

SMALL SCALE FARMING IN BARBADOS, ST. LUCIA AND MARTINIQUE

JANET D. MOMSEN

INTRODUCTION

Over the last two decades much has been done to analyse the functioning of individual small scale farms in the West Indies (Jolly, 1956)¹ and a great deal of information has been gathered, particularly with reference to Jamaica (Edwards 1961;² Found 1966;³ McCulloch 1969),⁴ but it is sixteen years since a conference was held on this specific topic (Caribbean Commission 1954).⁵ Today we have a broad picture of small farming in the West Indies, but lack detailed information on the interrelationships of the economic, social and agronomic aspects of the small farm.

The historical development of small scale agriculture follows a similar pattern throughout the West Indies.⁶ There was some pre-nineteenth century small farming by Americans, poor whites, and manumitted and runaway slaves. This occasionally left traces of specific areas, but on the whole Caribbean small scale agriculture is a post-emancipation development.⁷ These small farmers of the nineteenth century opened up new frontiers of settlement and cultivation in the hitherto uncultivated Crown Land areas of each territory.⁸

¹Jolly, A.L., *Readings in Small Scale Farming*, Port of Spain, 1956, pp. 47;

²Edwards, D.T., *An Economic Study of Small Farming in Jamaica*, University of the West Indies. I.S.E.R., Kingston. 1961, pp. 370.

³Found, W.C., *Land Use Patterns and Problems in Selected Land Settlements in South Central Jamaica: a study in multiple regression analysis*. Unpublished Ph.D. thesis. University of Florida, 1966.

⁴McCulloch, C., "Sociological Considerations in Planning for Agricultural Development". Paper read at the *Jamaica Agricultural Society Conference*, Jamaica, July 1969.

⁵Caribbean Commission, *Caribbean Small Scale Farming*. Prepared for joint conference, on Education and Small Scale Farming. Trinidad, 1954.

⁶Momsen, J.D., *The Geography of Land Use and Population in the Caribbean with special reference to Barbados and the Windward Islands*. Unpublished Ph.D. thesis University of London. 1969.

⁷Marshall, W.K., "Peasant Development in the West Indies since 1838". Paper read at the *Third West Indies Agricultural Economics Conference*, Jamaica, April 1968.

⁸Even in Barbados where there was no Crown Land for colonisation, small farmers moved onto land on the margins of plantations hitherto considered unsuitable for cultivation.

They had more in common with the homesteading frontiersmen of the New World than with the traditional village-orientated European peasant farmer. The West Indian small farmer responded to the 'export explosion'¹ brought about by improved transport and communications, and increasing world trade by developing new cropping patterns. In the face of sugar-planter defeatism the small farmers were the innovators of the nineteenth century introducing the cultivation of cocoa, bananas and spices and supplying local markets with vegetables and ground provisions. Today these small farmers are still in the process of adjusting to an unstable environment of growing population pressure and changing world trade patterns, and they are still searching for their role in the Caribbean economy.

This state of transition leads us to expect to find small scale farms in the West Indies at different stages in the gradation from a strongly subsistence to an intensely commercialized and export-oriented system of cultivation. This is reflected not only in variations in the proportions of cash and subsistence crops, but also in differences in the factors of production. Some farmers depend entirely on unpaid family labour whilst in other cases paid labour is dominant. Again the optimum use of land may be restricted by communal 'family' ownership or sharecropping. Technological inputs will also vary from place to place and affect yields and intensity of land use. Yet it is expected that the content and order of these stages of development will be similar for all parts of the Caribbean. Consequently any model of small scale agriculture must take this dynamic aspect into account.

The general model of small scale agriculture as drawn up by anthropologists and sociologists² is totally inapplicable to the West Indies. The ties to the land build up over centuries, the lack of knowledge of the outside world, the resistance to innovation, ----- none of these characteristics is

¹Myint, H., "The Peasant Economies of Today's Underdeveloped Areas". In *Subsistence Agriculture and Economic Development*. Edited by C.R. Wharton Jr., Chicago, 1969, pp. 99-104

²Rogers, E.M., "Motivations, Values and Attitudes of Subsistence Farmers: Towards a Subculture of Peasantry. In *Subsistence Agriculture and Economic Development*. Edited by C.R. Wharton Jr., Chicago, 1969, pp. 111-135.

typical of Caribbean small scale farmers.¹ In order to generate a model of small scale agriculture for the West Indies integrated surveys covering economic, social, agronomic and environmental factors must be undertaken. The relationships between the various aspects of small farming must be measured and the spatial patterns relating to them ascertained.

It may be hypothesized that although there is a strong common basis amongst the characteristics of small scale farming in the region, there are certain inter-territorial variations resulting from differences in physical environment and culture. In order to test this hypothesis small scale farming was studied in Barbados, St. Lucia and Martinique, islands which represent the major variants in physical and cultural environment found in the Eastern Caribbean. On each of these three islands a random sample of approximately 200 small farms was visited and questionnaires completed covering between 28 and 32 different aspects of small scale agriculture.² The complete data matrix contained 18,576 pieces of information for 611 farms of less than 25 acres (10 hectares), distributed widely throughout Barbados, St. Lucia and Martinique.

The Interrelationships of the Characteristics of Small Scale Farms

A few variables were found to be highly correlated in each of the islands surveyed.³ These variables fall into three groups: those concerning the farm family; those relating to the farmer's managerial ability; and those describing the qualities of the soil on the farm. In all three islands the most strongly marked correlation was that between the total size of the farm family and the number of children under 15 years on the family. From this it may be deduced that youngsters on attaining working age prefer to seek job opportunities outside agriculture rather than stay on the family farm. High correlations were also found between the farmer's attitude to farming and his efficiency level in all the islands studied. In St. Lucia and Martinique there was some relationship between the farmer's education attainment and farming efficiency and attitude but in Barbados, where the general level of education is higher, this relationship was not apparent.

Many of the intercorrelations between the variables describing the soil characteristics associated with small farms were common on all three islands. A positive correlation between soil

quality and depth and a negative correlation between the depth of soil and the degree of stoniness was found for farms surveyed. This would suggest that depth of soil is one of the basic parameters in the physical environment of the small farms. It is noticeable that in Barbados, St. Lucia and Martinique shallow soils are found in all the areas perceived by small farmers as being generally hostile to agriculture. A close relationship was also found between the slope of the land on the farm and the degree of erosion. Erosion was not generally associated with poor farming techniques on the farms surveyed. It would seem that although better farming practices might reduce the damage caused by soil erosion, it is on the whole the physical attributes of the small land holding which determine the extent of soil erosion present.

In certain cases variables showed high inter-correlations in two of the islands surveyed but not in the third. In Barbados and St. Lucia a marked relationship between the distribution of cash crops and that of sugar cane and bananas respectively emphasised the commercial monocrop agriculture of these islands. In both Martinique and Barbados the size of farm had a positive correlation with labour and livestock, but this relationship was not important in St. Lucia. Martinique and Barbados also displayed a marked spatial pattern of land values with farm land prices decreasing as distance from the main town increased. It was not possible to test this relationship for St. Lucia as an adequate sample of land values could not be obtained.

SPATIAL ANALYSIS

Intra-territorial

In each of the islands certain less favourable areas were noted which, nevertheless, had distinctive land use patterns. Amongst food crops, corn was more important than root crops in the dry, shallow soil areas especially in Barbados, and minor cash crops such as tomatoes and ground-nuts often replaced the dominant export crops. Livestock production for meat showed some tendency to be concentrated in the drier parts of the islands where natural pastures are found. Specialization in livestock is most noticeable in Martinique where 43 per cent of all the cattle and 36 per cent of the dairy cows counted in the survey were located in the Morne Verte area and 45 per cent of the sheep in the dry Ste. Anne district with shallow stony soils.

The land use pattern was also influenced by the presence of major urban centres, hotels and processing plants. Farms situated close to the main towns of the three islands tended to be of two types. Firstly, some of these peri-urban farms were operated on a part-time basis by people with full-time jobs in the town. These farmers received the main part of their income from non-farm employment and should, in many cases, be classed as

¹Braithwaite, L., "Social and Political Aspects of Rural Development in the West Indies. Paper read at the *Third West Indies Agricultural Economics Conference*, Jamaica, April, 1968.

²See Table 1.

³Five correlations in the St. Lucia data, six for Martinique and eight for Barbados were significant at the 0.1% level.

middle-class 'hobby' farmers. They grew mainly food crops and vegetables for home consumption with some land kept in a major export crop such as sugar cane. The second type of farm found near urban areas was that specialising in the commercial production of vegetables and dairy products for the local market. This pattern is most noticeable in Barbados and Martinique where Bridgetown and Fort-de-France contain a population of sufficient size and buying power to generate a considerable market for produce from such farms. Hotels catering to the tourist industry influence the land use pattern by offering contracts to nearby farmers for the supply of particular vegetables or food crops. This effect was already noticeable in the St. James and Christchurch coastal areas of Barbados in 1963. It is believed that there has been a similar development around Castries in St. Lucia with the recent growth of hotels since the peasant farm survey was undertaken. Processing industries, such as pineapple canning in Martinique and the production of dried milk in Barbados have also shown a tendency to encourage local farms to concentrate on supplying these industries.

Inter-territorial

Differences between the three islands were found for many of the variables studied. Many farm characteristics were similar in two territories, but differed in the third and no two islands were consistently alike over the whole range of the 32 variables in the surveys. In order to examine these inter-island differences as measured by the variables used we may allocate the characteristics of small scale agriculture to five groups:

- (a) institutional (farm size, fragmentation, land value, land tenure);
- (b) land use (export crops, non-export crops, livestock);
- (c) operational (distance to market, farm labour force, off-farm employment, the farm family, mechanization, water supply, fertilizer input, transport availability);
- (d) physical (soil quality, slope, depth of soil, stoniness, soil erosion);
- (e) and managerial (farm efficiency, attitude to farming, education level of farmer, woman's role on farm).

(a) The institutional variables did not differ widely from island to island. Farms were, on the average largest in St. Lucia and smallest in Barbados reflecting differences in population pressure and settlement history. The number of parcels making

up the holdings averaged between one and two per farm in all three islands although the distance between the housespot and the furthest parcel was greatest in St. Lucia. The size and fragmentation of small farms is strongly influenced by the cost of agricultural land. Land values were consistently higher in Barbados than in Martinique as a result of the greater pressure on land in the smaller island and perhaps the slower development of competition for land from the tourist industry in Martinique. Despite high land values and cultural and political differences, two-thirds of the small farms sampled in each island were held in freehold ownership. For the minority of farms which were not freehold those cultivated under a system of sharecropping were more common in Martinique than in the other two islands.

(b) Inter-island land use variation was strongly influenced by cultural differences as well as by political and physical factors. The three territories vary considerably in the average proportion of the land on a small farm which is cultivated in cash crops, from 71 per cent in Barbados to 24 per cent in Martinique. However, the vast proportion of farms in the Commonwealth countries had some cash cropping whilst almost half the farms surveyed in Martinique had no commercial production at all. Yet even in this last mentioned island the average farm's acreage in food crops did not exceed that in cash crops. The Barbadian farms surveyed had an average of one-quarter acre of food crops whilst the figure for St. Lucia and Martinique was approximately half an acre. If it takes two acres of food crops to support a family of five¹ then given an average total farm size of less than 3 acres it seems impossible that the small farmer can achieve self-sufficiency in ground provisions whilst maintaining a farming system in which export crop production is important.

Almost all the vegetables and ground provisions supplied to local island markets come from small farmers, but this supply is often merely the seasonal surplus of subsistence production. However, more of the farms sampled in St. Lucia grew vegetables than in the other two islands and food crops were more widely grown in St. Lucia and Martinique than in Barbados emphasizing the importance of export crops in Barbadian small scale agriculture.

Within the range of basic food crops there are very marked individual island preferences. Barbadian small farmers show a preference for yam, maize, eddoe and sweet potato. St. Lucia is characterized by the prevalence of tannia, a root crop only rarely grown in the other islands studied. In St. Lucia and Martinique dasheen is widely grown

¹McKigney, J.I., "The Importance of Nutritional Considerations in Agricultural Development Planning". Discussion. Paper read at the *Third West Indies Agricultural Economics Conference*, Jamaica, April 1968.

on small farms while this root crop was not reported by any of the farms in the Barbados survey.

In all three of the islands four-fifths of the farms surveyed had both fruit trees and animals. Cattle and sheep were found on nearly half the farms in each of the three islands, but horses, mules and donkeys were more frequently found on the farms in Barbados than in St. Lucia or Martinique, reflecting the greater prosperity of the Barbadian farmer. In Martinique some unusual farm animals such as rabbits, pigeons and fighting cocks were noted indicating cultural differences between the French and Commonwealth islands in both cuisine and sport.

Land use on small farms in Martinique, St. Lucia and Barbados illustrates some of the major differences between the agricultural systems of the islands. St. Lucian and Martiniquais small farming is less closely orientated to commercial export production than that of Barbados. There are differences between the three islands in the frequency of occurrence of specific crops. The spatial pattern of land use also differs with areal specialisation being more noticeable in Martinique, where it has been encouraged by government land use planning, than in the two Commonwealth islands.

(c) In terms of the operational variables Barbados stands out as being considerably higher up to commercial and technological scale than the other two islands, with even distance to market having a more marked effect on farm operations than in St. Lucia and Martinique. Most farms in Barbados employed two workers for at least four weeks in the year whilst in St. Lucia and Martinique very few farms utilized non-family labour. In Barbados only 17 per cent of the farms surveyed had no paid labour whilst for St. Lucia and Martinique the figures were 76 per cent and 81 per cent respectively. In Barbados 33 per cent of the work force on the farms surveyed was provided by the farm family and 4 per cent by non-family unpaid workers, whilst paid labour made up the remaining 63 per cent.

Off-farm employment amongst small farmers is a well known characteristic of Caribbean farmers. In Barbados the proportion of farmers with non-farm jobs was 62 per cent, in Martinique 56 per cent, but in St. Lucia only 36 per cent of the farmers surveyed worked off the farm. These figures reflect the greater diversity of the economies of Barbados and Martinique, with consequent larger job opportunities, as compared to that of St. Lucia. For those farmers with off-farm jobs the average number of days per week spent working off the farm was 3 to 4 in Barbados and St. Lucia and 4 to 5 in Martinique as a result of cultural differences in working patterns. In all three islands the most common occupation of the small farmer was that of plantation labourer. In both St. Lucia and Martinique a few farmers were also part-time fishermen, but this occupation was strongly localized. In Barbados jobs

in the professions, retail trades and crafts were more common than on the other two islands reflecting the general higher educational attainment of Barbadian farmers.

Farm facilities contained fewer children in Barbados than those surveyed in the other two islands. This is probably due to the differences between the semi-urbanized, largely Protestant, literate society of Barbados where family planning has government support, and the Roman Catholic, poorly-educated, rural societies of St. Lucia and Martinique. In Barbados, in addition, 41 per cent of farm families interviewed had no children living on the farm whilst the figures for Martinique and St. Lucia were 24 per cent and 14 per cent respectively. On about half the farms in the Barbados survey women took an active, if not leading, role in running the farm, but this proportion was much lower in the other two islands. Those farms on which women had the greatest influence tended to grow a larger proportion of market garden crops than did the average farm. These crops were sold by the women to increase their cash income.

The technical inputs of mechanization, means of transport, water supply and fertilizer showed a very similar distribution pattern to that of the other operational variables with Barbados being the most advanced. This island was the only one to have a high level of mechanization, transport and piped water supply to farms. Fertilizer use was reasonably high, at least for the export crops, on St. Lucia and Martinique but it was outstandingly high on Barbados where virtually all farmers used some form of fertilizer.

(d) The differences in the physical environment of coralline limestone Barbados and the two rugged, volcanic islands had less effect than had been expected on small scale agriculture. In all three islands the small farms were found to be located on the less fertile, more steeply sloping land whilst the best land was in the hands of the plantations. Stoney and shallow soils were widespread in Barbados than in the two volcanic islands although even in St. Lucia and Martinique certain localities did suffer from these disabilities. Soil erosion was noticed on a higher proportion of farms in the St. Lucia survey than on the other two islands.

(e) In terms of managerial factors Barbados also differed from the other two islands. Farm efficiency, attitude to farming and education level had higher scores amongst Barbadian farmers than they did in St. Lucia and Martinique. Every farmer interviewed in Barbados was literate and farming efficiency, including levels of fertilizer input, mechanization and water usage, was higher than in the other two islands where 37 per cent of the farmers surveyed in St. Lucia and 41 per cent of those visited in Martinique could neither read nor write. The most highly educated farmers tended to

be well motivated towards farming possibly because education allowed them a greater choice of occupation. These farmers also tended to be less dependent on agriculture as they usually had other income from non-farm employment. The farmers of lowest educational attainment, that is the illiterate, had a few alternative occupations open to them. They were thus forced into agriculture as a last resort and they formed, in most cases, the least efficient and least interested farmers. It would seem that education, or at least literacy, is the single most important element in determining the efficiency of small farming. Information on weather, market fluctuations and new agronomic practices can be much more easily disseminated to a literate population. In addition to the high level of illiteracy amongst Martiniquais and St. Lucian farmers the rural population of these two islands speaks a French patois which further cuts it off from the English or French-speaking administration.

By studying the results of these sample surveys it may be possible to suggest the characteristics of small scale agriculture which would benefit most from development inputs or which may be barriers to change. The following may be cited: the birth-rate in farm families and the general level of education in St. Lucia and Martinique; the high cost of agricultural land and the need for paid labour on small farms in Barbados; soil erosion and the low level of commercial agriculture in Martinique; the absence of piped water and mechanization on farms and the lack of opportunity for non-farm employment in St. Lucia; and the dominance of a single market centre in Barbados and Martinique have been identified as problems affecting small farming in the three islands.

THE INTERNAL STRUCTURE OF SMALL SCALE FARMING

In attempting to develop a general model from our study of over 600 farms we have an aggregate problem. Using a multi-variate technique, factor analysis, the structure of small farming, as determined by the characteristics sampled, can be identified by a smaller number of synthetic variables, or factors. For Barbados the original 32 variables were collapsed to form 12 new independent factors; the 28 variables for St. Lucia were reduced to 11 factors and the 31 variables for Martinique to 10 factors. These factors accounted for the total variation between the small farms that was apparent on the original variables. This method allows a complicated farming system such as that of small scale farming in the Caribbean to be described in terms of a few parameters.

There is a basic similarity between the factors recognized in all three of the surveys which suggests a common pattern in the underlying structure of small farming in the islands. The first two factors extracted approximately one-third of the total variance between small farms in each territory and

thus these factors are of major importance in describing the differences between the three islands in terms of small scale agriculture. The first factor was identified with the land use variables, especially the export crops, in the two Commonwealth islands whilst managerial attributes were most important on the first factor for Martinique. Factor I for Barbados differentiates between highly commercialized cane farms and the best commercialized farms which grew mainly ground provisions. This factor accounts for 17 per cent of the total variance. For St. Lucia this first factor extracted 19 per cent of the total variance and differentiates between the banana growing farms and the livestock enterprises. The first factor in the Martinique analysis accounted for as much as 25 per cent of the total variance and recognises the better-educated, more efficient farmers with large farms and high inputs of fertilizer and water usage. These managerial qualities and emphasized on the second factor for St. Lucia, but account for only 15 per cent of the total variance. Soil characteristics account for 13 per cent of the variance in both Barbados and Martinique and this second factor distinguishes between farms on shallow stony soils and those with deep soils.

In all three islands the five factors relating to managerial skills, soil quantity and erosion, farm population and employment accounted for at least half the total inter-farm variation. If we add to these five the factor of land use for St. Lucia and Barbados then two-thirds of the total variance has been extracted from the original data matrix. Thus factor analysis allows us to describe small agriculture in Barbados, St. Lucia and Martinique in terms of six synthetic variables or factors instead of the 28 to 32 variables originally used.

CONCLUSION

The analysis of small scale agriculture in three Eastern Caribbean islands allows certain conclusions to be reached concerning the original hypothesis of intra-territorial variation within a structural framework which is basically similar for all islands, St. Lucia and Martinique, despite being under different colonial influences during the last 150 years, have retained a large amount of cultural and social similarity. This is reflected in education levels, farming efficiency, resource use and family size. Physical differences reinforce cultural differences between Barbados and the other two islands. The two volcanic islands of St. Lucia and Martinique are considerably larger than Barbados and these differences are seen in farm size and distance measurements as well as in the environmental attributes of soil and slope. In addition, the land use pattern is affected by population density. This means that very little land is left uncultivated and there is much inter-cropping and double cropping in densely populated Barbados whilst in St. Lucia and Martinique there is less