A SURVEY OF PEASANT AGRICULTURE IN THE STREATHAM LODGE, SAINT AUGUSTINE, CUREPE AND MOUNT SAINT BENEDICT AREAS OF TRINIDAD

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PREFACE

The report concerns a relatively long settled area about which little information was available. The writer has endeavoured to sketch a general picture of the area, the problems occurring within it, possible potentialities and major recommendations.

Much of the data it contains should be of some value to other authorities besides the Department of Agriculture. Public Health Matters, Education and Civil Administration problems are discussed. Such social problems cannot be disregarded as they influence the efficiency of peasant agriculture.

The problems which confront peasant agriculture in these days of world food shortages and increasing populations are many. Thus the need for government attention and action is great if a satisfied and efficient peasantry is to be created or maintained.

The solutions to these problems can only be found after careful researches have been made into the peasant way of life. Such investigations must necessarily involve the increased use of surveys of peasant agriculture.

John S. Blacklock
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I. Introduction to the Survey and the Method of Survey

The field work for this survey was carried out between early January and late April, 1947. It was undertaken in conjunction with the normal studies of the post-graduate course. The work it involved was intended to give future agricultural officers some experience of field work which they would be required to undertake in the course of their duties.

Due to the limited time which it was found possible to devote to this work, the survey should be regarded only as a general account of the area in which cardinal points are emphasised. It virtually constitutes a pilot survey which would normally precede more detailed area work.

In this case the survey is a result of investigations made by a syndicate of four students, Messrs. Blacklock, Brockbank, Nichols and Wright. Each member submitted an individual report which was based on the observations made by the group.

Prior to undertaking our field work a questionnaire of leading points was compiled and was used as a basis for gaining relevant information.

Short tours were made through the area and peasants were spoken to both in the field and at home. Where possible individuals were cross questioned in the course of conversation so that some check could be made on the reliability of their information. After preliminary tours had been carried out individual peasants were selected representative of each area of cultivation. Such peasants were then regarded as criteria of that area.

When a tour had been completed the members of the group discussed cardinal points observed in the course of their work. The results of these group discussions were entered in individual log books and record sheets.

As this survey was undertaken wholly in the dry season much of the information regarding wet season conditions is purely the result of peasant information and personal inferences.
II. Boundaries of the Area Under Survey

As there are no well defined topographical features marking the limits of this survey the boundaries are best indicated by sketch maps 1 and 4.

III. General Description of the Area, Past History, Topographical Features and Climate

For the sake of reference the whole area of the survey can be divided into two well marked and distinct sub-areas, viz.,

1. The Lower Area extending due south of the Churchill-Roosevelt Highway with a small triangular piece of land to the north of it enclosed by Watts Street and Evans Street.

2. The Hill or Upper Area extending north of a line east to west along Gordon Street, to the ridge of the Tunapuna Mountain.

These areas are separated by the grounds of the Imperial College of Tropical Agriculture and the residential Saint Augustine area.

The Lower Area comprises the following estates, Streatham Lodge, St. Augustine and part of Curepe estate. Streatham Lodge and St. Augustine estates were entirely in cane cultivation 70 to 80 years ago. Due to the smallness of the units and the relative inefficiency of small factory extraction they eventually proved uneconomical to work as estates. Estate cane growing was discontinued and the land divided into lots and rented or sold to former plantation labourers or their descendants. Curepe Estate belongs to Caroni Estates Limited and was up till the depression of the 1930s worked as one of the estates supplying cane to the Caroni factory. After the depression the eastern portion was let to cane farmers who worked it under contract to the Caroni factory. The eastern portion of this estate on the survey boundary is at present derelict marsh and secondary bush. Caroni Estates Ltd. intend to re-assume direct control of this area at the end of 1947. Cane grown here is to be railed to end ground at the Brechin Castle factory which
at present is not working to capacity. Use of the Caroni factory is to
be discontinued as much of the equipment is obsolete.

The Hill Area in the upper northern slopes is comprised mainly of these
lands in the trusteeship of the Monastery of Mount Saint Benedict and
to a lesser extent by Crown Lands. The lower southern slopes of this area
are irregularly divided up amongst many private owners. The size of
their holdings varies greatly.

The crests of the topmost ridges are still in virgin forest.
Shifting cultivations have been practised on the lower slopes with
drastic erosion results. These slopes are covered in secondary bush and
savannah with spasmodic and irregular patches of cultivations. Derelict
groves of cacao occur in the more sheltered folds of the hills and in
valley bottoms. These are the remains of cacao properties which were in
existence 30 to 40 years ago. Owing to the impoverishment of soil,
disease and destruction of the trees together with high costs of main-
tenance they were abandoned and reverted to bush. Attempts are being
made to establish tree crops in the better soils and slopes of this area
and also to rehabilitate the derelict cacao. It would appear that recent
rises in the price of cacao have made the latter an economic proposition.

The lowermost slopes of the upper survey area, owing to their
pleasant situation and outlook are becoming a residential area. This
area is likely to extend further up these slopes in future.

Topographical Features

The Lower Area is characterised by being extremely flat. The 50 foot
contour passes roughly along the northern boundary and the 25 foot
contour for part of the way along the Tacarigua River.

The Tacarigua River runs for part of the way east to west
along the southern boundary of the survey and then cuts due south and
runs into the Caroni River. The Tunapuna or Dry River flows south
through the eastern part of St. Augustine Estate, cuts south-west
through Curepe Estate, where it is joined by a south-east flowing
tributary and continues its direction of flow south-west out of the
survey area.
The Trinidad Government railway line to the south runs diagonally on an embankment north-west to south-east through St. Augustine Estate area.

Map number I contains most of the features described above.

The Hill Area consists of the lower slopes and foothills of the Northern Range of mountains. For contours and features of this area see map number 4. The highest points on the crests of these hills are approximately 1500 feet high. Characteristic of foothills the slopes are very cut up by ravines, possibly the result of early geological foldings, slips and land movements. These ravines are very irregular in shape, size and conformation, The largest of these, the Tunapuna Ravine acts as the eastern boundary of the survey. It runs almost due north and south from the base of mount Tunapuna to below the Monastery slopes. Such ravines have extremely steep sides not suited to cultivations. Exceptions occur where pockets of better soil have been formed as a result of landslips leaving V-shaped depressions in hill sides.

The western boundary of the survey roughly follows a ridge running south-west from a point 1521 feet above sea level. This ridge characterises many of the derelict and eroded areas seen on the Northern Range. Its present bare state is a direct result of indiscriminate burning, deforestation and shifting cultivations. This has resulted in a slope covered with sparse secondary bush and poor grassland which, when dry readily catches fire leaving bare surface subject to further erosion in the wet season.

Climate

The climate of the area is similar to that of the rest of Trinidad, i.e., tropical, hot and humid.

The shade temperature for the area varies between 75 and 87°F.

The annual total rainfall falls into two classes, viz.,

1. Areas below the 100 foot contour, average annual rainfall varies between 60 and 80 inches.

2. Areas above the 100 foot contour, i.e. from 100 to 2000 feet, average annual rainfall varies between 70 and 90 inches.
The differences in mean rainfall are due to elevation effects. Seasonal fluctuations are the same for both areas.

IV. Commercial Situation of the Area—Distances from Markets

The whole of the survey area lies 8 miles due east of Port-of-Spain astride the Eastern Main Road to Arima and the Churchill-Roosevelt Highway to Port Road. Both the upper and lower areas are cross connected by roads running north to south between these two arterial highways.

Curepe and St. Joseph lie 1 mile and 1½ miles respectively due west of the area. Tunapuna lies half a mile to the east.

These four towns, Port-of-Spain, Curepe, St. Joseph and Tunapuna have markets for peasant produce. Tunapuna market, because it is the nearest, is the one most used by peasants lacking transport. The Port-of-Spain market is thus almost wholly confined to peasants of the area who possess a donkey and cart and who are willing to take their produce into town. It is estimated that the time taken to reach this market by donkey and cart ranges from 3 to 4 hours. This means that to go in and out of Port-of-Spain constitutes a whole day’s journey to the peasant cultivator.

The railway lines from Port-of-Spain to Arima and to San Fernando in the south run through the area. This relatively cheap and direct method of transporting produce to more distant markets appears to be little used by the peasant.

Caroni cane factory lies about 3½ miles from the Curepe area and the Orange Grove factory 1½ miles from the Streatham Lodge area.

V. Soils of the Area

Lower Area, See Map Number 2

This provisional soil map is part of E. M. Chessery’s most recent soil survey, 1946, which attempts to class the soils of the island according to the American system. Due to the recent nature of this work little information was available about the individual soil types of the area at the time of writing this report.
The following data was culled from Professor Hardy's course of lectures in tropical soils.

It would appear that the major part of the soils in the lower area are zonal soils which have been derived from such soil parent material as Northern Range detritus, river and marine alluvium.

The occurrence of an azonal detrital soil type in the north of the area is possibly the result of a smear of transported alluvial material from the Northern Range.

A high water table and marsh conditions seem to prevail in the intrazonal planosol areas. The specific effect of these conditions may have played some part in past soil formation.

In physical appearance the soils of the lower area are heavy and difficult to work and cultivate in the wet season. In the dry season they are characterised by extreme drying out and cracking.

The following general chemical characteristics would seem to hold good for the lower area soils:

1. **Acidity** was markedly high, possibly due to the major part of the soil parent material being composed of quartzose mica schist and to the waterlogging and impeded drainage of the soil for 5 to 6 months during the wet season.

2. **Organic Matter** was low, due to the continued cropping and very small returns of vegetable matter and pen manure to the soil.

3. **Nitrogen Status** was medium to low as a result of cropping with little or no replacement, especially in the cane growing areas. The nitrogenous manuring is confined to a standard rate of application per acre and not to crop and soil requirements.

4. **Available Potash and Phosphate** was also low, due to high acidity rendering them unavailable and to the lack of manuring.

**Upper Area**

As no other data was available the inferences in this section are based on the results of the analysis of soil samples taken by Messrs Jollans and Winter in the course of their survey. The sampling sites are marked on map number 4.
(1) **In Texture** the soils of the northern area were very variable, ranging from sands to silts. They also varied extremely in depth and many outcrops of rock occurred in the area. Due to their occurrence and physical nature these soils are relatively difficult to cultivate and are particularly suited to erosion and water transportation.

(2) **Acidity** was high all over the area except in one case, see G on map number 4. There it varied from slightly acid to neutral.

(3) **Organic Matter** varied from fairly high to low. Due to too few samples no conclusions or correlations could be reached about the effects of bush falls and cultivations on the soil humus content. It is possible that the repeated burning through of ground cover and consequent erosion minimise any beneficial effects of leaf fall from secondary bush.

(4) **C/N Ratio** was high in all samples except for one, see A on map, there it was very low. This denotes a deteriorated worn out soil not suited to further cacao growing.

(5) **Total Nitrogen** was medium to fairly high in all samples. As far as could be seen there was no correlated rise or fall with bush falls and cultivations.

(6) **Available Nutrients** were low in all samples except for one case, see G on map. There the value was in the very high status. It seems possible that at this point a very high lime content derived from shallow parent rock has this beneficial effect on the availability of soil nutrients and on acidity.

(7) **Available Potash and Phosphate** both were low to very low in all but two cases, see B and C on the map. There it varied from medium-low to medium-high. This was possibly due to an outcrop of rocks rich in potash felspar minerals.

**Recommendations**

As comparatively little data seems to be available about the soils of the survey area, detailed mamural experiments on each soil type would be necessary before any definite scheme of management and
marrual treatment could be proposed.

It is obvious that quick and easy returns cannot be expected from such impoverished soils. These will require careful management and marrual treatment if production is to be increased. The soils of the lower area would benefit greatly by heavy applications of lime in the cane growing areas. Increased applications of pen manure in the localities where ground provisions are grown would also give good results. Such treatment accompanied by balanced applications of potash and phosphate would do much to restore soil fertility in this area.

Upper area soils would benefit by similar treatments preceded by long periods of bush fallows which would not be subjected to repeated burning and consequent destruction of protective ground cover.

VI. Total Area of Land Under Survey, Areas Under Cultivation, Areas not Cultivable, Derelict Areas

In the lower area the total area of land under survey extends to some 650 acres. All of this was cultivated except for 40 to 50 acres of derelict land, marsh and secondary bush in the extreme west of the survey area in Curepe Estate. Unless extensive drainage and mechanical tillage operations are to be undertaken in this area the land should be classed as not cultivable by the peasant small holder.

Much of the rice land in the Streatham Lodge and St. Augustine areas is allowed to lie fallow in the dry season. Some of it, about one-eighth of the total rice acreage, near the centres of population is sown down with short growing period ground provision crops under a heavy mulch of rice straw. These are planted about mid-March, that is, midway through the dry season.

It is obvious that this land is not being so fully utilised as its potentialities would allow. Many isolated fallow areas also occurred in ground provision and vegetable lots.

The upper area runs to 1,100 acres approximately. At a conservative estimate only one-tenth of this land is under cultivation. Owing to the very broken nature of this area and to the unreliability of existing records it was impossible to determine accurately the
extent of peasant cultivations. It was obvious that the areas of derelict land and secondary bush were very great and possibly covered one-third of the total area. Many of the slopes at present cultivated could be classed as not cultivatable. Cultivations on such slopes apparently are continued for only two years and are then shifted to other virgin or secondary bush slopes.

The balance of the upper area land is under derelict cacao in the more sheltered parts and virgin forest in the higher and topmost slopes.

VII. Forest Trees: Potentialities of Timber Growing for Commercial Extraction

Except for a few isolated trees and clumps of bamboos along the Streatham Lodge boundary and along the banks of the Tacarigua River there were no trees of any economic importance in the lower area.

Trees of commercial value which occurred in the upper area were: Poul, Mahogany, Cedar and Cypress. These were of isolated occurrence being mixed with soft wood trees of little or no commercial value. Trees of any girth and size were mostly confined to the rear and more inaccessible areas as indiscriminate felling for fire wood and charcoal burning on the lower slopes had greatly reduced their numbers.

It appears that Mahogany and Cedar suffer extensive damage as a result of borer attack. These insects penetrate the bark near the base of the tree and allow secondary rots to penetrate. It also causes defoliation and dieback of saplings.

If any commercial extraction of timber is to be undertaken in this area, extraction and transport would constitute a major problem due to the very broken nature of the ground and lack of roads.

Recommendations

It seems feasible to suggest that reforestation would be a suitable long term policy for such slopes as were uncultivatable in the more isolated areas. Introductions of new varieties of timber such as
the better quality Barbados Mahogany would do much to increase revenues from hitherto unproductive areas.

The organised planting of Teak wood, Cedar and Mahogany along with suitably legislation to prevent indiscriminate felling and burning of such plantations would go far in preventing future erosion and slip dangers in uncultivable areas.

VIII. Communications Within the Area, Roads, Traces and Bridges

For the location of these see maps 1 and 4.

The area was relatively well served with communications. There were exceptions in the upper area where the broken nature of the country rendered communications difficult. In the more outlying parts of this area bridle paths were the sole means of communication.

Tarmac Roads: were kept in a reasonable state of repair. In the upper area more attention could be paid to the disposal of road surface drainage and road embankments. It was noted that drainage was allowed to run over the edge of roads causing gully wash and a tendency for embankments to slip.

Dirt Roads: were very variable in their state of repair. Those running through centres of population were well kept. Whereas those running to isolated groups of houses and distant cultivations whilst being passable in the dry season broke down to rutted morasses with wet season traffic.

Traces: in the Streatham Lodge and Curepe areas these showed little signs of any care or attention. In many places they were overgrown, deeply rutted and broken down at the sides. The embankments on which the traces ren had been washed away to such an extent that large pools of standing water lay across them. In the Curepe area traces had been allowed to deteriorate to such an extent that many of them were covered with thick bush.
Bridges; in the Streatham Lodge and Curepe Estates long neglect had apparently caused many of the old plantation bridges to cave in or be washed away. These were either never replaced or were replaced by makeshift structure which would wash away in the first flood.

Where bridges had not been replaced the passage of hooved and wheeled transport had so broken down the banks that large pools of standing water many times the size of the original stream bed had resulted. This renders existing bridge foundations useless and will necessitate the rebuilding of ditch banks and the redigging of ditch beds to allow reasonable bridges to be constructed.

Marked contrasts could be seen between Public Works Department maintained utilities in the St. Augustine area and privately maintained utilities in the Streatham Lodge and Curepe areas. In the latter cases maintenance appeared to take the form of only absolutely essential makeshift structures.

Recommendations

Immediate attention should be paid to those faults already described. Existing conditions are such that transport within these areas is extremely difficult. In the wet season, this does much to retard cultivations and transport of pen manure to peasant lots.

As the existing mat of vegetation was observed to be thick and close in many places on traces it seems to indicate that there is a future in the development of potential trace grazing areas on which indigenous varieties of grasses could be established.

IX. Drainage and Irrigation

Except for the St. Augustine area any organised system of drainage and irrigation was completely lacking for the whole survey area. Map number 1 indicates the existing system in that area.

In Streatham Lodge and Curepe the original estate
drainage systems still existed but were in such a bad state of repair that they would be unable to cope with surplus flood water. Makeshift structures built to replace fallen bridges over these ditches were inadequate as they had a very low clearance which further impeded wet season drainage.

Natural drainage in these areas followed the slope of the land in a south-westerly direction. In the Streatham Lodge area this drainage flow appeared to be considerably obstructed by the Trinidad Government Railway embankment. The inadequacy of drainage channels through this embankment also hindered drainage.

It was noted that considerable scouring had taken place on dirt road surfaces near bridges and that cane growing near ditches showed high level flood water marks. This indicates that existing drainage systems in the Streatham Lodge area were totally incapable of dealing with wet season flood water.

In the lower rice growing areas many of the rice bunds were broken down. Little attempt had been made to repair these adequately and this would not make for efficient control of drainage and irrigation.

The banks of the Tacarigua River along the southern perimeter of the Streatham Lodge area were undermined. Bars of sand and silt blocked the river bed and these caused sudden and excessive rises in wet season water levels which resulted in uncontrollable flooding of the rice lands.

In the St. Augustine area drainage and irrigation control has recently come under Public Works Department administration. The drainage system was mainly dependent on the Tunapuna River and the irrigation system relied on the Tacarigua River. The main control sluice for the irrigation scheme lay down stream for the Freeman Road bridge. This sluice was used to back water up the river course to the levels of the subsidiary irrigation sluices on the river banks and up the raised irrigation channels. These were carried over or under drainage channels by viaducts and pipes. The bed and banks of the Tacarigua River had been suitably prepared for holding water as far back as the railway bridge. As far as could be seen there were no sluices controlling run off into the Tunapuna River.

In the upper area, due to the ground slope drainage was by
natural run off. Such channels as had been cut by natural flow were of a gully nature and emptied into the Tunapuna River. With the high rate of run off in this area, land soon dried out and rain penetration appears to be slight. The banks of the Tunapuna River in this area were considerably undercut and large accumulations of rock debris lay in the river bed.

Recommendations

As an immediate temporary measure existing drains in the Streatham Lodge area should be cleared out and where necessary redug. This would facilitate peasant cultivations and would to some extent alleviate the difficulties of water control in the rice areas.

In order that a more complete control be got of wet season flood water, river banks throughout the area should be repaired and river beds cleared of accumulations of silt and stones.

As a long term project, an enlargement of the St. Augustine drainage scheme seems advisable. At present the existing system would be unable to cope with extra drainage resulting from an extension of the scheme into the Streatham Lodge area. An alternative would be to create a separate drainage scheme for this area in which drainage was run into the Tacarigua River. The existing Tunapuna River appears to be too small to cater for all the area drainage. Other main sluices on the prepared river course could be used to irrigate the rice lands through subsidiary sluices.

X. Site of Housing in Relation to Cultivations

Location of housing in the area is shown on maps 3 and 4. It was found with few exceptions that housing in the area was grouped into communities. This is due to the Indian inhabitants desire for a communal life and nearness to social centres.

Other possible factors which limit the spread of housing from the community areas are as follows:

1) A Public Health Department ordinance which requires all new houses
to be built in/ location that is easily accessible to a doctor.

(2) The spread of housing southward in the lower area is limited by wet season flooding in the lower limits of this area.

(3) Limits of a piped water supply and the labour involved in carrying water long distances from street standpipes.

(4) The desire to live near centres of casual employment, viz., Tunapuna, St. John's village and the Monastery.

These factors would require consideration before any scheme was prepared for an extension of housing which aimed at having the peasant occupier resident on his holding.

XI. Holding Size and Distribution of Land Composing the Peasant Holding

The following conclusions were reached for the lower area:

(1) The average holding size varied from 1 to 4 acres.

(2) House lots varied from half to 1 acre in size and were used mainly for the production of ground provisions.

(3) Few rice lots were bigger than half an acre. In the southern part of the residential area where the water table was relatively high small rice lots were often located beside the house.

(4) Cane lots varied from half to 2 acres. Larger acreages per individual owner occurred in Curepe Estate.

(5) The position of house lots relative to the rest of a peasant's holding varied greatly dependent on the position of the house in the community. See maps 3 and 4.

(6) Cane and rice lots varied from beside the house lot to/quarter to three-quarters of a mile away. These distances were often doubled and trebled when road and trace communications were considered.

(7) A few of the Streatham Lodge peasants were found to own half acre lots in the St. Augustine rice growing area.

From field and map observations and reference to Department of Agriculture crop record sheets the following conclusions were reached for the upper area:
(1) It appears that holding sizes took the following order of occurrence.

(a) 1 to 5 acres
(b) Under 1 acre
(c) 5 to 10 acres
(d) 15 to 20 acres
(e) 10 to 15 acres
(f) 20 to 25 acres
(g) Above 25 acres

The 1 to 5 acre size of holding took precedence over the others because they were in size which could be conveniently handled by a peasant family labour force. That areas of greater size than this declined in popularity may be due to the great amount of family labour required to keep them in production without the employment of hired labour. Such large acreages were also widely distributed throughout the area and this factor would also detract from their popularity.

(2) Holding sizes under 1 acre were mainly house and general provision lots in residential areas.

(3) Holdings above 25 acres in size were of exceptional occurrence.

(4) It was estimated that a third of the cultivators of this area were resident on their cultivated lots. A third had land under cultivation within 1 to 2 miles of their house lot. The remaining third had land from 2 to 6 miles away. Lots as far away as Blanchisseuse were recorded. Peasants owning such distant lots would travel over and stay on them for 2 to 3 days each month while cultivating them. This practice leaves crops in these distant areas very open to praelial larceny.

Recommendations

It seems reasonable to suggest that a 15 to 20 acre lot would be most suitable to the poor soil types of the upper area. Apparently fertility falls off markedly in this area after 2 years cropping and requires a 7 year bush fallow to restore fertility. That is, for 2 to 3 acres to be cultivated per annum per peasant, the ground requirement varies from 15 to 20 acres. All round benefits could be obtained from such a method of rotational cropping.
XII. Systems of Land Tenure, Leases, Growing Contracts, Rents, Taxes

Lower Area

Streatham Lodge Estate is owned by three absentee owners who have vested their authority in a resident manager. The holdings in this area are leased to peasants on a year to year basis. Land rents varied with the type of land, viz., Cane land costs $7.50 per acre per annum. Rice land $10.00 per acre per annum. A tenant was free to build his own house within an approved area provided it complied with public health standards. Thus an incoming tenant has to buy his house from the outgoing tenant. No compensation is offered by the estate for peasant improvements.

Cane farmers in this area are under contract with Orange Grove Estate which provided them with credit in the form of sulphate of ammonia and approved cane setts.

St. Augustine Estate, and Watts Street, Evans Street Triangle

The system of land tenure in this area was freehold. From interviews with occupiers it was estimated that most of the residents owned their own land. Peasants who rented lots in this area from small absentee owners paid them at the rate of $10.00 per acre. A small proportion of the residents in this area rented land from the Department of Agriculture in the rice experimental area.

The Europe Estate cane lands were rented under contract to farmers resident in the western part of the St. Augustine area. Rents varied from $5 to $7 per acre depending on the site of the lot. Credit was supplied in the form of rent, sulphate of ammonia and approved varieties of cane setts. The cost of these being deducted from the price offered for the current years cane crop. This system will be discontinued next year, tenants have had notice to quit as Caroni Limited intend taking the area back into plantation cultivation. Under the terms of their contract farmers were not allowed to intercrop their cane and were discouraged from planting cane tops as setts.

The Watts Street Evans Street triangle was mainly taken up by house and ground provision lots. These were owned by owner occupiers who worked out.
Upper Area

The Monastery of Mount St. Benedict held the trusteeship of some 600 acres of this hill area. On this land they had settled eleven tenants from the Caura dam area. Their house lots were situated at the top of St. John’s Road. For their location see map number 4. These tenants were allowed a house lot and half to 1 acre of land at a flat rate of $2.40 per annum on condition that they worked part time on the Monastery cultivations at $1.20 per day. They also had the option of contracting with the Monastery Authorities to rehabilitate part of the derelict coco groves. Contract lots varied from 1000 to 5000 trees per peasant dependent on his available family labour force. For the first two years the peasant contractor has to sell through the agency of the Monastery, the latter paying him the full value of the crop. After this period payments are based on a half share system, the Monastery retaining half the value of the crop.

Any surplus ground provisions grown by the peasant contractor had to be sold to the Monastery.

The Monastery vegetable garden and citrus plantations were so far only run to meet their own needs. Labour for this project was drawn from St. John’s village.

The Slopes to the South of the Monastery Boundary were mostly freehold tenure and were divided up amongst many small non-resident owners who let to tenants at the rate of $2 to $3 per acre per annum. These tenants appear to take over, burn, clear and plant slopes indiscriminately with little regard to holding limits.

Lands in the St. John’s Village Area was divided between two major land owners. They rented it out in house lots of half an acre a year to year lease. The residents in this area mostly came from the Caura dam district and were dependent on outside employment as a source of income.

In the Santa Margarita area much of the land had been taken over as potential building sites.

Taxes were the same for the whole survey area, viz., $1 per annum house or door tax and 24 cents per acre per annum land or ground tax.
XIII. Types of Peasant People Resident in the Area, Religion, Diet, Health, Size of Families

The population of the lower area was mostly composed of the descendants of Tamil Indians who had been imported as licensed labour in the latter half of the nineteenth century to work cane plantations.

The slopes below the Monastery were mainly populated by Indians. In the higher areas Negroes were in the majority.

In physique the Indian type was slight compared with the more robust Negro. The Negro type is thus more suited to the exacting work of high ground cultivations.

The Negro type appeared to work for longer and more regular periods than the Indian. In addition to a longer working day the Negro in this area invariably had considerable distances to walk to and from work.

Religion: The majority of the Indians were Hindus though few appeared to be strict followers of their faith. Nearly all the peoples of the Upper Area were Roman Catholics.

Diet: As far as could be ascertained peasant diets in the area were badly balanced. Diets were excessive in carbohydrate foods and very low in animal protein foods. They were to a lesser extent deficient in green vegetables. This is due to the very high price and non-availability of meat and to the availability of cheap carbohydrate foods such as yams, sweet potatoes and rice. There was no evidence of deficiency diseases amongst the population.

Whilst nutrition was on a low plane for the whole area, that of the Negro peasant appeared to be appreciably low than that of the Indian.

Shops in the area were well stocked with tinned goods. Tinned milk was in high demand by all the population as it appears that the peasant finds it more economical to sell fresh cows milk and buy the tinned commodity.
Recommendations

The lack of animal protein in diets could be alleviated to some extent by vegetable protein. The peasant should thus be encouraged to grow such vegetable protein crops as pigeon pea and soya bean.

Health: The incidence of hookworm infestations may be high in the area. This disease is commonly associated with a low plane of nutrition and protein deficient diets.

Malaria was uncommon due to the area being unsuitable to the anopheles mosquito. Many of the peasants however complained of "Little" fever. This is possibly an undetermined fever carried by other species of mosquito.

Umbilical hernias characteristic of many native peoples were of uncommon occurrence. Some cases were observed in young children.

On the whole younger people were comparatively healthy in appearance but many of the older inhabitants showed signs of emaciation and hard living.

Family Size: The number of children in the area was high. It was estimated than an average family had from 5 to 8 children in it. Marriage was at an early age and the women appeared to deteriorate rapidly due to their high rate of child bearing.

Due to improved conditions and medical facilities there were comparatively few child deaths.

Some though not all of the peasant wives and elder children worked on the holdings. Younger children often looked after tethered cattle during the day.

Nearly all of the peasants interviewed hoped that some of their children would work on the land after leaving school but doubted it due to the easier and more remunerative work offered by city employment.

Many of the families had an aged parent or poor relation to support in their homes.
Figures obtained in this respect were too vague to be of
definite value. Many of the peasants interviewed were finding living
difficult due to the high prices of food and clothing. This was
especially the case where large families had to be clad for school
attendance.

From the figures obtained it was estimated that $60 to $65 per
month was a reasonable figure for family upkeep.

Relatively few peasants appeared to be full time workers on
their holdings, working out an average of 3 to 4 days per week. Supple-
mental employment such as estate labouring, drainage and irrigation
work and labouring on the roads was common.

Peasants working on estates were afforded the advantage of
cutting available firewood on the estates at nominal prices and cane
sets were offered to cane farmers free of charge.

When no exchange help was available to a peasant for extra
work he employed paid labour at the rate of $1.50 to $2 per day. In
their opinion this was expensive but force of necessity made it unavoid-
able

Estates paid peasant labour at the rate of 70 to 80 cents per
task. Maximum earnings at this rate varied from $1.50 to $2 per day.
Peasants did not like estate work as they said it was too exacting.

Those peasants with facilities for making money used them to
the full. Peasants owning a bullock team and a plow contracted to plow
rice land at a cost of $10 per acre. If a peasant had cattle on his
holding he was prepared to sell the manure they produced at a cost
of $1 to $2 per cart. Other peasants with a bullock and cart contracted
with cane farmers to cart their cane to the factories at exorbitant
rates.

No definite family income per week could be arrived at, few if
any of the peasants were able to save any money.

Peasant credit other than for the growing of contract cane
crops was obtained from friends or relations. Borrowing small amounts
from a number of people at once was a common practice. Such loans were
apparently given without security and there was no time limit for repay-
ment. This system is apt to involve the peasant in heavy unrepayable debts.

**Recommendations**

In such agricultural communities as this, some sort of credit society is necessary to meet peasant capital requirements and to eliminate promiscuous borrowing.

Loans should be limited and should only be granted to those men of visible merit. A thorough enquiry into the purpose of the loan should be made before it is granted. Loans should be solely for the purpose of agricultural development. Loans alone are of little use. Such loans should be accompanied by advice as to the best method of application from the area Agricultural Officer. This would necessitate a thorough knowledge of prevailing economic and agricultural conditions.

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**XV. Education Facilities in the Area**

The Government School serving the area was situated in Tunapuna. This had a school garden attached to it. The Monastery authorities ran a private school in St. John's village.

At the Government School no specialised teaching was given in agriculture. Some instruction was given in simple garden methods and the production of ground provisions as part of the school curriculum.

The average school leaving age in the area ranged from 13 to 15 years. It seems unlikely that pupils attaining this standard of education will take a practical interest in agriculture. The trend is away from the land towards more remunerative employment in the towns.

Peasant parents recognised the value of education. It seems that if and when they can afford it they prefer to send their children to a private school.

**Recommendations**

Attempts should be made to raise the standard of education in
Government Schools. Where possible more emphasis should be laid on school gardening. Pupils should be shown how farming is linked with the internal economy of their country. Further interest should be stimulated in pupils by lectures, film shows, and extension work under the auspices of the Department of Agriculture. By these methods it would be possible to influence parents agricultural knowledge through their children's education.

XVI. Peasant Housing in the Area

The characteristic house of the area was a single roomed tapia walled structure roofed with a thatch of palm fronds or corrugated iron sheets. Floors were made of beaten earth. Many houses had lean-to structures built against their walls. These were used as cooking sheds or storage space.

Any new houses being built have to conform to a Public Health standard. This states that all houses have to be built at least 2 feet 6 inches from the ground, have solid wood floors and an air space of at least 5000 cubic feet. New houses that had been built to conform to this regulation appeared to be an improvement on the older type of house.

The existing type of house is quite adequate for peasant requirements and more elaborate structures are unnecessary. Such simple houses are easily extendable to meet increased requirements on house space.
Recommendations

It would be more advantageous to have the peasant house raised higher from the ground than the regulation 2 feet 6 inches. Dirt, rubbish and refuse tend to accumulate beneath such low built structures and are not easily cleaned out. The space beneath such raised housing whilst being more sanitary could be utilised as storage space for produce and implements.

A perhaps simpler and less expensive method of housing would be to have the house built on the ground with a living or sleeping room raised on beams 2 feet above ground level.

If any future scheme of assistance is proposed to aid peasant housing in land settlements or communities, such aid should be given as material assistance. This makes the peasant householder responsible for the upkeep and repairs to his own house.

Domestic Sanitation: Throughout the area took the form of dry closets. These were often situated no more than 20 yards away from the dwelling. As wells were often dug close to houses there are possibilities of sewage seepage contamination of domestic water supplies.

Recommendations

In future land settlements where there is no adequate piped water supply care will need to be taken in sighting closets and wells so that the chances of contamination are eliminated.

Water Supply: The limits of the area water supply and the location of communal standpipes are shown on maps 1 and 4. If reference is made to these maps and to the distribution of populations as shown on maps 3 and 4, it will be seen that the only area to have a more or less central communal water supply is in St. Augustine. Water supplies to all other areas are badly distributed or lacking.

Where houses are distant from street standpipes water carrying has to be resorted to. In certain outlying areas this was impracticable and shallow dug wells had to be relied on as a source of domestic water
supply. The inhabitants of St. John's village drew their entire water
supply from the Tunapuna River.

Nearly all houses in the lower area had wells dug in the house
lot. Water from these was used mainly for watering vegetable crops and
for stock kept on the house lot.

Recommendations

Any proposed or encouraged extension of housing out of existing
communities will need to be preceded and accompanied by a similar
extension of water supply.

XVII. Distribution of Labour Throughout the Year

March - April - May: Cane farmers harvest their cane and cart to factories
Those peasants with no cane or who manage to get their cane off early
seek casual estate employment.

April - May - June: Cane farmers prepare land and plant their cane lots.

June - July - August: Rice planting with onset/wet season. Peasants have
slack period after planting.

June - July - August: - September: If there is no work to be done on their
holdings peasants seek casual estate work such as cane planting, weeding,
trash turning.

October - February: Main vegetable growing season. Peasants occupied
with vegetable lots.

December - January: Peasants reap and thresh rice with onset of the dry
season.

It has to be borne in mind that these operations vary to a
great extent with the suitability of the season.

The busiest seasons of the year when labour is employed to the
full appear to be:

October - February: Vegetable growing and rice harvesting.
March - July: Cane reaping and rice planting.

This leaves a slack period of roughly 4 to 5 months each year, namely May to September. Thus peasants have to seek external employment to supplement their income.

**Recommendations**

In any future land settlements a scheme of cropping will need to be devised which ensures that the peasant is employed full time on his holding all the year round. This should result in greater efficiency and higher outputs.

**XVIII. Major Crops Grown in the Area. Rice and Cane**

(For the location of these see maps 3 and 5)

**Peasant Rice Growing:**

The times of the operations in rice growing were as follows:

Nurseries were sown down from the end of June to the end of July.

Planting was carried out from the end of July to the end of August.

Harvesting, from early December to late January.

The rice crop was grown for home consumption. Few peasants if any sold their rice crop off the holding.

**Methods of Cultivation:**

**Nursery Beds:** These are marked out in a corner of the rice lot and surrounded by a small bund. The nursery is first flooded and allowed to soak, it is then puddled by hand hoe and treampling, pen manure sometimes being incorporated at this stage. This is the only manure applied to the crop.

Before sowing padi the bed is allowed to dry out so that hardy plants will develop. The bed is kept moist after the seeds have rooted.

A month after sowing the seedlings are ready for transplanting.

**Transplanting:** The nursery beds are flooded for a few days prior to pulling so that the seedlings will pull easily. Plants are pulled by
Preparation of the Main Area: There are three practices in the area of survey, viz.,

1) Dry Flowing: The advantage of this is that it is quick and gives a better turn over of weed growth.

2) Wet Flowing: A time consuming method. It is heavy work for both draught animals and man.

3) Hand Cultivations: This was the most common method of cultivation. Many of the peasants were too poor to own a plow and bullocks and couldn't afford to pay for animal tillage. In this method weeds and old standing straw are cutlassed close to the ground. The land is then flooded and weeds turned in by hand hoe, the ground being puddled by this action. This is an extremely laborious method and the maximum area cultivatable per day does not exceed a tenth of an acre.

Planting: Is mostly a woman's job. It is done in standing water 3 to 8 plants being planted per hill by hand.

Flooding: The peasants did not seem to appreciate the advantages of an efficient water control. Many improvements could be made in this respect.

Harvesting: Ripening of the crop throughout the area was irregular due to the wide variation in planting dates and inefficient water control. The peasants appeared to harden the crop off too quickly and brittle grains resulted.

Threshing: A family and neighbour help operation. It was done in the field using a slatted table made of bamboo spars.

Winnowing: Generally done at home by women. Done in small lots to meet family demands.

Storage: In sacks in house storage space.

Yields: An average of 10 barrels per acre was got in the lower rice lands and 15 barrels per acre in the higher areas.

Measures: 1 Barrel = 160 lb. 6 Kerosene tins = 1 Barrel.
Milling: There were only two mills in the lower survey area. These were Engelberg Hullers operated by private owners.

Milling was done for cash at the rate of 12 cents per kerosene tin. The miller retained the bran and sold it back to the peasants at 5 cents per tin.

As far as could be judged the present system of milling is inefficient. Large proportions of broken grains were found in milled rice. This is possibly due to machines being worn out or being badly set.

Milling Rate: On an average 160 lb. of padi gave 100 lb. of finished rice, i.e. a 60% extraction rate.

Judging from the amounts of padi seen spread to dry on sacking at the sides of roads parboiling seems to be a fairly common practice. The peasants recognised the value of this practice as it reduced the amount of grains broken in milling.

Comparatively few peasants take off a second crop of padi in the dry season. Second crops are the result of regrowth from existing stools and the growth of self sown padi from the first crop.

Some peasants believed that this second crop padi gave better results if used for seed. This is of doubtful value but may be due to benefits derived from the existing root stock, decomposing vegetable matter and to the fact that only the hardiest plants survive in the dry season.

The yield from this second crop padi was on the average only about 10% of the first crop.

Another peasant practice is to sow wooly pyrol amongst the self sown rice, the resulting mixture being grazed or seared.

The majority of the rice growing peasants prefer to leave their land fallow from January to June and let it accumulate a thick weed cover.

Some peasants catch cropped their padi land in the better areas. The land was mulched heavily with rice straw after the crop was harvested. Short growing period crops such as tomatoes and okras were sown in holes scraped through the mulch. This practice appears to be quite successful.
Whilst increasing output per unit of land the practice of mulching does much to suppress weed growth and adds to the soil organic matter content and facilitates next season’s crop cultivations.

Seed Selection and Distribution

These were non-existent. There is a great need for it as field crops at present seem to be a collection of many types and strains. This results in irregular crop ripening and great variability in yields. Mechanical mixing of seed rice is inevitable due to individual tastes for different varieties of rice for food.

Health of the Crop

Isolated instances of the following fungal diseases were observed:

Sclerotial Disease, casual fungus Sclerotium oryzae: Caused premature seed shedding and left empty glumes.

This parasite infects the rice plant through the root system. It is a very resistant soil parasite normally controlled by uprooting and burning infected area stools. In the rice area this would be inadvisable due to the very low humus content of the soil.

If it got serious in the area possibilities of control are, early and dry season plowing to greater depths, also prolonged flood fallows.

Covered Smut, casual fungus Tilletia horri- /isolated cases were seen. If it gets worse it can easily be controlled by seed treatment.

It is recommended that isolated and healthy stocks should be kept at some centre in case of a epidemic outbreak of diseases.

Recommendations

The writer has dealt with this crop in some detail as he feels that the potentialities of rice growing in the area are not being exploited to the maximum.

It would not be economic to practice large scale rice growing
due to the limited size of the area and the very great expense of contouring and bulldozing such a small unit of land.

The following recommendations are made:

(1) A definite zonation of the rice and cane crops is required. These were often found growing side by side and it would appear that much land now under cane is more suited to the rice crop. These crops are antagonistic in their seasonal water requirements and this renders water control more difficult.

(2) Crop improvement requires consideration. Line breeding and development of existing ecotypes.

(3) A definite Department of Agricultural policy for seed propagation, seed distribution and advice to peasants.

(4) If commercial growing and production of rice develops, the peasant will require to spend less time on the crop to render its production economic and allow a fair margin of profit.

(5) Sponsored area schemes to help the peasant with heavy cultivations. e.g. Power driven cultivators and plows available at relatively low cost. These would allow a concentration of operations within a period and would make for a more efficient water control of each area. i.e. All the crop would be at the same stage of growth. At present due to the wide range of crop growth stages efficient water control is difficult for each area and many disputes arise.

(6) A more efficient water control is necessary.

(7) Sponsored communal rice mills to reduce milling charges. These could also be used as exchange seed distributing centres. Peasants taking rice to such mills should be given the option of keeping the milled rice and bran or selling to the mill.

Peasant Sugar Cane

The times of operations were as follows:

- **Planting**: Preparation of cane beds and planting cane sets. April to May.
- **Harvesting, Cutting**: March to April to May.
Method of Cultivation

**Planting Materials**

In the cane growing areas two types of planting material were used, viz.,

1. Cane tops
2. B and BH variety setts

The use of cane tops as planting material was still a common practice amongst the cane farmers in the Streatham Lodge area.

Estates are now discouraging this practice by providing cane farmers with setts of approved varieties. These they supply free to contracting cane farmers who work part time on the estate. Non-estate workers were charged at the rate of $1 per 1000 setts.

**Cultivations:** In nearly all cases the peasant had retained the old estate cane bed. These were narrow and had a steep camber which rendered animal cultivations difficult. The peasant had thus to rely on laborious hand cultivations. Such cultivations took the form of ridging and furrowing across the cane bed.

**Planting:** Setts were planted vertically in crowbar holes or furrow bottoms. These were later earthed up. There was little evidence of after cultivations. Some cases of planting on the flat were also seen.

The application of pen manure to furrow bottoms was not a standard practice.

**Harvesting:** Cane farmers harvest their plant cane a year after planting. Cutting was done by hand cutlassing.

**Yields:** Were low throughout the area and did not compare favourably with those of estates. Farmer’s cane yields in the first ratoon varied from 20 to 25 tons per acre. That of estates was around 30 tons per acre. Peasant cane yields as low as 10 to 12 tons per acre were recorded.

**Ratoons:** Cane farmers were very indefinite about the number of times they had ratooned their cane. Ratoons of 4 to 5 to 6 years were common.

Yields apparently dropped markedly after the third ratoon and land was often allowed to fallow for 2 years after this ratoon was cut.
Contracting estates have been trying to discourage these long ratooning periods with apparently little success. This is no doubt due to the difficulties of heavy land cultivations which confront the peasant. As a result the peasant prefers to ratoon his cane for long periods rather than replant for higher yields.

**Carting:** The peasant carted to factories in his own or a hired cart. All complained of the long periods they had to wait at the factories to get their cane weighed and also about the high standard of trash ing required of them.

It appears that much of the peasants time in the harvesting season is spent waiting to have cane accepted.

**Manuring:** After cutting their cane, the peasants applied from 2 to 3 cwt s. of sulphate of ammonia per acre. This seems to be a standard dressing which ignores both soil and plant requirements.

Bearing in mind the fact that approximately 50% of Trinidad's cane is produced by cane farmers, it still seems difficult to imagine how continued cultivation of cane can pay the peasants if yields of cane in the area surveyed are representative of other cane farmed areas. Yields are approximately a half to two-thirds that of estates. The rate of sugar extraction from peasant grown cane is also low being about two-sevenths that of estate cane.

The relative inefficiency of cultivations, the lack of supervision and undercapitalisation constitute major drawbacks to the peasant.

Land in the cane area was often too heavy to grow alternate ground provision crops on.

**Health of the Crop**

Cane growing in the Europe area was comparatively healthy in appearance. That in the Streatham Lodge area was very variable. Much of it exhibited the characteristic symptoms of "Blight" froghopper attack.

There may be some correlation between low fertility soils and the incidence of froghopper attack.

Control of this pest amongst peasant cane would seem to centre
round better cultivation methods, balanced manuring and improved drainage conditions. The use of improved planting materials and shorter ratooning periods would also lower the incidence of the pest.

**Recommendations**

1. As already stated much of the land under cane in this area seems more suited to rice growing. This calls for a reorganization of crops under any land settlement scheme.

2. Manuring to standards does not cater for soil and plant requirements. These should be worked out and the data supplied to the peasant farmer.

3. Any departmental aid to poor soil peasant cane farmers whether material or otherwise would possibly result in very small increases in yield over the total area. Such increases would do little to solve the food supply problem of a rapidly increasing population. From this it would appear that such a form of peasant agriculture on unsuitable cane soils should be discontinued and the people incorporated in more efficient forms of agriculture.

   In better soil types improvements in cultivation methods and manural treatments would possibly raise the peasant farmers yields to a standard equitable with those of estates.

4. If aid is to be given to peasants it should take the form of assistance in cultivations, e.g. Sponsored power driven cultivating machines and plows to help groups of cane farmers.

5. The practice of estates taking back rented out cane lands in time of comparative prosperity and leasing them out in times of depressions leads to an uncertainty of tenure which is not conducive to a stable peasant agriculture.

   Leases should not be on a year to year basis. Periods up to 10 or 15 years might be considered with advantage.
XIX. Minor Crops and Ground Provisions

The peasant’s object in growing these was primarily for the home food supply. Surpluses were readily saleable and thus acted as a source of income.

The types of crops grown varied greatly from holding to holding. The following is a list of vegetables seen growing:—Okra, Tomato, Eggplant, Cucumber, Pumpkin, Bodi, Pigeon pea, Maize, Yam, Dasheen, Tania, Eddoe, Sweet potato, Cabbage, Cassava, Bagi, Onion.

Many and varied were the combinations of the above vegetables. The following is a list of the more common methods of cropping and crop combinations:

1. Sweet potatoes were always grown alone on banks in the moister areas.
2. Tall and low growing plants were sometimes combined e.g. Creeping plants like Cucumber and Pumpkin were often grown under upright egg-plants.
3. Okras were the most common cash crop as it was rarely stolen.
4. Pigeon peas were grown in pure stands and often round bunds in the upper rice areas.
5. In the hill area pigeon peas were often intercropped in the early stages with corn or tomatoes.
6. Corn was rarely grown alone in the lower area. Stalks were often used to support yam tendrils.
7. Tomatoes were mostly grown alone in house lots. They were a popular prey for thieves.
8. Dasheens, Tannias and Eddoes occupied corners of gardens.
9. Cabbages and Onions were chiefly grown alone by peasants who special-ised in the production of marketable vegetables.

No rotations were practised and the peasants had no knowledge of such methods.

Manuring: This consisted of small quantities of sulphate of ammonia or manure spread in depressions round individual plants.

Pests and Diseases: Vegetables grown in the area appeared comparatively
healthy and most damage appeared to be confined to introduced crops such as cabbage and tomato.

A fair amount of damage was done to brassicas by mole crickets and surface cut worms.

Bacterial wilts of brassicas were also common. This is possibly due to an introduction of the disease in imported seeds.

Sources of Seeds: Apart from cabbage seeds which were only obtainable through the Control Board the major portion of peasants seeds was got by retaining and drying a portion of the preceding years crop.

Recommendations

Whilst the practice of retaining a portion of the preceding years crop seems inevitable due to the lack of any other source of seed supply it is not to be encouraged. With it inherent plant weaknesses and diseases are transferred from year to year and resulting crops get progressively poorer. It would be advisable for the Department of Agriculture to devise some scheme of seed selection, propagation and distribution in an attempt to increase production.

House Lot, Tree Crops

In each house lot there was always some trees grown, the fruit of which could be used to augment the family food supply or be readily saleable.

The most common of these trees were Mango, Coconut and Banana. Citrus and Cashew nuts were grown to a lesser extent.

XX. Plantation Tree Crops

These were confined solely to the upper survey area, their location is shown on map number 5.

Cacao: Such cacao as occurred in the area was the derelict remnants of abandoned cacao plantations. Attempts were being made by the Monastery authorities to rehabilitate part of these plantations by means of a
peasant share cropping scheme.

Cacao trees in these plantations were old, moss grown, broken and grossly overshaded. They also appeared to suffer extensive damage from rat and squirrel attack. The incidence of black pod was high amongst the trees. Witches broom infestations were not extensive.

The soils on which these plantations stood were found to have:

(1) A low C/N ratio
(2) A high acidity
(3) Low available Phosphate and Potash
(4) A generally degraded appearance.

**Recommendations**

The process of rehabilitation had only been in progress for two years. Thus it was impossible to judge the efficiency and justification of such a procedure.

It seems a suitable short term policy while cacao prices are high but should not be considered as a permanent policy due to the degraded nature of the soils.

**Citrus:** Existing plantations were scattered and varied in size. Trees appeared healthy but were suffering from drought at the time of the survey (April 1947). Tree yields are said to be good but vary greatly from season to season.

The Monastery was carrying out an extensive orange planting programme amongst old cacao and secondary bush. The young budded trees being planted on roughly scraped platforms on all degrees of slopes. These platforms do not seem adequate to meet tree requirements.

**Recommendations**

There seem possibilities in the extension of this crop to easier slopes and better soil types. Such an extension would need to be accompanied by appropriate soil conservation methods to prove successful.

Some means of controlling leaf eating ants will need to be
evolved in the rear of the upper area. These apparently do a great deal of
damage to young trees.

Small citrus groves should make good peasant plantation crops.
They would serve to "fix" peasants in the area whilst allowing them to
cultivate valley bottoms and less erodible slopes.

Other Tree Crops

Tonka Beans: A fair number of tonka bean trees occurred in the upper area.
These varied from single trees to haphazard peasant planted groups.

The fruits were collected and sold in town for Coumarin
extraction and export.

Recommendations

The possibilities of organised planting of these trees on steeper
slopes with ground cover anti-erosion measures should not be overlooked.

It would however be doubtful if they would serve as a good
peasant crop due to the uncertainty of markets and apparent over produc-
tion.

Mangos: Occurred in irregularly planted groups which belonged to peasants.
The trees appeared to be growing and bearing well on hill slopes.

Recommendations

The possibilities of mango growing developing into an organised
peasant crop are limited. Fruits have only a local consumption and there
is definite overproduction.

An export trade might develop when and if new methods of low
temperature storage and refrigeration are evolved which would allow the
delicate fruits to be packed without bruising.

Bananas: A very small plantation of bananas existed in the rear of the
upper area. This was run by the Monastery to meet its own needs.

Bananas would not make a successful crop in this area due to
dry season drought conditions and possible wind damage on exposed slopes.
XXI. Soil Erosion

Classical examples of gully erosion occur in the Tunapuna Ravine section and on the south-western Monastery slopes. There indiscriminate felling and burning of secondary bush was followed by erosion causing cultivations.

In the upper reaches of the Tunapuna Ravine cultivations extended onto seemingly impossible slopes. This had resulted in the erosion of whole areas of shallow soil and exposure of soil parent material.

It was reckoned that land cleared of secondary bush could be cultivated and cropped for only two years with any measure of success. It had then to be allowed to revert to bush and lie fallow for 7 to 8 years in order that its fertility be restored to render further cropping possible.

Erosion often extended into secondary bush. There continued dry season firing had so depleted immediate ground cover and soil organic matter that rills and gullying were baring tree roots.

Gullying varied in magnitude with slope and the type of cultivations. It was noted that the tendency to deep gullying was very marked. The incidence of gullying was low in the upper forest area where ground cover was relatively little disturbed.

The magnitude of erosion in the Tunapuna Ravine area could readily be appreciated by the great amounts of suspended soil particles in samples of wet season flood water. Large accumulations of sand and silt deposited by the Tunapuna River in its lower reaches could be seen in the dry season.

Recommendations

Much of the erosion in this area could be prevented by the following methods:-

(1) Immediate measures should be taken to arrest and reduce existing gullies and prevent new ones from forming. This would involve the extensive planting of ground covers and re-afforestation.

Such measures should be controlled and governed by some responsible
central authority. Peasant holdings are too small to constitute a topographical unit for major soil conservation earth works. The peasant cultivator also lacks capital, implements and tools to construct such works.

(2) Legislation prohibiting the indiscriminate deforestation and firing of hill land for cultivations.

(3) A system of controlled cultivations which allows only the more reasonable slopes to be cleared for cultivations. Such a scheme should also allot a specified area to be cultivated by each peasant.

(4) Peasant cultivators should be made erosion conscious. Steps should be taken to encourage and enforce such measures as contour planting of crops and the construction of simple check bunds and pits. The planting of suitable cover crops and shrubs should also be encouraged on land left fallow and on areas between cultivations.

Before any settlement of overflow population is proposed for these upland areas a detailed survey of the areas of cultivable land would be necessary to determine whether or not it would be economical to embark on such a project. An alternative would be to bring derelict areas on the flat into cultivation accompanied by an intensification of peasant agriculture in more fertile areas.

XXII. Livestock

Distribution

The major part of the cattle population in the survey area occurred on the lower ground where traces and derelict land afforded relatively good natural grazing. In the upper area cattle keeping was rendered difficult by the broken and hilly nature of the land. Peasants in this area had thus to rely on goats for milk and donkeys for pack transport.

Pouls and pigs were kept in both areas but were not numerous.

Milk Cows

Only about two-fifths of the lower area peasants kept a cow or cows. Usually the latter did not exceed one or two in number.
Cows were mostly grade Holstein Zebu crosses. The crosses varying from a half to two-thirds Holstein blood. Other breed characteristics such as Channel Island, Red Poll, Ayrshire and Aberdeen Angus, were also evident in Zebu crosses. The grade Holstein appears to be the best cross as it is more suited to rough conditions.

From the better class of animals milk yields were relatively high at the peak period. These varied from 2 to 3 gallons per cow per day. The standard milk measure was the "Bottle", 6 bottles being equivalent to 1 gallon.

Milk produced on holdings was mostly sold to neighbours or to village roundmen. Little or none of it was consumed by the average peasant family.

Service facilities for the area were good and appeared to be fully utilised. The Government Stock Farm with pure bred and grade Holstein bulls was nearby, Orange Grove Estate adjoining the survey area kept a pure bred Holstein bull which was used for servicing peasant cows. In addition other relatively good grade Holstein bulls were kept in the area. Service fees were reasonable and cows could be brought back if they did not hold the first service. Failure to hold the first service seemed to be a fairly common complaint amongst peasant kept cows.

Calves produced were either suckled or pail fed. They had mostly to be sold at 6 to 12 months due to the lack of fodder and feeding stuffs.

The significance of feeding cows for milk production is not fully understood by the peasant. Supplies of concentrate foodstuffs were limited or too costly but were fed when obtainable. Molasses, coconut meal, rice bran and oil cakes were concentrates most used. As a result of the limitations of concentrates, rations were bulky and unbalanced.

During the day cattle were tethered on traces or allowed to pick over padi lots in the dry season. As there was much cattle stealing in the area at night all cattle were tethered or housed on the house lots.

As far as could be seen cattle in the area were relatively healthy but appeared to lose condition rapidly in the dry season due to the lack of food.
Cattle housing on house lots was generally in makeshift structures. Some peasants however recognised the value of good cattle sheds and had built concrete stands and drains to collect liquid manure.

Pen manure in nearly all cases was carelessly stored being thrown in loose heaps in the open. Whether it was applied to the peasant holding or not seemed to depend on the availability of transport, the state of tracks and the great need for ready cash. Much pen manure was sold off the holdings.

Recommendations

The numbers of stock in this area could be increased by encouraging peasants to keep more milk cows. Many of the traces had a good natural sward which with care and attention could give increased yields of fodder for grazing and soiling.

Methods of conserving wet season excesses of fodder such as simple pit silos would overcome the major difficulty of fodder shortages in the dry season.

Peasants could be encouraged to plant areas of selected fodder grasses for soiling or grazing. Such areas sown down with ecotypical grass species and rotationally grazed could give good results.

The sale of milk to a central collecting depot would ensure the peasant of a steady income from milk production. This would encourage him to keep more milk cows.

The benefits of an increased cattle population on soil fertility in such areas as this would be far reaching and crop yields increased.

Draught Oxen

These constituted a very heterogeneous group of cattle in which many characteristics of the Sahiwal and Zebu breeds were evident.

Many of the oxen lacked the conformation of a good draught animal as they were loosely built and had light shoulders. As a result of this weak constitution the stamina of such animals was low and they couldn't be worked hard for long periods.
At present existing draught animals appear to be the results of random selections from bull calves with little regard to conformation. Due to their poor financial position few peasants were able to purchase or own a single or a pair of oxen. Thus those who were in possession of a plowing team were in a strong bargaining position for contract plowing work.

**Recommendations**

It is obvious that if food production has to increase the numbers of draught animals will have to undergo a corresponding rise. The major problem in draught animal improvement lies in the unwillingness of the peasant to have his cow served from a draught type bull. The resulting progeny would not be readily saleable at an early age and part of the peasants' income would be lost.

Unless some central herd of cows for draught animal breeding is kept the only solution to this problem lies in the selection of bull calves with a suitable conformation.

**Milk Goats**

These were kept by peasants in both areas but were in greatest numbers in the upper area. There seem to be some potentialities in peasant goat keeping. Goats endure harder conditions than milk cows and yield more than second rate cows. Regularity of breeding, a prolonged milking period, relatively cheap and easy upkeep are other advantages.

The great disadvantage of uncontrolled goat keeping is the damage they cause on free range and generally increasing the tendency to soil erosion in hill areas.

If any policy is proposed to increase the numbers of goats, especially in the hill area, care should be taken to ensure that grazing is controlled on selected sites. This virtually amounts to a tethered and rotational grazing system in which many limitations will manifest themselves.
Donkeys

A fair proportion of the peasantry kept donkeys for light haulage work to and from markets. These were of a very hybrid type and varied greatly in conformation. The type of donkey kept in the lower area was bigger and more heavily built than those in the upper area. These donkeys were of a small wiry build suited to pack work over broken country.

Recommendations

Some attempts could be made to improve the type of donkey by crossing existing mares with chosen stud sires. Such sires could be put under the management of trustworthy peasants who should be paid for their duties.

Pigs

With few exceptions the pigs kept in the area were very poor in conformation. The characteristics of the Berkshire breed were sometimes evident.

In the lower area pigs were tethered and in the upper area allowed free range.

Due to the present shortage and high price of concentrate feeding stuffs, pig keeping on a small peasant scale does not seem to be economical. There would however be possibilities in specialised pig keeping in areas near centres of population where swill could easily be obtained.

Much improvement could be made in existing pig body conformation by upgrading with proven boars.

Poultry

Nearly every peasant kept a few hens on his house lot. These were mainly Rhode Island Red crosses with other breeds. Most of these were poor and scraggy in conformation. No particular attention seemed to be paid to feeding and resulting egg production was poor and irregular.

The majority of poultry appeared to be relatively healthy,
possibly due to the preponderance of hardy native strains.

Eggs and fowls were mostly sold off the holding. In fact the peasant seemed to regard such sales as a regular feature in his weekly income.

Recommendations

As there will always be a regular demand and fair price from population centres for poultry and eggs, peasant poultry keeping could be made a highly profitable sideline to peasant farming.

To fulfill such demands peasants should be encouraged to keep improved breeds of poultry and to pay more attention to their feeding and management.

The Government Stock Farm could develop a hatchery for the production of day old chicks from proved laying strains. The sale of these to peasants would establish basic laying strains throughout the area.

XXIII. Marketing

As there was no organised marketing system in the area through which peasants could sell their produce, marketing took place in an irregular and haphazard manner dependant on the trends of local prices.

The majority of the peasants market their own produce in Tunapuna and other local towns. Marketing in Port-of-Spain was rendered difficult as the peasant producer had to maintain a permanent market stall. Some of them did this through a friend or relation resident in town. A peasant who is unable to do this is wholly dependant on local markets.

Lack of transport leaves a peasant open to the practises of the travelling "marchand" or middleman. The average peasant was aware of the sharp practises of these merchants and normally only sold small quantities of produce to them. Large quantities were sold only as a last resort.

The fear of glutted markets and low prices, especially in the latter part of the vegetable season, restricted production to some extent. There was also the additional fear of importations of refrigerated high
quality vegetables from abroad causing a great drop in the demand for local produce.

Recommendations

Some sponsored local marketing system is necessary for the peasant producer in the area. This might take the form of a representative group of producers and an economic adviser from the Department of Agriculture. Such a system would give the peasant a regular market, a fair price for his produce and reduce his transport difficulties. It would also protect the peasant from unscrupulous middlemen and excessive market fluctuations. Gluts could be overcome by improved storage facilities.

The results of a marketing system such as this would have beneficial effects both in the quality and quantity of peasant produce. Thus optimum use would be made of existing areas under cultivation.

XXIV. Civil Administration of the Area

Other than for routine matters there appeared to be little direct contact between the civil administration authorities and the peasants.

Local administration was controlled by a Warden with an office situated in Tunapuna. He was the government intermediary and was responsible for the collection of taxes and the keeping of local records.

A Police Station and Court House were also located in Tunapuna. The Police apparently did little patrol work in the outlying areas. Hence there was much praedial larceny.

No community or village elder council existed in any of the centres of population. The peasants complained about the slowness and poor results of representations made through the Warden or local member of the legislature.

Any legal disputes concerning a community were met by the persons involved contributing to the cost of engaging a lawyer to support their case.
Recommendations

An improvement in civil administration in such areas as this is necessary. At present the people feel that the authorities are apathetic and complacent towards them. Such an improved administration would impress the population that their representations were being considered and would result in a greater self confidence and unity.

As a first step the people of an area should be encouraged to elect a representative village or community council which should hold regular meetings. Representations made by such a unified body would have more effect than isolated and weak representations made by small groups of peasants.

XXV. Local Peasant Industries

There were no true peasant industries in the survey area. The Monastery authorities maintained a large apiary, the honey produced being extracted and sold in bulk.

Small scale beekeeping could be profitably developed by peasants in the upper area. There the proximity of flowering trees and shrubs would make for rapid and heavy returns, especially in the dry season. Such a system could be based on the existing Monastery extraction plant.

There were also two privately owned dairy herds in the upper area. These were composed of very heterogeneous grade Holstein cows with pure and grade Holstein bulls. The animals were stall fed and were not in good condition due to the lack of grazing and exercise. Such an agricultural industry is not suited to the upper area due to the many limitations.

The remnants of a fairly large milling plant still existed on the western boundary of the survey area. It was once apparently used for milling peasant produced cassava, rice milling and for the preparation of coir fibre. The fibre retting tank was still intact and there was an excellent well water supply.
Recommmendations

In the development of peasant industries there is a danger of capitalisation and profits being confined to those peasants who have sufficient capital to develop a good original set up.

If the numbers of dairy animals in areas rise to any great extent as a result of improved agricultural conditions, it might be worthwhile setting up a milk collecting and condensing scheme on the lines of that in Jamaica. Locally produced condensed milk would have the great advantage of having large local sales and would not require to be exported as would other local products of peasant industries, e.g. Coconut products, Copra and Coir.

Any future general development policy should be carefully fostered by the Department of Agriculture.

XXVI. The Future/Experimental Stations in the Area

As relatively little information was available about prevailing conditions in the area much investigational and experimental work would require to be undertaken in order to guide future policy.

The primary stage of such work could take the form of a short term policy which would reveal the economic background of peasants in the area. It would also indicate the most suitable size of peasant holdings, cropping policies and stock carrying capacities of such holdings. This could only be achieved through the medium of central experimental and investigational holdings. The Imperial College Farm lands seem most suited to this work. They are relatively isolated from the rest of the peasant community and are centrally placed in relation to the whole area.

The secondary stage of such a policy would be the determination of individual soil type requirements and their reactions to manurial treatments and separate crops. Such an investigation could not be undertaken on a central investigational centre as it would require many investigation lots distributed over the area of survey.
A policy based on results of such investigations could then be undertaken in order to try out the proved systems. This could be achieved by establishing wage paid tenant peasants on holdings throughout the area. These would come under the direction of the investigation authority. Not only would such holdings prove the value of the various systems to the peasant cultivator but would also act as an example and incentive to them. This work would provide valuable data for a possible long term policy of land settlement.

XXVII. Conclusions

A general policy of agricultural improvement is necessary throughout peasant farmed areas in the colony to meet the growing demands of an increasing population and higher planes of nutrition. Food production cannot be increased by the spasmodic cultivation of spare or marginal land. It must be a sustained and systematic effort.

Any scheme for improvement should not be strictly confined to one area alone. To be successful it has to be designed to embrace large areas and be modifiable to suit the peculiarities of smaller units within them. Political and economic implications cannot be ignored as these are vital factors which could limit the success of such a general policy. As far as possible an improvement scheme should be designed to fit into the economic pattern of an area and if possible be designed to meet future economic trends.

The salient feature in present peasant husbandry is the lack of system in cropping and care of stock. As a result general soil fertility was low and optimum use was not being made of cultivated land. Specialisation in major cash crops should be discouraged. The labour demand throughout the year is uneven and as a result the peasant has to seek external employment to augment his income. Soil fertility is also greatly impaired by this system.

The availability of good land to peasants is limited by estates and large land owners being unwilling to sell or let any but poor or marginal land. The prices of such lots of land are also unduly high to be met by the limited capital resources of the average peasant. It
might be the basis of a sound policy if the Government were to intervene in this matter and buy up large areas of land which were not being fully utilised. Such areas could be divided up and holdings on them let to peasants at reasonable rates. Leases on such holdings should be long term so as to afford the peasant security of tenur. They should also have provisional clauses to prevent abuse of land and wastage of soil capital. This could further be enforced by legislation. Such a system virtually amounts to the more expensive policy of land settlement.

Marketing schemes would play a vital part in a land development policy. A central assistance scheme for the improvement of crops and stock could easily be based on produce receiving and marketing centres.

As peasant farming is a family concern the family becomes an important and vital social unit, thus domestic circumstances will need some consideration in future land development schemes.

Peasants should as far as possible be made independent of estate work. Estate practices whilst being instructive to peasants in some parts of the world, e.g. rubber growing in Java and Malaya, are not conducive or applicable to good peasant farming in Trinidad. Estate work here tends to make a man shirk the responsibility of managing his own holding and guiding his future destiny.

Skill and management are the two main demands made of a peasant farmer. Failures in management appeared to be common due to his apparent lack of knowledge. Extensive improvements in agricultural knowledge is thus required and can only be achieved through extension and advisory work directed by the Department of Agriculture. On the whole peasants seemed willing to learn and add to their agricultural knowledge. A central advisory scheme whilst justifying its existence would also serve to encourage the industrious peasant and establish a nucleus for the improvement and expansion of peasant agriculture.

As a future short term policy, the building up and multiplication of the better type of existing holdings on good soil types does not seem impossible. This would provide valuable data and would also act as a preliminary to a possible and more expensive long term policy of land settlement. From this, ideal compact holdings of a size most suited to area Peasant farming could be developed.
APPENDIX I

Maps of the Survey Area

LOWER AREA: Maps Nos. 1: Communications and Drainage Systems

" " 2: Provisional Soil Map
" " 3: Crop and Population Distribution

UPPER AREA: " " 4: Communications, Population Distribution, General Features
" " 5: Crop Distribution
Provisional Soil Map of Lower Area
After E. H. Chenery '1966'

Legend

Zonal Soils
- Brown Podzolic Soils
- River Estate
- Yellow Podzolic Soils
- Golden Gravels
- Cumulitic

Infrazonal Soils
- Planosol - Streatham
- Azonal Soils
- Deltisol - St. Augustine
Crop and Population Distribution

Lower Area

Legend

Land reserved for Dept. of Agriculture.

Sugar cane Areas.

Residential Areas

A.-F. Positions of Selected Area Peasants.
APPENDIX II

Photographs of the Survey Area

I. Typical Peasant Housing
II. Lower Area Cultivators
III. Illustrations of Neglect on Streatham Lodge Traces
IV. Communications in Curepe and St. Augustine Estates
V. Some Cattle Types Kept in the Lower Area
VI. Clearing Ground for Cultivations in the Upper Area
VII. Illustrations of Cultivations on Upper Area Hill Slopes
VIII. Soil Erosion in the Upper Area
I.

Typical Peasant Housing in the Survey Area

Plate 1

Plate 2

Plate 3

Plate 4
Cultivation of sweet potatoes on banks in the dry season. Second crop Padi in the background.

Close up of sweet potato cultivation showing the cracking and drying out of the heavy soil in this area.

Lower area Padi land - Pigeon peas planted along a bund are to be seen at left centre.

Okra growing through a rice straw mulch on the bottom Padi lands in the dry season.

Close up of okra, showing depth of mulch and ground free from weeds.
Illustrations of the results of neglect on Streatham Lodge Traces.

Plate 1.
The vulted main trace.

Plate 2.
A neglected trace in the lower rice area.

Plate 3.
Stream bank broken down by traffic due to the non-replacement of a washed away bridge.

Plate 4.
Swampy part of a trace due to flooding from a faulty drainage system.
Communications in Cuvape and St. Augustine Estates.

Plate 1
Trace through cane holdings on Cuvape Estate. The surface will become very rutted with wet weather traffic.

Plate 2
Make-shift bridge over an overgrown drainage ditch in Cuvape Estate. This type of structure will be easily washed away in wet season floods.

Plate 3
Freeman Road, the main dirt road through St. Augustine Estate, maintained by the P.W.D. - Irrigation ditch in foreground, grass planted sides act as reinforcement. This is an example of an ideal track through a peasant settlement.
Some cattle types kept in the Lower Area

Plate 1.
A Zebu cross draught ox.

Plate 2.
Typical grade Holstein dairy cows.

Plate 3.
Poorer types of draught oxen.

Plate 4.

Plate 5.
A good type of cattle shed with concrete stands and gutter for collecting liquid manure.
Clearing the ground for cultivations in the Upper Area.

Plate 1
Secondary bush before cutting and burning. The thick cover will prevent any soil wash.

Plate 2
A clear burn over secondary bush preparatory to cultivations. The complete absence of any ground cover is very marked.

Plate 3
A clear burn on one of the slopes below the Monastery. After the timber is hauled off, it will be planted on at the commencement of the Wet Season, so anti erosion measures will be constructed.
Illustrations of cultivations on hill slopes in the Upper Area.

Plate 1
Irregular patches of cultivations on the side of the Tunapuna Ravine

Plate 2
The result of shifting cultivations. Denuded areas are left on hill slopes

Plate 3
Typical of the haphazard cultivations on the slopes below the Monastery
Soil erosion in the Upper Area.

Plate 1
Thick natural ground cover in the rear of the Upper Area. This region is never burned through.

Plate 2
Gullying on a slope denuded of immediate ground cover by repeated burning through.

Plate 3
The start of a gully. Rain wash varying the roots of trees as it runs down a steep slope.

Plate 4
A mixed orchard beside the Monastery. Sparse ground cover and no anti-erosion measures.