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EXPORT AGRICULTURE AND LABOUR MARKET IN
NICARAGUA

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**VRIJE UNIVERSITEIT
FACULTEIT DER ECONOMISCHE WETENSCHAPPEN
EN ECONOMETRIE
AMSTERDAM**



Export Agriculture and Labour Market in Nicaragua

Jan P. de Groot en Harrie Glemens

1. Export agriculture and crisis in Central America

Colonial policies of a feudal and mercantilistic character laid the foundations for a dual economic system in Central America, associating commercial agriculture with production for export and subsistence agriculture with food production. Export agriculture was concentrated in the haciendas which exacted cheap labour from the indigenous sector.

After independence and the falling-apart of the Central American Republic in 1839 the five small nations embraced economic liberalism as a guiding doctrine. Liberalism contained a new political model for the post-colonial state as well as an economic programme. Free trade and specialization according to comparative advantage were seen as dynamic forces of economic development. Public policies were redirected and resources re-allocated to the development of new agricultural commodities for export, in particular coffee and bananas. Thus the colonial economy was transformed into a larger and more productive one, but its dual character was maintained (Quirós, 1971:33,93). Although vulnerable for world market conditions the Central American economies expanded rapidly until the economic crisis of 1973. After World War II there was a new round of expansion of export agriculture.

Central America's rapid economic growth in the 1960s was supported by export earnings which increased 10 percent a year on the average (Williams 1986:4). Regional coffee and banana exports almost doubled, but non-traditional exports increased still faster; cotton and beef became the two most important new exports.

These exports provided foreign exchange for the importation of modern agricultural technologies and induced investment by multinational corporation, local farmers and businessmen. Modernization brought prosperity to these groups, but at the same time a large number of peasants were evicted from the land. Export-led growth caused, as was the case in the past, serious social distortions (Torres Rivas, 1980:25).

Cotton developed in the Pacific coastal plains, where pockets of fertile, flat soils and climatic conditions were perfectly suited for this crop once insects could be controled. The insecticide revolution that took place after World War II brought new possibilities for checking insect damage (Williams, 1986:17). The Pacific plains at that time were still extensively used, portions had been

settled by peasants, but other parts were in forests or in unimproved rangeland, belonging to traditional livestock haciendas. Peasants cleared the forest land and were allowed to plant corn for some years. When the cotton development started peasants flowed in to bring the land into cultivation, but once cotton had been established they had to make way. Consequently, peasants who were sharecroppers on the haciendas or who disposed of a subsistence plot in usufruct were evicted. Others, not holding a secure title to the land lost their land to powerful cotton farmers. The number of landless in the coastal plains increased rapidly. Cotton cultivation is semi-mechanized and does not need more than a small permanent work force, although the harvesting of the crop requires a large amount of seasonal workers. During two or three months labour demand is high, the work force is enlarged by women, children and migrating labour from outside the cotton zone. But at other times of the year wage work is hard to get. What came to replace access to land was seasonal wage work on the cotton plantations. The peasants joined the minifundio-sector, migrated to other frontier areas or left for the slums of the cities. Cotton thus changed the way the peasants made their livings (Williams, 1986:20).

In the 1960s Central America's export quotas to the protected U.S. beefmarkets were increased. This measure started the development of the region's beef export business. Production increased through extension of grazing areas and the expansion of the region's herd from a 4 million head of cattle in 1960 to 10 million in 1978. But modernization also played a role. Ranchers were provided with credit and technical assistance, improved breeds of cattle were introduced, management of pastures spread, packing plants were established and refrigerated transport came to be used. As in the case of cotton, multinational corporations and the Central America elites were the main beneficiaries of the export boom. For the peasants the consequences of the rapid expansion of pastures and fences were still worse than those of the earlier expansion of export crops. As Williams (1986:151) observes: "Unlike coffee, cotton and sugar, which require very rich soils and special climates to be profitable, cattle raising did not stop when the relatively fertile soils of the Pacific strips had been claimed, but spread wherever grass would grow." Cattle ranching also competed for the marginal lands where the peasantry in earlier export booms had found refuge. Moreover, ranching offered less employment than crops.

The Central American crisis, social and political unrest in the region, in large degree reflects the intensification of the struggle over land and over conditions of survival. The peasantry does not accept to be cut off from the land, its basic

means of subsistence. The export boom of the 1960s and 1970s brought rapid economic growth and export diversification. As in the past, the economies grew and became more productive as the region was further inserted in the world economic system. But the living conditions of large numbers of peasants, who lost access to land and came to depend on seasonal and insecure work, deteriorated.

2. Nicaragua's agro-export sector

Nicaragua, compared with the other Central American countries, was late in developing its export agriculture. As a consequence the export activities that developed more recently, such as cotton and beef, became relatively more important in Nicaragua than the traditional sectors. Also due to this late development and to a lower population density the structure of the Nicaraguan agro-export sector differs substantially from that of other Central American countries, in the sense that in Nicaragua there is a higher participation of small and medium-size producers in the agro-export activities (see section 3). Before World War II the country's export economy did not reach a degree of development comparable with that of Costa Rica, Guatemala or El Salvador. Coffee was the main commercial crop and provided the earliest basis for capital accumulation. But ecological limitations in the Pacifico Central and insufficient development of the transport system in the interior prevented further expansion of the crop. Production increased from a yearly average of 9,700 tons in the period 1909-18 to 14,300 in 1929-38 (Quirós, 1971:66). Bananas formed the next important agro-export activity. But the country failed to develop an important banana industry, not as much because of a lack of appropriate ecological conditions, in particular on the Atlantic Coast, but rather as a consequence of conflicts with the banana companies over navigational rights. In 1911 exports amounted to 83,200 tons, this volume fell to 45,000 tons annually in the period just before the Second World War and to a 7,500 tons in the afterwar years 1945-1949 (ibid, 1971:76).

In the 1950s the agro-export sector expanded rapidly. Cultivation of coffee and bananas increased, but cotton production contributed most to this accelerated growth. In the 1960s there was a further expansion and diversification of the agro-export economy as exports of beef, sugar, sesame and tobacco developed.

Foreign exchange surpluses formed during the Second World War were used for public investments in rural infrastructure, energy and ports. This, together with the insecticide revolution constituted the basis for expansion of cotton cultivation in the Pacific plain. Due to the fluctuation of prices on the world

market this expansion had a cyclical course. The area increased from 14,000 in 1950 to 84,000 in 1954. New peaks were subsequently reached in 1966 and 1974 and in 1978 the area had grown to a level of 212,000 ha, which included a considerable part of marginal quality.

The cotton acreage expanded at the expense of the area in basic grain production. Before cotton came to the Pacific plain peasants had access to land of livestock haciendas as sharecroppers or as workers who had obtained the usufruct of a subsistence plot. The peasants as well as the haciendas combined livestock activities with the production of basic grains. When cotton cultivation expanded, the peasants had to pay money rents for the land they used, which they only were able to do if they joined cotton cultivation on a modest scale. Some of them did so, but many peasants lost access to the land and the acreage in basic grains decreased almost proportional to the expansion of the cotton area. Between 1952 and 1966, for example, the acreage under cotton in the three main producing departments of this crop, Chinandega, León and Managua, increased from 10,000 to 43,000 ha, whereas simultaneously the area under basic grains and sesame decreased with the same amount from 55,000 ha to 22,000 ha (Quirós, 1977:185).

Beginning in the late 1950s cotton had surpassed coffee as foreign exchange earner, but also in terms of rural development. The area under coffee meanwhile expanded from 56,000 ha in 1950 to 86,000 ha in 1976. Over that same period yields almost doubled, increasing from 330 kg per ha to over 600. Part of the coffee cultivation was modernized, but the main proportion was produced under traditional conditions. When compared with coffee production in neighbouring countries productivity in Nicaragua is low.

In the 1960s beef exports developed rapidly as the export possibilities to U.S. markets expanded. An increasing demand for low cost industrial meat in the U.S. coincided with rising costs of U.S. producers and with decreasing Argentine exports. Nicaragua's beef exports increased from 10 million lbs in 1960 to 54 million in 1970 and 58 million in 1976.

In 1960 cotton, coffee and beef exports together counted for 65 percent of the value of all exports, in 1977 this figure was almost 60 percent, while other agricultural exports represented 9 percent of total value (see Table A-1).

As indicated, in the 1970s the export boom continued, in particular the area under cotton still expanded substantially, that of other export crops augmented only slightly. The cotton area that reached a peak of 150,000 ha in 1965/66 was cut back to 95,400 ha in 1970/71, and subsequently increased again to 212,400 ha in 1977/78, a record level not surpassed since then.

In 1970 agricultural exports amounted to 110 million U.S. dollars; they increased to 177 million in 1973, then doubled in 1976 to 354 million and reached

unprecedented levels in 1977 and 1978 when the value increased to 425 and 446 million dollars respectively (see Table A-2). IN 1977 and 1978 international coffee prices were very high, coffee producers picked all they could. Cotton and beef prices were good. Livestock producers concerned by the political developments in the country slaughtered more animals than ever before and converted their stock into flight-capital. Or they moved their cattle over the borders to Costa Rica or Honduras. There was a considerable reduction of the national livestock herd.

Consequently, from 1970 to 1978 the value of agro-exports increased continuously. As indicated, the volume of cotton exports expanded, coffee prices climbed to a high level especially at the end of this period and livestock exports increased as a consequence of the political developments in the country.

Given the exceptional conditions of 1977 and 1978 it was to expect that it would be difficult for the Sandinist government to maintain the high levels of export values after 1979. The reconstruction after the revolution, the redistribution of income, the public investment programme of the Government and since 1983 the war with the 'contras', all put pressure on the import demand. In 1980 agricultural exports decreased, mainly because in the 1979/80 cotton season timely plantings had been made only on 20 percent of the area sown the year before. Total export of goods in that year covered only half of the value of imports. And this situation worsened over time. In 1986 exports only covered one quarter of imports. (SPP, 1987:156). The Sandinist regime has not been very successful in recovering and maintaining equilibrium in the trade balance. Imports almost doubled with respect to pre-revolutionary levels, and although the agricultural exports soon recovered to the level reached in the early 1970s their growth was insufficient to stop the increasing gap.

Cotton production has recovered the least (see Table 3-A). After the unsuccessful harvest of 1979/80 the area planted increased gradually and in 1983/84 was at a 60 percent of the high pre-revolutionary level. Since then production has been decreasing. Low international prices, the high foreign exchange input requirements and labour scarcity are the main factors to explain this reduction. Cotton is an annual crop and producers can easily switch to other activities (Colburn, 1956:51). The government thus provided stronger incentives for this crop than for a permanent crop as coffee where investment is more of a fixed nature. But the response in particular of large capitalist enterprises to these incentives has been low. Other classes of cotton producers have encountered serious agronomic, ecological and economic problems. Actually the government, because of the low rentability of cotton cultivation, aims at the concentration of production in areas of optimal conditions. This contraction of the cotton area

will not affect the provision of fibres to the national textile industry, and the production of substitutes is foreseen as far as prime materials for the vegetable oil and animal feed industry are concerned (SPP, 1987:47).

Coffee production suffered little from the 1979 revolution and the volume harvested increased even up till 1982/83. The state farms cover a 14 percent of the coffee area of which more than half is under traditional technology. The efficiency of state farms is low, production costs are relatively high. In 1981/82 the government started a coffee renovation scheme on 8,400 ha, about 10 percent of the total coffee area. This scheme was oversized and certainly in the first years after implementation caused a reduction in the coffee harvest. The incentives for the coffee sector were insufficient to keep producers to invest in coffee production. Since 1981/82 the overvalued exchange rate has reduced the real prices the producers received. And this in combination with labour shortages made that coffee farmers have reduced their costs of maintaining their plantations even at the expense of declines in future yields.

Sugar and bananas were seriously hit by the U.S. boycott, but when other market outlets were found the increase in area and production continued. Beef production recovered only partly from the herd reduction in the period 1978-80, but since 1984 official production figures present a decreasing trend. The war situation has a considerable impact on livestock production, because in particular the humid regions of Chontales and Boaca, the two most important livestock departments, are affected by 'contra' activities. The seasonal migration of cattle from the dry to the rainy zones is hampered by the war. Illegal slaughter seems to have increased making production figures less reliable. But beef exports have declined partly in response to lower export prices.

3. The structure of Nicaragua's agro-export sector

In the first section it was emphasized that the export-led growth model of the Central American countries gave rise to a dual economic system. In the course of time export agriculture was concentrated in large estates, traditional semi-feudal haciendas in the past and modern capitalistic estates in contemporary agro-export development. Every round of agro-export expansion brought loss of land and new forms of subordination to small farmers. Such dualism served to draw cheap labour from the peasantry. In Nicaragua this dualist nature of the agricultural economy is undeniable but less pronounced than in other Central American countries. Probably as a consequence of a much lower man/land ratio in Nicaragua and of its relatively late development of the agro-export sector, land

distribution is less skewed and a class of medium size farmers has a higher participation in export crop production. This specific class is defined by a farm size between 35 and 350 hectares, those with smaller farms (I) dispose of between 35 and 140 hectares, those with larger farms (II) of between 140 and 350 hectares. In the livestock sector land-use is more extensive and a farm size double as large is used to define this class and its subclasses. Medium-size farmers directly participate in farmwork, although they also hire wage labour. They try to maximize profits and thus respond to prices and economic incentives, but because of their dependence on commercial, financial and agro-industrial capital their surplus often is exacted (Kaimowitz, 1986:103). In Table 1, based on Warnken's elaboration of the agricultural census of 1971, the contribution to gross production is presented for the different classes in the agrarian sector. With respect to the livestock sector the figures indicate participation in livestock numbers as the contribution to production is more difficult to establish.

Table 1

Contribution to production of export crops and participation in livestock numbers by classes of agricultural producers, 1970/71
(percentages)

classes	farmsize	sugar	cotton	tobacco	coffee	sesame	livestock*
subfamily and family farms	< 35 ha	3.4	5.3	46.0	52.1	71.7	21.6
medium size farmers I	35-140 ha	8.5	17.6	40.6	36.8	8.3	29.0
medium size farmers II	140-350 ha	9.6	34.7	6.0	8.4	20.0	12.3
large capitalist estates	> 350 ha	78.5	42.4	7.4	2.7	-	37.1

* In the livestock sector farmsize limits are < 70 ha, 70-350 ha, 350-700 ha and > 700 ha

Source: Agricultural Census 1971, as reproduced by Warnken (1975: 34, 36)

These data indicate that the contribution of medium size farmers to exports was substantial. For 1970/71 it can be estimated that the smaller medium size farmers contributed a 24 percent of the value of export of crops, the larger ones participated with 21 percent and family and subfamily farms with 25 percent.

Together these classes provided about 70 percent, whereas the agrarian bourgeoisie, the large capitalist estates contributed 30 percent of the export value of crops. With respect to the livestock sector it can be estimated that large capitalist producers had a larger share in beef exports. Smaller livestock farms tend to specialize more in cattlebreeding and larger farms in fattening, which is the last stage of the cycle. Small and medium producers provide part of the animals to the large ranches, and these in their turn sell to the export slaughterhouses and meatpackers.

The Sandinist regime did pay much attention to export agriculture, in various ways the agro-export sector received priority in economic policy. But developments in the international economy, the growing military conflict, the U.S.-supported 'contra' war and the political opposition of the agro-export bourgeoisie has made these policies less and less successful. But it has also been stated that the Sandinist policies were hampered by a misconceived perception of the structure of the agro-export sector (Baumeister and Neira, 1986:294-300; Vilas, 1984: 107; Kaimowitz, 1986:101).

Kaimowitz states that the Sandinist perception of prerevolutionary agrarian structure was one of a dualist model with an agrarian bourgeoisie and a semi-proletariat as the two most important classes. In this perception Nicaraguan agriculture was characterized on one side by a modern agro-export sector dominated by an agrarian bourgeoisie and on the other side by a traditional food producing sector made up by semi-proletarians who cultivate basic grains, but also depend on seasonal wage labour in the agro-export sector. In this view the large agro-export bourgeoisie before 1979 had used their influence on the state to displace the peasants from the potential cotton and livestock land and subsequently to prevent that they got access to the land on the agricultural frontier (Kaimowitz, 1986:104). The emerging dualism was considered to have been functional in creating a semi-proletarian labour force which could provide cheap seasonal labour and cheap food.

From this perception stemmed the emphasis on state farms and the attention for those production sectors where the large agrarian bourgeoisie was dominant (ibid, 1986:107). The land confiscated from the Somozas was converted into state farms because this was seen as a continuation of large-scale, capital intensive farming brought about by the agrarian bourgeoisie. In this view the bourgeoisie had achieved capital formation, modernization and growth, and the state farms and the remaining agrarian bourgeoisie were expected to continue this role. Thus it was considered necessary to provide strong economic incentives to the agrarian

bourgeoisie in order to stimulate them to continue production. On the other hand this model required the continued existence of a semi-proletarian class to provide cheap seasonal labour to the agro-export sector and cheap food to urban areas. Thus redistributive land reform and real wage increases were perceived as inconsistent with this dualist model.

The opposing view argues that Nicaraguan agriculture cannot be simply defined as a two-sector, two-class model. Baumeister in particular states that the agrarian bourgeoisie is a less numerous class than is supposed in the dualist model. In his view there is a substantial middle class of medium size producers. A class without much political influence and control of the state, but with a significant participation in export agriculture. As this class lacks the political power to create and reproduce a semi-proletariate, one can hypothesize that in his model this semi-proletarian class must be much smaller than in the dualist model. Baumeister and Vilas consequently interpret the trend in the development of the economic active population not only as one in which a substantial 'peasantry' has emerged, but also as one of an increasing proletarianization. They call attention to the growing number of landless labourers who completely lost access to subsistence land. In their opinion the dualist model overestimated the role of the agrarian bourgeoisie and concomitantly of the semi-proletariate in agro-export activities.

The one-sided policy orientation on the state farms and the large agrarian bourgeoisie has been detrimental for the recovery and the development of the agro-export sector. The state farms incurred in substantial losses mainly because of the lack of experienced management. And the agrarian bourgeoisie opposing the revolutionary process and its government was not inclined to retake its role in capital accumulation. The foreign exchange intensive production methods of this class of producers and the over-generous credit provision it received from the government made the incentive policies costly. At the same time the role of the medium size farmers, of the family farms and of the rural proletariat has in their opinion been underestimated. Medium size producers and family farms require less incentives to produce and they have received less resources and government assistance than state farms and large capitalist estates. Redistributive land reform that could have stimulated landless and landpoor small farmers was held up. And keeping down real wages contributed to labour scarcity, which became a serious problem in export agriculture. Kaimowitz (1986:113) argues that the 1985-switch in land reform policy, extorted by the war situation, came late and does not represent a complete change in agrarian policies, as the government continues

to invest substantial public resources in large scale projects.

As can be deduced from the presentation of the structure of the agro-export sector in Table 1, in this paper the simple two-sector, two-class model, that can be indicated with the concept 'functional dualism', is not considered valid as a general characterization of this sector. Small and medium size producers participate substantially in export agriculture and this situation should have important implications for agrarian policies. The second model, which can be designated as the 'farmer production model' better expresses this situation. It is evident that, at least up till 1985, the Sandinist policies have been onesidedly inspired by the dualist perception. But that is not to say that the two models are mutually exclusive. In section 4 for example it will be argued with respect to coffee production that in Matagalpa/Jinotega coffee is produced on large estates with still a considerable participation of semi-proletarians, whereas in the Pacifico Central region production is predominantly in hands of medium size and small farmers who hire a far more proletarianized labour force. Agrarian policies, in particular those related to labour availability for export crops, must take into consideration differences in structural characteristics and between crops.

In the following sections labour problems in Nicaraguan export agriculture (section 5) and in particular in the coffee sector (section 6) are discussed. Fieldwork data are presented to place the labour process in the context of the regional production structure and to discern the different nature of the labour problem in various production zones.

4. Production systems and class relations in coffee producing regions

The two models which represent different perceptions of the Nicaraguan agrarian structure are useful to explain different tendencies in post-1979 agricultural policies. However, it seems that neither can fully describe Nicaraguan reality. For one thing, significant differences between crops and between regions can be observed.

In this paper regional differences in coffee production systems and its related class relations will be shown. One of the authors made a new elaboration of the coffee data of the 1980/81 LTC-CIERA survey which have formerly been elaborated on a national level by Havens and Baumeister (1983). He also participated in the ongoing research of the Department of Agricultural Economics of the UNAN on

employment in the coffee sector in Nicaragua.^{1*} In this section production systems and class relations in the main coffee producing regions will be described. In the next section we will elaborate on the consequences of regional differences in types of producers, as well as on the distinct possibilities to overcome labour shortages by the various types of producers, which is currently a constraint for increasing coffee production.

In the Nicaraguan coffee sector there are three main producing regions. The departments of Matagalpa and Jinotega (Región VI) constitute the main region, with 52 percent of national production in 1980/81 (UNAG-ATC-CIERA, 182:23). The mountainous area of the Pacífico Central is the second area in importance. The departments in this area, Carazo, Masaya, Granada (part of Región IV) and Managua (Región III), accounted for 29 percent of national production. The third area is the Interior Norte (Región I), consisting of Estelí, Nueva Segovia and Madriz, where 17 percent of coffee was harvested in 1980/81. The agrarian structure and the man/land ratio are quite different in each region, which results in different labour relations.

Coffee production in the Pacífico Central takes place mainly on medium size farms with a high degree of specialization in coffee. On the average 64 percent of the land is under coffee, there are some other crops and a small area in pastures. Actually not much land is left unused, although the cooperatives have a high proportion of marginal land not yet incorporated in production. (UNAN-DEA, 1987b:4). Over time the coffee farms have decreased in size. Production growth and capital accumulation are attained not by extension of the farm area, but by intensification of production, in particular by increasing yields of coffee cultivation. The 1986/87 survey data of coffee farms show a relatively high level of technology in this production region, which can be observed in Table 2.

^{1*} The Department of Agricultural Economics of the UNAN (UNAN-DEA) has conducted pilot studies in the coffee sector during the 1984/85 harvest. A large survey among coffee pickers and producers in the Matagalpa/Jinotega region was organized in the 1985/86 season. In 1986/87 surveys were held among producers and pickers in coffee in the Matagalpa/Jinotega region and in Carazo (Pacífico Central), as well as among cotton producers and pickers in León/Chinandega.

Table 2
Technology level on Coffee Plantations by Type of Farm -
Pacífico Central
 1986/87, percentages

type of farm	modern	intermediate	traditional	in development	abandoned
private farms	77	14	6	2	1
state farms	93	-	-	7	-
cooperatives	76	2	19	3	-

Source: UNAN-DEA, 1987b:10

Technical change in coffee production can imply different changes: renovation of the coffee shrubs, intensive pruning, use of fertilizers, or mechanization of certain jobs such as irrigation, cultivation and spraying of chemicals. In this paper attention will be concentrated on the level of technology, that is on the use of certain varieties, pruning, and biological-chemical inputs. The level of technology determines yields per unit of land. Coffee in the Matagalpa/Jinotega region is produced on large, traditional haciendas that combine coffee cultivation with livestock activities. There are some other crops and part of the land is unused. The degree of specialization in coffee is low; on medium sized and large farms the crop is cultivated on approximately one quarter of the land. Expansion of the farm area is important for capital accumulation on most of these farms. As far as intensifying production is concerned this takes place by changing the product mix. First unused land is transformed in pastures and second coffee trees are planted or other crops are grown on this land. As can be observed in Table 3 technology levels on coffee plantations are lower in this region than in the Pacífico Central.

Table 3

Technology Level on Coffee Plantations by Type of Farm-
Matagalpa/Jinotega
 1986/87, percentages

type of farm	modern	intermediate	traditional	in development	abandoned
private farms	71	22	2	2	3
state farms	46	28	19	5	2
cooperatives	12	37	-	6	44

Source: see Table 2

Labour shortages are a main obstacle for both maintaining technology levels and upgrading and renovation of coffee areas. Therefore it is most important to analyze the labour situation in coffee production, taking into consideration the specific characteristics of the various production regions.

Table 4 indicates the class character of the coffee pickers by region.

Table 4

Social class characteristics of the labour force in coffee*
1980/81, percentages

Social classes	Pacífico Central	Matagalpa/ Jinotega	Interior Norte
semi-proletarian	25	33	50
agricultural proletaria	31	41	27
non-agrarian labourers	44	26	23

* Social classes are defined by allocation of family labour time. Semi-proletarians dedicated more than 10 percent of family labour time to own cultivation and less than 50 percent to wage work. Agricultural proletarians dedicated more than 50 percent of family labour time to agricultural wage work. Non-agrarian labourers did the same with respect to non-agricultural work, either wage work or own account activities.

Source: Clemens (1987:21), based on 1980/81 survey among coffee pickers by LTC/CIERA

As can be observed in Table 4, the 1980/81 survey found that semi-proletarian labour was less important in the Pacífico Central than in other coffee producing regions. This is the most populated area of the country where agriculture is predominated by medium size capitalist farms and in relative terms has been more modernized. Wage labour in coffee, according to the 1980/81 survey, was mainly supplied by proletarian labour, in particular by non-agrarian workers. The process of class differentiation in agriculture has advanced most in this region, with on the one hand the formation of capitalist farms and on the other hand peasants losing access to land. As indicated above, coffee farms over time have decreased in size, but reached relatively high levels of specialization and technology. The use of wage labour increased. In this process of modernization many peasants lost their land, or when they still disposed of a subsistence plot they only invested a small part of family labour in it.

The 1980/81 survey shows that in the Matagalpa/Jinotega region semi-proletarian labour was more important than in the Pacífico Central. As indicated above the large traditional livestock - coffee haciendas dominate agriculture in this region. Expansion of the farm area has been the characteristic way of accumulation of these haciendas. In that process peasants were reduced to a

semi-proletarian status within the region itself or displaced to the frontier area of Zelaya, Boaco and Chontales from where they migrated to the coffee areas in the harvest season to earn a cash income. As Matagalpa/Jinotega is the most important coffee region where half the crop is grown, labour demand in the peak season is substantial. The hacendados always had an interest in securing a labour supply for the coffee crop and they have been influential in the colonization policy that contributed to the provision of semi-proletarian labour. In this sense the Matagalpa/Jinotega coffee region represents more the model of 'functional dualism', whereas the Pacifico Central can best be characterized as the 'farm production model'.

In the Interior Norte region half of the labour force in coffee production in the 1980/81 harvest consisted of semi-proletarian workers. In this area coffee is cultivated by small producers and semi-proletarian labour is provided by peasants from the same region who supplement their wage labour with growing basic grains. The Interior Norte contributes less to national coffee production than the other regions, only about one-sixth of the total. Coffee growers were less influential in prerevolutionary governmental policy.

5. Labour problems in Nicaragua's agro-export sector

With the low man-land ratio in Nicaragua availability of labour power has been a long standing problem in agriculture. However, through monopolization of land by large landowners and the poor accessibility of large part of the country, employers have succeeded in maintaining sufficient supply of cheap labour power. In addition, Salvadorean and Honduran migrant workers were contracted in times of peak demand, during cotton and coffee harvests. As a result, agro-export production could make use of cheap seasonal labour power furthering its expansion in the 1960s and 1970s.

After the triumph of the Sandinist revolution policies with respect to the agro-export sector were directed at maintaining a high level of exports. But at the same time measures were taken to improve the lot of the peasantry and to strengthen the position of the labour class by promoting their organization. Growth of the agro-export sector could no longer be based on the existence of a labour reserve of peasants and landless workers with low incomes and lacking alternative employment opportunities, which forces them to offer their labour power on cheap terms. This contradiction is one of the central problems of the Sandinist development policy.

As could be expected, and has happened in other countries in revolution as well,

soon after 1979 labour shortages occurred in times of peak demand. Initially labour problems were most serious in cotton harvesting, but later the coffee sector met with even more problems. Several explanations for this situation have been put forward in the literature which are discussed by Weyland c.s. (1988).

The explanation given by different authors depend on their perceptions of the rural labour market, which is reflected by the model of the Nicaraguan agrarian structure they follow.

Initially, the Sandinist government, in accordance with the model of 'functional dualism', attributed labour scarcity to peasants who did not want to sell their labour power, since the opportunities to employ this labour on their own plots had improved. It was thought that to strengthen and to reorganize the peasant sector by redistributive land reform and complementary policies would be detrimental to agro-export production.

The 'functional dualism model' stresses competition between wages in harvesting and peasant incomes on own plots. After an initial rise of wages in 1980, real wages in harvesting have fallen sharply compared to producer prices of peasant crops as has been shown by Vilas (1984:401).

The 'farmer production model', in contrast, emphasizes other factors to explain the labour shortage. Competition between wages in harvesting and non-agricultural incomes and other agricultural wage labour are stressed. Besides, other factors are mentioned as well, such as labour productivity decline due to elimination of repression (Vilas, 1984:102, 348), and institutional factors like the loss of specific communication channels and intermediaries to recruit harvest workers (Colburn, 1983:15).

Irrespective of the two models, external factors have been important in the development of labour scarcity in the agro-export sector. Initially, labour supply decreased because of the international migration from Honduras and El Salvador ceased. Since 1983, the war has severely interrupted the functioning of the rural labour market.

When considering policies with respect to wages and land reform, it can be concluded that cheap labour policies towards the agro-export sector have not disappeared after the revolution. However, because of falling labour productivity and rising opportunities for earnings in other activities, labour supply falls short of demand. Therefore cheap labour policies have in effect become an impediment for growth, or even maintenance, of the agricultural exports.

6. Labour problems in coffee production

Comparison of survey results among coffee pickers in the Pacifico Central (1986/87) and the Matagalpa/Jinotega region (1985/86 and 1986/87) on large farms with 1980/81 data of pickers on large coffee farms in these regions shows that in both regions participation of non-agricultural workers as well as of semi-proletarians has decreased (Aznar, 1986; Clemens, 1987; UNAN-DEA, 1987b; UNAN-DEA, 1987c). The agricultural proletariat now is the main source of labour for the coffee plantations, and to keep workers attached to the farm producers are offering subsistence plots to permanent and even to seasonal labour.

In the Pacifico Central a slight reduction of semi-proletarian labour and a sharp decrease of the participation of non-agricultural workers can be noted. Real wages in coffee harvesting have not kept up with incomes from own account activities of farmers and informal sector workers. Participation of informal sector workers, contributing to 25 percent of total labour force, was quite important in this region during the 1980-81 harvest. It can be noted that most of them lived in rural areas or small towns and picked coffee in the same municipality where they lived. It seems that above all rising profitability of trading and small industrial production, compared to wages in harvesting, have caused them to withdraw labour from coffee picking.

The 1985/86 and 1986/87 survey in the Matagalpa/Jinotega region show a decrease of the participation of the semi-proletarian labour force, compared to the situation on similar sized farms in 1980/81. In that harvest season large private farms were still able to contract a relatively high number of migrant workers, most of them semi-proletarians, from agricultural frontier areas. On these farms 46 percent of coffee pickers came from outside the department, compared to 28 percent of coffee pickers on large state farms. Lower migration to state farms can be explained by the breakdown of traditional recruitment channels, in line with Colburn's argument (1983:15).

In the following years migration to large private farms decreased sharply as well, as a consequence of the reduced mobility of the frontier peasants. In the 1985/86 harvest only 12 percent of coffee pickers on large farms came from outside the department. The war situation makes seasonal migration to the coffee plantations more difficult. At the same time the competition between wages and food cultivation has turned against wages. Many peasants have also been evacuated from the war zones to the Matagalpa/Jinotega region and in part have joined the agrarian proletariat which now represent more than half of the labour force in coffee production. The participation of non-agricultural labour has decreased as well as was the case in the Pacifico Central. With respect to the Interior Norte

region it should be mentioned that this region is most affected by the war. However, no recent survey data are available to document the changes in labour supply in this region.

The shortage of labour in coffee production, according to information provided by the producers, is more serious in the Matagalpa/Jinotega area than in the Pacífico Central. The latter is more densely populated and less affected by the war. If a distinction is made according to type of farm, the survey data of 1985/86 and 1986/87 indicate that the large private farms are suffering most of the labour problem. State farms resolve their labour shortage in part by the employment of voluntary labour, the 'brigadistas'. The cooperatives depend less on the hiring of wage labour because they dispose of the employment of the membership and their families. In the Matagalpa/Jinotega region, however, the cooperatives have a high proportion of traditional coffee varieties with lower labour productivity, making it more difficult to hire labour when the same piece rates are paid. Moreover, the cooperatives have received plantations with a high proportion of abandoned coffee land (see Table 3). To recover this area they actually need to invest more labour than under normal conditions, and therefore they have substantial labour problems too.

With respect to the traditional labour force in the coffee harvest there are some differences between the private farms and cooperatives on the one side and the state farms on the other. The information of the 1985/86 survey indicates that private farms and cooperatives make use of personal relations to get in touch with outside labour. This results in the contracting of groups of workers, often formed by members of one family. The state farms have a more bureaucratic way of contracting labour; a larger proportion belongs to the agricultural proletariat, whereas more workers are hired individually instead of in groups. One of the characteristics of this agrarian proletariat, however, is that they spend more time on the coffee harvest than non-agricultural or semi-proletarian workers. The state farms also contract more permanent labour which reduces their labour shortage in the harvest season.

The labour shortage is not only a problem in harvest time, but also in the slack season, when the coffee crop requires substantial care of a labour intensive nature. The demand for labour in the slack season depends on the cultivation technology of the crop. Under modern conditions three times more labour is needed than under traditional production methods, under intermediate conditions this factor is about two times. Labour input in the slack season is needed for pruning, irrigation and spraying of fertilizers and pesticides. On medium sized plantations wage labour must be hired for these tasks. In the actual situation

labour supply falls short of demand also in the slack season, which makes it difficult for producers to maintain the level of technology that has been reached. At the same investments in coffee renovation and in new plantations are low. As the lifetime of a modern plantation is about 10 years, a substantial rate of substitution is required. The data in

Tables 2 and 3 on the percentages of total area in development indicate that investments are insufficient to replace older plantations, let alone to increase the acreage of coffee with modern cultivation technology. Large private producers retain investments because they lack confidence in the political and economic situation. But labour shortage in the slack season is an obstacle for investment also for the state farms.

As is the case with labour for harvesting the coffee, large private farms have most complaints about labour shortages in the slack season. That is, they have more difficulties to maintain the level of technology and more obstacles for investment.

State farms have less problems in the picking season because they use voluntary labour, but although they employ proportionally more permanent labour than the other types of farms, they also suffer from labour scarcity in the slack season because the 'brigadistas' are only available in harvest time. The cooperatives in Pacifico Central were the only ones reporting that they had no labour problem in the slack season. Yet the area they had in development on the moment of the 1986/87 survey was low (see Table 2).

7. Policy options to reduce labour problems on coffee farms

Possibilities to overcome labour problems and perspectives to adapt to the situation of labour scarcity differ by type of farm and by region.

Large private farms have most difficulties to cope with labour shortages. They are less able to maintain their plantations and thus maintain its productivity and less willing to invest in renovation. Production will decrease gradually and so will labour demand. In the Matagalpa/Jinotega region where the degree of specialization is low, producers are more inclined to gradually abandon coffee cultivation and to switch to other activities. In the meantime they make an effort to retain permanent and seasonal labour by providing them a subsistence plot.

The state is counteracting the labour problems by the mobilization of volunteers. Students and government workers are requested to pick coffee for some time, and since 1985/86 they are given material incentives. In the 1985/86 harvest nearly

20,000 'brigadistas' have been mobilized compared to the employment of 41,400 traditional pickers. So they represented 32 percent of coffee pickers. As their average productivity, however, is lower (3,1 tins per day, compared to 4,4 tins per day for traditional pickers), and the average picking period is shorter, their contribution to production was less, namely 12,4 percent (Gieskes y Valkenet 1986:55). State farms get priority in their assignment, and for cooperatives and private farms relations with regional authorities are important to have access to voluntary labour. In addition, state farms got more experienced volunteers, who picked a longer period than those on cooperatives and private farms.

As stated before, the cooperatives, which can dispose of the labour of its members and their families, face less labour shortages. The cooperatives in the Matagalpa/Jinotega region in the process of land reform received marginal plantations with a high degree of traditional technology and a high proportion of abandoned coffee land. But the cooperatives in the Pacífico Central are in a somewhat better situation and they have no labour problem in the slack season. That makes it possible for them to invest in technological change and renovation of the coffee crop. If this will occur depends on the profitability of coffee cultivation compared with competing activities and on the pressure the members exercise to increase subsistence activities.

The situation on family farms so far has not been investigated sufficiently, but it is supposed that these can cope with labour problems in the same way as the cooperatives. Family labour can play an important role and personal relationships will be helpful in labour recruitment.

In the long run technological change is an important way to counteract labour problems. Higher labour productivity reduces the number of workers that need to be employed and provides the basis for higher wages. Labour productivity of picking of modern varieties, if well pruned, is much higher than that of traditional varieties which predominate in Nicaragua. But as indicated, the actual efforts in technological change and renovation are insufficient to produce such an increase in productivity. The state programme CONARCA has been criticized because of its large scale, the low efficiency and the reduced participation of the farmers involved. It also employs a high proportion of the scarce technical personnel available in the country. It can be hypothesized that, because of their better access to the local labour market and to family labour, cooperatives and family farms would be better able to modernize coffee plantations and increase labour productivity than state farms and large private farms. This would require sufficient support for these classes of producers.

As has been stated, the role of semi-proletarian labour is already quite small in the Pacífico Central and is decreasing in the Matagalpa/Jinotega area. Land reform is not the cause of the relatively small contribution of semi-proletarians to labour supply on coffee farms. Upholding land reform, aimed at maintaining 'functional dualism', will contribute little to diminish the labour shortages. On the contrary, in the short run providing access to subsistence land seems to be a condition even to retain the agricultural proletariat in the coffee sector. In the longer run, land reform which establishes cooperatives on coffee land may contribute favourably to resolving the labour problems.

8. Conclusions

After World War II Nicaragua experienced rapid economic growth which was led by the increase of agricultural exports. Expansion of export agriculture, in particular of cotton cultivation and ranching, displaced many peasants from their land, as had been the case in the past when coffee was established as an export crop. This process depressed the rural labour market, where cheap seasonal labour power became abundant that was hired in as cotton pickers and coffee harvesters. After the revolution the Sandinist regime aimed at maintaining a high level of agro-exports, but they were only partly successful. Cotton production decreased to a lower level as did coffee production from 1985 onwards. Minor export crops maintained their production levels, but beef exports fell sharply. Combined with falling export prices of agricultural products, and of rapidly decreasing industrial exports, this gave rise to a serious trade balance deficit.

Even the lower production of cotton and coffee met with labour problems, especially in harvesting. Cheap labour policy continued, but among other factors the increasing profitability of own account activities, both in the informal sector and on own plots, led to a decreasing supply of seasonal labour power. Cotton picking was increasingly mechanized (reaching a level of 50 percent of the total harvest in 1986/87), thereby further reducing its capacity to generate net foreign exchange. Coffee picking is dependent upon the mobilization of voluntary labour that picked about 12 percent of the relatively small harvest of 1985/86. To expand agro-export production labour availability has become an impeding factor, which should be taken into account when policies are designed. Future prospects differ per product, per region and per type of producer. In the paper the case of coffee was examined. Although voluntary labour in this crop is useful in the short run to overcome the labour shortages in the harvest season, in the longer run the labour problem should be counteracted by productivity increases.

In this respect labour shortages in the slack season are more serious because they make technological change and labour productivity increase more difficult. Conditions for modernization of technology and renovation of coffee plantations seem to be more favourable in the Pacífico Central than in Matagalpa/Jinotega due to the different structure of the coffee sector in both regions. In this respect conditions seem also more favourable for cooperatives and probably for family farms than for large private growers and state farms, especially because they have less labour problems in the slack season.

In the case of cotton the lower foreign exchange margin which results from mechanization is an important reason for the planned re-organization of this sector. Cotton cultivation which had expanded excessively will be gradually restricted to areas with optimal conditions. World market prospects for sugar seem so gloomy that the prospected expansion of sugar cane production might not take place. Beef production has not yet recovered and there is no information that large farmers are building up their herds. Internal consumption leaves a decreasing margin for export.

As most minor agricultural export crops seem to be largely produced by small farmers it seems that expansion of these crops can be furthered by selective policies directed at small producers. Redistributive land reform can be compatible with policies to further agro-export production. First, allotment of plots to workers on large farms in the agro-export sector can help to retain labour on these farms, as was shown for the coffee sector. Second, land redistribution to small farmers individually or in cooperatives may well enhance their production of export crops, if additional policies are implemented. Credit policy, input provision, technical assistance, and research for suitable innovations, should be part of the package necessary to expand agro-export production in the small farmers stratum.