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NEW LAND SETTLEMENT IN THE
EASTERN LOWLANDS OF COLOMBIA

By

Ronald L. Tinnermeier

This paper is an abbreviated version of the author's Ph.D. thesis of the same title.

All views, interpretations, recommendations and conclusions expressed in this paper are those of the author and not necessarily those of the supporting or cooperating organizations.

INTRODUCTION

In this study a description and evaluation of directed and spontaneous land settlement in Caqueta, Colombia is presented. The analysis is based on personal observations, field surveys, and detailed case studies. Its focus is to discover if there are significant differences between the two groups in terms of selected economic and social characteristics and to determine relationships between the selected variables.

The Problem and Its Setting

During the past few years there has been a growing concern over agrarian reform. This is true in many parts of the world, but especially so in Latin America.

The proponents of violent revolutionary methods had Mexico, Bolivia, and Cuba to point to as examples. They proposed that the only possible way was by revolution. Their opponents, who favored a more evolutionary type of change, had little to demonstrate as concrete examples, except for Taiwan, Egypt, and 19th Century Europe, all of which were very different from Latin America in terms of development and the existing institutional framework. They could only argue that logically it should be feasible to bring about reforms in Latin America without revolution. Although the evidence is not yet complete, various countries are showing signs of agrarian change which is short of revolution. This does not mean, however, that the changes are without conflict or loss of life.

Colombia is an example of a country trying to bring about change but yet avoid outright revolution. The revolutionary and his opponent are present in Colombia as is the diehard opponent of any type of agrarian reform. However, agrarian legislation has been passed and is being carried out. The bargaining process and the extent of compromise between the interest groups who are for and against agrarian reform has been described by Hirschman.^{1/}

^{1/} Albert O. Hirschman, Journeys Toward Progress (New York: The Twentieth Century Fund, 1963), pp. 141-150.

During the last half century various reforms have been proposed; some have been rejected, others approved and tried. Colonization is one such proposal that has continually been met with acceptance. Colonization programs originally were for the purpose of opening up new land; however, many scholars submit that the present day existence of colonization programs is brought about by other forces. The power structure of the Colombian political system is such that the large landowners are power holders. The landowners, often political authorities rather than the actual political leaders, have vested interests in any agrarian reform program. Colonization can be pointed to as a visible agrarian reform program, but it does not jeopardize the large owners of land. Such a program is not resisted and is easily passed by the legislature. The landowners oppose only measures attempting to bring about changes which affect their status quo. The greater the effect, the stronger the opposition. Since colonization does not affect their land it is an easy out for the landowners even though such a program might be costly in terms of the allocation of scarce resources.

Although there have been many types of reforms proposed, this study will be limited to a description and evaluation of land settlement.

Land settlement can be thought of as a continuum. At one end no direct assistance is given to the settlers. This is what is often referred to as spontaneous settlement. At the other end full assistance is given to the settlers, including clearing the land, providing homes, and making the following services and facilities available: drinking water, sanitary facilities, health services, schools, means of transportation and communication, technical assistance in agriculture and veterinary science, credit and grants of operating capital, and marketing facilities.

One can find settlement projects all along this continuum involving various degrees of planning and assistance. In this study two types of settlement projects were compared. One of these was an area of spontaneous settlement where no outside assistance was given. The other was a directed settlement project where the Colombian government provided considerable assistance. Criteria were established for selecting the settlers, and they were transported to the project area by the government. A cooperative was established and medical services, schools,

technical assistance, property demarcation, and supervised credit were provided.

Directed settlement or directed colonization in this study refers to settlement in the delineated areas originally opened by the Agrarian Bank and now administered by the Colombian Agrarian Reform Institute (INCORA). The term colonization is used quite differently in many countries and even within a country in Latin America. Since "colonization" usually is associated with the development of "colonies", it will be used synonymously with directed settlement.

Objectives of the Study

There are currently five directed colonization projects in Colombia, all of which were established by the Agrarian Credit Bank in the late 1950's and early 1960's.

Caqueta is one of the more advanced directed projects in terms of the number of families settled and the degree of assistance available. There is also a considerable amount of spontaneous settlement taking place. For these reasons it was selected as the focal point of this study.

When one looks at new land settlement in relation to the overall picture of agrarian reform, two questions must be faced: (1) What are the advantages and disadvantages of directed and spontaneous settlement--does one type of settlement outweigh the other in terms of costs and benefits? and (2), Is new land settlement a feasible alternative considering the other avenues of agrarian reform?

The primary objective of this study is to determine if there are significant differences between the two types of settlers in terms of selected economic and social characteristics. A secondary objective is to provide general data on newland settlement.

There have been few studies of an empirical nature to point out the types and the dimensions of the problems related to these two types of land settlement. This study is organized to fill this need, hoping to provide relevant empirical data which can be used as a basis for policy decisions.

Operational Hypotheses

For the present study, operational hypotheses were formulated to serve as guidelines for field research and data analysis. The main hypothesis is: There is no significant difference between directed and spontaneous settlers in terms of education, experience, attitudes, labor efficiency, level of living, and land area cultivated. Other social and economic characteristics will be compared but are of less importance.

The secondary hypotheses are:

- (1) The land area cultivated is positively related to education, experience, level of living, and years of occupancy.
- (2) The adoption of new techniques is positively related to the level of education, the amount of agricultural information available, level of living, and the age of the farmer.
- (3) Labor efficiency is positively related to education, experience, and size of family.
- (4) The amount of agricultural information available to the individual is positively related to use of credit, adoption of new techniques, and level of living.

SOCIAL CHARACTERISTICS

Migration Patterns

The settlers migrating to Caqueta were born in many parts of the country. Many settlers from both the groups studied were born in the departments of Tolima and Huila. The similarity of the groups ends at this point. Twenty-eight per cent of the directed colonists were born in Caldas while only 6 per cent of the spontaneous settlers were born in this department or state.

To give some indication of the degree of mobility the interviewees were asked to name the area where they lived before migrating to Caqueta and this information was then compared with their birthplace. A relatively high proportion of the spontaneous settlers (15 per cent) were born in Caqueta and did not migrate. Only 2 per cent of the colonists were born in this department.

It was found that 18 per cent of the directed colonists migrated from the same community--the village or town--where they were born; the spontaneous group showed a higher figure of 26 per cent. If these people had changed their residence this was not found since they had returned to their place of birth sometime before moving to Caqueta.

A number of settlers came from the same department of their birth but from different localities. It was found that 24 per cent of the directed settlers had changed residence only within the department of their birth before migrating to Caqueta. Twenty-one per cent of the spontaneous settlers did the same. The majority of the settlers of both groups moved from department to department before they finally migrated to Caqueta. It was found that, of the families who migrated, 56 per cent of the directed colonists had previously migrated between other departments. Thirty-seven per cent of the spontaneous settlers had moved about from department to department before migrating to Caqueta. The directed colonists appeared to have been a more mobile group although almost 59 per cent of the spontaneous settlers had also moved from their place of birth, either to another community nearby or to another department.

The reason for such mobility, which may be an indication of economic and social insecurity, is no doubt complex and related to many factors. The directed settlers indicated that almost half migrated to Caqueta in search of land or because of government promises. Another 21 per cent left to escape the civil violence which was prevalent in the interior.

The spontaneous settlers gave more varied reasons for migrating, although wanting land or better land was the most important reason. A smaller percentage of the spontaneous settlers came to the new area to escape the violence. This may be explained by the fact that many of the spontaneous settlers moved to Caqueta before the heavy violence began in 1948. A considerable number of spontaneous settlers had ties with family members or with friends already in Caqueta who induced them to make the move. Only one of the group interviewed indicated that he had been influenced by the government.

A rough index of violence score was calculated for each individual interviewed. The departments were ordered from least to most violence and a weight given for proximity to actual violence within each department.^{2/} Thus if an individual were from a violence area the department score would be multiplied by three; if near a violence area, by two; and if in an area where there was no violence, by one. The total score was divided by three for purposes of computation. The distribution of scores was as follows:

Number of Settlers Who Received An Index of
Violence Score From Zero to Nine

	Score			Total
	0-3	4-6	7-9	
Directed	23	35	42	100
Spontaneous	57	4	23	84

^{2/} The index was based on the work of Orlando Fals Borda, et al., La Violencia en Colombia: Estudio de un Proceso Social, Bogotá: Universidad Nacional, Facultad de Sociología, Monografías Sociológicas No. 12, Tomo 1, 1962.

This approximate estimate of involvement in violence supports the previous data in that the directed colonists came from areas of more violence than did the spontaneous settlers. Their own expressed reasons for migrating to Caqueta indicated the same results.

The original selection of directed colonists by the government was based on the premise that those in need of land were those displaced by the violence. (At least this was the publicized reason for their selection.) Even with the great turnover of colonists within the past four years a high proportion of those present at the time of the interview had been affected by the violence; however, a number of spontaneous settlers affected by violence also had come to Caqueta on their own.

Forty-two per cent of the directed colonists had not owned or rented land during the ten years before they arrived in Caqueta, while 23 per cent of the spontaneous settlers had had no land immediately before migrating to Caqueta. Many of the persons without land were also not working in agriculture. Eighteen per cent of the directed settlers were engaged in occupations outside agriculture. Another 12 per cent were employed both in agriculture and in other occupations. Only 2 per cent of the spontaneous settlers were not engaged in agriculture with another 8 per cent working in both agriculture and other trades. Both groups working in trades other than agriculture were employed as craftsmen, miners, public works employees, and in small business.

In regard to tenure rights in land before arriving in Caqueta, the interview results showed the following:

Tenure Rights in Land

	Directed Number	Spontaneous Number
Non-agricultural occupation	14 (14%)	2 (2%)
Agricultural laborer	35 (35%)	19 (23%)
Share cropper	8 (8%)	0
Renter	14 (14%)	4 (5%)
Owner	28 (28%)	59 (70%)

Once again it is clear that in addition to a higher per cent employed in agriculture, more of the spontaneous settlers were owners of the land they farmed where they lived previously.

Degree of Satisfaction in Caqueta

It was indicated earlier that both groups seemed to have migrated much of their lives; perhaps this was a sign of social and economic insecurity. Most of the families were searching for a better life. The question now arises: Are they more satisfied in Caqueta and, therefore, less willing to move to other areas? This is a crucial question for supporters and planners of new land settlement.

A relatively high percentage (76 per cent) of the heads of household indicated they were more satisfied in Caqueta as compared to the area where they lived previously. The majority of the wives in both groups also closely agreed with their husbands but with less enthusiasm. Many of the directed colonists' wives (23 per cent) said they were less satisfied while a smaller proportion (8 per cent) of the spontaneous settlers' wives were dissatisfied with Caqueta. The same relationship for the men held true, 16 per cent of the directed colonists were less satisfied while four per cent of the spontaneous settlers held this view.

Even though one may be more satisfied now than before this still does not mean there will be no further changing of residence. Each settler was asked to select one of the choices listed in Table 1 to determine if he was satisfied enough to remain in Caqueta.

TABLE 1
Degree of Permanence in Caqueta

Choice	Directed Number	Spontaneous Number
Anxious to leave	1 (1%)	4 (5%)
Want to leave but not anxious	2 (2%)	8 (10%)
Indifferent	2 (2%)	3 (3%)
Want to stay but not anxious	21 (21%)	26 (31%)
Anxious to stay	74 (74%)	43 (51%)

Most of the directed colonists (95 per cent) indicated they wanted to stay in Caqueta while 82 per cent of the spontaneous settlers gave the same reply. More spontaneous settlers (15 per cent) indicated that they wanted to leave compared to the directed colonists (3 per cent). The reasons for wanting to leave included: death of wife or wife left, old age, life going badly, and a desire to educate the children.

Similar reasons for wanting to stay in Caqueta were given by both groups. A few settlers gave more than one reason; however, the first reason was assumed to be the most important. All the responses were listed and it was found that they could be classified into four groups. Group I includes indifferent responses--the settlers indicated that there was no special reason for wanting to remain. Group II includes negative responses--the settler didn't like the situation but could see no better future elsewhere, or he was unable to move without losing everything. Group III includes positive responses about present conditions. These settlers said they wanted to stay because of something they had at the time of the interview. This might have been because of the abundance of land, the tranquility, a good life, or that they were working for themselves. Group IV lists positive responses about future expectations. The settler was willing to wait for better things, hoping that they would come.

The highest number of responses for both groups fell within Group III, a positive response for the present; the spontaneous settlers were more pragmatic in their answers as shown by a 6 per cent response in Group IV. Their desire to remain in Caqueta was based on fact and not on future expectations. The directed colonists placed more emphasis on the future.

There was a direct, positive relationship between the degree of permanence and the reasons given but the relationship was smallest for the directed colonists. Simple correlation gave an $r^2 = .20$ with a significance level of $.001^{3/}$ for the spontaneous settlers and an $r^2 = .04$ with a significance level of $.001$ for the directed colonists. The directed colonists who said they were anxious to stay were less likely to give a positive response indicating why they wanted to stay.

It is possible that a larger number of directed colonists indicated that they wanted to stay in Caqueta because they felt this was the "correct" response. INCORA, no doubt, would be less willing to assist those who indicated or even suggested they might want to abandon their parcel.

Approximately 50 per cent of the parcels in the directed colonization projects have been abandoned since the beginning of the project in the late 1950's. That is, there has been a turnover of about 260 families out of the over 500 parcels. Most abandoned parcels are assigned to new colonists after a short waiting period.

Available records on the abandoned colonists indicate that 20 per cent gave sickness as the reason for leaving. Most of those who left did so in 1960, shortly after the project was established. It appears there is a smaller rate of abandonment now.

^{3/} Significance level is the probability that such an observed value of r could have arisen from a population in which the theoretical correlation coefficient equals zero.

Age and Family Composition

The mean age for the head of household for the spontaneous and directed settlers was 44 and 41, respectively. This difference was not significant at the .05 level. The variation of ages was greater for the spontaneous group with a standard deviation of almost 12 years. The standard deviation for the directed colonists was nine years. This difference is significant at the .05 level. Some of this difference in age can probably be explained by the fact that the selected colonists' age must fall between 21 and 55.

The size of household averaged 7.2 persons for the directed colonists and 7.0 for the spontaneous settlers; this is not significantly different at the .05 level. The standard deviations are 2.9 and 3.0, respectively. It should be noted that the figures indicated above are not size of family but rather size of household. It is quite common to find other relatives or friends living with the family. No attempt was made to obtain information for the immediate family.

Even though size of family was a criterion for selecting directed colonists when the project began, those with larger families having priority, there is now no significant difference between the two groups in terms of the number of persons the head of household supports. This implies that the selection of colonists was not carried out according to the priorities listed or that the size of household of the spontaneous settlers migrating to Caqueta approaches that of the directed colonists.

Educational Level

The level of education for the heads of households in both groups was quite low. The mean of the number of years of school attended was 2.2 years for directed colonists and 1.1 years for spontaneous settlers. The difference was not significant at the .01 level. The mode for each group was zero years. The directed colonists also had more variability in years of school attended, with the standard deviation being 2.1 years as compared to 1.6 years for the spontaneous settlers. The years of school attended varied from 0 to 8 for both groups. Some may have attended a school for more years than there were grades. That is, some people attend school for four years even though the school offers only two grades. No significant relationship was found between age and level of education for either group.

A number of operational hypotheses presented in the Introduction were used to test the importance of education. Simple correlations show no significant relationship between education and the following: land area cultivated, per cent cultivated, adoption of new techniques, labor efficiency, or level of living. It can be concluded that the limited level of education was not related to the items listed. The number of individuals with a higher level of education was not sufficient to determine if there was a significant relationship between education and the above items after some minimum level of education had been attained. This suggests the need for further research related to the type and length of education needed to be effective in agriculture.

Approximately 73 per cent of the directed colonists (heads of households) said they could read and write; however, in many cases, their ability to do so was quite limited. A smaller proportion of the spontaneous settlers, 48 per cent, said they could read and write. This difference appears much more significant than the difference between the number of years attended in school.

The illiteracy rates by age groups for the families interviewed are shown in Table 2. In the school age groups more females than males were able to read and write. This did not hold for the older age groups

TABLE 2
Population Illiteracy Rates
By Age Groups and Sex

Age Group	Directed		Spontaneous	
	Male	Female	Male	Female
	(%)	(%)	(%)	(%)
10 - 19	53	41	62	44
20 - 29	23	34	47	50
30 - 39	24	26	56	57
40 - 49	26	62	48	40
50 and up	26	42	51	65

however. It can be concluded that the male school age group in the colonization area received less education than did the older male members of the family. The parents probably had more access to school in the more settled areas where they had lived previously. Many were not in agriculture and, therefore, had more need for knowing how to read and write. This same relationship was not found for the females.

The technique of asking the interviewee if he can read and write is not entirely satisfactory since an extremely biased response may be obtained. It can be assumed that an individual with two years of schooling will not have a great deal of competence; however, he should be able to read and write to some extent. If a person can read and write at all his response will be positive where in fact his ability may be so limited that he does not use it.

The average illiteracy rate for the families interviewed was 35 per cent for the directed colonists and 52 per cent for the spontaneous settlers. The difference was significant at the .01 level.

Type of Home

Various types of materials were used for home construction. The most common material for construction was wood, due to its abundance. The main difference between the two groups was that more directed colonists had roofs constructed of galvanized steel. In order to make a direct comparison between the two groups and to utilize correlation analysis, each family was given a score based upon the construction of the home in which they lived. If the floor was constructed of wood instead of palm a higher score was given. All scores were added to make a total home construction score. The mean of the type of home scores were 11.9 and 11.1 for the directed and spontaneous settlers, respectively. This difference was not great enough to be statistically significant, since a difference of this size could be expected to occur 18 times in 100 as a result of chance. The standard deviations were 4.7 for the directed colonists and 3.4 for the spontaneous.

Most of the homes have the kitchen built on one side, often in a separate structure but connected with the home. A crude table covered with soil is located in the kitchen and a wood fire built on it for cooking.

The directed colonists' homes averaged 2.4 rooms resulting in an average of three persons per room. The spontaneous settlers had even smaller homes with a mean of 1.9 rooms. This results in an average of 3.7 persons per room.

The home had no toilets and only 2 per cent had covered outdoor latrines. The settlers expressed the opinion that where there were latrines there were mosquitoes--the author's observations support this view. If a latrine is built it must be disinfected and cared for; since this usually is not done, it provides a good breeding ground for insects.

Candles were used for lighting the homes after dark with 38 per cent of the directed colonists using no other source while 19 per cent of the spontaneous settlers used only candles. The next most used source for light was a fuel oil wick lamp. A total of 92 per cent of the directed colonists used candles or oil lamps. A smaller proportion, 61 per cent, of the spontaneous settlers used candles or oil lamps for lighting. More gasoline lamps were used by the spontaneous settlers.

Each family was asked to compare his present home to that in which he had lived previously. The results were:

	Worse (%)	Equal (%)	Better (%)
Directed	47	23	30
Spontaneous	30	29	41

The spontaneous settlers seemed to view their present home more favorably with 70 per cent indicating the present home was as good or better than the one they lived in before. A smaller proportion, 53 per cent, of the directed colonists gave this response.

Family Possessions - An Indication of Relative Wealth

A number of items were selected and listed in the questionnaire to give an indication of the relative wealth of the family. The items listed included most of the material possessions found in the area with the exception of hand tools and essential household items. The items were listed in order of cost with a hand grinder being

the cheapest item. Many families owned more than one item while others possessed only one or, in the case of the spontaneous settlers, none. A total score was calculated for each family. The mean of the total scores for the directed colonists was 6.7 and for the spontaneous settlers was 7.6. The difference was not significant at the .01 level. Sixteen per cent of the directed colonists owned four or more of the items while 31 per cent of the spontaneous settlers had four or more of the items.

Level of Living

An attempt was made to establish a relative level of living score for each family in order to compare the two groups and also to try to isolate important variables related to the level of living.

Each family was asked to estimate the food expenditures incurred during the week before the interview. Most families go to the local market once a week although some go only every two or three weeks.

In addition, the specific amounts spent on meat, salt, and lard were recorded. Yearly expenses for clothing and medicine were also collected. Each item was ordered and given a Sten score.^{4/} The sum of all the items divided by the number of persons living in the home gives the relative level of living score. The level of living was then correlated with other items which will be presented in a later part of the study.

As an example, a family might have a Sten score of five for total expenditures, four for meat, six for salt, five for lard, six for clothing and six for medicine. This gives a total of 32, and dividing by four (persons in the home) results in a level of living score of 8.

^{4/} For an explanation of this method see: A.A. Canfield, "The 'Sten' Scale: A Modified C Scale," Educational and Psychological Measurement, 11:295-298, 1951; and Charles H. Coates and Alvin L. Bertrand, "A Simplified Methodology for Developing Multi-Measure Indices as Research Tools," Rural Sociology, 20:132-141, 1955.

This method is quite useful for correlation analysis but it cannot be used for making a direct comparison between the two groups since the values are equalized by the Sten scoring which is based on normal distributions.

For food items the spontaneous settlers spent a greater amount at the weekly market than the colonists; however, they spent a little less for clothing and medicine during the year. Each purchase feeds about seven persons on the average.

In connection with the level of living score, each head of household was asked to compare his present earnings with what he had earned previously.

A Comparison of Present Earnings to
Previous Earnings by the Settlers

	Less (%)	Equal (%)	Greater (%)
Directed	65	13	22
Spontaneous	25	30	45

It is quite clear that the directed colonists considered their present earnings to be much smaller than what they had earned at their previous locations. The reverse was true for the spontaneous settlers. The figures are relative; therefore, one cannot estimate the previous incomes of either group. However, assuming that the incomes of the two groups had not changed greatly, one could predict more dissatisfaction on the part of the directed colonists. During the interviewing many colonists did express the view that life was hard and that they could not earn enough from the land.

Both groups spent approximately the same for food and clothing. If this is actually the case then one could hypothesize that, if the spontaneous settlers are in fact earning more it is being invested in opening up more land, purchasing animals, buying tools and seeds, or other items.

Public Services Wanted

There is usually considerable discussion concerning the types of services which should be provided to a new settlement area, be it directed or spontaneous. A section was included in the questionnaire soliciting the opinions of the farmers in regard to the relative importance of some of these social services.

The technique of paired comparisons was used for this study. This method allows not only the ranking of the items but also the attaching of weights to the items indicating their relative importance. Seven items were used: roads, school, church, credit, a better market, electric lights, and clean drinking water.

The weighted rankings for both groups are shown in Table 3. (One item in each group was dropped to meet the consistency test.) It is quite obvious that neither group considered electric lights as being very important and therefore useful. Electricity when available was used almost exclusively as a source of light and not for power in the rural areas.

The availability of roads was the service most desired by the directed colonists. A road was also placed high by the spontaneous settlers but tests showed that it was not on the same continuum as the other items. That is, when the spontaneous settlers thought of a road they judged it by different attributes than they used to judge the other six items. The same held true for drinking water when judged by the directed colonists. It is not clear why these two items were viewed differently. It is possible that the settlers living near a road and the colonists who had good drinking water may have placed both items low. Other settlers without these services may have responded differently bringing about an inconsistency in the group causing the items to be dropped in the analysis.

The two groups placed different emphasis on the importance of school, church, credit, and a better market, placing the items in different positions. All were grouped fairly close together on the scale, however.

Both groups judged drinking water as being important; however, neither group had a good knowledge of diseases which could be caused by impure drinking water. None of the spontaneous settlers was able to name a disease caused by using bad water while 8 per cent of the

TABLE 3

Weighted Rankings of Selected
Social Services by Importance

Directed

Spontaneous

2.3 Road

2.0 School

1.9 Credit

1.8 Market

1.9 Water

1.6 Church

1.6 Credit

1.4 Church

1.3 Market

1.3 School

0.0 Lights

0.0 Lights

directed colonists could. A higher per cent, 43 for the spontaneous group and 32 for the directed, were aware that diseases were caused by bad water but couldn't name any specific diseases. The majority of the spontaneous settlers, 55 per cent, indicated they knew of no diseases caused by dirty water. Two per cent of the spontaneous settlers gave no response. A larger part, 60 per cent, of the directed colonists said they knew of no diseases caused by bad water.

An unanticipated conclusion was reached when this question was tabulated. It was found that many people named malaria as a disease which could be contacted from drinking bad water. It is said that at intervals of about every six months malaria spray teams disinfect the homes. If this is so, it is quite obvious that no attempt was made by the team to inform the people about malaria and its cause. The spray teams would be ideal groups to spread this information.

Although public health service was not included in the paired comparison listing, it, no doubt, is considered to be very important by most settlers. Sickness is common and a qualified nurse or doctor would be quite welcome.

On the average the directed colonists took nearly two hours to reach the nearest road and another hour to reach the market place. The spontaneous settlers interviewed were an hour away from the road on the average and another one-half hour away from the local market. The greatest distance a directed colonist had to travel to a road was about 10 hours; it took six hours for the most distant spontaneous settler. These distances are somewhat biased due to the areas selected, especially for the spontaneous settlers. There are hundreds of settlers who live farther from a road than is shown above.

The directed colonists were promised a road through the project but this had not been carried out yet. After four years a road had reached the administration buildings on the edge of the projects. The spontaneous settlers, no doubt, will have to wait much longer for a road.

The directed projects have more schools available with the average time between the home and school being three-fourths of an hour. Some colonists, however, are two to three hours away from the school. All the schools offer only the first few grades. The spontaneous settlers live a greater distance from school, averaging one hour, with some as far away as four to six hours.

The ranking of social services was tested to determine its significance. The first test used was to determine the extent of group agreement. The measure used was the coefficient of agreement. Even though each person might be consistent in his judgment he may not agree with the other judgments made. One is interested, therefore, in the extent of agreement among all the respondents.

The maximum value possible for the coefficient of agreement is one, which indicates complete agreement. The less the agreement, the smaller the value. The coefficient of agreement for the directed colonists was .334 which was highly significant at the .01 level. The coefficient of agreement for the spontaneous settlers was .312, also significant at the .01 level. It can be concluded that there was significant agreement among the settlers as to the relative importance of the six items.

Each individual received a score indicating whether he was consistent with himself. Both groups had a mean individual consistency score of .91, indicating high consistency.

Individual deviation from the group consensus was also measured and correlated with other items. The inter-relationships will be presented later.

Orientation Towards Government and Society

A study of people's attitudes toward the government and toward other members of the society can give indications as to the effectiveness of a given program, be it directed colonization, supply cooperative, or any other program. The directed colonists have a close connection with a governmental program while the spontaneous settlers have very little or no connection. An attempt was made to determine if there was a difference between the two groups in terms of alienation from the government and from other members of the society.

Sociologists have developed a scale which attempts to measure the extent of deviation from the accepted rules of the society. This is called anomie or normlessness.^{5/}

^{5/} For a theoretical analysis of anomie, see: Robert K. Merton, Social Theory and Social Structure (The Free Press of Glencoe, New York, 1963).

All societies set forth culturally defined goals, purposes and interests which the individual members try to reach. Certain institutionalized rules, or norms, are outlined as acceptable means to achieve the goals. In some societies the norms are specifically defined while in others many alternative means may be used to reach the defined goal.

When a society places high emphasis upon the goals but far less upon the prescribed methods for reaching these goals, the most effective means is then used. As this process continues the society becomes unstable and there then develops "anomie" or "normlessness." This concept has been extended to the individual where "anomy" signifies the state of mind of one who has been pulled up by his moral roots, who has no longer any standards but only disconnected urges, who has no longer any sense of continuity, of folk, of obligation."^{6/}

A series of scale indicators have been developed to test anomie by empirical research. The scale uses items referring to the individual's perception of his social environment and to his perception of his own place within that environment.^{7/}

The following statements were used as indicators for the scale of anomie: (1) One must be concerned about today and leave the things for tomorrow for tomorrow, (2) Nowadays one doesn't know whom he can trust, (3) Regardless of what others say, the situation is worsening and not getting better, (4) Most people don't care what happens to others, and (5) Most governmental officials have no interest in the problems of the people. Each person was asked to indicate whether he (1) completely agreed, (2) agreed, (3) was indifferent, (4) disagreed, or (5) completely disagreed with each statement. An indifferent response to all statements would give a total score of 15. A smaller score would indicate agreement with the negative statements and a larger score, disagreement with the statements.

Both groups agreed with the negative statements concerning the government and other people. The directed settlers had a mean score of 10.1 and the spontaneous

^{6/} R. M. Mac Iver. The Rampards We Guard (New York: The Macmillan Company, 1950), pp. 84-85 and Chapter 10.

^{7/} Robert K. Merton, op. cit., p. 164.

settlers a mean score of 10.8. There was no significant difference at the .01 level. The scale, with its indicators, has various limitations and inadequacies but it does furnish some measure of anomie. The scale has been tested by others in Colombia and it was found to be valid and reliable.^{8/}

It is quite clear that both groups have little respect for the government or for other people. The implications are obvious. An extension program, a credit program, or a colonization project will have to overcome these negative attitudes. The families who have migrated to Caqueta are highly suspicious of strangers and do not trust others outside their own group nor do they trust governmental officials. The underlying attitude which confronts any person interested in helping improve the settler's lot is that the settlers suspect his actions. The farmers feel the stranger has a hidden reason for asking questions or getting rapport and that this will be used against them later.

Researchers in the United States have found negative relationships between anomie and education, socio-economic status, and indicators of social interest. This study did not find any relationship between these variables. The U.S. studies dealt with more diverse groups, while in this study the groups were fairly homogeneous, as shown previously. However, the results did show a high degree of despair on the part of both groups--enough to indicate the need for obtaining the respect of the farmers before any type of program could be initiated.

A high degree of anomie has also been found in other areas of Colombia. This implies that the settlers arrived in Caqueta with a relatively high level of anomie. All Colombians have witnessed a collapse of the social structure and norms due to the civil violence beginning in 1948 and continuing to the present. The government made promises to the directed colonists but these were not carried out. The life is still hard and the colonists are dissatisfied in the region. Not only did they start with a negative attitude toward the government but it has been reinforced by the government in failing to live up to its promises.

^{8/} A. Eugene Havens and A. Lippmann, "The Effects of the Colombian Violencia on Personality," Sociología y las Sociedades en Desarrollo Industrial, Argentina, 1963, p. 157.

ECONOMIC CHARACTERISTICS

The complete separation of social, economic, and other variables is much more difficult when studying a population which is basically outside the money economy and lives virtually at the subsistence level. In this environment the economic variables are considerably influenced by sociological factors. For this reason, the conclusions arrived at in this chapter must be viewed with caution and be related to the results of the previous chapter.

Size of Holdings

The mean size of holding varied between the two groups with 60.4 hectares for the directed colonists and 75 hectares for the spontaneous settlers. The standard deviations were 16.6 and 60.6 hectares respectively. The variation of holdings for the directed colonists was much smaller since the plots were equalized at the start by the government, taking into account, where possible, differences in soil and topography. Most of the boundaries between farms, in both groups, were marked by trails or by specially marked trees. For this reason, the farmers were able to closely estimate the size of their farms even though much of each farm may have still been in forest.

Length of time on the farm was positively correlated to the size of farm for the spontaneous settlers with an r^2 of .08 at a significance level of .001. Length of residence explained only a small part of the variation, however. There was no significant relationship between the age of the head of household and the size of farm.

Land Ownership

As has already been pointed out in an earlier chapter, the majority of the farms in Caqueta are owner-operated. This is the case for all the directed colonists; however, three of the spontaneous settlers interviewed were not owners--one rented, one was in partnership, and one was a share cropper.

Even though most farms were owner-operated, this did not mean they had security of tenure. Many persons did not have registered titles to their land and were not, therefore, protected by the legal system.

Directed Colonists

Almost all the directed colonists had a title of sorts. The common legal document is called an escritura which gives the colonist rights to the land providing he meets the requirements set forth by the government.

The government has required, and as far as is known, still requires the following:^{2/}

1. The owner reside on the land and work it personally.
2. The owner and his family conduct themselves well and agree not to use alcoholic beverages on the grounds of the project headquarters.
3. At least one-half the parcel be exploited within five years. The fee simple title will be given only when the colonist has shown the Institute of Agrarian Reform that he is economically exploiting his parcel.
4. A part of the parcel be used for crops considered by INCORA to be necessary for the development of the zone.
5. All financial obligations be met with INCORA or the Agrarian Credit Bank.
6. The colonist develop his parcel in accord with the dictates of INCORA or the Ministry of Agriculture. He is responsible for using the soils, trails, streams, etc. as suggested by the agencies mentioned.
7. The colonist may not sell, rent, or transfer his rights to a third party without the permission of INCORA until he has fee simple title.

^{2/} Taken from an INCORA document, "Contrato de Explotación de 'Unidad Agrícola Familiar'."

8. INCORA has the right to buy the parcel, with its improvements, at a price set by impartial judges, if the colonist wishes to sell to a third party who does not meet the criteria outlined for new colonists.
9. A settler who does not comply with the previous conditions is subject to a fine or loss of his parcel depending upon the severity of his action. In case of expulsion, he must leave the parcel within 10 days after written notice from INCORA. The value of the improvements will be applied to loans due or other obligations.
10. If a parcel is abandoned and the settler does not return within 30 days, he loses all rights to the land. All improvements are then the property of INCORA.

These, then, are the rights of the government with which the colonist must work. There are few rights, specifically spelled out, for the new colonist. The rights for the colonist begin after receiving fee simple title and no colonist has a fee simple title yet.

It is difficult to judge the effect of such a land policy. Without doubt these policies were set forth to protect the government's investment but one must question whether this in fact results. Does the insecurity of tenure discourage exploitation of the land? Would there be less abandonment if the colonists had fee simple titles?

The provisional title given by INCORA does allow the colonist to obtain credit through the Agrarian Credit Bank. However, this in itself does not make the colonist more secure. It may be that a large debt can cause a great deal of insecurity, even to the point of abandonment. Security of tenure has to do with the period of time over which one keeps or expects to keep rights to land. In the case of the directed colonist the time is uncertain depending upon the government's evaluation of his compliance to the regulations. The colonist has no guarantee of future ownership.

At the start, the colonists were required to pay for the land through extended credit. This resulted in a heavy financial burden and there is evidence that many left because they felt they could not pay off the debt. Payment for land has now been dropped or at least has not been enforced.

The directed colonists, then, have some degree of ownership but only to a limited extent. They face many problems, some of which are:

- (1) They can be evicted from their land with little recourse.
- (2) They cannot legally transfer, mortgage, rent, or bequeath the land in question.
- (3) The obtaining of a fee simple title is dependent upon the decision of the INCORA personnel.
- (4) They must comply with suggestions and plans submitted by INCORA.

Their rights do include access to credit and to some technical assistance.

Spontaneous Settlement

Many of the spontaneous settlers in Caqueta exploit lands over which they have no legal title or other legal guarantee. This situation of title insecurity discourages development of the land since there is no way to protect the investment and improvements made on the farm. In addition, this can lead to violence or extreme conflict if a second party attempts to prove ownership and move the settler off the land. A farmer cannot obtain credit from the Agrarian Credit Bank or commercial banks unless he has a registered land title.

At least 35 per cent of the settlers had no legal title to the land they farmed with another 43 per cent having a bill of sale but not a registered title. Only 22 per cent had a registered fee simple title. A bill of sale is made to protect the buyer. In a sense, the previous owner who actually occupied the land turns the possession of the land over to the buyer. The bill of sale records this transfer but it is not a registered legal document even though it is respected by the farmers of the region.

Obtaining Title to Public Domain^{10/}

The procedure for obtaining title to public land is quite different from that for getting title to private property. That is, there is no adverse possession or prescription of public domain. Adverse possession or prescription is the establishment of a claim to title by use and enjoyment during a time fixed by law.

To obtain title, a settler on public lands must follow the administrative procedure set forth primarily in Law 97 of December 30, 1946. Law 135 of 1961 delegated powers of adjudication of public lands to INCORA which then partially delegated this power to:

- (1) All governors of departments as long as the area did not exceed 100 hectares.
- (2) The Agrarian Credit Bank which adjudicated public lands within the colonization fronts of Ariari (Department of Meta), Sarare, Lebrija, Carare (Department of Santander) and Galilea (Departments of Tolima and Huila).
- (3) The governors of Antioquia, Boyaca, Cauca, Cordoba, Huila, Magdalena, Narino, North Santander, Santander, Tolima and the Cauca Valley to adjudicate public domain up to 450 hectares.

The final authority rests with the general director of INCORA.

Law 135 fixes a maximum limit of 450 hectares for any grant of public land and requires, at the same time, that no more than one-third of the land adjudicated be unexploited. This maximum acreage limit can be extended by INCORA to 1,000 hectares for land situated in regions far from centers of economic activity as long as this condition exists. Flooded lands which cannot be economically sown to improved pastures fall under the same classification. Up to 3,000 hectares may be granted in the Eastern Llanos for natural grassland which cannot be sown to improved pastures.

^{10/}Taken from: Joseph R. Thome, Title Insecurity, Land Tenure Center, University of Wisconsin, Mimeo, May 14, 1964; and publications of INCORA, Law 135 (1961), Law 200 (1936), and Law 97 (1946).

Legal Procedure

The settler desiring a title must first present a petition for adjudication to the local alcalde, to the local Commission for the Adjudication of Public Domain, the territorial judge, or to the public official (Corregidor) of the intendencia or comisaria, whichever is appropriate for his area.

The public official then notifies the agent of the Public Ministry which is usually the Personero Municipal. At the same time, he must post a notice of the petition on the door of his office for 30 days, it must be published in an official publication of the department or in an official diary, and it must be posted during three consecutive market days.

Once the publication phase is completed the actual land area is visually inspected under the direction of the appropriate public official. If the land area is greater than 200 hectares it is a superior judge of the area. For smaller areas a municipal official directs the inspection. In the national territories the Land Judge and the Corregidor are responsible. In Caqueta, for example, where there is a Commission for the Adjudication of Public Domain, the chief lawyer or his representative, along with the local alcalde (trustee) or an INCORA representative, is in charge of the inspection.

Once the inspection is completed, a notice is posted at the office of the alcalde for 10 days, during which time one may oppose the proposed adjudication by supplying written proof contesting it.

The petition is then submitted to INCORA or to the other designated agencies for a decision, providing the adjudication has not been contested. The agency reviews the petition with its technical information and determines if it meets the requirements of the law. If so, it recommends the issuance of a "Title of Domain." The entire packet is then sent to the office of Titling of Public Domain in Bogotá which makes a technical judgment of the request. It then passes to the Division of Public Domain to see if there are any other claims for the same area. A resolution is prepared, signed, and sent to the General Director of INCORA who awards the title. The original copy of the title is retained in the files of INCORA and a copy sent to the originating office. The applicant must then formally register the document at the local registry office.

Common Procedure

For the directed colonists or for others soliciting aid from INCORA, the procedure is fairly simple. For extensions of more than 50 hectares a document with an official stamp must be prepared by a licensed lawyer or by an authorized agent. The document must bear a stamp worth 5 cents for each hectare of land. In the colonization areas, with 50 hectares on the average, this amounts to \$2.50. In addition, the colono must pay \$1.50 for the title once it is finished and must also pay a small fee to register the title with the Office of Registry.

The request to INCORA is handled by tituladores who are rarely lawyers. This accounts for the relatively small fee charged for the services.

In 1963 a group of Peace Corps Volunteers began assisting with the measurement of farms in Colombia in cooperation with the National Commission for the Adjudication of Public Domain. When enough requests are made in an area the group moves in and measures the farms. The farm maps are then turned over to INCORA which processes the title. The farmer need only assist with the measurement and pay for the stamps required for the document. Unfortunately, many farmers do not know of INCORA's project for adjudication.

In the areas of spontaneous settlement various middlemen have developed who provide the services of measurement and titling of lands. In Caqueta, for example, the investigation revealed that there are at least three "lawyers" located in Florencia who carry out land adjudication for a fee.

The Commission for the Adjudication of Public Domain in Florencia has been concerned only with farms of 50 hectares or less, although the total land holding of a family is often more. The commission has handled up to four requests in the same family where each family member had part of the farm in his name. There is evidence that families with large farms are using this method to evade any size restrictions set forth by the government.

Even though many assert that campesinos are not interested in getting title to land, the study did not support this view. The campesinos were interested in the adjudication of land but were unfamiliar with the procedures. A more serious limitation for those not assisted by INCORA was the cost of obtaining the title. The cost

varied from one to two dollars per hectare. When the settlers spend an average of \$5.00 per week for food, titling land becomes a heavy additional financial burden.

Obtaining Title to Private Land^{11/}

Legislation has been passed which enables one to get fee simple title to land if he has occupied the land for a specified period and if he meets the other requirements of the law. When a person occupies and exploits someone else's land, whether knowingly or unknowingly, he is often entitled to legal rights over the land. However, in Caqueta squatting is not a prevalent means for obtaining ownership of land.

The law recognizes two types of prescription: ordinary prescription and extra-ordinary prescription. The first involves a situation where there are two persons with title to the same land. The law recognizes the title of the person who is occupying the land if he has done so for a period of 10 years. It is assumed that the title of the occupant was obtained in good faith. That is, it was obtained without knowing the land was already privately owned. The person who is occupying the land is given the legal right since he has possession. This right has been legislated over the years based on the concept of the correct social use of land. Through this concept the person who is personally exploiting the land is given preference over others. Of course, if it can be proven that one of the titles was obtained by fraud, collusion, or other illegal means it then becomes void.

Ordinary prescription is very important for a newly developing area like Caqueta where it is quite probable that some lands will be claimed by two or more persons. The boundaries are poorly marked and the registering of properties slow and inaccurate in the outlying areas.

It must be pointed out that various other methods are used to define ownership before land is titled including threat, use of force, compromise, and the whole range of techniques used in a frontier area which lacks legitimate legal and law enforcing institutions. Compromise seems to be the common technique in Caqueta but the others are not, nevertheless, absent.

^{11/} Ibid.

Extraordinary prescription involves no title for the squatter but rather the occupation and exploitation of the land for at least 20 years. If the squatter has been on the land for the prescribed period, he is presumed to be acting in good faith. Only when it can be proven that he was a tenant, or in some other form had recognized the owner, will this presumption be negated. To prove possession the occupant must have tilled the soil, fenced, or put other improvements on the land.

The squatter must initiate an action of "pertenencia" (ownership) in the local Civil Court against the owner or against any person having interest in the land. If the court rules in his favor, he will be issued a title which can then be registered at the local Registry Office.

Law 200 of 1936 included a section on prescription which allowed a squatter to obtain title over privately owned property if he occupied it for a period of five years thinking it to be public domain. Only the land actually used is given to the squatter under this law, however. About the same legal procedure is followed to obtain a title as described previously. The same types of proof of exploitation by the occupant are required as listed previously except further proof must be given showing that the squatter's parcel was not within any property marked by fences, posts, or signposts at the time of occupancy.

Squatters who have had possession of land for a period of time would appear to have adequate legal procedures for obtaining title to the land. If this were really the case one would find a much smaller group of titleless farmers in Colombia. On the contrary, the ordinary prescription and the prescription outlined by Laws 200 and 97 are difficult to get through the courts plus the fact that the cost may be prohibitive to settlers with little or no cash income. For the squatters this leaves only the extraordinary prescription which requires 20 years possession. This is one-half to one-third of a man's lifetime and may look impossible from the viewpoint of the squatter. Twenty years is a long time to wait for a title when there is a possibility of eviction before the time is completed.

It is granted that the law provides for the payment of improvements built by the squatter but this too implies that the squatter knows his rights and that he has the resources to fight for them.

The more common situation is families living at the subsistence level with no understanding of their legal rights and without enough monetary resources to hire a lawyer who would presumably know and fight for their rights. The families are then at the mercy of others.

To add to this, lawyers can easily manipulate laws to the detriment of the campesinos. As mentioned previously, it is a common practice in spontaneous settlement areas for the lawyers to exact a fee which is from 15 to 40 times greater than INCORA charges for the same service.

The Agrarian Reform Law of 1961 recognized this problem and entrusted INCORA with the responsibility of reviewing land titles and assisting farmers with titling problems. It recognized "...the necessity of extending to the ever-increasing sectors of the Colombian rural population the exercise of the natural right to (own) property,..."^{12/} One function of INCORA is "to clarify the land situation as regards ownership..." and to "...facilitate the perfection of private land titles and cooperate in the establishment of fiscal land registries."

Some action has been taken by INCORA in solving title insecurity but largely within project areas. In the case of the colonization projects the question has already been raised concerning the type of ownership security which the colonist has at the present. Most of the spontaneous settlers were not aware of the service being provided by INCORA for securing titles at a relatively low cost. This implies the need for more dissemination of information during market days and for providing periodic legal counsel at local centers of population.

Land Use and Production

The way in which the land is used does not vary greatly between the two groups since they are both limited to crops adapted to the region and to hand labor. The common procedure for opening up new land is to begin clearing the underbrush in October when the heavy rains

^{12/} The Colombian Agriculture Reform Law (Bogotá: Antares, Limitada, 1962), pp. 25-28. A translation of Law 135 of December 13, 1961 of the National Congress of Colombia.

begin to subside. In the months of November to January the big trees are felled by axe and allowed to dry. It normally takes 8 to 12 men to clear one hectare in a day. The fields are burned leaving a tangled mixture of black, scorched tree trunks criss-crossing the plot. At the start of the rainy season in February or March, rice is planted in the fields. No attempt is made to remove the tree trunks.

At least two persons work together when sowing rice, one makes a hole in the ground with a pointed stick and the second comes behind placing a few kernels into the hole by hand. He then fills the hole with dirt using his bare foot. Rice planted in newly cleared areas is usually not weeded. If the land has been planted to crops previously, one or two weedings must be made. The harvest begins around the middle of June. A second crop might be planted in August and harvested in November or December. The rice is usually planted in a separate lot. The other crops, however, are often planted together in a field that has previously been in rice.

It is common for farmers to go into partnership where the owner prepares the land and provides the seed. The partner sows and harvests the crop. Each then takes half of the yield.

After the rice is harvested the land may be fallowed--brush is allowed to grow during the fallowing period and is later cut before planting the land to other crops. The crops following the rice are usually inter-planted and grown on the same plot for only a couple of years since the yields drop rapidly after the first two years. The land is then placed into pasture. During this time new land is being cleared to replace the worn out soils planted to crops. No one has thought about what will happen when there is no more virgin forest land to use for cropping. When that time comes, food products will have to be imported from other areas or new practices such as fertilizing will have to be employed to improve the yields on the older fields.

Corn is the second most important cereal crop, and is usually interplanted with the rice after the latter has germinated. It is harvested after the rice, usually in August. A second crop of corn is sometimes sown with the second crop of rice.

The other crops on the farm are planted throughout the year depending upon the weather and the labor force available. Sugar cane is planted on most farms to provide sugar for home consumption, with a few farmers growing a larger crop in order to sell panela (crude sugar) on the local market. Cane can be out about 15 months after planting.

Plantain and manico (cassava) are interplanted with other crops any time of the year when the labor load permits, providing it is done at the correct time of menguante (the period between full moon and the new moon). The farmers believe this is the best time to plant these crops. The plantain needs to be weeded every six months and will often produce for 10 to 15 years. Plantain is similar in appearance to the banana but is somewhat larger and starchier. It is usually cooked rather than eaten raw.

Manioc or yuca requires about one year to reach the harvest stage and can be planted almost anytime. The common planting time is in March when the rains begin. This crop must be weeded every four months.

Pineapple is planted in very small lots and requires a year and a half to begin producing. A sweet pineapple with white meat is common to the region.

With the exception of rice, most of the crops are grown for home consumption with little being sold on the local market. When cash is needed for a special purchase or for commercial items like salt, machetes, etc., a small amount of plantain or other crop is sold at the market.

It would be difficult to measure the amount of land allocated to each crop since there is a great deal of variation and most of the crops are interplanted making quantitative analysis virtually impossible. However, one can deal with the total crop acreage to evaluate any differences between the directed and spontaneous settlers.

The spontaneous settlers had, on the average, more land cleared than did the directed settlers.

The standard deviations for the means are large which indicates there was more variation within each group than between the groups. It appears, then, that there was no significant difference between the directed and spontaneous settlers in terms of land use. However, when simple correlations were run between the variables a difference between the two groups was found.

Although the spontaneous settlers had more land cleared, on the average, there appeared to be little difference between the two groups when the number of hectares cleared and the size of the farm were correlated. Both groups cleared about one-third of a hectare for each additional hectare of farm size. The b_{yx} was .38 for the directed colonists and .32 for the spontaneous settlers. However, for the spontaneous settlers, the variation in the number of hectares cleared was more closely related to variation in the total number of hectares. The r^2 was found to be .58 for the spontaneous settlers and .25 for the colonists. Both were significant at the .01 level.

For each hectare of land cleared, the directed colonists placed .37 hectares into crops and .49 hectares into pasture. The rest, .14 of a hectare, was non-productive or idle. The variation in hectares in crops was closely related to the variation in the number of hectares cleared. The r^2 was .55 for the colonists.

The spontaneous settlers placed only .09 of a hectare into crops with each additional hectare cleared. An additional .46 of a hectare was placed in pasture, and the residual, .45 of a hectare, was non-productive or idle. The low regression coefficient for hectares in crops indicates that each spontaneous settler had about as much land in crops as his neighbor and that the number of hectares in crops was not closely associated with the number of hectares cleared. It may be that once the spontaneous settler reaches a certain crop acreage, he then uses his labor in other enterprises of the farm such as livestock. Clearing more land has no effect on the number of hectares in crops except that the actual crop areas may be continually shifting to the recently cleared land. The land previously in crops is then fallowed or placed in pasture.

The main difference between the two groups was the emphasis placed on crop production. The colonists placed more of each additional hectare cleared into crops. The variation in the number of hectares in crops was also more closely related to the number of hectares cleared for the colonists than for the spontaneous settlers. Both groups placed about the same amount into pasture with each additional hectare cleared. The residual was land idle or non-productive. The spontaneous settlers left a greater amount of each additional hectare cleared in non-productive plots.

Inter-planting of Crops

There was very little difference between the two groups in terms of crop production. Similar methods were used for the soil preparation, the sowing, and the harvesting stages. Inter-planting of crops is common and is considered a good farming practice. No effort has been made by INCORA or other government agencies to prove or disprove this belief.

Ascertaining correct acreages of crops when three or four crops were grown in the same plot was extremely difficult. The directed colonists tended to interplant their crops much more than the spontaneous settlers, although both groups followed about the same system of clearing the land, planting crops, and then planting the land to pasture.

Labor Efficiency

A crude estimate of labor efficiency was used in the study to determine its relationship to the other variables studied. Labor efficiency for the family was defined as the total days of labor available per year on the farm divided by the total number of hectares cleared. This was then multiplied by .1. All males between the ages of 10 and 70 were considered able to supply 300 man days per year.

The sample mean of labor efficiency was 3.8 for the directed colonists and 5.3 for the spontaneous settlers. The larger the value the less efficient the labor force. That is, the spontaneous settlers had cleared fewer hectares per available man hour than had the directed colonists. However, when the standard deviations were considered the difference was not significant due to the large differences in labor efficiency within each group.

The hypothesis that "labor efficiency is positively related to education, experience in agriculture, and the size of the family" was tested using simple correlations. It was found that there was little relationship between the variables selected. This may be due to an inadequate measurement of labor efficiency; the farmer might put more labor into crops rather than into clearing land. Such a practice would make the labor efficiency measure inaccurate since labor was compared only to the number of hectares cleared. The only significant correlation was between labor efficiency and the size of the household.

For the directed colonists the labor efficiency dropped as the family grew larger ($r^2 = .12$). No other relationship was found.

Livestock Production

The ownership of cattle is considered very important by most Colombian farmers; Caqueta is no exception. Even though cattle ownership is important for prestige, many farmers are unable to obtain cattle because they lack the needed finances.

The sample mean of cattle numbers on the spontaneous farms was 8.6 head and for the directed colonists it was three head per farm. The difference was significant. However, almost 38 per cent of the spontaneous settlers and 50 per cent of the directed colonists had no cattle at all. When those without cattle were excluded from the analysis, the average increased to 17 head per farm for the spontaneous farms and to nine head for the directed colonists. The largest spontaneous herd numbered 88 head. The largest herd among the directed colonists was 34 head.

As was shown previously, the spontaneous settlers had more land in pasture. It was also found that as the number of hectares in pasture increased the size of herd increased ($r^2 = .48$). The correlation between the number of hectares in pasture and the size of the cattle herd for the directed colonists resulted in an r^2 of .14. Many of the directed colonists indicated that the Agrarian Bank had advised them to establish pastures for cattle production but that the Bank's promise of assisting in the purchasing of cattle was not carried out. As a result, many directed colonists had good pastures but no cattle. The spontaneous settlers had, on the average, one cow per hectare while the directed colonists had one cow for every four hectares. Well established artificial pastures in the directed project are now reverting back to brush because the colonists see little prospect of obtaining cattle.

INCORA had a small herd which was being built up in order to enter into partnership agreements with the colonists. This is a much needed program since a few head of cattle can provide a source of meat, milk, and income for the family, all of which are extremely limited at the moment.

The Agrarian Credit Bank has assisted some settlers in purchasing cattle, but most of the help has been extended to the directed project. The majority of the spontaneous settlers who had partnership agreements were in partnership with friends. The directed colonists who had partnership agreements were with the Cattle Fund^{13/} and the Agrarian Credit Bank.

There was a positive relationship between the size of the herd and owning cattle in partnership for the spontaneous settlers. There was no apparent relationship for the directed colonists in this respect. The Cattle Fund assisted the larger spontaneous settlers, with little aid being extended to the directed colonists. The reverse was true for the Agrarian Credit Bank in that it tended to assist the directed colonists who had small herds.

The partnership arrangements varied considerably, especially among friends. The Cattle Fund and the Agrarian Credit Bank both provided cattle on a profit-share basis where the cattle were provided by the agency and the farmer was responsible for their care. The cattle were valued at the beginning and at the end of the contract period which was usually for three years. The farmer then received 65 to 70 per cent of the gain and the bank the rest. The farmer was responsible for caring for the animals and was charged any losses which were due to neglect or poor management. Natural deaths were shared the same as gains.

The cattle death loss in Caqueta seems to be relatively high due largely to poor management. Much needs to be done to disseminate information on the proper care and management of livestock.

The second most important animal for the farmer was the horse or mule. Its importance was due to the need for transporting products to market. A farmer who owns horses or mules will often transport farm products on a contract basis for neighbors who own no draft animals. The animals are seldom or never used in the fields as a source of power.

^{13/}The Cattle Fund is a semi-autonomous agency established by law for promoting livestock production. In Caqueta the Fund provides cattle to the settlers on a lend-lease basis where the farmer cares for the cattle in return for a given per cent of the increase in value, usually 65 per cent.

More of the spontaneous settlers had a horse or a mule than did the directed colonists. Almost two-thirds of the spontaneous farmers had at least one horse or a mule. Fifty-three per cent of the directed colonists had at least one horse or a mule. The spontaneous settlers tended to have a larger number on the average with 38 per cent having two or more while only 15 per cent of the directed colonists had two or more animals.

Only three (3 per cent) of the directed colonists had both horses and mules while 12 (14 per cent) of the spontaneous settlers owned both animals. The horses are faster when the trails are dry and in good condition but are less useful during the rainy season when the sure-footed mule is the fastest and most reliable source of transportation.

The production of pork is common in the region but swine numbers are low. The spontaneous settlers owned between three and four head per farm--the largest herd was 30 head. The average for the colonists was one to two head and the largest lot was 19. The animals must usually rummage food for themselves and few recommended management practices are followed.

Those who had cattle tended to also have the other types of livestock and vice versa. Twenty-one per cent of the directed colonists had no cattle, horses, mules, or swine. In addition, 27 per cent had no cattle or swine. Fewer spontaneous settlers owned no livestock; approximately 17 per cent owned no cattle, horses, mules, or swine. Twenty-four per cent had no cattle or swine.

Poultry was an extremely important source of protein for many families since they did not own any livestock. Almost every farm, be it directed or spontaneous, had at least a few chickens running around near the home. The directed colonists had 22 chickens on the average and the spontaneous settlers an average of 14. The chickens were also allowed to fend on their own in the search for food. Assistance is often given to the small chicks by providing feeding creeps. Grain is given to the older animals when available. The larger animals are often sold on the local market to provide cash for other needed purchases.

Livestock serve as a form of savings for the settlers. Any surplus cash is invested in buying livestock or, in some cases, land. When a crisis such as sickness or poor crops strikes the family, the livestock are consumed in the form of meat and other products or by selling on the local market in order to purchase other needed items.

Public Institutions

The present study was also concerned with the availability of marketing, credit, cooperative, and extension institutions to the new settlers. It was felt a study of the institutions and their effect could locate bottlenecks and, therefore, suggest ways of improving assistance to the new settlers of the region.

Marketing

Few agencies or services are available to assist the Caqueta settler in the marketing of his farm products. The main product which is marketed is rice. The majority of the settlers (70 per cent of the spontaneous and 64 per cent of the colonists) received proceeds from rice last year. Another 39 per cent of the spontaneous and 27 per cent of the colonists sold corn, and 12 per cent of both groups sold livestock (not including poultry). Six per cent of the spontaneous and 25 per cent of the directed settlers indicated they sold no grain or livestock off the farm excluding poultry. Accurate amounts of sales off the farm were not obtained in this study.

Of the spontaneous settlers who sold products off the farm, 68 (81 per cent) sold on the local open market, one settler also sold to INA (National Supply Institute), and six sold nothing at all. More of the directed colonists sold through public marketing agencies. Fifty-four per cent sold only on the open market, while another 13 per cent sold on the open market and also to INA or to the cooperative. A small percentage (5 per cent) sold only to INA or to the cooperative. One-fourth of the colonists sold nothing from the farm during 1963.

INA, Instituto Nacional de Abastamientos, was established as a price control agency of the government. INA buys and sells grains to control seasonal and other price fluctuations. As shown by the study, only a few of the farmers sold directly to INA. The buying price for rice at INA was approximately 110 to 115 pesos per carga^{14/} but the farmer selling on the open market received from 80 to 90 pesos per carga. Even with the difference in

^{14/} One carga is approximately 250 pounds.

price very few farmers sold directly to INA. The main reason given was that it takes about a month to receive the money from INA while one receives cash when selling on the market. It is likely that transportation costs make up some of the price difference although not all. It appears that middlemen have developed who buy from the farmer at a low price and then sell to INA at a higher price. Little more can be said concerning these middlemen. It is unknown whether the local INA office encourages such a marketing structure or not.

Regardless of INA's policy, the result is quite evident. Any price advantage due to INA's action is not received by the producer except indirectly. Assuming no collusion on the part of INA and the middlemen, a set price by INA could also hold up open market prices if INA does not place a limit on the quantity it will purchase. It is not known if this assumption is valid.

The INCORA established cooperative sells grains, purchased from the directed colonists, through INA. Theoretically this will cut out the middlemen and provide economies of transportation thereby returning more to the colonist.

Cooperatives

If the number of pages in the constitution and by-laws were any indication of prosperity, the cooperative in Caqueta would be a booming success. However, it takes more than good organization on paper to run a cooperative. The membership for the cooperative has been listed at 420,^{15/} but the actual participation was limited as shown previously. The larger cooperative stores were located near the directed settlement projects but the colonists did not sell much of their produce through the cooperative.

The colonists have little understanding of the cooperative and distrust its operation. They feel that the prices paid them for farm products are low and that they must pay higher prices than they pay commercially for items purchased in the store. The validity of such

^{15/} Instituto Colombiano de la Reforma Agraria, Segundo Año de Reforma Agraria, Bogotá: Oficina de Divulgación, Junio de 1964, p. 59.

charges was not determined in this study. Nevertheless, whether true or false, the effect will be the same. As long as the colonists have this feeling the cooperative will continue to receive limited support from the farmers.

Credit

The main source of agricultural credit available to farmers in Caqueta is through the Agrarian Credit Bank. The main office is located in Florencia with branch offices in other parts of the territory. Almost all the settlers who indicated that they had received credit during the past two years received it through the Agrarian Credit Bank.

Of the 100 directed colonists interviewed, 72 per cent received a loan during the past two years. Twenty-six per cent received no financial assistance. The remaining 2 per cent did not respond to the question. Of the 26 per cent who did not receive credit, 11 per cent requested a loan but were turned down. The rest, 15 per cent, did not solicit credit. Four per cent of the colonists indicated they requested credit through a friend or a business man.

For the spontaneous settlers, 53 (63 per cent) received credit during the past two years. Twenty-nine (35 per cent) received no aid. Of these, 10 per cent requested loans but were refused. The rest did not request financial assistance.

The spontaneous settlers relied more on non-official sources for credit. Friends were the most important outside source with 20 per cent turning in this direction. Another 5 per cent obtained credit from local businessmen.

The main criticism of present credit services voiced by both groups was the short term of credit. The Agrarian Credit Bank usually gives credit for short-term loans only. When long-term loans are given the farmer must begin repayment within one year. This limits the service to those farmers already established who can begin repaying the loan. A poor farmer, hoping to build up a herd of cattle, for example, cannot begin to pay the first year since the cattle are not yet producing and he usually has few other sources of income.

The size of loans vary from a few hundred pesos to as much as 15,000 pesos. The interest rate is usually

between 8 and 12 per cent, a relatively low figure compared to other Colombian sources. However, the interest rate is discounted which means the actual real interest paid will be greater than indicated. The study results show inconsistencies for interest rates charged, implying a poor knowledge by the farmers of rates charged, or a type of "interest discrimination" by the loaning agency. All farmers incur more expenses than just interest rates when soliciting credit. Numerous trips must be made to the issuing office where the farmer must pay for lodging and meals. This often amounts to another two to three per cent additional expense on the loan.

It is evident that credit programs in Caqueta need supporting technical assistance programs. In order to repay loans, the settlers must be able to produce more than previously. This means better management practices must be followed. A possible source of assistance for crop and livestock improvement is the extension service.

No extension service was available to the spontaneous settlers at the time of the interview. INCORA has now extended its service to most of Caqueta; however, there is a shortage of county agents to cover the new area.

INCORA now has one extension agronomist, one veterinarian, and 11 practicos agricolas (county agents) in Caqueta. Five of the county agents are located in the Maguare colonization project, two in La Mono, and one in Valparaiso. The other three agents are located in Morelia, and Paujil, areas settled previously without governmental assistance.

Of the directed colonists interviewed, 73 had had an average of one visit per year by an extension agent. Thirty-six of those visited indicated they had received no help, 18 received assistance with crops, and another 19 received visits by agents handling loans. When asked if they would like more technical assistance, 90 per cent answered "yes." However, they were uncertain as to the type of help needed.

The spontaneous settlers interviewed were largely outside the influence of the extension program. Only five settlers were visited by technical personnel, three of whom were with the Agrarian Credit Bank. A large number, 88 per cent, of the settlers also indicated the need for more technical help. The responses showed a limited understanding of technical information, as such. Most of

the farmers wanted money in the form of credit, help in buying drugs, etc. Only a few said they wanted more technical assistance in agriculture. The directed colonists recognized the need for more agricultural information, or at least they were familiar enough with the term of technical assistance to give a "proper" answer. Many indicated that they wanted more information on agriculture but only those included in item 7, new agricultural practices, were able to specifically indicate what they wanted. This included information on the time of the year to plant various crops, the best seeds to use, the use of fertilizer and ways to obtain books on agriculture.

Technical information, as it is known in the United States, has not reached the new settlers of Caqueta. The extension agents in the area have limited training and their views are not respected by the settlers. The directed colonists indicated that when the county agent visited it was often necessary for them to kill a chicken for the guest or at least provide a meal with other products from the farm. This constitutes an expense for the farmer and unless the agent assists him to better his production, the farmer comes out behind. The latter, unfortunately, is the more common result.

The "county agents" spend most of their time evaluating the need for credit. They are now making "micro-plans" for each farm which outlines goals for the next few years and estimates the credit needs of the farmer. Unfortunately, the plan includes more of the ideas and plans of INCORA than of the farmer. INCORA suggests each farmer plant two hectares of African palm, and two hectares of sugar cane. The plans fail to recognize the desires and fears of the colonists. African palm is a new crop and has not yet been demonstrated as economically sound. Unsurprisingly, many colonists are reluctant to develop African palm plantings.

The farmer living on a subsistence level is not able to accept risk--he must put his efforts into the production of crops which will at least keep his family on the same economic level that they are on now. This means producing the traditional crops of yuca, plantain, rice and corn. Any new crop must be risk free before the farmer will try it. If it were to fail he would have nothing. African palm, for example, requires four years to begin producing oil. During this time the colonist is building up a debt to cover the cost of the small plants and the cultivation and care of the plantings. If the palm doesn't

pay as predicted, then he will be unable to pay off the debt and will lose everything he has. This he cannot afford. If the risk and uncertainty can be minimized for the farmer, he will be more likely to participate.

It was found that the extension service was only a limited source for new agricultural information for the farmers in Caqueta. Were there other sources? Unfortunately, there were few. Of the directed colonists interviewed, 65 per cent had no source for obtaining agricultural information. A higher proportion, 78 per cent, of the spontaneous settlers had no source for learning about new agricultural practices. The radio was the main source, with 10 per cent of the directed colonists and 14 per cent of the spontaneous settlers using it. Both groups had some contact with newspapers but only on market days when they travelled to the larger population centers. The limited access to agricultural information sources was also reflected in the low adoption of new practices.

Adoption of New Farming and Other Practices

A number of practices were listed in the questionnaire and the respondent was asked if he had ever used the practice and if he were using it at the present. The adoption score was obtained by giving two points to each item which the farmer had used and if he wasn't using it at the time of the interview, one point was deducted. The average adoption scores were 4.9 and 3.5 for the directed and spontaneous settlers, respectively. This difference was significant at the .01 level.

The directed colonists have apparently received more information through being a part of a government program. Most of the accepted practices have to do with health rather than with techniques to improve agricultural production, however. Few settlers use improved seed, fertilizer, or weed killers, further supporting the conclusion that the farmers receive little technical information from the "county agents" or other sources. It is likely that all the responses are biased in that one would respond positively if he used a practice only once a year. The degree of error cannot be predicted from this study. The respondent often may not understand the term but is embarrassed to ask what it is, and instead, gives a positive response.

A relatively high proportion, 41 per cent, of the directed colonists boil their drinking water but only 17 per cent use drugs for the prevention of malaria. A smaller percentage of the spontaneous settlers boil their water, 12 per cent, and use a malaria prevention drug, 13 per cent. Many settlers boil their water only during the dry months when there is more danger from disease.

There was no significant correlation between the adoption of new practices and the educational level. It is likely that the limited amount of education and the limited adoption of new practices gave this result since neither item had enough variation to enable any meaningful measurement of correlation.

A second hypothesis, which was presented earlier, is that the amount of agricultural information available to the individual is positively related to the use of credit, the adoption of new techniques, and the level of living.

No correlations were run using credit data but some relationship was found between the two variables. Of the 29 spontaneous settlers who had received no credit, only three indicated they had a source for new agricultural information. However, this source was by receiving information from neighbors. No new information was received through mass media such as radio or newspapers.

For both groups there was no significant relationship between the type of agricultural information available to the farmer and the adoption of new techniques nor the level of living. There was a positive relationship between information sources and the number of household items owned by the spontaneous settlers ($r^2 = .09$). The greater the wealth of the family the more likely it was that they had a source of agricultural information.

One should not necessarily conclude that those farmers having access to new agricultural information are not significantly different from those without access. The measure of agricultural information sources in this study was very limited. No data was obtained on frequency of use of the listed sources. Such a listing would no doubt, have shown more significant differences.

Attitudes Toward Farming

One portion of the study was orientated towards evaluating the attitudes of the farmers towards the management of their farms. Each farmer was asked to make value judgments of selected items in order to obtain a weighted ranking of the items. The technique of paired comparison was used as was done in the section on social services.

Seven items were used: belief in God, experience in agriculture, the location of the farm, size of the family, farm acreage, ambition, and good management. Each farmer was asked to evaluate the importance of the item in exploiting his farm. For example, one pair to be judged was belief in God and experience in agriculture. The farmer picked the item which he considered to be the most important or to have the most influence upon the operation of his farm. The composite results were then tabulated and a weighted ranking established.

The two groups listed the items in a similar manner. The main difference was that belief in God was considered most important by the directed colonists while good management was listed as being most important by the spontaneous settlers. Belief in God was also rated most important by the spontaneous settlers but it had to be dropped from the analysis to meet the internal consistency test. The item, good management, was dropped from the directed colonist's scale for the same reason. The only other difference was that the spontaneous settlers considered the size of family more important than did the colonists; more important, in fact, than the location of the farm or of having had previous experience in agriculture. Both groups considered ambition an unimportant attribute. The farm acreage was also considered as relatively unimportant.

The new settler, then, feels that belief in God is the most influential factor on his farm operation, that having previous experience, a large family, and a good location have a somewhat smaller importance, and that acreage and high ambitions have little influence on farming in Caqueta.

The Colombian farmer is often described as fatalistic and the present study tends to support this conclusion. One must rely on powers outside his control--an extreme effort on his part will have no appreciable effect on his economic improvement and betterment.

Each scale was tested for group agreement. The coefficient of agreement, "u," was .459 for the spontaneous settlers and .452 for the directed colonists. A "u" of 1 indicates complete agreement. Both values of "u" were highly significant at the .01 level. It may be concluded that there was significant agreement between the settlers in both groups as to the relative importance of the selected variables in influencing the operation of the farm.

Each individual received a score of individual consistency as he did in the section on social services. The mean individual consistency score for the spontaneous settlers was .90 and for the directed colonists was .87. Both scores indicated a high degree of internal consistency for the individual.

Individual deviation from the group consensus was measured and correlated with other items. It was hypothesized that if an individual deviated from the group he would also tend to disagree with the group concerning the importance of the social services. However, no relationship was found. An individual disagreeing with his neighbors as to the influence of certain items on farming did not necessarily also disagree with his neighbors on the relative importance of selected social services.

It was also thought that a person who placed belief in God lower and ambition higher, in disagreement with the group, might differ in level of living, adoption of new practices, and in his anomie score or degree of despair. No significant relationship between the above items was found for the directed colonists. However, for the spontaneous settlers there was a relationship between deviation from the group and individual self consistency. A simple correlation gave an r^2 of .15 which means there was a tendency for the individual, who didn't agree with the group on the importance of selected items towards farming, to be inconsistent in his response. That is, he tended to give a more confused response to the ranking of the items. This did not seem to hold for his judgment of social services where no relationship was found between deviation from the group and individual self consistencies.

CONCLUSIONS

The main hypothesis tested in this study was to determine if there was a significant difference between the directed colonists and the spontaneous settlers. A number of other hypotheses were also tested. The principal conclusions arrived at in this study can be summarized as follows:

- (1) The governmental assistance program for the directed colonists in Caqueta has not been effective. No significant differences were found between the two groups in terms of their level of education, level of living, adoption of new practices, attitudes, labor efficiency, and material possessions. The directed settlers had more access to credit, the extension service, and to new agricultural techniques. However, the same colonists had less livestock, sold less on the market, were less satisfied in Caqueta, and tended to have less wealth and to be living on a lower level of income than the spontaneous settlers. The spontaneous settlers' experience in agriculture was their most important advantage.
- (2) Land was not the real limiting factor of production. Almost all the settlers in Caqueta had sufficient land yet their level of living was still very low. Receiving more land may be a necessary condition for many farmers in Latin America but it is not a sufficient condition for increasing the income levels of the families. If a farm unit is too small to produce an acceptable level of income, even under advanced levels of technology, then reorganization or redistribution of the land is a necessary condition. Giving land will not by itself, guarantee a higher income for the producer, however.
- (3) Insecurity of ownership is found in Caqueta even though there is an abundance of land. Even the directed colonists have insecure ownership since obtaining a clear title depends on fulfilling a number of obligations set forth by the government. Title security is not as important in Caqueta where there is a lot of land compared to the interior of Colombia where there is more pressure on land use.

- (4) Farm labor productivity is extremely low and seriously limits production. It was found that as the size of the farm increases the per cent of land cleared decreases. The family labor supply is limited and can handle only a given amount of land. Outside labor cannot usually be hired because the production does not pay for the labor cost. Any difference in the number of hectares cleared and used is related to the type of operation. The farmers with less land cleared put their land to more intensive use, such as in crops. Those with more land cleared use the more extensive practice of livestock production.
- (5) The hand methods used in Caqueta contribute to the low labor productivity. Even advanced hand methods such as scythes are not used by the settlers. The use of better production practices and improved hand methods could produce additional income. Many settlers own horses or mules but they are never used in the field. Using animal power would also enable the farmer to use more land effectively and thereby increase his income.
- (6) There is a great need for more effort in the field of technical assistance. The present extension workers know little about agriculture in general and even less about tropical agriculture. Effort in the field of credit is likely to be ineffective unless means are provided for increasing the productive level of the farm--that is, by providing more technical assistance. A second need is for more information on the potentiality of the various crops, the proper management practices which should be followed, and the effects of fertilizers and other modern techniques on production levels and cost.
- (7) A road is one of the necessary social services needed in any new settlement area, be it directed or spontaneous. A road acts as a catalyst generating incomes by providing bus and truck service for moving products and people. The transporting of farm products by trail using mules or humans is time consuming, inefficient, and expensive--usually too expensive to make it profitable for the farmer to sell products on the market.

Implications

The conclusions arrived at in this study imply that no future colonization project should be attempted by the Colombian government without showing--using sound empirical evidence--that such a project would provide enough benefits to more than offset the expected costs. This assumes that capital is a scarce resource and that there are other investment opportunities in Colombia which would produce a high benefit-cost ratio. The costs incurred by the Colombian government in establishing the directed colonization projects in Caqueta were high. The directed settlers were found to be in no better position socially or economically than were the spontaneous settlers even though the spontaneous settlers had moved to Caqueta on their own and had received no outside assistance. This implies that few benefits have been derived from the assistance given to the colonists in Caqueta.

INCORA has now taken the position of working with all of the settlers in the region and has made no new plans for opening up other directed colonization projects. However, the effectiveness of the INCORA personnel in working with any settler in the future will depend to a considerable extent on their knowledge of tropical agriculture. The existence of a supervised credit program and an extension program will be inadequate, by themselves, to help improve the income and productivity levels of the farms. There is a real need for providing information on new agricultural inputs such as fertilizer, improved varieties, insecticides, improved methods and tools, and proper soil and seedbed management.

The credit program can be useful for assisting farmers in developing cattle programs since considerable experience has been gained in the region by large cattle raising operations. It is when the credit is granted for new crops or for increasing crop production that its chances for success are small. No new inputs are given to the farmer along with the credit to enable him to increase the productivity of his labor and land. It is here that the real need lies.

In the long-run, more will have to be known, through experiments and basic field research, about the proper techniques and improved practices which will increase productivity levels. Colombia can draw on previous work in other parts of the world where considerable knowledge has been accumulated in the fields of soil science, animal

husbandry, and agronomy. However, there is still a great need for developing and testing improved seeds and new practices under the local conditions to insure that they lead to increased productivity. Much more effort is required in studying the effects of rainfall, fertilizer and other practices, on the tropical soils in Latin America.

It was not the objective of this study to evaluate new land settlement in relation to other agricultural development programs. However, a few comments need to be made concerning the opening up of new lands. It has been argued that one disadvantage of new land settlement is the higher cost of developing an infrastructure--including the construction of roads, schools, medical centers, etc. This argument is based on the assumption that there is already a highly developed infrastructure in the areas where the mass of the people now live. Is an argument based on this assumption valid? Are there really roads, schools, and medical centers in the rural Andean regions? The answer appears to be no.

One advantage of opening up new lands (the new lands are usually the tropical lowlands) is the flexibility of production techniques which might be used in the lowlands as compared to the mountainous regions. For the most part, these lands are relatively flat and could be mechanized. It is likely that as the country develops, labor will become more expensive and the agricultural sector will shift from labor-intensive, capital-saving practices to labor-saving, capital-intensive practices and the relative farm population will decline. The steep, eroded mountainsides can not be easily transformed into mechanized farms. The unanswered question is: can sustained production at a low relative cost be achieved in the tropical lowlands using modern techniques of farming?

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