
1960s	1	Soil preparation changes: size and shape of plots redesigned to systematize distance between plants and make cutting more efficient.			X	X	
1970s	1	Cane planted at a deeper level of subsoil, micro and macro levelling.	X		X		X
1970s	4	Appropriate fertilizer dosage established.			X	X	
1970s	3	Microlevelling & redesign of plots to improve efficiency of water application.	X			X	
1970s	4	Mechanized disease control introduced.	X		X		X
1974	4	Mechanized fertilization introduced.					X
mid 1970s	2	Anti-virus & anti-fungal seed treatment.			X		X
1976/78	5	Mechanized cane lifting introduced.					X
1978/82	5	Innovation of Caterpillar-Manuelita Transport Vehicle for Sugarcane.		X		X	
1980s	2	Technological Advance in seed varieties: Mayaguez variety bred in Colombia.		X		X	

Categories: 1)soil preparation, 2)seed varieties, 3)irrigation, 4)inputs, and 5)harvest.

Source: Constructed from information based on: Pifreiro, Martín (1982). Cambio Tecnológico y Articulación Social en la Agroindustria Azucarera en Colombia. San Jose: Instituto Interamericano para la Cooperación Agrícola; Manuelita Archives: "Innovaciones Tecnológicas en Manuelita S.A." Document written by Field Department. Signed by Alberto Anzola Jimenez, Vice President. Undated, must have been written post 1988; "Recuento Historico de los Ultimos 25 Años de Fabrica." Mimeo. Undated, unsigned. Must have been written up in 1989. Interviews with Carlos Navia Director of Manuelita S.A. Field Department, Palmira, Colombia.



**Appendix S.2**  
**FIELD PRODUCTIVITY DATA FOR MANUELITA S.A., 1971-1990.**

	LAND PREPARATION	PLANTING		DISEASE CONTROL			FERTILIZATION		IRRIGATION		YIELD			
		Manual Techniques	Mechanised Techniques	Manual Techniques	Mechanised Techniques	Mixed Techniques	Manual Techniques	Mechanised Techniques	Area Irrigated	Area Irrigated	Manuelita-Owned Land		Cane Suppliers	
Year	Tractor Hours/ Hectare	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	(ha)	(%)	Tonnes of Cane (100's)	Tonnes/Ha/Month	Tonnes of Cane (1000s)	Tonnes/Ha/Month
1971											467.8	8.4		
1972	19.46	1057	2928				1957		11764		n.a.			
1973	11.87	11074	3172	16349	6684		9258		2871	48	552.7	8.4		
1974	4.86	10246	2671	12482	7356		8289		32995	63	529.0	9.2		
1975	12.37	13840	3372	11679	8504		8408	527	25561	49	730.1	8.3		
1976	11.58	14188	7429	10945	8924		10190	1312	37385	63	636.3	7.7	318.8	8.1
1977	33.12	10568	6342	13692	9517		6435	1305	34277	58	518.5	8.4	296.5	8.3
1978	27.59	7013	6111	7452	6923		4518	2166	27793	56	566.5	8.3	412.0	8.7
1979	25.18	1481	6738	7881	5771		3102	2377	16894	31	646.0	9	535.9	8.9
1980	24.39	7878	10148	3125	7824	3370	1820	3656	24872	49	669.6	8.6	546.9	9
1981	17.2	5953	12186	2311	8407	4641	1345	4627	27536	48	612.3	9.7	651.3	9.4
1982	15.05	7274	13374	3786	8550	4922	557	5550	26160	45	697.5	10.1	642.9	9.8
1983	11.94	8940	12788	3828	8788	4537	329	6047	47863	76	748.8	9	685.8	9.4
1984	13.19	10151	16716	4769	9465	5068	734	6306	47130	67	780.5	10.2	892.7	9.8
1985	15.61	10023	17457	4698	9765	4228	443	6478	61685	89	969.2	9.9	961.6	9.9
1986	17.22	8947	16252	2945	9893	4382	710	5475	54550	83	875.1	10.3	914.8	10.2
1987	13.73	9985	17280	2373	12611	5507	2338	6364	62825	91	937.7	10.1	960.3	9.6
1988	11.34	8956	15480	2492	10340	5599	5585	5571	41528	61	896.4	10	955.5	10.6
1989	9.71	9550	17274	4211	12014	6065	3898	6305	52416	75	950.9	10.5	1144.9	9.9
1990	9.71	8035	16193	3682	11880	5531	2928	5852	56448	80	858.5	9.9	1135.7	9.8

Source: Manuelita Archives. Superintendencia de Campo Monthly Reports: Irrigation Department 1970-1990, Cultivation Department 1970-1990, Harvest Department 1970-1990. Manuelita S.A., Palmira, Colombia. Mixed techniques started being employed in 1980, thus the reason for no data prior to 1980. Mechanised fertilizer technique did not commence until post-1975.

**Appendix S.3**  
**FACTORY PRODUCTIVITY LEVELS IN MANUELITA S.A., 1936-1990.**

Year	% Sacrose in Cane	Number of harvest days	Milling Hours	Tons of Cane Milled (in 1000s)	% sucrose extracted as % of sucrose content	Average Tons Cane Milled/Hr.
1936	14	248		91615		22.68
1937	13	313		115285		23.57
1938		327		144394		28.09
1939	14	330		135342		25.46
1940	14	277		110765		25.58
1941	14	309	4183	145554	93	34.8
1942		304	4829	155847	91	32.27
1943	14	336	5058	171022	91	33.81
1944	14	293	4398	144834	92	32.93
1945	15	338	5195	185505	90	35.71
1946	16	287	4568	148539	92	32.52
1947	15	296	4975	165107	91	33.19
1948	15	293	4763	171866	91	36.08
1949	15	313	5470	196473	89	35.92
1950	14	318	5556	208040	90	37.44
1951	14	319	5780	221773	90	38.37
1952	13	322	5953	230675	91	38.75
1953	13	313	5097	281900	94	55.31
1954	15	314	5324	223576	95	41.99
1955	14	313	5314	333285	96	62.72
1956	14	319	5398	350154	95	64.87
1957	15	285	4825	341100	95	70.69
1958	14	348	5995	372147	95	62.08
1959	14	320	4889	359857	94	73.61
1960	13	314	5213	480232	92	92.12
1961	13	318	5361	533583	90	99.53
1962	14	317	5329	546977	91	102.64
1963	14	298	5007	490121	93	97.89
1964	14	322	5325	554509	93	104.13
1965	13	324	5355	589370	92	110.06
1966	13	360	5876	640022	91	108.92
1967	14	284	4455	551199	95	123.73
1968	13	304	4890	655025	94	133.95
1969	14	312	5197	701899	94	135.06
1970	13	336	5541	671808	95	121.24
1971	13	330	5377	718829	95	133.69
1972	13	331	5825	795584	94	136.58
1973	12	353	6276	813408	94	129.61
1974	12	353	6208	877924	93	141.42
1975	12	349	6158	1036291	91	168.28
1976	13	343	6192	1087303	91	175.60
1977	12	353	6136	925016	92	150.75
1978	12	365	5816	1091085	91	187.60
1979	12	365	6361	1263143	89	198.58
1980	13	366	6537	1301250	89	199.06
1981	14	365	6513	1280359	90	196.59
1982	13	365	6620	1355080	90	204.69
1983	14	365	6579	1434664	92	218.07
1984	13	366	5951	1684422	93	283.05
1985	13	365	6318	1924920	93	304.67
1986	13	365	6409	1801329	94	281.06
1987	13	365	6318	1924920	93	304.67
1988	12	366	6707	1975594	92	294.56
1989	13	365	6728	2089978	92	310.64
1990	13	365	6707	1962813	94	292.65

Source: Manuelita S.A. archives: Factory Productive Statistics in three volumes: 1925-1953, 1953-1970, 1970-present. Statistical incongruities were reconciled by factory head engineer, Gerardo Ortiz.

**Appendix S.4**  
**CHRONOLOGY OF PURCHASED CANE IN MANUELITA S.A, 1945-1971.**

HACIENDA	1945	1953	1956		1959		1961		1963		1964		1971	
	Cost	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost	Amount	Cost	Amount
La Cabana	251823	25114	714497	34111	904635	34553	1327873	38393	1719667	31867	4151397	36702	5769191	33299
														4737510
Hda. Real	512210	92467	886761	84163	1313794	59538	1686123	71079	1932380	63715	5253452	95826	8407858	49604
														5793354
La Rita		41887	802565	50699	1283201	55126	1829571	52358	1632542	59603	4475118	62686	7888027	55510
														6025514
Rosario		51174	840286	58381	1319419	65397	1861856	72169	1965090	84345	4935375	85774	7704223	89762
														8000708
Casajal		71375	791350	91433	1254469	61519	1745306	101199	2335971	72958	5193744	109068	8834822	99105
														7569918
Sa. Anita				31374	819824	58999	1474977	76686	1717168	73637	4140941	63829	6268068	77488
														5608979
Realpes								53515	1673057	59218	3073653	49953	4596753	45519
														3082888
San Jose						24723	741705	55976	1847227	71464	3737862	36506	2747178	89077
														9993556
Casagal								10167	422913	12353	837671	14161	1386920	
Carbonera	14686													
TOTAL	778719	282017	4035459	350161	6895342	359855	10667411	531542	15246015	529160	35799213	554505	53603040	539364
														50812427
Cost/Ton			£14.31		£19.69		£29.64		£28.68		£67.65		£96.67	
of Cane														£94.20

Source: Manuelita S.A. Archives. Annual Hacienda Accounting Reports found in Main Archive Room. Reports drawn up for submission to the Banking Superintendency. For example La Cabana annual accounting report 1945, 1953, 1956, 1959, 1961, 1963, 1964, 1971.

**Appendix S.5**  
**DIRECT AND INDIRECT WORK FORCE IN MANUELITA S.A., 1948-1990**

	Direct Work Force			Total	Indirect Work Force			Total	Total of Direct and Indirect Work Force	
Year	Field	Factory	Administration		Field	Factory	Administration			% of Direct Work Force
1948				1136				95	1231	92.28
1951				1296				112	1408	92.05
1952				1435				124	1559	92.05
1953				1366				122	1488	91.80
1954				1484				121	1605	92.46
1955				1366				129	1495	91.37
1956				1239				121	1360	91.10
1957				1386				129	1515	91.49
1958				1373				133	1506	91.17
1959				1551				142	1693	91.61
1960				1754				148	1902	92.22
1961				1817				152	1969	92.28
1964				2017				163	2180	92.52
1965				2086				165	2251	92.67
1966				2040				187	2227	91.60
1967				1977				206	2183	90.56
1968				2061				203	2264	91.03
1969				2176				241	2417	90.03
1970	1465	550	97	2112	62	68	120	250	2362	89.42
1972	1753	536	98	2387	65	68	121	254	2641	90.38
1976	1815	549	96	2460	68	70	122	260	2720	90.44
1979	1700	614	101	2415	72	70	155	297	2712	89.05
1981	1743	655	109	2507	75	73	157	305	2812	89.15
1982	1718	652	96	2466	77	74	157	308	2774	88.90
1983	1665	643	98	2406	74	71	156	301	2707	88.88
1984	1741	589	96	2426	75	72	158	305	2731	88.83
1985	1718	756	93	2567	69	76	157	302	2869	89.47
1986	1702	548	99	2349	73	77	175	325	2674	87.85
1987	1737	533	104	2374	72	76	177	325	2699	87.96
1988	839	520	118	1477	75	74	184	333	1810	81.60
1989	1917	516	129	2562	74	79	204	357	2919	87.77
1990	1952	514	136	2602	77	86	214	377	2979	87.34

Source: Manuelita S.A. Archives: Manuelita Annual Accounting Books 1972-1990; Annual Reports to the Banking Superintendency submitted by Manuelita, 1936-1987, Palmira, Colombia.

**Appendix S.6**  
**COLOMBIAN SUGAR PRODUCTION, CONSUMPTION AND EXPORT, 1960-1990**  
(Metric Tons)

Year	Production	Consumption	Export
1960	328327	287436	167
1961	362643	321216	45667
1962	401872	369407	65666
1963	368139	340700	40334
1964	427601	367500	25350
1965	485191	389473	101344
1966	537365	409720	113917
1967	596575	393390	200367
1968	663327	446772	238311
1969	708673	521960	173495
1970	676174	545692	129705
1971	743974	602081	161061
1972	823681	625574	202856
1973	809890	690223	142470
1974	894820	749716	128661
1975	969701	771461	197837
1976	934632	844247	100220
1977	853607	911465	0
1978	1014075	856081	132000
1979	1107268	837722	278214
1980	127488	992378	28045
1981	1212371	1041052	177213
1982	1318047	1011364	293319
1983	1340190	1006958	302607
1984	1177169	963237	182980
1985	1366893	963736	294934
1986	1272154	1006653	211815
1987	1293484	1066016	97621
1988	1363976	1033452	243269
1989	1523323	1110562	323319
1990	1592816	1177484	416339

Source: Constructed from Asocaña (1992). Aspectos Generales del Sector Azucarero, 1990-1991. Cali: Asocaña, Table I, p.37.

**Appendix S.7**  
**ESTIMATED DEMAND OF WORKERS ACCORDING TO CROP,**  
**1950, 1960, 1971**

Type of Crop	1950	%	1960	%	1971	%
Commercial	61.2	4.8	174.1	10.9	215.4	11.7
Traditional	295.0	23.0	332.6	20.9	410.3	22.3
Plantation	38.1	3.0	42.0	2.6	51.4	2.8
Mixed	320.1	25.0	344.4	21.6	281.1	15.2
Coffee	248.0	19.4	334.1	20.9	385.0	20.9
Minor Crops	49.5	3.8	58.8	3.7	100	5.4
Subtotal	1,011.9	79.0	1286	80.6	1443.2	78.3
Cattle Ranching	270	21	310	19.4	400	21.7
Total	1281.9	100	1596.0	100	1843.2	100

Source: Kalmanovitz, Salomon (1974b). "La Agricultura en Colombia, 1950-1972." Boletín Mensual de Estadística, No.277, Table 4.A., p.111.

**Appendix S.8**  
**MANUELITA AGRICULTURAL WORK FORCE DATA, 1944-1990.**

Year	Number of Cutters	Number of Contracted Cutters
1944	141	
1949	158	
1950	199	
1955	302	
1958	192	
1961	414	
1964	437	
1968	466	
1971	503	
1974	703	258
1978	929	307
1980	903	342
1981	723	421
1982	770	523
1983	817	515
1984	839	609
1985	655	625
1986	846	603
1987	871	632
1988	888	660
1989	910	760
1990	947	712

Source: Manuelita S.A. archive data. Number of Contracted Cutters derived from field productive data, 1980-1990. Number of cutters for 1944-1974 was obtained from the weekly payrolls. Since there is year round harvest in the Cauca Valley there is not very much fluctuation from month to month of sugarcane workers. However, there is a larger harvest in the months of February to April, and October to November. Cane cutters were counted from the payrolls of these months. A systematic month could not be chosen for all the years because of the nature of the organisation of these payrolls.

# Appendix B.1

## BIASES OF TECHNICAL CHANGE IN BANANA PRODUCTION, 1936-1990.

Year	Category	Innovation	Land Saving, Capital Using	Labour Saving, Capital Using	Land Saving, Labour Using	Colombia: Internally Induced	Colombia: Externally Induced
pre-1936	2,3,4,7	Banana cultivation based on traditional methods, small amounts of inputs applied, land clearing conducted by animal power, and little if any irrigation or drainage networks on banana plantations, transportation irregular and banana packing is based on bunches.	X		X		
1930s	3	Application of insecticides using the pump method, and other disease control methods conducted manually.			X		
1940s	3	Flooding of fallow land in order to cleanse land infected with Panama disease; a technical change introduced instead of switching varieties.	X		X		
1940s	2	Substitution of mules for tractors for banana transportation from plantation to point of export.		X			X
1940s	4	Introduction of washing fruit at point of harvest on the banana plantation proper.			X		X
late 1940s/and 1950s	1	First time full-scale variety shift from Gros Michel to Cavendish, primarily impelled by destruction being caused by Panama Disease.			X		X
late 1940s/and 1950s	3	Irrigation ditches constructed suitable for the new Cavendish variety.	X		X		X
1956/64	4	Banana boxing instead of shipping fruit in bunches, precipitated by the variety switch of Gros Michel to Cavendish.		X			X
1960s	5, 6	Improved managerial and administrative structures of plantations, systematic planning of banana harvests.		X			X
1960s	4	Packing plants become integrated parts of banana plantations.		X			X
1960s	1	Cavendish becoming the popular variety throughout the world.			X		X
1965/70	7	Tractors replaced by suspended cable systems, signifies enormous decrease in labour use.		X			X
1960s/70s	3	Low volume aerial spraying for Sigatoka Control		X			X
1970s	3	Polyethylene sleeves used for protection of banana bunches during the growing period.		X			X
1970s	3	Fertilization with other chemicals besides urea.			X		X
1980s	1	Reproduction of suckers scientifically conducted in regional greenhouses using in-vitro fertilization for methodical reproduction of banana suckers.		X			X

\*Not necessarily land saving, this technique is perhaps both biased towards capital and labour: i.e., capital and labour using.

Categories: 1)variety, 2)cultivation, 3)irrigation/inputs, 4)packing, and 5)harvest, 6)administration, 7)transportation.

Source: Constructed from information based on: Ellis, Frank (1983). *Las Transnacionales del Banano en Centroamerica*. San Jose: Editorial Universitaria Centroamericana; "Producción, y comercialización del banano." (1986) *Revista Augura*, 12(2), pp.117-138, 1986; Botero, Fernando (1990). *Urabá: Colonización, Violencia y Crisis del Estado*. Medellín: Universidad de Antioquia; *The World Banana Economy 1970-1984: Structure Performance and Prospects*, (1986), Rome: FAO. Interviews with Arturo Hernández, (March 1991) Vice-President for Planning and Development in UNIBAN, Medellín; Humberto Uribe (Nov. 1991) Head of Operations for UNIBAN, Urabá; Camilo Peñalosa (March 1992) Head of International Marketing for UNIBAN, Bogotá.



Appendix B.2  
WORLD AND COLOMBIAN BANANA TRADE FIGURES, 1936-1990.  
(1000s of Metric Tons)

Year	World Imports	Colombian Exports	Uraba Exports	Participation of Colombian Exports in World	Participation of Uraba Exports in World	Colombian exports in 1000s of bunches
1936	247.59					
1937	275.6	164.6				6585
1938	256.89	187.3				7493
1939	238.89	189.4		79.3%		7575
1940	198.2	12.5		6.3%		5003
1941	162.26	66.8		41.2%		2672
1942	90.42	6.4		7.1%		255
1943	79.78	0.0		0.0%		1
1944	97.35	11.5		11.8%		460
1945	117.737	34.6		29.4%		1383
1946	1700	52.8		3.1%		2110
1947	2020	83.5		4.1%		3339
1948	2080	117.9		5.7%		4716
1949	2030	157.0		7.7%		6280
1950	2319.2	143.8		6.2%		6438
1951	2381.6	154.472		6.5%		6348
1952	2664.2	152.585		5.7%		6454
1953	2662.1	196.2		7.4%		7659
1954	2882.5	195.7		6.8%		7925
1955	2886.2	209.6		7.3%		9155
1956	3038.1	215.9		7.1%		9547
1957	3234.1	184.1		5.7%		8349
1958	3431	174.1		5.1%		8220
1959	3585.9	203.3		5.7%		9526
1960	3968.9	190.7		4.8%		9255
1961	5131.4	205.6		4.0%		
1962	3905.5	108.2		2.8%		
1963	4191.7	202.6		4.8%		
1964	4386.9	171.5	23.2	3.9%	0.5%	
1965	4951	253.5	90.6	5.1%	1.8%	
1966	5308	31	230	0.6%	4.3%	
1967	5400.7	339.1	262.5	6.3%	4.9%	
1968	5557.6	304.1	239.3	5.5%	4.3%	
1969	5707.7	334.9	259	5.9%	4.5%	
1970	5737.7	290.9	276.5	5.1%	4.8%	
1971	6248.9	256	241.9	4.1%	3.9%	
1972	6477.1	245.2	224.4	3.8%	3.5%	
1973	6449.1	250.8	226.4	3.9%	3.5%	
1974	6388.2	287.3	244.2	4.5%	3.8%	
1975	6390.4	387.8	332.2	6.1%	5.2%	
1976	6325.6	433.5	382.2	6.9%	6.0%	
1977	6549	441.6	399.3	6.7%	6.1%	
1978	6967.1	577.6	530.8	8.3%	7.6%	
1979	7040.4	612	562.9	8.7%	8.0%	
1980	6852.7	715.9	668.3	10.4%	9.8%	
1981	6970	785.9	740.2	11.3%	10.6%	
1982	6786.8	704.7	668.7	10.4%	9.9%	
1983	6199.9	766.6	710.1	12.4%	11.5%	
1984	6714	921.5	847	13.7%	12.6%	
1985	6903.2	774	694.2	11.2%	10.1%	
1986	7301	987.1	757.7	13.5%	10.4%	
1987	7561	962	883.6	12.7%	11.7%	
1988	7844	977.7	743.6	12.5%	9.5%	
1989	8278	985.4	651.3	11.9%	7.9%	
1990	9061	1148.2	717.1	12.7%	7.9%	

Sources: Constructed from The World Banana Economy 1970-1984, (1985) Rome: FAO, Table 4, p.6; "Producción y Comercialización del banano" (1986), Revista Augusta, Year 12(2), pp.132 & 127; Banana weight pre-1950 was measured according to bunches, not by metric tons. Conversion from number of bunches was made so that 1000 bunches=25tons. Figures from Revista del Banco de la República, 34(411), p.134, the conversion is not precise but at least a rough idea of Colombian banana exports can be obtained from this; Data on total Colombian Exports 1974-1985 Botero Herrera, Fernando (1990). Uraba: colonización, violencia y crisis del estado. Universidad de Antioquia: Medellín, Table 11, p.96; Data on Urabá exports 1986-1990: Computer print out from UNIBAN, "Exportaciones de banano zona de Urabá 1980-1991, Source: Turbó Customs and Commercial Houses, Data on World Exports from FAO Trade Yearbook 1987 (1988), Rome: FAO 41(84), Table 56, p.159 and FAO Trade Yearbook 1990 (1991). Rome: FAO 44(102), Table 57, p.160; International Yearbook of Agricultural Statistics 1940-41, (1941), Rome: International Institute of Agriculture, Table 77, p.286; International Yearbook of Agricultural Statistics 1941-42 to 1945-46, Vol. I: International Trade, (1947), Rome: International Institute of Agriculture, Bureau of the FAO, Table 19, p.160; Yearbook of Food and Agricultural Statistics 1950, Vol. IV, Part 2, (1951), Washington, D.C.: FAO, Table 12, p.36.

**Appendix B.3**  
**AREA PLANTED WITH EXPORT-BANANA**  
**AND BANANA EXPORTS IN URABA, 1964-1990.**

Year	Banana Exports from Uraba(1000s MT)	Index	Area Planted with Export-Banana in Uraba(Ha)	Index	Banana Exports Per Hectare (MT)
1964	23.2	10.09	6000	41.52	3.87
1965	90.6	39.39	11400	78.89	7.95
1966	230	100.00	14450	100.00	15.92
1967	262.5	114.13	15550	107.61	16.88
1968	239.3	104.04	16730	115.78	14.30
1969	259	112.61	18950	131.14	13.67
1970	276.5	120.22	15860	109.76	17.43
1971	241.9	105.17	15358	106.28	15.75
1972	224.4	97.57	11498	79.57	19.52
1973	226.4	98.43	13120	90.80	17.26
1974	244.2	106.17	13725	94.98	17.79
1975	332.2	144.43	14830	102.63	22.40
1976	382.2	166.17	15300	105.88	24.98
1977	399.3	173.61			
1978	530.8	230.78			
1979	399.3	173.61	17479	120.96	22.84
1980	668.3	290.57	17365	120.17	38.49
1981	740.2	321.83	18300	126.64	40.45
1982	668.7	290.74	19400	134.26	34.47
1983	710.1	308.74	19800	137.02	35.86
1984	847	368.26	20100	139.10	42.14
1985	694.2	301.83	20300	140.48	34.20
1986	757.7	329.43	19700	136.33	38.46
1987	883.6	384.17	20400	141.18	43.31
1988	743.6	323.30	20000	138.41	37.18
1989	651.3	283.17	20400	141.18	31.93
1990	717.1	311.78	20456	141.56	35.06

Source: Data from 1964-1980 constructed from *Revista Augura*, (1986) 12(2); 1981-1990 constructed from *Anuario: Estadísticas del Sector Agropecuario 1990*, (1991) Bogota: Ministerio de Agricultura, p.13, data based on export-banana from Antioquia. Since most export-bananas in Antioquia must be in the geographic region of Urabá data must mainly be from this region; "Exportaciones de Banano Zone de Uraba Anos 1980-1991." Computer Print Out from UNIBAN. Citing Turbó Customs and Commercial Houses.

**Appendix B.4**  
**MOST PROMINENT COLOMBIAN EXPORTS, 1905-1935.**  
(Value in 1000s of pesos)

Year	Coffee	%	Banana	%	Petroleum	%	Tobacco	%	Leather	%	Gold	%	Platinum	%	Total
1905	4822	39.16	485	3.94			404	3.28	759	6.16	1692	13.74	83	0.67	12315
1910	5517	31.02	1668	9.38			377	2.12	1850	10.40	3370	18.95	261	1.47	17786
1915	15248	48.29	1997	6.32			335	1.06	3680	11.65	5453	17.27	550	1.74	31579
1919	54292	68.71	2215	2.80			1703	2.16	8595	10.88	277	0.35	3506	4.44	79011
1925	66524	78.33	55563	65.43			308	0.36	3222	3.79	1610	1.90	4006	4.72	84924
1930	61654	54.42	8741	7.72	26292	23.21	198	0.17	3493	3.08	9063	8.00	1888	1.67	113288
1935	7922	5.55	8939	6.26	29099	20.38	403	0.28	2681	1.88	19186	13.44	2088	1.46	142788

Source: Constructed from Revista del Banco de la República 12(146), Table 6, p.478.

**Appendix B.5**  
**URABA BANANA EXPORTS ACCORDING TO COMMERCIAL HOUSE (%)**

Year	UFCO	UNIBAN	TECBACO	BANACOL
1964	100	-	-	-
1965	100	-	-	-
1966	100	-	-	-
1967	100	-	-	-
1968	100	-	-	-
1969	88.3	11.7	-	-
1970	48.5	51.5	-	-
1971	15.4	84.6	-	-
1972	--	--	--	--
1973	--	--	--	--
1974	55.9	44.1	-	-
1975	56.3	43.7	-	-
1976	57.5	42.5	-	-
1977	44.1	46.5	9.4	-
1978	37.4	44.0	18.6	-
1979	32.2	48.7	19.0	-
1980	37.3	46.4	16.3	-
1981	37.9	46.1	13.7	2.3
1982	33.2	44.9	8.5	13.4
1983	22.4	55.5	1.1	21.0

Source: Ramírez, Margarita (1983). "Consolidación de la Actividad Bananera de Urabá" In *Revista Augura*, 9(2), p.91.

# Appendix P.1

## COLOMBIAN POTATO PRODUCTION, LAND AREA, AND YIELDS, 1934-1990.

Year	Production (1000s of Tons)	Area (1000s of Hectares)	Yield (Tons/Ha)
1934*	225	27	8.3
1937-38**	285	67	4.2
1946***	460	96	9.0
1948****	487	102	4.8
1949****	538	115	4.7
1950	360	39	9.2
1951	550	56	9.8
1952	600	61	9.8
1953	610	58	10.5
1954	650	62	10.5
1955	580	56.2	10.3
1956	624	55.2	11.3
1957	682	60.7	11.2
1958	566	74.5	7.6
1959	785	94.5	8.3
1960	653	79.6	8.2
1961	551	76.5	7.2
1962	872	103.8	8.4
1963	572	72.4	7.9
1964	867	102.0	8.5
1965	762	90.7	8.4
1966	760	95.0	8.0
1967	800	95.2	8.4
1968	950	115.8	8.2
1969	850	101.2	8.4
1970	913	106.1	8.6
1971	869	88.3	9.8
1972	823	89.5	9.2
1973	1030	98.6	10.5
1974	1012	92.0	11.0
1975	1320	110.0	12.0
1976	1516	125.0	12.0
1977	1608	130.0	12.4
1978	1995	141.6	14.1
1979	2065	151.0	13.7
1980	1727	142.0	12.2
1981	2105	160.0	13.2
1982	2149	165.2	13.0
1983	2234	161.3	13.9
1984	2319	165.2	14.0
1985	1880	153.1	12.3
1986	2091	156.0	13.4
1987	2355	161.6	14.6
1988	2659	165.7	16.1
1989	2698	172.5	15.6
1990	2464	161.4	15.3

Source: Constructed from Atkinson (1970), *op.cit.*, p.68; Fedepapa (1970-1990), *Boletín Informativo*, various issues; Ministry of Agriculture (March 1992), Bogotá: Computer print out #2.

\*PRO, Foreign Office. "Economic Section of the Annual Report on Colombia for 1935." (18 May 1937) Commercial Secretariat in Bogotá citing 1934 crop census largely estimated and compiled by municipal authorities, FO371.20624, Registry Number A4084/2851/11.

\*\**Anuario General de Estadística Colombia 1937* (1938). Bogotá: Contraloría General de la República, p.134.

\*\*\**Anuario General de Estadística Colombia 1946* (1949). Bogotá: Contraloría General de la República, p.viii.

\*\*\*\**Estudio Sobre las Condiciones Del Desarrollo de Colombia* (1958) Bogotá: Presidencia de la República, Comité Nacional de Planeación, p.148.

Note: The data from 1950 to 1957 originated from data compiled by Jay Atkinson and are considerably higher than the rest which were derived from official sources such as the Ministry of Agriculture and FEDEPAPA.

Appendix P.2  
AREA CULTIVATED AND YIELDS BY DEPARTMENT , 1979-1990  
AREA CULTIVATED (in 1000S), YIELDS (tons/ha)

Depart ment:	Antioqu ia		Boyaca		Cald as		Cauc a		C'un dina marc a		Nari no		N. de Sant ande r		Sant ande r		Toli ma	
Year:	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield
1979	15.8	12.7	41.2	16.1	7	12.3	2.1	12	36	15.1	27	7.7	5.5	11.1	2.5	13	8.3	14
1980	14.2	12.7	39.5	11.3	6.2	11.3	2.9	13.2	32	13.2	30	11.2	4.6	12	2.3	14.1	6.9	13.1
1981	14.6	12.7	43.6	14.2	7	11	4	12	37.6	14	30.5	13	6	12	3.8	11.2	9.5	11.7
1982	15.6	11	52	14.5	4.5	9.11	3.5	10.6	48.1	14.5	22	11.5	4.8	9.5	4.4	9.5	7.7	10.5
1983	17.1	10.8	48.5	15.2	3	10.3	3	10.3	50.7	15.3	19	12.7	4.9	9.3	4	9.9	7.9	9.5
1984	17.5	16.4	50.2	15	3.1	12.4	1.7	13.8	51	17.2	19.8	13.3	4.5	14	3.9	12.4	5.3	13.8
1985	15.7	16.4	38	13.4	1.9	12.7	1.1	12	46.4	14.7	23.5	11.6	5.8	14.7	3	12.5	2.2	13.3
1986	13	15.3	43.5	13	2.2	11.5	2.2	9.2	53	13.8	27	13.6	7	12	4	11.9	2	11.8
1987	16.4	16.1	40.8	13.2	2.7	12	2	12	53.5	14.4	29	15	8.4	14.7	5	12.7	1.8	13
1988	16.9	16.4	41.7	13.6	3.3	12.1	3.3	12	59.9	15.6	31.5	14.8	12	14.6	5.1	12.7	2.7	13.4
1989	18.6	10.9	37.5	14.3	1.9	11.4	6.3	15.8	60.4	16.1	34.5	15.9	3.1	16.2	5.1	14.3	2.8	13
1990	18.6	16.7	37.8	13	1.8	10	5.1	18	54.4	15.7	26.4	16.9	4.4	17.4	4.6	17.5	6	11.7

Source: Constructed from Triana, Augusto and Prieto, Fabio (1984). "Aspectos Económicos del Desarrollo del Cultivo y la Agroindustria de la Papa en Colombia, 1950-1982." Bogotá: Departamento Nacional de Planeación, Unidad de Estudios Agrarios; Cifras del Sector Agropecuario 1980. (1981). Bogotá: Ministerio de Agricultura, pp.133-134.

### Appendix P.3

#### PERCENTAGES OF TOTAL AREA BY TYPE OF LAND OWNERSHIP: BOYACA (ha)., 1988

Size of APU (ha)	Total	Owned Land	Rented Land	Share-cropping	Colonists	More than one Form
Total Hectares	1883658	1620644	28040	39403	3053	77419
0 > 1	.8	.8	1.5	.9	.1	.4
1 > 3	5.5	5.5	10.5	7.7	0	5.6
3 > 5	6.5	6.5	12.7	7.1	0	8.4
5 > 10	12.1	12.1	16.6	14.4	0	17.3
10 > 20	15.5	15.7	10.6	15.2	0	22.8
20 > 50	22.5	23	33.2	28.1	0	25.2
50 > 100	15.5	16.2	14.9	0	99.9	16.8
100 > 200	9.9	9.6	0	26.6	0	3.5
200 > 500	8.3	6.6	0	0	0	0
500 and up	3.4	3.9	0	0	0	0

Source: Primera Encuesta Nacional Agropecuaria: Boyacá, (1990), Bogotá: Ministerio de Agricultura, table 4, p.37.

#### PERCENTAGES OF TOTAL AREA BY TYPE OF LAND OWNERSHIP: CUNDINAMARCA (ha), 1988.

Size of APU	Total	Owned Land	Rented Land	Share-cropping	Colonists	More than one Form
Total Hectares	2278316	1927085	94943	6721	5898	120402
0 > 1	.9	.8	1.2	1.9	.4	.6
1 > 3	4.6	4.5	5.1	16.7	2.6	3.1
3 > 5	5.0	4.8	5.0	13	5.6	5.6
5 > 10	10	9.4	11.4	10.6	7.4	14.9
10 > 20	13.3	12.5	14.2	40.6	56.3	21.4
20 > 50	18.5	17.8	22.2	17.2	19.4	15.5
50 > 100	12.3	12.6	6.4	0	0	14.1
100 > 200	13.5	14.2	13.5	0	8.3	2.5
200 > 500	12.4	12.4	21.	0	0	19.2
500 and up	9.5	11	0	0	0	3.1

Source: Primera Encuesta Nacional Agropecuaria: Cundinamarca (1990), Bogotá: Ministerio de Agricultura, table 4, p.37.

#### Appendix P.4

#### FERTILIZER CONSUMPTION AND PRODUCTION IN COLOMBIA, 1960-1987.

Year	Total Consumption of Fertilizers (Thomas data)	Year	Total Consumption of Fertilizers (tons)*	Internal Production of Fertilizers *	Internal prod.fert as a % of total consumption *
		1960/61	53,500	--	--
		1964/65	161,243	--	--
1971	479,000	1969/70	140,606	57,800	41%
1975	565,800	1973/74	270,600	154,900	57%
1981	661,000	1982/83	312,300	90,300	29%
		1984/85	362,900	80,700	22%
		1986/87	421,000	113,000	27%

Source: Constructed from CEPAL, *Anuario Estadístico de América Latina*; Thomas (1986), *op.cit.*, table 8.1, p.165, based on data citing OPSA, DNP, and the World Bank.

\*CEPAL figures.



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Alberto Anzola (22 Nov. 1991; 13, 28 Feb.1992), President of Manuelita S.A.

Carlos Arias (22 Nov.1991), Head of Cane Contracting Operations.

Lucero Bernal (Nov.1991 and Feb.1992), Sales Department, Manager of National

#### Marketing and Acquisitions.

Manuel Cabal (Feb. 1992), Surveyor, Land Department.

Marco Tulio Carvajal (Feb.1992), Director of Accounting Department.

Henry Cubillos (Feb.1992), Statistician for Superintendencia de Campo.

Juan Carlos Dávila (20 Feb.1992), Director of Occupation Health.

Fernando Giraldo (Feb. 10, 1992), Chief Agricultural Engineer in Harvest Department.

Graciela Gómez, (Feb. 12, 1992), Housekeeper.

Eric Halliday, (Nov.1991 and Feb.1992), Sales Department, Manager of International Sales and Acquisitions.

Gabriel Londoño (18 Feb.1992), Head of Industrial Relations.

Hugo Mosquera (9 Feb.1992), Factory Engineer.

Carlos Navia (27 Jan. 1992, 13 Feb.1992), Head of Field Department.

Gerardo Ortiz (14 Feb.1992), Head of Factory Operations.

Juan Carlos Osorio (Feb.1992), Field Preparation Agricultural Engineer.

Fernando Otoyá (Feb.1992), Head of Agricultural Machinery Workshop.

Rafael Rodríguez (Feb.1992), Cane Cutter Instructor from SENA.

Liliana Valderrama (Feb.1992), Accountant, Accounting Department.

Jorge Alberto Vallejo (Feb.1992), Cane Variety Agricultural Engineer.

#### INTERVIEWS AT UNIBAN; BOGOTA, MEDELLIN AND URABA:

Manuel Arias (Nov. 1991), Banana Stevedore for UNIBAN, Urabá.

Oscar González (Nov. 1991), Director of Urabá Operations, UNIBAN, Urabá.

Nestor Gutiérrez (Nov.1991), Agricultural Engineer, UNIBAN, Urabá.

Arturo Hernández (March 1992), Vice-President for Planning and Development in UNIBAN, Medellín.

Oswaldo Jaramillo (Nov.1991), disease-control and input applier, UNIBAN, Urabá.

Camilo Peñalosa (March 1992) Head of International Marketing, UNIBAN, Bogotá.

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Daniel Vargas (Nov. 1991), Manager of Hosa farm (flower), Bogotá, Colombia.

Ricardo Vargas (Sept. 1991 and May 1992), Advisor to the Minister of Agriculture, Ministerio de Agricultura, Bogotá, Colombia.

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