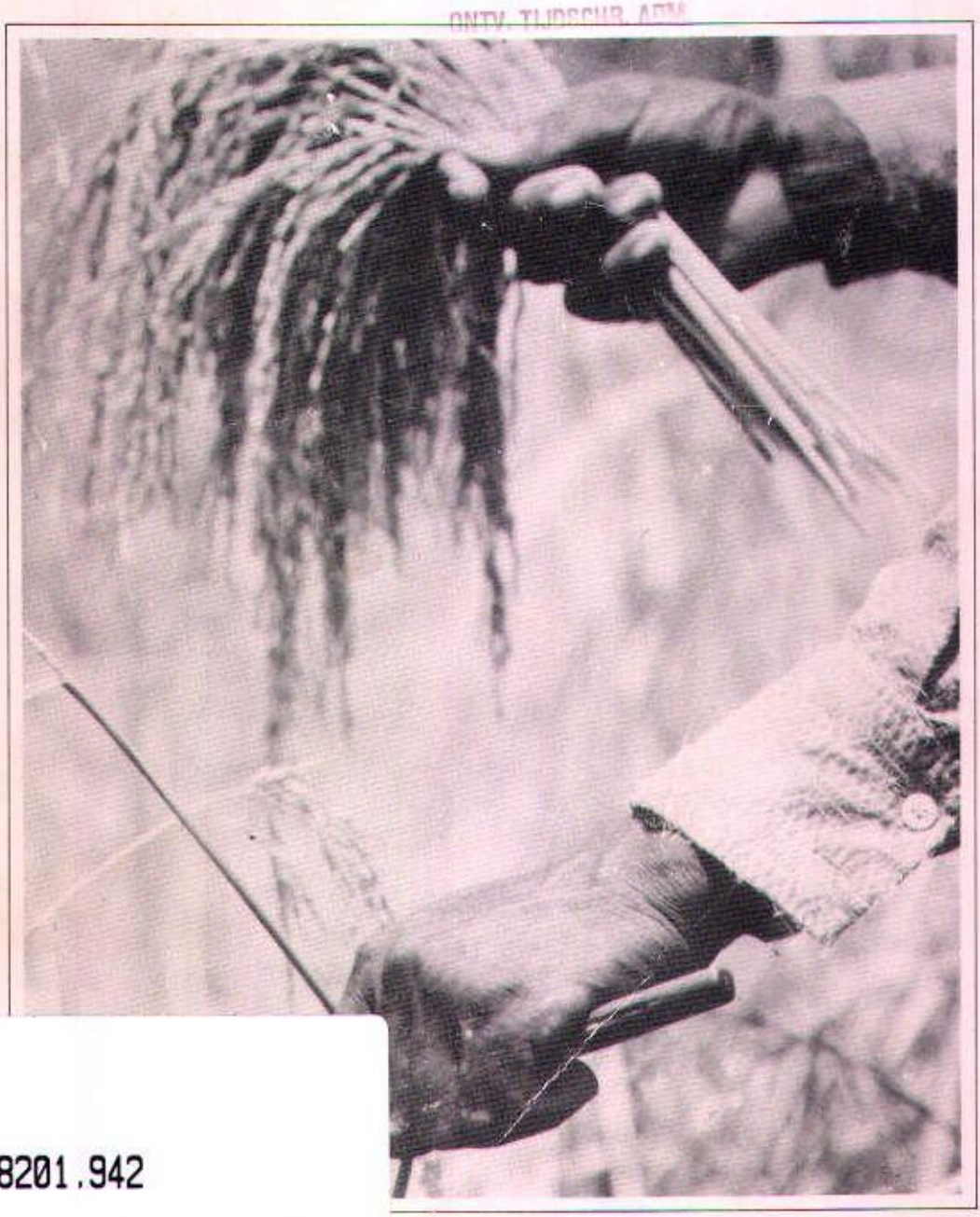
RICE PEASANTS AND RICE RESEARCH IN COLOMBIA



P. Spijkers

STELLINGEN

1 Landbouwkundig onderzoek als geïnstitutionaliseerde actie is een sociaal fenomeen, en dient derhalve door sociologen als serieus object van onderzoek te worden opgevat.
Dit proefschrift.

2 Nationale en internationale landbouwproefstations dienen bij hun streven naar verbetering van de voedselproduktie meer gebruik te maken van inzichten uit de sociale wetenschappen. Omgekeerd kunnen de sociale wetenschappen verrijkt worden door het verrichten van studies naar de rol en de betekenis van veredelingsonderzoek in verband met sociale ontwikkeling.
Dit proefschrift. Zie ook: D.B.W.M. van Dusseldorp, Some thoughts on the role of the social sciences in the agricultural research centres in the developing countries, Netherlands Journal of Agricultural Sciences, Vol. 25 (1977).

3 De uitspraak van Jennings als zouden de neolitische boeren een "bijna even grote bijdrage" aan de ontwikkeling van de landbouw hebben geleverd als de moderne plantenveredelaars, is onjuist; deze laatsten hebben voortgewerkt binnen reeds door de neolitische boeren vastgelegde patronen.
P.Jennings, The Amplification of Agricultural Production, Scientific American, Vol. 235, No. 3, 1976. C.O. Sauer, Agricultural Origins and Dispersals, 2nd edition, 1969.

4 Bij het onderzoek ten behoeve van de agrarische ontwikkeling in Latijnsamerika wordt er te weinig rekening mee gehouden dat grote delen van de Latijnsamerikaanse samenleving als "frontier society" aangemerkt moeten worden.
Dit proefschrift. Zie ook: R.A.J. van Lier, Samenleving in een grensgebied, 1949, 1e druk. A. Hennesy, The Frontier in Latin American History, 1978.

5 Onderzoek ten behoeve van verbetering van de rijstteelt in Latijnsamerika zou zich in de toekomst meer moeten richten op *arroz forastero* (moerasrijst).
Dit proefschrift.

6 De Colombiaanse statistieken die betrekking hebben op de produktie van rijst in dat land zouden aan duidelijkheid en aan bruikbaarheid winnen door voor de nu gehanteerde categorie *arroz de secano* twee nieuwe categorieën in te voeren, namelijk die van *arroz criollo* en *arroz secano mecanizado*; tevens zou de categorie *arroz de riego* dan vervangen dienen te worden door de categorieën *arroz forastero* en *arroz de riego mecanizado*.
Dit proefschrift.

7 Ontwikkeling leidt niet altijd tot verkleining en tot functieverlies van boerenhuishoudens; in sommige gevallen leidt ontwikkeling tot vergroting van die huishoudens hetgeen gepaard kan gaan met functiewinst.
A. Pearse, The Latin American Peasant, 1975.

8 Ontwikkeling in de zin van economische groei die gepaard gaat met sociale verbetering, is in Latijnsamerika grotendeels achterwege gebleven. Een van de redenen is het ontbreken van een onder de bevolking wijd verbreid geloof in vooruitgang als een gemeenschappelijk ideaal.

9 De constatering van Sahlins dat in de ecologische antropologie het verschijnsel kannibalisme gereduceerd wordt tot "subsistence activity" moet als overdreven van de hand worden gewezen.
M. Sahlins, Culture and Practical Reason, 1976.

10 De algemene conclusie van Abercrombie dat landbouwmechanisatie in Latijnsamerika een negatief werkgelegenheidseffect heeft, is voor het geval van Colombia niet bewezen.
K. Abercrombie, Mecanización agrícola y empleo en America Latina, Revista Internacional de Trabajo, Vol. 86, Num. 1, Geneva.

11 De betekenis van het boek "Honderd jaar eenzaamheid" van de Colombiaanse schrijver Gabriel García Marquez ligt niet in de eerste plaats, zoals onze dagbladen willen doen geloven, in het aanklagen van ongewenste sociale situaties in Latijnsamerika, maar veeleer in de originele uitwerking van het incest-taboe.

P.A.N.M. Spijkers
Rice peasants and rice research in Colombia
Wageningen, 8 juni 1983

RICE PEASANTS AND RICE RESEARCH IN COLOMBIA

Promotor: dr. R.A.J. van Lier, emeritus-hoogleraar in de empirische sociologie en sociografie der niet-westerse gebieden

P.A.N.M. SPIJKERS

RICE PEASANTS AND RICE RESEARCH IN COLOMBIA

Proefschrift
ter verkrijging van de graad van
doctor in de landbouwwetenschappen,
op gezag van de rector magnificus,
dr. C.C. Oosterlee,
hoogleraar in de veeteeltwetenschap,
in het openbaar te verdedigen
op woensdag 8 juni 1983
des namiddags te vier uur in de aula
van de Landbouwhogeschool te Wageningen.

CONTENTS

PREFACE AND ACKNOWLEDGEMENTS

Between 1974 and 1978 I was assigned, as a FAO associate expert in rural sociology to the Centro Internacional de Agricultura Tropical (CIAT) in Cali, Colombia. CIAT is one of a number of agricultural research centres which contribute to increasing food production in developing countries.

As a social scientist in an environment dominated by agricultural scientists, I have had considerable difficulty in defining my role and I became convinced that the institute's administration did not have a clear understanding of possible contributions of the social sciences to their program.

Almy (1981) has stated that the most critical part of the job of a social scientist in an international agricultural research centre is "to recognize the level at which one should work and to negotiate .... expectations on both sides appropriate to this level." I discovered this level, when on a field trip to the north coast of Colombia I found myself looking at a neatly laid-out rice field, alongside of which in a muddy pool were a number of tall meagre rice plants, quite different in appearance from the plants in the rice field in front of me. I was informed that the neatly laid-out field belonged to farmers who until a few years ago had only grown the taller rice varieties. The new shorter varieties were from CIAT, and farmers were growing them with apparent success. What had the introduction of these new varieties meant to the farmers? What changes had they brought to their lives? What type of problems had farmers had with these new varieties? To document the social consequences of the changes in rice cultivation may contribute to the "process of technology development" in the institute for which I worked.

I began to think about the role of agricultural research. This consists not only of finding new ways of increasing yield and production of crops. It is a driving sometimes even a steering force in the economies of the poorer countries where the majority of the population depends on the seed they grow, year after year, in some

years producing a surplus for sale and in other years not producing enough to eat, but always balancing on the edge of survival.

The two rice fields made me realize that I was not only looking at two fields of different plants, but at two different worlds. The new, shorter varieties entail new cultivation practices, and ways of relating to the market by the farmer, which have consequences not only for the farmer and his family but also for his community and for rural society at large. It cannot be denied that there is a relationship between the field trials of agricultural experiment stations and the most distant farmer, who will eventually be using the results of these trials. There is, however, another point to this relationship which has not received sufficient attention. The new rice varieties grown by Colombian peasants in the mid-1970s were the results of trials carried out only ten years before in a remote country in Asia, thousands of miles away.

With increasing communications and an ever increasing co-operation among nations, diffusion of new crops and cropping technologies has become increasingly the objective of deliberate planning and the goal of national and international agencies. The merchant from Amsterdam who accidentally introduced coffee to South America in the 18th century could never have imagined that a century later this plant would be the propellor of the economies of many countries of this continent. It is different now. Present agricultural administrators cannot accurately predict the economic consequences of the introduction of a particular crop, but the organization of modern societies is such that these decisions are being made increasingly by rationally structured bureaucracies, which, on a routine basis, define goals, identify and allocate means, and after evaluation make the necessary adjustments to the ends and the means. The changes in crops and the diffusion of these changes have recently become more within the reach of such bureaucratic procedures. The complex interdependencies between farmers and modern goal-oriented institutions which have been organized around new crops and new cropping technologies have entered and complicated the interdependencies which previously operated on a small scale at the farmer's level and with meanings he could understand himself. This is a fascinating field of research, to which I have tried to contribute.

Sincere thanks are expressed to Prof.Dr. R.A.J. van Lier, who has guided and supervised this work. His free and intellectual mind has taught me that without striving for intellectual independence and daring, the path to knowledge is barren.

Appreciation is also expressed to the staff of the Department of Rural Sociology of the Tropics and Subtropics of the Agricultural University of Wageningen. Especially I want to thank Dr. L. de la Rive Box and Prof.Dr. D.B.W.M. van Dusseldorp for stimulating debate.

I am grateful to FAO and CIAT who have provided facilities for this research project.

Dr. H. ten Have and Ir. J.T. Sital have made valuable comments on parts of the manuscript, for which I express my thanks.

Acknowledgement is also made to the Department of text-processing of the Agricultural University, Wageningen, especially to Mrs. W.M. Laoh-Gieskes who worked with dedication to get this manuscript ready. Mrs. Helen West helped with the correction of the english. Mr. E. van Cleef designed the cover of this book.

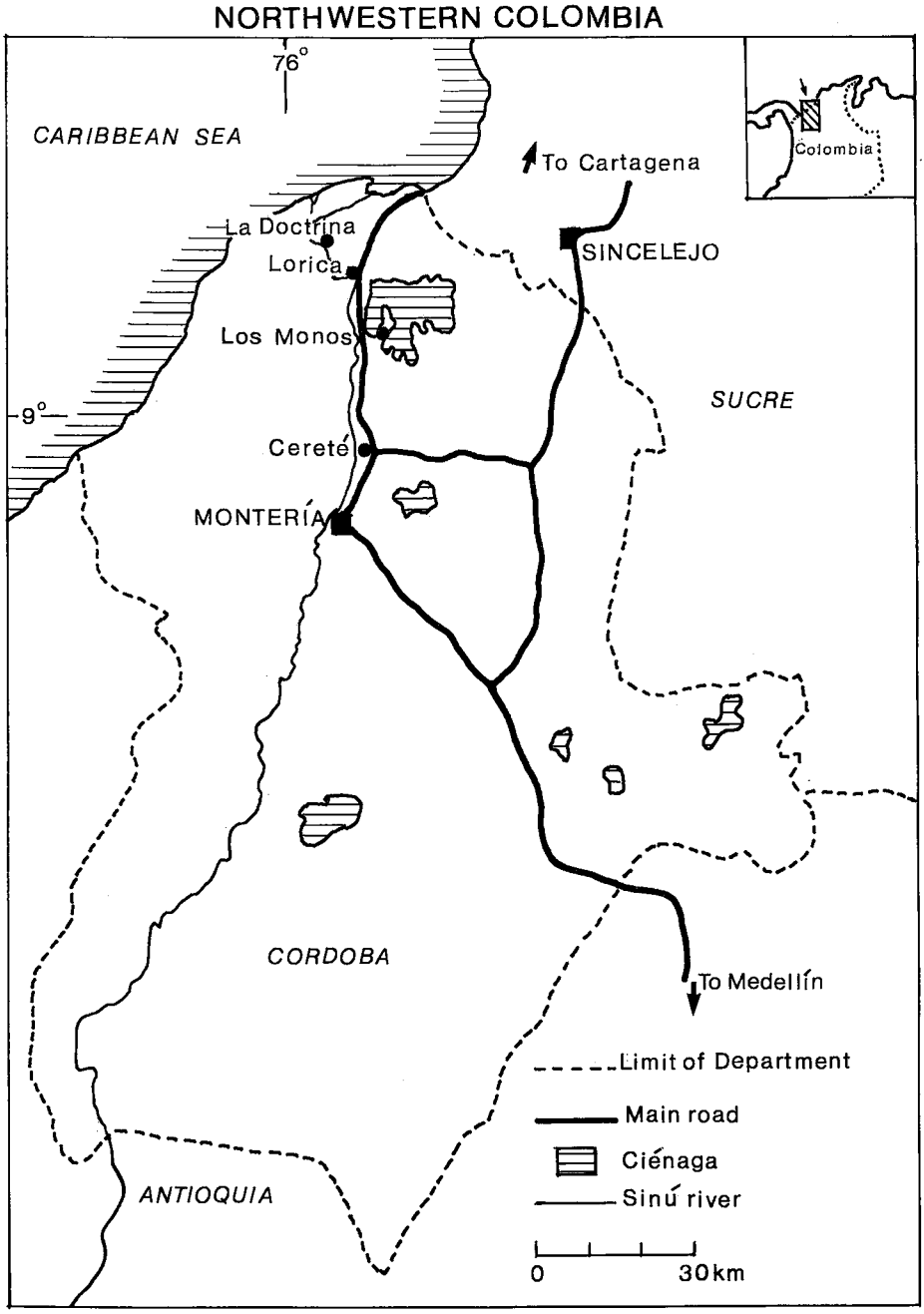
For support and interest I thank my colleagues from the Institute of Cultural Anthropology of the University of Utrecht, especially Drs. J. Ooijens.

My stay in Colombia has given me many friends. To the farmers of Los Monos and La Doctrina I wish that some of their hospitality may be rewarded with improved rice research and other highly needed assistance.

I want to express my gratitude for support, advice and above all friendship, to my colleague Dr. Marcelino Torres from Bogotá.

Finally, I thank Saskia, Klaartje and Fleur, with whom the boat is rowed, gently down the stream.

Bennekom, april 1983


NORTHWESTERN COLOMBIA
76°
CARIBBEAN SEA
Colombia
To Cartagena
La Doctrina
Lorica
SINCELEJO
Los Monos
SUCRE
9°
Cereté
MONTERÍA
CORDOBA
To Medellín
Limit of Department
Main road
Ciénaga
Sinú river
0
30km
ANTIOQUIA

INTRODUCTION

Agricultural research, and the application of the findings, may follow two basic strategies in making optimal adjustments between agricultural innovations and the rural population. One strategy is to aim for high-yielding crops and cropping technologies, and the recipients of the technology are expected to adapt their way of life to the exigencies of these technologies. The other strategy aims at producing research results which fit as closely as possible the social situation of the farmers, and then, possibly alternative research programs follow, which aim at a greater social and technological innovation.

Agricultural research has recently arrived at a stage, in which the standardization of crops seems to be one of the more important concomitants. New international agricultural research centres play an important role in identifying characteristics of crops which contribute to increase in food production. Especially in the tropical regions, this has led to a confrontation with the highly complex and varied small-scale agriculture, which is intrinsically interwoven in local social structures and cultures.

In this study the social consequences of the introduction of new rice varieties in peasant villages on the north coast of Colombia have been investigated. The main objectives of the study were:

- to investigate the relationship between peasant systems of rice cultivation as part of the agricultural system and the wider social and economic structure of the rural communities;
- to investigate the social consequences for the farmer and the community of new systems of rice cultivation in this area.

In this study the emphasis is placed on rice cultivation by the peasant farmers with limited resources.

The Atlantic north coast of Colombia was chosen as the study area not only because it has been an important rice growing area since colonial times but also because in the last twenty years new systems of rice cultivation have been introduced. Changes in the system of

rice cultivation among peasants are partly the result of the development of irrigation districts by Colombia's land reform agency, INCORA.

In the first chapter the relationship between man and crops is explored from an historical perspective. Attention is focussed on the changing role of agricultural research, and the possible contribution of social science to the agricultural research process. An historical review of the introduction and diffusion of rice in Colombia is given in the second chapter. The major institutions active in rice research and promotion of rice cultivation in Colombia are also discussed in this chapter. In the third chapter, a description of the north coast as a distinct cultural area is given, including geographical background, agricultural development and a portrait of the social structure of *Costeño* society. Systems of rice cultivation and the ways in which these systems are related to social institutions in *Costeño* society are discussed in Chapter 4. In Chapters 5 and 6 the social consequences of changing rice technology are investigated in detailed studies of two villages on the north coast. In the village of Los Monos, even though changes in the system of rice cultivation occur, rice is still cultivated as a subsistence crop. In the village of La Doctrina new rice varieties and corresponding cropping technologies have been introduced and rice is now cultivated as a commercial crop. The social consequences of changes in rice cultivation, especially as a result of the introduction of new technology are discussed in Chapter 7. A summary and conclusions are presented in Chapter 8.

Field-work

During 1976, a reconnaissance trip was made of the north coast region in order to become familiar with rice growing in northern Colombia in general and to interview local research staff, extension officers and farmers, and others knowledgeable about rice cultivation on the north coast. During this trip special attention was given to irrigation districts developed and operated by INCORA.

A questionnaire was sent by mail to about 100 research and extension officers, from INCORA, Colombia's official agrarian bank (*Caja Agraria*), the national rice growers federation (Fedearroz) and the official agricultural research and extension service (ICA). In the

letter accompanying the questionnaire, each was asked to provide information on various aspects of rice cultivation in his geographical area. Topics included were: areas under rice cultivation, type of rice growing systems, production costs, yields, numbers of rice farmers, labour needs, problems related to technical aspects of rice cultivation in the region, changing cultivation practices, and changing land prices. Fifty percent of the recipients completed and returned the questionnaire. Results have been published in CIAT's Annual Report (1976).

In addition, during 1976 open-ended interviews were held with key informant farmers in 17 villages on the north coast departments of Córdoba and Sucre. These interviews aimed to obtain detailed information on the social setting of north coast rice cultivation. Questions were asked about land tenancy, local practices of rice growing, labour aspects in rice cultivation, harvesting methods, and social aspects of rice marketing. The information obtained from these interviews was very important. The role of *criollo* rice as a pioneer crop, the social significance of mechanisms such as selling rice before harvesting, and rice harvesting practices would not have been understood as being of such significance if these introductory stages of the investigation had been omitted. During these first stages of the study, locally grown rice varieties were collected, together with information on local names, systems of cultivation, yields, local preferences, growing cycles, etc. The seeds collected were sent afterwards to the collection of rice varieties at IRRI, as it was thought by CIAT rice breeders that valuable genetic materials may be stored in these varieties.

Another objective of the interviews in the 17 villages was to identify communities where indepth studies could be carried out in order to obtain detailed information on changing rice growing practices, and to study the consequent social changes at the local level.

The village of La Doctrina in Córdoba Department was selected. In La Doctrina, most farmers were growing the CICA 4 rice variety on land assigned to them in a recent land reform program. La Doctrina seemed to be a community representative of those on the north coast in which former low income farmers had changed to new rice growing technologies. It was also decided to select a neighbouring community, where no such changes had taken place, in order to be able to draw

more precise conclusions about the effects of the new rice technology. Los Monos which is located about 25 kilometres from La Doctrina was selected. The main criterion on which Los Monos was selected was that the situation in the village had to resemble as much as possible the situation in La Doctrina before the technical and socio-economic changes had taken place. Although technical and socio-economic changes also occur in Los Monos, diachronical comparisons, based on interviews and oral history, could be corrected by data from Los Monos.

During December 1976, a survey of rice growers in both communities was carried out. In La Doctrina, all 68 farmers growing CICA 4 as an irrigated crop were included in the survey. In Los Monos, a stratified sample was taken, representative of relevant categories of farmers. The interviewers were sons of local farmers who had completed their education at the *Instituto Agrícola Technológica*, an intermediate agricultural school in Lorica. These interviewers were trained for a period of one week in interview techniques and in thematic aspects of the study. During this training period, a census of all households in Los Monos was carried out in order to obtain a sample frame. In this census, questions were asked about rice cultivation systems, years of experience with rice cultivation, and land tenancy situation. On the basis of this census, a stratified sample was drawn of rice farmers (42) in Los Monos. Criteria for stratification were rice area and type of land tenancy. The survey included questions on years of experience in rice growing, varieties of rice grown, problems with rice cultivation, areas of rice under cultivation, yields, costs of rice production, labour requirement for various types of rice cultivation, methods of rice harvesting, ways of paying rice harvesters, opinions on various harvesting payment systems, labour exchange, outside labour, credit for rice growing, debt position, selling of rice, prices, identity of buyers, selling rice before harvesting, rice consumption, need to buy additional rice, making gifts of rice to others, types of rice grown in the past, land tenure, other crops, size and structure of the households, migrant labour, other sources of income, investment in land and cattle, housing situation, items indicating standard of living, aspects of health, role of the women in the households, aspirations, and future views.

The survey was carried out first in Los Monos, and then in La Doctrina. On average, each interview took an hour and a half to complete. In Los Monos one farmer objected to being interviewed, and in La Doctrina all farmers co-operated.

Apart from these methods of data collection described above, I lived for several months in La Doctrina, and in Los Monos. In addition, farmers in Los Monos and La Doctrina were visited on many occasions during shorter visits to the region. Before starting this research project, I had made myself familiar with the regional dialect of Spanish, *Costeño*, which is a rapidly pronounced Spanish with numerous local expressions and idioms. Talks and interviews with *Costeño* farmers were always a pleasure, as I found *Costeños* sympathetic and openhearted people, who are as curious about the visitor as the visitor is about them. Furthermore, I found the *Costeño* language to be a very rich, expressive means of communication, and perhaps the "overdose" of local words and expressions in the following chapters is the result of a personal delight in their language, and the feeling that their words and concepts can never be translated adequately into another language.

Additional information on Los Monos and La Doctrina was collected by three students in rural sociology from the Agricultural University in Wageningen, The Netherlands; H. Dorrenstein, F. van Dorsten and G. Gooren. They lived for 6 months in these villages carrying out field-work in fulfilment of the requirement for the Master's Degree in Rural Sociology. In addition, during 1979 and 1980, literature on the development of agriculture in Colombia and the history of rice in Colombia was studied and analysed.

The processing of the information was started at CIAT, and completed at the Department of Rural Sociology for the Tropics and Subtropics, Agricultural University, Wageningen during 1979 and 1980. For data processing use was made of the Standard Statistical Package for the Social Sciences (Nie et al. 1975), limited mostly to the calculation of means and frequency distributions. The correlation coefficient used in Chapter 5 is Pearson's r. Some results of the research have been published in the annual reports of CIAT (CIAT 1976; 1977).

1 RELATIONSHIPS BETWEEN CROPS AND MAN

1.1 INTRODUCTION

The social and economic consequences of changing agricultural technology have been the subject of scientific research for many years. The United Nations Research Institute for Social Development (UNRISD) has recently carried out studies in a number of Asian countries and Mexico on the socio-economic implications of changes in technology for rice and wheat farmers in these areas (Bathi 1976; Dasgupta 1977; Hewitt de Allcantara 1976; and Palmer 1975, 1976 and 1977).

Although a very small time perspective has been taken in many of these studies, it has been clearly shown that millions of farmers are stepping out of a peasant era into the world of modern capitalist agriculture. However, the deeper implications of structural change in a wider historical perspective have often not been touched upon.

In this study, a broader historical perspective has been taken in an attempt to show that one important aspect of these massive changes is related to the ways in which agricultural producers have changed, and still are changing, characteristics of their food crops. It is proposed that both ancient and contemporary agricultural producers have made historical choices in the domestication of plant species and in crop selection. These choices have influenced greatly the organization of social life around agricultural and cropping systems, which are the main bases of their economies. The characteristics of their crops have had structuring effects on the various types of societies in which these cultivators have lived or are living. On the other hand, societal needs have also contributed to the shaping of crop characteristics. The study of the relationships between characteristics of crops and the encompassing social structure, is referred to as crop sociology.

At this point it is appropriate to clarify the nature of the relationships suggested here. It would be an exaggeration to suppose that a particular characteristic of a crop exclusively determines a

social phenomenon. For that reason the term structuring is preferred, and emphasis should be given to the fact that this is essentially a two-way process.

Further, the approach taken in this study does not imply that other social factors and processes are of less importance in influencing rural societies. For reasons which will be discussed in this chapter emphasis is given to crops and crop characteristics as it is considered that these provide particular insights.

The Neolithic Revolution, indicating the time when man first started to grow food crops, took place about 9000 years ago. This means that domestication only took place during more recent stages in the history of man. Even more remarkable is the fact that domestication only occurred during one historic period. Neolithic Man and later cultivators did not continue domesticating more and more botanical species, but instead the number of domesticates remained limited to a relatively small number (Baker 1978; Sauer 1952). During this relatively short period of domestication, mutual dependencies between food crops and corresponding societal arrangements began to develop. After that, these dependencies did not change as a result of the domestication of other food crops, but through further refinements of existing food crops. These refinements led to further more complex dependencies between crops, cropping systems and the social contexts in which the cropping systems were to be found.

Geographers and ethnographers have drawn attention to the extremely complex and highly varied agriculture of the food cultivator in tropical regions (Sauer 1969; Schlippe 1956; Gourou 1947). The fact that modern economic and social sciences have become interested only recently in this area of research is related possibly to the essentially ethnocentric perspective taken. As Boserup (1965) has pointed out, the study of agricultural land use has been dominated by the classical marginalist theory. This theory was developed at the beginning of the 19th century when agricultural expansion was especially visible in the frontier economy of the United States, where socalled "empty lands" could easily be incorporated into the expanding agricultural economy. This condition led to the analytical distinction between unused land and cultivated land, theoretically suitable for these circumstances. In contrast, traditional agricultural systems can only be fully understood when analyzed through

time, including fallow periods which form intrinsic parts of these systems. Distinctions between cultivated and uncultivated land are less meaningful, and thus classical marginalist theory is less suited for understanding the dynamic and adaptive nature of these systems (Boserup 1965). Only detailed empirical studies as can be expected from geographers and ethnographers focussing on the totality of agricultural systems, and including explanations for fallow frequencies, could demonstrate that traditional agricultural systems are well balanced. Recent insights into agricultural development have demonstrated the need for analysis of traditional agricultural systems by both agricultural and social sciences (Saint and Coward 1977). An example of such an analysis is the well-documented portrait of the agricultural system of the Zande people in East Africa, given by Schlippe (1956), in which he explains the reasons for the failure of Western agronomists to improve the agricultural system of this people.

Sauer (1969) has also made a valuable contribution to insights into the complexities of traditional agriculture. He has pointed out, that in the careful study of one crop alone, an enormous wealth of forms and functions can be found:

> "Maize is a species complex, the enormous diversity of which is being uncovered by geneticists, mainly by study of Indian varieties. Only a small part of this genetic wealth is preserved in our commercial corns which have been developed for rich soils and yields of grain, in part, as has been found lately, to the detriment of food value other than carbohydrates. Our main interest in corn is as feed for livestock; native attention has been given to it as a staple of human food. The corn on Mexican or Guatemalan hillsides that may seem a sorry plant to the visitor from the United States, is likely to be very properly suited to the native diet and the local soils and weather. The experiences of many generations of corn growers are not to be set aside lightly by the simple and shortrange interests of commerce. It is not accidental that a single native village may maintain more kinds of maize than the Corn Belt ever heard of, each having a special and proper place in the household and the field economy." (ibid. p. 65).

Systematic relationships have been found to exist between the technological aspects of an agricultural system and the social and cultural forms based on it. In a review of more than 300 case studies, McNetting (1974) has put forward general propositions about the functional relationship between agriculture and social organization.

The concept of cultural ecology as proposed and developed by Steward (1955), offers a more explicit and refined theoretical orientation in this respect. The basic proposition in cultural ecology is that ecological environments, which feature the same crucial elements for human adaptation, tend to produce similar forms of labour organizations in both the productive and the distributive spheres. These forms of labour organizations in turn tend to give rise to social groups, which justify and coordinate their activities with corresponding values and belief systems. In every culture there are certain features or traits which have explicit relationships with the natural environment. These features, referred to by Steward (1955) as the cultural core, include the total of characteristics which are related closely to subsistence activities and other economic arrangements. "Cultural ecology pays primary attention to those features which empirical analysis shows to be most closely involved in the utilization of environment in culturally prescribed ways" (ibid. p. 37).

Steward's theories evoke almost automatically reminicences of 19th century deterministic thoughts on biological environmentalism. Sahlins (1976) has criticized materialistic explanations for variations in human behaviour, using as an example, the fact that although the wearing of clothes may be related to physical environment, the phenomenon of fashion in clothing can never be explained in terms of physical environment. However, by not acknowledging the concept of adaptation, Sahlins is inclined to throw away the baby with the bath water. The environment is always a limiting factor on social behaviour. In this study, many examples will be given to substantiate this general proposition.

It is proposed to study crops, cropping systems, domesticates, agricultural techniques and technologies, agricultural knowledge and practices as basic elements of a cultural system. Furthermore, it is assumed that they are specific and theoretically distinguishable elements within a cultural system. The ecological system is

also regarded here as functioning in a limiting sense. This approach allows a broader historical view on agriculture as a social process and helps in the formulation of hypotheses on the origins of agriculture and on qualitative changes within agriculture at various stages. Furthermore, it may also be helpful for future contributions of sociological and anthropological research within the context of agricultural research.

In providing an analytical framework for the study of the relationships between man and characteristics of his crops, it is argued that domesticated plants have characteristics and requirements that have structuring effects on the social and economic contexts of primitive, peasant and modern agriculture. Conversely, such contexts influence the choices made by both ancient and modern crop cultivators. Thus, the prehistoric swamp dweller who gathered sparse grains from plants growing on refuse heaps where seeds were occasionally discarded, can be compared with the 20th century farmer who skilfully masters his 100 ha with aerial sowing techniques and complex machinery such as combine harvesters. Both have to organize their lives to a greater or lesser degree around the crop they produce, and both have to resolve the major problems of distributing their resources of time, labour, capital, knowledge, etc. with regard to acquiring the seed, getting it into the ground, nurturing the crop, harvesting it and deciding what use to make of it. To a certain degree both are dependent on the best planting time, on the duration of the cropping cycle, on plant productivity, on the ease of harvesting, on the fierceness of competition with surrounding weeds which are also often introduced by man himself, and other characteristics of the crop.

Crops are plants made useful by human intervention. In this sense they are cultural artefacts, theoretically distinguishable from other cultural elements such as religion, art, and inheritance patterns, because they have material, and above all cumulative aspects. The process of bringing plants under man's control is known as domestication. An important characteristic of this process is that the growth and reproduction of these plants become increasingly dependent on man, until eventually they are unable to survive without him. Domesticates do not have the original power of dispersal and are dependent on man to provide for their reproduction and dissemination.

An extreme view on the mutual relationship between man and crops has been formulated by Lathrap (1969, p. 715):

> "We tend to think that by this time man has fully domesticated the cultigen, but, as usual, it is later than we think. What has really happened by this time, is that the cultigen has fully domesticated man. The tyranny of the overbred cultigen over its human protector cannot be too much stressed and is nowhere more obvious than in central Illinois today, where the farmer is in bondage to the insatiable appetite and immense vulnerability of his monstrous hybrid corn".

The term domestication is somewhat ambiguous. As a historical event it is not easy to place on the calendar of history and reasons for its occurrence are still debated. Rindos (1980) has summarized the theories on the origins of domestication: as a development of traditional sexual roles and the division of labour that they created (Frazer, Bachofen); as being related to climatological changes (Childe); as a consequence of certain religious or ritual processes (Hahn); and simply as a discovery (Carter). More recent explanations refer to ecological environmental changes: that agriculture came into existence as a correction for a disturbance in the equilibrium between population and physical environment (Flannery 1965; and Sauer 1952).

Estimates as to when the process of domestication began vary considerably. Childe (1951) has opted for the onset of the Neolithic Revolution as being about 9000 years ago, but according to others such as Lathrap (1969) it began very much earlier, perhaps more than 100 000 years ago. It is also argued that domestication is still going on. The fact that some domesticates appeared later than others, the now generally-accepted multicentre theory on domestication (Heiser 1973) and the phenomenon of ongoing modern breeding all give support to the assertion that possibly other crops as yet unknown may well be added to man's assortment in the future. These considerations, however, are not sufficient to invalidate the conclusion that historic man has not added any plant of major importance to the domesticated forms on which he depends (Sauer 1952).

If domestication implies a step in which the development of human history became more tied to the very ways man has mastered nature,

degrees of domestication should also be distinguished that is not all crops are as fully domesticated as others. Sauer (cited by Steward 1955, p. 488) has put forward a useful classification:

> "Cultivated plants may be classed under four groups, though the knowledge is inadequate at present to allocate many if not most of the plants under cultivation: (1) the unmodified plant species which is planted for convenience of harvesting or for increase of producing units, or which may be allowed to increase by protecting a wild stand. The number of such plants is almost indefinitely large, especially among woody species. Here, man serves only to enlarge the local population of the given species or to extend its range by carrying it to settlements and clearings where it did not grow originally. (2) Domestication takes place when, in addition to the care and planting of the wild species, local improved races are created. These may replace the unmodified wild forms in certain areas, but not in others. Here, man definitely appears as an agent of selection. (3) Full domestication is achieved when the wild form, though still existent, is discarded for purposes of cultivation, and only improved mutants or hybrids are grown. (4) Finally, there are the cultigens of which the wild ancestors are lost, and which in most cases depend on the care of man for their continued existence. In numerous cases these have lost the capacity to produce seeds or are otherwise unable to maintain themselves".

This narrow agricultural basis becomes more apparent when it is realized that of the 200 000 species of flowering plants known, only about 3000 are used to any extent by man. Of these, only 200 are domesticated to an extent which would fit the categories (2), (3) and (4) listed by Sauer, and only 12 or 13 are really important to man (Heiser 1973). Thus, from a range of hundreds of thousands of plants, Neolithic Man has only domesticated a few hundred, limiting his scope of action in one way or another by these early choices. Ancient cultivators have set the tone for later developments; the choices they have made could only be modified by later cultivators. Braudel (1977, p. 12) has stressed this argument by formulating it as follows:

> "Wheat, rice and corn represent three definite choices made very long ago. The predominance of one grain in a civilization is the result of a countless succession of experiments that, as a result of "drifts" over a period of many centuries (.....) gradually eliminated all other alternatives".

While neither the factors which led to domestication, nor the course of the historical process which may have encompassed the starting period of domesticating crops are known, the implications of the choices involved are of great importance. It is only possible to speculate on the consequences of the choices open to our ancestors. Simple choices made by early agricultural man, such as preference for root crops or seed crops, or preference for heliophile or heliotropic crops may have influenced the course of early history. The choice for heliophylic crops may have been a decisive contributing factor for early village settlements, instead of a more dispersed settlement pattern. It could be argued that the open clearings required for heliophylic plants would have necessitated larger work groups, as opposed to the situation of planting small plots of land in shaded woodlands, which also offered opportunities for hunting. The apparent preference for cultivating root crops instead of grain crops in earlier stages of agricultural development must also be related to earlier preferences. Harris (1972) has pointed out that in the tropical lowlands, root crops were domesticated first, and that the cultivation of seed crops intruded into lowland agricultural systems only in later periods. The lack of need for territorial expansion was a feature of early root crop cultivation, whereas seed agriculture is more prone to: "relatively rapid shifts from one temporary clearing to another" (ibid.).

Thus domestication represents one level of historical choices. A second level of historical choices concerns the refinements, adjustments and other changes within the domesticated species or cultigens. These decisions are also of an historical order in the sense that they have developed and specified the structural relationships between man-made crops and their social contexts. This complex of decisions can be referred to as selection. More precisely, it is the process in which the cultivator is seeking continuously the "best" sample from a crop population for reproduction. The mechanisms which govern these processes are not well understood as yet.

The apparent or inapparent motives for selection vary greatly. Harlan (1975) has suggested that in the criteria for selection a distinction should be made between automatic selection pressure and deliberate human selection. Automatic selection pressure includes for example the non-shattering (that is, the non-dispersal) of grains in grain crops: those seeds that do not fall on the soil are harvested, and thus after resowing automatically the non-shattering trait becomes predominant during a selection process of many centuries. In fact, as is pointed out by Harlan, the non-shattering trait of cultivated races is the most conspicuous and the most diagnostic in separating domestic subspecies from spontaneous subspecies.

A further example is provided in the harvesting methods used by North American Indians reported by Wilke (1972). While seated in their canoes, these people harvested herbaceous seeds by simply shaking the plant heads into a basket. If the plant heads had been cut with a sickle or knife as was done in harvesting grain crops on other continents, then perhaps the more fragile heads would have been in a more advantageous position for selection. Thus by not cutting the heads, these North Americans were unconsciously refraining from domesticating these species (Harlan 1975).

The deliberate choice of offspring as determined by human preferences may reinforce the direction of automatic selection, but it may also take a completely different turn. Selection for stable yield may automatically reinforce characteristics such as larger seeds, more seeds and easier threshing. However, selection for a certain colour may run counter to statistical chance distributions as they are determined biologically. These and other selection criteria amount to another type of selection pressure, namely deliberate human selection.

> "Man selects for color, flavor, texture, and storage quality. He selects maize for popping, boiling, eating off the cob, flour quality for making hominy, and for ceremonial purposes in religious rites. He selects sweet sorghum for chewing, white-seeded types for bread, small dark-red-seeded types for beer, and strong-stemmed, fibrous types for house construction and basketry. He selects glutinous rice and non-glutinous rice, long-grained rice and

> short-grained rice. He selects barley for food, barley for beer, and barley for live-stock feed. He selects grains that grind well or that process well in a mortar. Man delights in bright colors and curious and unusual variants, and he may select for several different types. High yield is seldom a factor in traditional agriculture, but consistent and reliable yield is absolutely essential; man knows his materials well because survival depends on it". (Harlan 1975, p. 137).

In any of these criteria, which are very often specific to one locality or to one social group, selection works as a pressure towards a certain crop type with traits relevant for this locality or group. On the other hand, social life has to be adjusted to the needs which the crops pose. During this process of refinement and change of crops by human action, which may be either deliberate or unconscious, society is adjusting itself, and indeed must adjust itself by the continuous creation of societal arrangements which the crops require.

The question arises as to whether it is possible to order the structural relationships between characteristics of crops and their social contexts. In studying the social consequences of crop characteristics it is useful to take a functionalist perspective that is, to ask what are the objectives and needs for which the crop is grown. These needs are not only economic (food, clothing, material for house construction, etc.) but are also outside the economic sphere. Medical care, religious, political and aesthetic needs are also met by crops.

In many cases one crop will meet several needs. In addition, certain functional relationships can be distinguished between the various crops which make up the total agricultural system. This can be seen in the agricultural cycle in which various crops are arranged to fit into one coherent complex with regard to growing cycle, labour needs and product availability. The traditional food cultivator produces more than one crop, and furthermore grows more than one variety of a particular crop. This makes it possible for the cultivator to spread his labour to correspond with his situation. Thus, it would seem that the structuring nature of crops has many different effects. This is first expressed in the labour process. This is not to say that agricultural labour patterns exercise deterministic influences;

it stresses the point that within the labour process, crop characteristics often become manifest. Each crop or crop variety is characterized by its own sequence of requirements for labour which has to be followed in order to produce the anticipated harvest results.

Relationships between crop characteristics and its social contexts can be found at the macro-social level, or be confined to micro-situations. Consequences of crop characteristics are sometimes economic, social, or political. The fact that some crops, or varieties of crops have traits which can be translated almost automatically into political factors can be illustrated by the example of sugar cane cultivation in the Cauca Valley in Colombia. In this area there are extensive sugar cane *haciendas*, some of which have changed recently to growing a new cane variety, POJ 22. Unlike varieties grown in the area previously, this variety does not loose its sucrose content immediately after ripening but remains high for 4-5 months after ripening. This has become a political factor in harvesting sugar cane in the Cauca Valley. The larger *haciendas* which had been especially innovative with regard to this new variety, were also the *haciendas* with higher incidence of labour unrest. Sugar cane is cut manually by contracted labour. With the new variety, *hacienda* owners are in a stronger bargaining position with the cane cutters, as the cane not necessarily has to be harvested as soon as it has ripened (Knight 1972). This example demonstrates the intimate and direct relationship between a botanical characteristic of a crop variety and its socio-political context.

Differences in harvesting requirements of perennial crops contribute to different patterns of work organization, management and leadership. This has to do with the fact that some crops may be harvested over a longer period of time, while others must be harvested and processed within a very short period. These differences can be illustrated by examining the differences in the production of two commercial crops, rubber and oil palm. Rubber plantations can be operated:

> "..... with a looser system of discipline and a less tightly coordinated set of activities than is required for oil palm. If the rubber trees are not tapped one day, they will wait for the next, and the liquid tapped from the trees does not deteriorate so rapidly that it must be

> rushed into processing. In contrast, there is much less flexibility in the time period when palm nuts can be harvested; once harvested, the nuts must be brought to the processing plant within 24 hours or the crop will spoil. When we consider these differences, it is obvious that the same model for organization, management and leadership will not hold." (Barnett cited by Whyte 1975, p. 25).

Storage requirement of crops may also have important social consequences. Meillassoux (1973) has suggested that the change from "planting" agriculture to "seed" agriculture is related to the tendency to change from matrilineal to patrilineal organization in West-African societies.

> "Planting agriculture, which does not require seeds, favours a type of disseminate storage of the product in the fields, sometimes in the ground. Women, who are the main cultivators, retain more easily control of production in this context. On the other hand, cereal agriculture requires stocks and care, and centralisation of the product in the village. Men can exert their control without overstepping women's prerogatives. Here are possible grounds for a patrilineal family and for the enlargement of the productive unit towards the extended family" (Meillassoux 1973, p. 81).

In addition, the ease of certain cropping practices is reported to have important social effects, as for example in the harvesting of sugar cane:

> "Sugar cultivation is hard and has always been based on male workers: this is a striking difference from, for instance, the cultivation of cotton. Sugar planters everywhere therefore preferred to rely on the continuous imports of male slaves rather than favouring slave reproduction. Consequently, in the case of North East Brazil the end of the slave trade around 1850 proved more crucial than the very abolition of slavery." (Mörner 1977, p. 466).

The very fact that certain crops are perennial sometimes prevents certain categories of farmers, within prevailing land tenancy conditions, growing these crops. This is the case for example in northern

Colombia where share-croppers are not permitted to grow plaintains on large cattle *haciendas* as this would give them certain tenancy rights. For the same reason, they are sometimes not permitted to grow crops which cannot be harvested within a year. A further example shows a relation between the farmer's age and characteristics of perennial crops. Older farmers in central Colombia sometimes change from annual crops (maize, beans) to perennials, such as cocoa and coffee, as these crops, after an initial capital investment, require less costs and attention and provide them with a steady monetary income.

The length of the growing cycle of particular crops has sometimes contributed dramatically to economic and social changes. The introduction in Canada of a wheat variety with a shorter growing cycle was the cause of a sharp production increase, as wheat could be grown further north. This happened during the 1920s. Canadian wheat exports which contributed to the surplus of agricultural products, was one of the contributing factors to the economic depression in the 1930s (Sneep 1976).

Socially relevant crop characteristics can sometimes be found by examining the wider significance of a crop in a culture. Very often, a crop has wider use than the apparent reason for its production. An example is given by Kelly (1952) of the Totonac Indians from Veracruz in Southern Mexico who have cultivated the same varieties of maize within living memory. These people have not changed to improved, higher yielding varieties, because they do not have the large ear-enveloping leaves of the traditional varieties. These leaves are used for packing and apparently are so important to Totonac culture that the introduction of higher yielding varieties with short ear-leaves has been resisted.

A further example is to be found in the unsuccessful efforts of agricultural extension officers to introduce a new hybrid maize variety in villages on the north coast of Colombia. The tall strong stalks of the traditional variety serve as stakes for the vines of yam plants which are grown alongside the maize in the multicropping system. During on-farm trials, the weaker stalks of the hybrid maize lodged at the onset of the first winds, and the farmers lost interest in the new variety in spite of the higher yields observed in other monocropped hybrid maize trials. From the last example, it can be

seen that farmers are primarily interested in the results of their total cropping system. Labour is an important variable in agriculture through which crops and man meet, and which ties them together in more or less strict rules, and higher levels of interdependency. Harvest practices, storage of crops, differences between annuals and perennials, all have been shown to be characteristics directly relevant to man, and to social structure.

A more general relationship between man and crops can be demonstrated in the change from root crops to seed crops. Root crops can be harvested throughout the year, so harvesting can be more continuous then is the case with grain crops as illustrated in the following example from Indonesia:

> "Grains react in a more subtle manner to the periodicity of the climate and are suited for being harvested only during a short time. Also it happens that food becomes increasingly more dependent on one crop. So it will be necessary to grow this crop on more extended areas than before. For the latter a finer atunement to the season is necessary. This all means that labour will be concentrated more in shorter periods. The nuclear family is unable to provide for this and needs extra help from outside." (Translated from Van der Kolff 1937, p. 10).

It can be concluded that apparently some types of crops are more conducive to interfamily cooperation, or at least to the recruitment of labour from outside the family.

Another general relationship between crops or cropping patterns and man can be observed in phenomena related to the harvesting which cannot as yet be explained by diffusion. In many societies, rice is harvested manually stalk by stalk, a practice which is related to certain distribution mechanisms. This has been reported for Indonesia (Collier 1974), for the Phillipines (Barnett 1969), and for Colombia and Panama (Grist 1965).

Other general propositions on the functional relationships between agricultural systems and social organization have been put forward. Cross-cultural studies have demonstrated that the intensity and complexity of agriculture correlate positively with increasing assignment of agricultural tasks to males, although sometimes considerable flexibility in the performance of necessary tasks is found (Murdock

and Provost 1973 cited by McNetting 1974). In addition, it is becoming clear that household composition of farmers varies with the type and amount of labour required for effective crop production. Labour requirements and household structure have been found to covary in time (McNetting 1974).

Harris (1972) suggested that there is a relationship between settlement patterns and crops and crop characteristics: a contrast between "the linear movement of settlement site by pioneering shifting cultivations, especially those dependent on soil-exhausting seed crops, and the more stable locations of vegeculturalists who rotate their fields in cyclical fashion around the village."

Finally, there are differences in the social consequences of the innovations in agricultural technology. Some elements in the technology are directly related to farmers' subsistence activities, as for example rice harvesting and distribution, while other elements have a more peripheral significance, as for example the maize leaves in the lives of the Totonac Indians. Thus, it can be concluded that there is a hierarchy of social consequences, some of which are related to the "cultural core", and others only to the cultural periphery.

It has been proposed that the choices made in the historical processes of domestication and selection contribute to the structure of human society. These choices necessarily imply limitations to other future activities. The predominant domestication of annual crops has implied the non-domestication of perennials and also that further selection took place predominantly among annuals. According to Barnett (1969), modern rice breeding for small, high nitrogen absorbing rice plants which can be planted in high densities per area unit, implies the non-selection for ease of manual harvesting (see also Chapter 6 and 7).

In traditional agriculture, farmers have selected and improved their crops themselves. Purposeful breeding based on scientific principles and with goals beyond those of the individual farmer, only came into existence after the application of the Laws of Mendel by private and public institutions. Earlier, traditional agriculture was characterized by the use of many crops by one cultivator and by the use of many varieties of the same crop. These land races, which are outwardly similar in appearance, but genetically highly diverse

are of a great value to the traditional farmer. In the case of plant diseases the lack of uniformity of the crop ensures that the entire crop will not be affected. This is also the case for other stress situations such as drought, floods and insect pests. These characteristics of traditional agriculture are well known to present-day plant breeders and geneticists, who in fact depend partly on the materials produced by ancient cultivators and contemporary peasant farmers, and who emphasize the usefulness of these land races to traditional farmers. However, sufficient attention has not been given to the consequences of genetic manipulations which have been carried out on the basis of criteria not defined by the user of the crop and as a consequence have not arisen directly from existing social and economic conditions, thus creating the problem of the introduction and acceptance of the technological innovations. Wade (1974) has pointed out the genetic vulnerabilities and socio-economic dependencies caused by the application of modern breeding. Land race populations are highly flexible and extremely well adapted to the situation of the local peasant farmer. In contrast with land races which are products of selection and genetic combinations found in nature, modern varieties (true-bred or pure bred varieties) are products which could not possibly exist without the intervention of the modern breeder (Jennings 1976). A new qualitatively different situation in cultural history has come into existence. Another level has been reached in the genetic management of crops, which can be defined as the total conscious and unconscious actions of man resulting in certain distributions of crops and genetic distributions within crops over geographical areas (fields, villages, regions, continents).

In order to obtain an insight into the process of changing interdependencies of man and his crops and how this process may be related to social institutionalization and social articulation, a historical framework is presented in which the concept of genetic management of crops is related hypothetically to the socio-political organization of agricultural societies. The model is primarily concerned with the relationships between crops and cropping patterns and social orders, and does not take into account multiple origins versus one-centre theories of agriculture (Heiser 1973).

Fig. 1 Levels[1] of genetic management of crops associated with characteristics of social orders

Level	Characteristics of genetic management	Characteristics of social order
Minimal	Collection of wild species	Band type orders of gatherers
Incipient	Elementary intervention in reproduction leading to domestication	Tribal orders based on settled agricultural populations
Advanced	Advanced intervention in reproduction reflected in availability of domesticates from elsewhere	Social orders with increasing division of labour, resulting in specific agricultural populations
Modern	Routinized intervention in reproduction, reflected in varieties purposely adapted to specific technological requirements	Social orders integrated in modern world system, depending on science for the generation of technologies and with a high division of labour, also within agricultural populations
Maximizing	Highly routinized intervention in reproduction, reflected in standardized varieties in increasingly low numbers. Emergence of international pooling of genetic material in gene banks	Social orders integrated in modern world system, depending on science for the generation of technologies and highly bureaucratized and standardized planned delivery systems for dissemination and support of these technologies

[1] Levels do not always necessarily correspond to historical epochs, although certain evolutionary tendencies are assumed. Genetic management may decline in particular periods and follow a circular course.

Source: Spijkers and Box 1981.

Certain historical movements with regard to the various ways agricultural man has manipulated his physical environment by developing crops and crop varieties can be studied within this framework (see Fig. 1). One such movement can be traced from the emergence of agriculture embedded in small tribal societies, to a proliferation of crops and crop varieties in societies with many intergroup contacts with the result that crops and crop varieties are diffused from one society to another. With this movement the role of the cultivator seems to be declining. The choice as to which crop to grow is increasingly affected by outside forces, the most decisive of these being the development of markets in peasant societies. The number of crops and crop varieties which increased during the incipient and

the advanced levels of genetic management tend to stabilize and decrease at the modern level (Harlan 1975). This happened when the application of science initiated a process of standardization in agricultural production. Peasant agriculture is becoming based less on local ecological adaptations, and the emerging capitalist market is giving rise to more complex mechanisms of credit, prices and labour opportunities as intervening factors between agricultural system and social structure. However, the economy still tends to favour one crop or cropping pattern, and the characteristics of the most important crops continue to exert their influence on the daily life of the producer, as has been shown with the changes in sugar cane varieties in the complex setting of present day Colombia. The cultivator's role further diminishes, when his role as selector and adaptor is taken over by institutions specifically created for this purpose. At present, most societies have specialized institutions for breeding and seed production for the economically most important crops. In developing countries this is also increasingly the case with major food crops, thus reducing further the role of agricultural man as an adaptor of crops. Agriculture in the maximizing level of management of crops (see Fig. 1) is now almost completely institutionalized. The products of modern agriculture have lost contact with individual farmers in the sense that farmers no longer determine the characteristics of the crop. On the contrary, when maximizing levels of genetic management of crops are reached, the characteristics of crops and crop varieties are the outcome of more complex sets of factors, in which institutions for research, education, credit, marketing and economic policies in the modern state have taken over the earlier role of the cultivator of passing knowledge from father to son, and the old ways of kinship, good neighbourship and religion.

With the development of international agricultural research, genetic management of crops has reached a new level. Research and extension have become standardized and the proliferation of cropping varieties as determined by the actions of millions of individual farmers appears to have come to an end. Man has come to the point of deciding to steer earlier anonymous processes in a rationalized way. Enormous collections of genetic materials of the most important food crops have been made and stored. Knowledge and wisdom as stored in these

seeds are the results of careful selection during millenia of agriculture, which have passed through the callous hand of the peasant into the refrigerated rooms of international agricultural research stations for future research and development. Crops and cultivation have passed through several stages: the emergence of agriculture; the slow and later accelerated proliferation and diffusion of crop varieties; the constriction of this movement; and finally the rationalized "controlled" system of genetic management. On the social side, those stages were accompanied by differentiation processes; increasing specialization and labour division to culminate in highly bureaucratized societies, integrated in a world social order.

1.2 THEORETICAL AND PRACTICAL LIMITATIONS OF THE "CROP SOCIOLOGY" APPROACH

A theoretical objection to the approach developed in the previous section is that as a crop can be grown under very different social and economic conditions, the proposition that characteristics of crops carry certain social consequences is weakened. Two arguments can be presented to refute this objection. Firstly as already stated, not all characteristcs of crops are equally important to the surrounding social structure. In some cases, the direct consequences of crops are of minimal importance. Secondly, it is only where crops have formed part of a culture over a longer period that it can be supposed that there are certain "crop sociology" effects.

In a recent study on land and labour patterns within the context of agrarian capitalism in Latin America, Duncan et al. (1977) have tried to define factors to explain regional differences in these patterns. One rejected explanation referred to the importance of predominant farming types based on certain crops, "whose significance would impart its main characteristics to the general social structure of the region" in question (ibid. p. 13). Crops presented to substantiate their case were coffee, sugar cane and cotton. However as these are all relatively recent introductions, including cotton as an annual crop, interdependencies could not have developed as yet. If other examples had been taken, quite a different conclusion may have been reached. In Middle America, for example, the development of the corn-bean-squash complex is very much tied to the development

of the social structure. The same is the case for the corn-hog system in frontier areas in the tropical lowland of South America, and for the system of llama and sheep production in combination with potato and quinoa cultivation in the Andean highlands. Unlike the different "sugar cane economies", it cannot be said of each of these examples that: "they have differed markedly with respect to their ethnic and social cultural environment, their class structure and their position in the national and international capitalist market" (ibid. p. 14). A second point to raise in disagreement with Duncan's conclusion must be sought in the very loose way the term "crop" is used. It still has to be shown that in the mentioned "sugar cane economies" indeed all sugar cane was of the same type. In the example cited earlier of sugar cane cultivation in the Cauca Valley, it has been shown that the change from one variety to another did have an important political consequence. A study of small-scale sugar cane cultivation in Aritama, Colombia, has shown that in one village nine sugar cane varieties were grown, of which two were clearly associated with ethnic groups within the local society (Reichel-Dolmatoff 1961).

Another objection to the "crop sociology approach" may be that the growing of a particular crop can never be viewed as an isolated factor. This is true, but it does not preclude investigation of social effects emanating from characteristics of crops as elements of a larger cultural complex. The argument is valid for each element of a cultural system. However as already stated, crops are distinguishable from other elements of culture because they have both material and cultural aspects. Furthermore, crops have been shown to be cumulative cultural elements in the sense that after domestication, not one society is known which has retreated to consuming wild species after a period of consuming crops. On the contrary, as far as it is known, cultural development has consisted partly in the further development of crops, once they have been included in the material basis of a society.

The foregoing is further complicated by the highly complex and diversified nature of traditional agriculture. This complication is of practical relevance. When social scientists have the opportunity to study the social consequences of particular crops, crop varieties or cropping systems, the question arises as to whether it is possible to make recommendations so that the whole farming system is not

necessarily upset with the introduction of new varieties. The question also arises as to whether the changing of one detail would automatically lead to massive change in the whole system as all elements of these systems are so intrinsically related. This poses a serious problem for agricultural and rural development. Traditional agricultural systems are always highly diversified and locally specific, while improvements in technology are designed for use over large areas, and thus by definition do not take into account local specifities. In addition, it should be stated that a degree of supra-local uniformity is always imposed from outside, even in the case of traditional agriculture. This may consist of the almost omnipresence of one particular crop as for example rice in Southeast Asia; the presence of irrigation in the desert valleys on the Pacific Coast of Peru and Chile; and the regional complexes in examples already mentioned.

Theoretically in any given cropping pattern, not all crops are of equal importance; some crops have stronger structuring effects on society than others. In addition, it can be said that focussing on one changing element of a system is correct if the condition of *ceteris paribus* is met. However, in order to determine the structuring effects of a cropping and farming system the characteristics of all constituent crops of the system should be included in the social analysis.

1.3 SOCIAL ROLE OF AGRICULTURAL RESEARCH

As agricultural research plays such an important role in rural development it is necessary to discuss further the role of agricultural research.

European agricultural research began as early as in the 16th century. Foreign visitors to Flanders marvelled at the agricultural trials being carried out by wealthy amateurs. Research being carried out in France on cropping systems and the use of fertilizers was widely known during the 17th and 18th centuries. Botanical gardens were established by the Portuguese, Dutch, French, and British as a result of the voyages of exploration and the colonies established. Species were classified and studied with the aim of applying the knowledge to agricultural and horticultural production. By the end

of the 18th century work on plant selection and breeding was considered to be highly developed as indicated by the statement: "The progress of a wild plant to a beautiful garden flower is perhaps more marked and striking than anything that takes place among animals" (Malthus 1798 in Flew 1970, p. 128).

Modern agricultural research started during the 19th century with the application of discoveries in chemistry by German scientists such as Von Liebig.

Much agricultural research was the initiative of individuals or of groups of wealthier farmers and/or land-owners. At the beginning of the 20th century, agricultural research was predominantly private enterprise. This was also the case with research on tropical commodities, often carried out by plantation industries. Up until the beginning of this century, agricultural research was mainly concerned with improvement of cultivation practices. Improvement of crops and varieties followed the same principle used by farmers from the beginning of agriculture:

> "The breeding methods devised by Neolithic Man remained standard until the 20th century, although in recent decades they were applied more systematically and with more sophistication. The technique is called pure line selection." (Jennings 1976, p. 181).

Pure line selection is selecting the best individuals from a given crop population every season, submitting them to experimental stress situations, and then selecting the strongest individuals. However towards the end of the 19th century, with the application of the Laws of Mendel, an enormous breakthrough was made in breeding. Hybridization became possible, thus making it possible to create new botanical species: "In principle every heritable characteristic of the plant is subject to the will of the plant breeder" (Jennings 1976, p. 181). Breeding became the cornerstone of modern agricultural research. Whereas previously research only amplified the ranges in which crop varieties could be produced, breeding could now change the crops themselves.

These changes in plant breeding became an asset of economic importance. They gave rise to the introduction of the concept of copyright within agricultural research, and in more developed countries to legislation stipulating the rights of breeders, and the amount

to be paid by users to the holder of the copyright. In some countries plant breeding and seed production became big business. The cultural role of plant breeders has become of great significance. With hybridization and the evaluation of new plant hybrids, plant breeders have considerable influence on determining the characteristics of new crop varieties.

During the last few decades, plant breeding has been introduced on a massive scale in tropical agriculture for both commercial commodities and food crops. The role of tropical peasant farmers in the selection of crops and adapting agriculture to their way of life has started to make way for plant breeding at agricultural research stations. This has been compared by Arnold (1976) to a factory in which materials with wide genetic variation are passed through a series of processes in which the end product is improved varieties.

In view of this modern breeding "regime", it is of vital importance to see whether the new crops fit into the social context of the farmer's community and to what extent the farmer must adapt to the exigencies of his crop. Thus, it would be logical to consider whether elements of the social context should be studied in terms of the desired or required characteristics of new crop varieties before far reaching research programs are started. This raises the question of research priorities. The setting of agricultural research priorities is examined in the report of the Consultative Group on International Agricultural Research (CGIAR 1980) which states that CGIAR must take into account "the equity position of the poorest farmers", even though it is concluded that few national research programs attempt to do so. Further the report suggests that researchers themselves have an important role to play in the setting of priorities. Together with the fact that biological research in the CGIAR research network is prominent, this leads to the conclusion that biological scientists are considerd to be the best equipped to set such priorities. While not denying the role biological scientists must play in formulating the aims of agricultural research, it would be undesirable to claim an exclusivistic position for these scientists, as the CGIAR report seems to suggest.

A more balanced view is given by Arnold (1976, p. 321) who argues for a system in which: "the prevailing agricultural circumstances

are not permitted to cause barriers to creative research", but where an explicit place is given to considerations from the social disciplines in formulating the sociological consequences of potential findings.

1.4 ROLE OF SOCIOLOGICAL RESEARCH IN THE PROCESS OF AGRICULTURAL RESEARCH

In the light of the discussion on historical and sociological aspects of agricultural development, the specific processes of developing and implementing technology are considered, especially new rice technology in Colombia. The question should be asked whether it is possible to identify such sociological factors within changing rice agriculture in Colombia, so that specific recommendations can be made to the designers of improved technology. In other words, consideration is given to the ways sociological research can contribute in a practical way to the process of agricultural research.

It is first necessary to discuss the role and the position of social sciences (including here rural sociology and anthropology) in agricultural research institutes in general, and in the institute in which the author worked, the Centro Internacional de Agricultura Tropical (CIAT) in particular.

The ideas presented in this section are especially directed to agricultural and sociological research in international agricultural research centres. This has been done firstly because it is easier to obtain data on these centres as results are widely published. Secondly, because of adequate funding and other factors, these centres are able to play a vital role in agricultural research and rural development on a world scale, as recently underlined in the report of the Brandt Commission (1980). Indeed, these centres appear to be in a key position in the hierarchy of agricultural research, from where regional, national, and local research stations can derive results which can be applied in more limited areas of interest. Ample evidence of the need to focus on the international level in current agricultural research has already been provided. A reason for the difficulty in generalizing about other levels in the agricultural research network is that unlike international centres there is a wide variation in scope, operation and management, size,

quality, and funding at these levels. In addition, social scientists are more likely to be found in international agricultural research centres than in national or regional centres. If indeed this were the case, it would certainly demonstrate the innovative approach of these centres but in fact only one member of staff in a thousand is a social scientist (Dusseldorp 1977).

As with other international agricultural research centres in tropical and subtropical countries, CIAT functions under the umbrella of the Consultative Group on International Agricultural Research (CGIAR), set up in 1971. Its first objectives were defined as follows:

> "On the basis of a review of existing national, regional and international research activities, to examine the needs of developing countries for special efforts in agricultural research at the international and national levels in critical subject sectors unlikely otherwise to be adequately covered by existing research facilities, and to consider how these needs could be met" (CGIAR 1977, p. 33).

The activities of all centres sponsored by the Consultative Group are focussed on basic food crops.

CIAT, which was formally established in 1969, is located in Palmira in the Cauca Valley where the Colombian government has provided 500 ha for the institute. Research is carried out on dry beans, cassava, rice, and tropical pastures. The early work on maize and pigs, has been discontinued. An interdisciplinary program, "Small Farm Systems Program", which began in 1974 to study the complexities of peasant farming in tropical Latin America and to help determine feasible improvements was also discontinued after two years.

CIAT's concept of its mission is set out in CGIAR (1977), in which the role of agricultural research in the process of rural and agricultural development is explored. It is argued that while investment in agricultural research is necessary, it is not a sufficient condition for increasing agricultural production (whether by increasing yields per hectare, or by increasing the total area under agricultural production). The role of agricultural research can be understood by examining four key factors, which affect the necessary and sufficient conditions for agricultural growth:

- technical ceilings, defined as the maximum physical output per unit of land under ideal circumstances, as for example in trials at agricultural research station fields;
- economic ceilings, defined as maximum farm output possible under perfect information;
- achievement distributions, defined as the actual performance of the farmer;
- theory of induced innovation, which provides a formal rationalization for the strategy of focussing research with priority on particular ceilings or achievement distributions.

The slopes of technical ceiling, economic ceiling and achievement distribution, expressed in yield per unit of land, vary with land quality and climatic conditions. A number of activities (research, availability of farming inputs, adequate rural infrastructure, pricing and land tenancy incentives, land improvement and training) are considered to be "the necessary and sufficient conditions" for pushing upwards the various ceilings and the achievement distributions. According to CGIAR (1977) it would be a serious mistake to concentrate efforts on extension rather than on research, in order to raise the achievement distribution and thus to close or to narrow the gap between actual performance levels and what is technically and economically feasible.

> "Instead it is important to raise the technical ceiling as rapidly as possible, while also raising the economic ceiling. A constantly raising economic ceiling is a powerful incentive to farmers to increase production ..... Efforts to raise achievement distributions are important, and need to be intensified. However, raising the technical and economic ceiling should be the primary focus" (ibid. p. 16).

By raising the technical ceiling, as sustained by the theory of induced innovations, the economic ceiling and the achievement distribution are also pressed upwards, because the: "availability of new technologies induces development of the other necessary innovations (such as services and organizations) that are essential to exploit fully these technologies ..... The influence agricultural research has on achievement distributions is primarily through its effects on technical and economic ceilings and farmer behaviour that

may be changed by expanding opportunities" (ibid. p. 16). In other words, agricultural research must primarily focus on raising technical ceilings, achieved on "maximum yield plots at experiment stations" (ibid. p. 13). For several reasons it is questionable whether this theory of induced innovations can always be applied on Latin American agricultural structures (see Chapter 2).

Consideration should be given to the role of the social sciences in the process of agricultural research. A survey of the contribution of social scientists to the goals and programs of international research centres has shown that in total six sociologists and/or anthropologists have been employed but none in core budget positions (Almy 1977). Almy concluded that, although these scientists had been working only for a few years, a wide variety of approaches had been adopted in response to the research programs.

These approaches can be summarized broadly into three categories. In the first which can be defined very generally as a basic anthropological and comparative sociological approach, the main contribution of the social scientist is to ask what important consideration(s) of the problem at hand are being omitted. The natural scientists are more inclined than social scientists to limit their research to those factors which their training and culture have taught them to be relevant to the problem. Social scientists have learned to take a broader comparative approach, and may, through fieldwork or through knowledge of the local culture, indicate problem areas overlooked by other scientists.

The second approach involves social analysis. While some centres limit their activities to little more than providing seed together with a bundle of recommendations with little opportunity for social analysis, others have more broadly defined goals, including the training of future agricultural administrators and planners, and aiding governments improve crop programs. In these situations social analysis cannot be neglected without impunity. (Almy 1981).

The third approach which is just beginning to be explored, is related to the cognitive analysis of "local systems of scientific belief". Anthropologists and biological scientists could work together in this area. Local knowledge stored in local varieties and land races is known to be a fertile source for modern plant breeding.

The contribution of social scientists in agricultural research centres could also be viewed as to ".....ascertain in advance what effects the development and introduction of new crops and/or new crop technologies could have on the existing social and economic situation" (Dusseldorp 1977, p. 215). It is essential to have knowledge of such items as leadership, power structure, size and structure of families, division of labour according to sex and age, marketing patterns on local and regional levels, the calendar of social and cultural events, food habits. With this knowledge in mind the generated technology would be "more beneficially, more readily accepted, and at least less disfunctional for the poor and weak groups of rural communities" (ibid. p. 215).

Dusseldorp has also formulated two sets of approaches which may be adopted by social scientists working in cooperation with agricultural scientists. One such set concerns the accomodating versus the steering approach. The accommodating approach deals with the strategic choice that existing social structures and patterns should be adapted to crop technologies; and the steering approach deals with developing crops and cropping technologies which correspond as closely as possible to existing social situations. With the first approach, the social scientist's role is limited because he does not become involved until the "product" is finished. He can study the possible social consequences and indicate how the social infrastructure could be adapted to the needs of the new technology. Although Dusseldorp (1977) suggests that these studies could contribute generally to better communication between research stations and extension services, the variables the social scientist is working with in this case may be so far apart from the technical variables manipulated by agricultural research, that it is difficult to imagine how cooperation between social and natural sciences within the same program could occur.

In the second approach, the steering approach, the role of the social scientist is more obvious. He can contribute to the development of criteria for crop improvement, that is he can help define those characteristics which crops or cropping systems should have, or not have, in order to fit into the existing structure of rural society, or which would prevent a serious upset of the social order.

> "The steering approach is seldom used in agricultural experiment stations. This is mainly because systematic insights into the major socio-economic mechanisms controlling rural development are seldom available, and if available they are not explicitly related to technical aspects of rural development. Secondly, when this information is available, it is either unknown or unused at agricultural research stations because there are no social scientists on the staff" (ibid. p. 222).

The second set of approaches concerns the commodity approach versus the farming systems approach. In the commodity approach, social scientists would assess the socio-economic consequences of newly developed crop varieties in order to determine which innovations would guarantee successful diffusion, and improvement of the farmer's situation. In this approach, factors external to the research centre should be included, such as marketing, storage, credit, and processing. A multidisciplinary strategy is indicated in the farming systems approach which attempts to assess the consequences of specific technical, social and economic elements of change.

The approach or mixture of approaches to be adopted by a social scientist will depend largely on the general approach of the agricultural research centre in which he is working: crops programs; groups of disciplines; or farming systems. Three areas in which social scientists can contribute to the process of agricultural research can be distinguished. Firstly, there is the analysis of relationships between broad categories of rural inhabitants (social classes, categories of farmers) and relevant aspects of agricultural technology, as for example levels of agricultural mechanization. One task of the social scientist could be to determine levels of mechanization, at which demographic consequences of the introduction of improved technology could be expected, and how this may change the target group of rural and agricultural development programs. These studies could contribute to the formulation of general guidelines for future research programs[1]. Further examples in this category include: analysis of agricultural policies with regard to particular crops, and changing disparities in rural income related to technical change in agriculture.

Secondly, the social scientist can contribute by investigating the processes of diffusion and adoption of new agricultural practices, resulting from the agricultural research. This would provide useful information for the agricultural scientist who wants to know to what extent his innovations have been accepted by the target group and would be especially helpful when technological improvements are not adopted or are abandoned after several growing seasons.

The third and most important task of social scientists in agricultural research is to analyze cropping or farming systems and to explore relevant relationships between technical variables of the crops and cropping technologies and elements of the social structure related to these variables. The social scientist could bridge the gap between the farmer and the agricultural researcher. In order to fulfill this role of interpreter, the social scientist should begin by immersing himself in the farmer's situation in order to understand the functioning of the social and economic system which are based on the particular cropping or farming system. Thus, it is suggested that social scientists should adopt an approach which is, in fact, a modified version of Dusseldorp's steering approach and what here is referred to as the crop sociology approach. Social scientists in agricultural research centres should not begin by offering insights into the major socio-economic mechanisms controlling rural development, as these are often not related explicitly to crop technologies. It is essential that social scientists begin by studying the material basis of cropping systems, especially from the point of view of the farmers. The systematic ways in which farmers deal with their cropping activities are always related to socio-economic institutions such as marketing, local power structure, use of credit, division of labour within the family and the community, and also with types of access to land, tenancy structure. Afterwards, additional information on factors such as political structure, historic developments should also be obtained. It is important that social scientists work together with agricultural scientists, but unfortunately there are few examples of this actually happening (Hildebrand 1976; Werge 1977).

There is further reason why social scientists would have difficulties with the steering approach. This is related to the position of the social scientist within the research centres. Apart from being centres of research, these centres are also social institutions, in

which members interact, and establish social relationships, solidarities and informal networks which may or may not be congruent with the formal organization of the institute. In multidisciplinary professional organizations, informal hierarchies, group solidarities and general social interaction are influenced by discipline-oriented, professional identities and possibilities of identification. These can easily lead to accumulated mutual sets of biases among groups of scientists. It is thought that sociologists and anthropologists often use jargon, which is difficult for those in the so-called "hard sciences" to understand. Related to this is the general belief that social scientists do not produce "hard facts" or "universal laws". This must be refuted firstly, because social scientists produce facts and laws just as hard scientists do; and secondly, applied scientists, be they social or agricultural scientists, have often to work in circumstances where controlled experimental designs are not possible, and as such differ from the basic disciplines from which they all draw insights for pragmatic and non-scientific reasons. This can be illustrated by an anecdote about an interdisciplinary study on the feasibility of pest management in rice crops by organized groups of farmers, which was carried out by a team including a number of entomologists and an anthropologist. The senior entomologist came to the conclusion that insect control by individual farmers could be just as effective as by group action:

> "..... when he saw the extreme difficulty of organizing the farmers in groups ..... The issue prompts an observation probably relevant to many such interdisciplinary teams, especially those comprising social scientists new to this kind of work: the anthropologist naively entered into partnership with the entomologists thinking that "hard" science was indeed "hard", and that the scientists had raised and answered the main questions already, not only theoretically but also in practice. She understood that the purpose was to work out the fine points of the technology, perhaps even secondary issues, and to adapt it to the small farmers in Asia; but she was by no means aware that the fundamental principles were in dispute, or that entomologists themselves had no empirical evidence

> to substantiate some of the basic foundations of the technology they proposed. She assumed that especially scientists in an institution dedicated to applied research would be sure of the soundness of the underlying principles, not just theoretically but also "that they work" in practice. She has had to modify her expectations of "hard" sciences in this regard - indeed, to modify her layman's awe of the certainty of science" (Litsinger et al. 1981, p. 30).

This is not meant as a criticism of agricultural scientists but merely to demonstrate that social scientists also have their biases toward their "hard" colleagues.

The following observations are based on the experiences of the author while working at CIAT. The research programs in this centre are organized on a commodity basis, and as was repeatedly emphasized, those working at the centre were not in the first instance entomologists or phytopathologists, but cassava entomologists, or rice phytopathologists. The need to stress this suggests that scientists do not always identify readily with formal structures of organization. The scientific reward system (record of publications, citations by colleagues) is a force which may run counter to established organization principles and may press the informal social structure in directions other than the formal structure. In the author's opinion, the informal social structure (which helps to define the individual's roles and positions) of CIAT's scientific community is hierarchical and can be compared to a micro solar system. At the centre of this system are the plant breeders and related scientists. Agronomists, mechanization and soil scientists, who are considered to be generalists by training and by professional work, are located in the relatively outer spheres of the system. Phytopathologists, virologists, entomologists who have important functions in the breeding process (screening of new plant materials on pests and diseases) logically command intermediate positions, while agricultural economists play subsidiary roles depending to some extent on their own interpretation of these roles. For example, production economics (analyzing of research trial production functions) is held in higher esteem than institutional analysis which may focus on constraints such as markets, agricultural credit policies and land tenancy. Sociologists

and anthropologists are located at the very edge of the system, in continuous danger of being launched into other micro solar systems or galaxies.

An inherent part of the work of social scientists in agricultural research centres is fieldwork which must be done outside the centre sometimes for extended periods. This inevitably leads to less frequent interaction with colleagues in other disciplines. However visibility in the "politics of research" is of importance in pioneering disciplines within the agricultural research process (Litsinger et al. 1981.

While one solution to the problem may be the establishment of independent institutes for social research in agricultural and rural development this would in fact only widen the gap between the disciplines. A more productive solution would be for social scientists to work in inter-disciplinary research teams within existing agricultural research centres and to follow the "crop sociology" approach.

Thus, returning to the recommendations of Dusseldorp (1977), it should be repeated that when information on mechanisms controlling rural development is not available, and not related explicitly to technical aspects of rural development, the social scientist should begin by analysing the relationships between crops and social structure, beginning with the characteristics of the crops and cropping technologies. Secondly, after having collected this information it is logical to use this in the most indicated location: the agricultural research centre. Only after these stages does it seem worthwhile to examine optimal strategies between commodity approach or farming systems approach, because until that point the contribution of social sciences to agricultural research has been minimal. Only when a body of applicable knowledge can be presented to these research institutes, the strategic question of commodity versus farming system can be answered and can agricultural research centres be reorganized on the basis of these insights.

2 *HISTORY OF THE INTRODUCTION AND DIFFUSION OF RICE IN COLOMBIA*

A historical review of the introduction and diffusion of rice in Colombia is given in the first part of this chapter. Attention is also given to the contribution made by rice research programs and the rice producers organization to the significant increase in rice production during the last decades.

2.1 INTRODUCTION

Rice has recently gained increasing prominence as a food crop in Latin America. After maize and wheat, it is the grain crop most extensively grown on this continent (FAO 1976). Although total production in the region has almost tripled in the last few decades (Scobie and Posada 1977), little research has been done on the introduction and diffusion of this crop in Latin America as a whole, or in individual countries. Patiño (1969) reviewed the literature on rice cultivation and consumption in equinoctial America and Jennings (1961) has reviewed rice cultivation in Colombia, but neither have attempted to draw general conclusions about the role and significance of rice in the history of Latin America.

Various statements on the introduction of rice in Latin America have been made by geographers. Cole (1965) concluded that rice has been introduced far more recently in Latin America than wheat, and that the introduction and diffusion of rice is mainly associated with the arrival of immigrants from India in recent times. Another geographer stated that rice was a recent introduction to northwest Colombia (Leroy Gordon 1957). In the light of the findings in the present study, both statements do not appear to be correct. However it is reasonable to conclude that at this stage very little is known about the introduction of rice in Colombia, or indeed, in Latin America in general.

2.2 PRE-SPANISH CONQUEST

It is first necessary to consider the matter of pre-conquest versus post-conquest introduction of rice in the New World. It is known that transoceanic contacts have existed for a very long time between people of South America and Southwest Asia. Most probably the art of pottery making, which is often associated with the introduction of agriculture, was brought to the coastal area of Ecuador by Melanesian people (Meggers 1963). It is also known that the indigenous population of western Colombia and western Middle America told stories to the first conquistadores about "big black people" who came in canoes from the west (Sauer 1969, p. 269). This may perhaps indicate that until relatively recent times, contact existed with people from Asia. Of more direct importance here is the striking similarity between circum-pacific rice-harvesting methods. Traditionally, there were three methods of rice harvesting in Asia (Spencer 1966): the cutting of rice stalks with a sickle; the cutting of individual rice heads with a special knife; and the plucking of individual rice heads by hand using the thumbnail as a knife. This last method has also been described by Grist (1965) who reported the custom in the Huanunoo, a small tribe in the Philippines. On the north coast of Colombia, rice is also harvested by cutting off the heads individually with a small knife. It is also mentioned by Grist (1965) for Panama. However, even more remarkable is the occurrence of the plucking method in areas on the Pacific Coast of Colombia. West (1957, p. 149) reported:

> "In isolated areas where rice was recently introduced harvesting methods are extremely backwards. Each head of ripened rice is carefully plucked from the stem with the thumbnail and forefinger without shattering the seed; the heads are tied in neat bundles and taken to the hut where they are dried."

The suggestion in this description is that rice farmers employ this method only because they are backwards. This, however, is difficult to reconcile with the supposedly important innovation of the cultivation of a new crop, when, in fact, other harvesting methods were known. In the tropical rainforest areas of the Pacific Coast (Chocó), the use of a steel knife and machete is widespread. At

present the machete is the implement most commonly used for rice harvesting in the Chocó, and it is highly probable that the rice growers "in those isolated areas" referred to by West (1957) had seen or known that rice was harvested with a machete. The point which should be stressed here is the great similarity between the rice harvesting methods on both sides of the Pacific Ocean. If harvesting methods have a cultural basis and do not depend entirely on the botanical or other characteristics of the crop, one possible answer to the riddle of this coincidence may be that rice cultivation has been brought to the the west coast of South America by Pacific peoples. There is no basis for this similarity if it can be established that the Spanish used the same system. However, as yet no such evidence has been found.

Another consideration for not rejecting immediately the possibility of transpacific diffusion is the remarkably early appearance of rice in the Uraba region in the upper northwest of Colombia, on the border with Panama. The use of rice in this area has been reported as early as 1514, yet only in 1508 were Spanish invaders trying to establish their first settlements on these coasts.

Thus, it is highly speculative as to whether rice was introduced into the New World via the Pacific. However, as long as no adequate explanation can be given for the facts mentioned above, the possibility, however remote, should not be discarded entirely.

2.3 EARLIEST REPORTS AFTER SPANISH CONQUEST

Patiño (1969) has suggested that rice was introduced to the New World during the first voyages of discovery. It is known that Columbus took rice with him on his second voyage. The earliest known reference to rice is in a letter dictated by Colombus to Antonio de Torres, who travelled back to Spain early in 1494:

> "..... *porque la gente, antes de entrar en el verano, vean é tengan algún refrescamiento d'estas cosas, en especial para las dolencias, de las cuales cosas acá ya tenemos gran mengua, como son pasas, açucar, almendras, miel é arroz, que deviera venir en gran quantidad, y vino muy poca, é aquello que vino es ya consumido e gastado.*"
> (so that the people, before the beginning of summer, may

> see and have some refreshment from these things, especially the sick. Of these things we have already great need, such as of raisins, sugar, almonds, honey and rice, of which a great quantity should have come and very little arrived, and that which did come has been expended and consumed) (Translated by Jane 1930, p. 87).

In this context, it is clear that the rice was intended for direct consumption and not for agricultural purposes. However in the same letter reference was made to experiments with crops grown from seed brought from Spain, "the wheat and the vine are doing quite well and also some sugar cane cuttings have rooted satisfactorily" (ibid. p. 83). Rice was not mentioned in this context, but neither were other important commodities such as cattle. Jefferson (cited in Jennings 1961) stated that efforts to grow rice from seed brought on the second voyage, had failed.

As already mentioned, the next known report of rice in the New World was in 1514: "In 1514 rice arrived in Uraba, and was sold for high prices during the first six months" (Patiño 1969). Here also it is not clear whether the rice had been cultivated, or whether it had simply been brought from Spain for direct consumption. The situation in those days in Uraba was extremely complicated. The Spanish, who lived there, were pawns in a military-political battle between high administrative officials in Sevilla over the control of the newly discovered Tierra Firme and the Gulf of Uraba. These areas were the richest and most promising so far discovered and there were already rumours about a "big ocean sea in the south". It should be remembered that the possessions which were later more important, such as Peru and Mexico, were at this stage still unknown.

In September 1513, Balboa saw the Pacific Ocean for the first time during an expedition from Uraba. Against the wishes of the Crown, he had quickly organized this expedition before similar expeditions could be undertaken by rival parties from Spain. In June of the following year, an army of Spanish soldiers arrived at the newly founded city of Santa Maria de la Antigua. The army was large, probably more than 2000 strong, and greatly outnumbered the few soldiers of Balboa. Sauer (1969) in a study of Spanish occupations in the early colonial times described in detail the most important activities of the newly arrived soldiers from Spain; looting

and harassing the local population but no mention was made of agricultural activities. Sauer (1969, p. 251) cited the most reliable of the 16th century chroniclers, Oviedo: "Therefore the men were obligated to eat what the land afforded, which were roots and a grain called mahizo". It is not surprising to read that rice was sold at high prices. The army arrived at a time of famine: "the new arrivals took to foraging and pillaging, using the native stores and destroying their plantings" (ibid. p. 251). This disaster was followed by another, a locust plague: "the earliest notice of its kind for the New World". Although the Spanish Crown had issued precise instructions on the establishment of settlements and cities, it is highly improbable that the hordes of soldiers, who followed the locusts in all directions in their forays for food, did spend time on such trivial matters as agriculture.

There are only very few historical reports which refer to the interior of present day Colombia. Agriculture was to be found mainly around the larger urban concentrations, and as these were mostly situated on elevated plateaus and in inter-Andean valleys, the urban diet often consisted of the products of temperate zones, such as potatoes, wheat, beans and maize. One such reference to the cultivation of rice is to be found in a government decree of President Andres Venero de Leiva in 1565, which prescribed in minute detail the obligations of the indigenous population within the context of the encomienda economy. This decree stipulated which crops were to be grown by the Indians of the Province of Tunja. It also specified, for all Indians liable to taxation, how much land was to be planted with each crop:

> "*Los dichos encomenderos se provee y manda que los tales indios hayan de hacer y hagan las sementeras de trigo, cebada e maiz a razon de doce indios de visita por hanega, por manera que cada doce indios de visita siembren y beneficien una hanega, y ansí al respecto de todos los demás indios que hobiere en el repartimiento, locual sea de trigo, cebada e maiz, lo que mas el encomendero quisiere y mejor se diere en la tierra ..... y ansímismo se manda que adonde quierra que la tierra fuera aparejada para sementera de garbanzos, arroz e caña dulce e lino, los naturales hayan de hacer y beneficiar para los dichos sus en-*

> *comenderos a razón, en los garbanzos, de ciento indios de visita una hanega, y de arroz media hanega, y de lino conforme a los dichos garbanzos, y de cañas dulces a razón de cuatrocientos indios de visita une suerte entera.*" (Colmenares et al. 1968, p. 65).
>
> (the *encomenderos* are to direct these Indians to prepare and cultivate fields of wheat, barley and maize in the proportion of 12 tax-paying Indians per *fanega*[2], that is 12 tax-paying Indians sow and take care of one *fanega*. Similarly all other Indians belonging to the *repartimiento* are to plant wheat, barley and rice according to the discretion of the *encomendero* and what can best be produced on the land ..... and it is also decreed, where flat land is available, suitable for beans, rice, sugar cane and linseed, the Indians are to cultivate crops for the profit of the said *encomenderos* in the proportion of 100 tax-paying Indians per *fanega* in the case of chick-peas; 100 tax-paying Indians per half *fanega* in the case of rice; in the case of linseed the same as for chick-peas; and in the case of sugar cane one entire *suerte*[3] by 400 tax-paying Indians).

The quantitative relationships between these crops indicate that rice was not given as much prominence as other crops such as maize and wheat. It must be remembered, however, that of the crops mentioned, rice is the only typical lowland crop. Sugar cane and maize are grown in Colombia up to 1700-2500 m above sea level, and the other crops are typical of temperate zones. It is also not surprising that in the Province of Tunja at about 1000 m above sea level, rice was not a primordial crop. The very fact that the Spanish colonial administration was promoting rice is in itself remarkable, while important indigenous food crops such as beans, potatoes, cassava and plaintain were not mentioned at all.

Information on rice cultivation in the Cauca and Magdalena river valleys during the 16th century is provided in several historical documents. As early as 1580 reference was made by Fray Pedro Simón to rice growing in Tolima, which is today one of the most important rice growing centres in Colombia:

> "At Mariquita rice yields abundantly and without the labour required to grow it in the kingdom of Murcia and Valencia

> in Spain, for it is seeded in the same manner as wheat and without any other attention or irrigation until harvested." (Translated from Simón 1882-1892, in Patiño 1969).

This rice was cultivated only with rain water, probably as a swidden crop. In slash and burn agriculture very little or no weeding is required during the first years of cropping, which was apparently the case here. All evidence indicates that this was probably an early predecessor of *arroz criollo* (see Chapter 4), at present grown in many parts of the country as a pioneer crop.

In addition, more elaborate techniques of rice cultivation were used quite early. In 1577, rice was grown on irrigated land in the Cauca Valley.

> "In the neighbourhood of the Tulua river, in 1577, there was at least one rice field with artificial irrigation, a thing which we know from a story of an assault to various *estancias*[4] on the flat parts (near that river), by the Pijao Indians who were coming down from the mountains." (Translated from Patiño 1969, p. 80).

Irrigation was not new to Spanish farmers, especially not to those from the south of Spain where it had been introduced by Arab invaders who probably also introduced rice as a crop as early as the 8th century.

At the beginning of the colonial era, rice was not a food item of prime importance, but neither was agriculture an economic activity of importance for the Spaniards. Early chroniclers reporting economic life have indicated that extraction of gold was their main preoccupation. Food for the Indians and later for the Negroes who worked in the mines was a critical factor in the labour intensive gold mining industry. The miners were probably fed on indigenous crops, such as cassava and maize, which were either directly stolen from the local population, or grown by the miners themselves. They had to settle in the vicinity of the mines, and devote part of their time to the production of food. Another way of ensuring the food supply may have been to force the Indian population to produce food for the miners under the terms of tax laws such as those enforced in Tunja.

Rice only became a more important food in the course of the 17th century and later. This development possibly runs parallel with the

slow migration of people from the more densely populated highlands to the tropical lowlands. The population on the north coast of Colombia was by then tri-ethnic with Indian, European and Negro roots.

2.4 COLONIAL PERIOD

Panama, which was part of the Vice-Royalty of New Granada, had a special place in the history of rice cultivation. As a result of its strategic position, this region became one of the main trading centres of the Spanish colonial system. Peruvian gold and silver were brought through Panama on the west side of the isthmus, to Puerto Bello on the east side, to the Spanish galleons which came once a year from Sevilla and Cadiz to pick up this precious cargo. While waiting for their cargo, the ships took aboard food supplies at Puerto Bello. At the beginning of the 17th century so much rice was produced in the vicinity of Puerto Bello that surpluses were exported to Perú.

> "Every year to Perú some 500 botijas, at the value of 3 patacones per botija. Indians and Negroes were the subject of many vexations by the Spanish in various activities, among these the cultivation of rice." (Translated from Patiño 1969, p. 75)

According to the contemporary traveller and historian, Vasquez de Espinosa, Puerto Bello, "looking like a paradise", obtained much of its food supplies from Panama (1969, p. 212) but "*arroz se da muy bueno*" (rice grows very well). He also visited various parts of northern Colombia where he reported on the cultivation of rice in Antioquia: "one finds in this district an abundance of agricultural products; from America itself and from Spain: maiz, rice and other crops" (Translated from ibid. p. 232).

Vasquez de Espinosa also reported flourishing agriculture in Caceres:

> "One has two crops of maize every year; rice; many varieties of beans; cassava; potatoes; yams, which is similar to potatoes (of these there are both wild and domesticated species); *rascaderas* [a tuber similar to taro]; and squash, which looks like gourds from Guinea." (Translated from ibid. p. 236).

He passed through northern Colombia in about 1615 and reported on the area which today is the northern part of Antioquia, southern Bolivar and Cordoba. These were the only areas in northwest Colombia with population concentrations of any significance. There were a number of gold mines from which the gold was transported by the Cauca, San Jorge and Magdalena rivers. Caceres, Nechí and Majagual were the main river ports, and around these cities rice was grown. At the beginning of the 17th century, rice was also being produced on the coastal area around the town of Tolú, partly to meet the increasing demand from Cartagena (Patiño 1969). It was not until the second half of the 18th century that rice was grown in northwestern parts of Colombia between the San Jorge-Magdalena delta and the Gulf of Uraba.

In the middle of the 18th century the Sinú area was a centre of rice production (Patiño 1969). Rice was mainly grown by local people for their own consumption but surpluses were probably sent to urban centres which were gradually developing. Probably by this time the Sinú area had taken over from other areas in supplying Cartagena with rice. According to Colmenares (1982), the interior of New Granada was supplying Cartagena and other cities with cereals well into the 18th century. From the reports of the Ulloa brothers, who visited Cartagena in 1735, it is known that rice from the northern part of Colombia was being exported, although be it in minor quantities, far beyond the borders of the Vice-Royalty of New Granada (Ulloa and Ulloa 1964). Apart from the annual visits of the Spanish galleons to pick up gold and silver, when for a couple of weeks a trade fair turned the city into a tumultuous market, with visitors from places as far away as Bogotá, Popayan and Quito, Cartagena was a sleepy city. The visitors described the commercial activities in Cartagena during the slack season (*tiempo muerte*), as:

> "for, with regard to the trade carried on with the other governments, it is not worth notice. The greater part of it consists in some islanders from La Trinidad, the Havannah, and St. Domingo, bringing leaf-tobacco, snuff and sugars; and returning with Magdalena cocoa, earthenware, rice, and other goods wanted in these islands. And even of these small vessels, scarcely one is seen for two or three months" (ibid. p. 44).

Merchants from Cartagena engaged in trade with other villages and cities under the jurisdiction of Cartagena. All types of goods and even "luxuries of life" such as "maize, rice, cotton, live hogs, tobacco, plaintains, birds, cassava, sugar, honey and cocoa" were brought to the city. Goods were transported by canoes and *champanes*, a boat specially suited for navigation on the Magdalena and Sinú rivers.

While the Sinú area provided to a certain extent rice for the Cartagena market, the area around the city of San Jeronimo supplied rice for the cities further inland. By about the middle of the 18th century, rice had been introduced to this area by Jesuit priests. By 1788, rice production in Antioquia had developed to such an extent that the Royal Visitor, Mon y Velarde, reported that all the rice consumed in the province was produced in San Jeronimo (Parsons 1968).

The methods of rice production in the places mentioned above probably did not differ very much from those described by Pedro de Simón in Mariquita in 1580 as rice without irrigation, perhaps as a pioneer crop. Cultivation practices in the Sinú area as described in 1776 are practically identical to those at present used in the frontier areas between tropical rainforest and cattle grazing areas in southern Cordoba, Bolivar, northern Antioquia and the Chocó:

> "*Las labranzas las hacen derribando la porción de montes que necesitan, y quemando despues aquellas maderas, en el primer aguacero hacen sus siembras repitiendolo tres veces al año, con varios frutos, como son platanos, maiz, arroz, frixoles, ñames, yuca, patillas, melones, papayas, caña dulce, y todo especie de hortalizas que antes poco conocían y usaban, adelantando mucho las crías de asta, cerda y caballar.*" (Sanchez Juliao 1970, p. 90).
>
> (The cultivation consists of clearing the forest from the area of land required and burning the vegetation. When the first rains come, several crops are sown (sowing is sometimes done three times per year) such as: plaintain; maize; rice; beans; yams; cassava; patillas; melons; papaya; sugar cane; and a variety of fruits previously unknown. At the same time much progress was made in raising cattle, pigs and horses).

By this time rice had become an important crop in the northern parts of Colombia. In the more remote areas inhabited by escaped slaves and others who had reason to hide from the colonial administration, rice was gaining in importance. In the savoury diaries of Padre Joseph Palacios de la Vega, one of the city founders in New Granada, rice is mentioned in connection with a large number of places he visited. For example the clandestine tobacco planters in the Caño Varra had, in addition to their tobacco crops, cleared small areas of forest and planted crops such as rice, cassava and yams. A 20th century small farmer in the region would have done the same. In September 1787, the Padre reported that near the junction of the Caño and Cauca rivers he saw:

> "..... a small path with fresh footprints. I jumped ashore and within a few passes I saw a woman collecting a few stalks of rice" (translated from Palacios de la Vega [1787-1788], in Reichel-Dolmatoff 1955, p. 42).

Rice was harvested manually, one can almost see the woman, shy, partly hidden behind the high rice plants, cutting her bundles of rice. The date is also interesting. Perhaps the rice was of a precocious variety, similar to those at present grown on the north coast, and harvested relatively early in the season, known as *arroz ligerito* (quick ripening rice). The description fits the general practice of collecting the rice, stalk by stalk which is still followed today. Palacios de la Vega continued:

> "I sent one of our company to tell her to approach. She came with him, but when she saw me, she wanted to run away. They took her by the arms and I asked her what she was doing there. Frightened she responded: cutting rice for the food of her folks." (Translated from ibid. p. 42).

Many references are made by Palacios de la Vega to the cultivation of rice. An idea of the size of the rice crops can be obtained from one diary entry in which the complaints of a man about his father are reported. The father had produced in that year: "more than four hundred *fanegas* of maize, and the same amount of rice", and "had hidden the money from him and had only given him cassava and maize to eat." (Translated from ibid. p. 94).

Four hundred *fanegas* would be equivalent to about 2.5 tonnes of rice which may have been produced on 1.5-2 hectares of the fertile soils

in the area between the Cauca and Mojana rivers. This sizeable amount of rice and maize must have been produced to be sold in the cities. Perhaps rice was still an expensive commodity. When newly arrived migrants to Maguajal were arrested by Palacios and forced to live in the city, they were provided on his instigation with meat, maize and plaintain. On the other hand, rice may have been in such common use that it was not worth mentioning, and taken for granted that it would have been provided. However, the son's complaint about his miserly father suggests the opposite: his father had given him only maize and cassava, even though the father had produced substantial amounts of rice. Seasonal scarcity could not have played a role, because the conflict took place in December when a substantial part of the rice crop must have been harvested. Another explanation may be that rice was obtained as payment in kind for assisting with the harvest. Whatever the explanation may be, the case above shows that rice was cultivated both for direct consumption, and also for commercial purposes. Rice was also produced for commercial purposes in other villages. According to the diaries of Palacios de la Vega, the village of Palmerito, which is still today in a rice growing area of some importance, produced rice for the entire Cauca area (Reichel-Dolmatoff 1955).

Most of the relatively early reports on rice production in Colombia are mainly concerned with the north coast, including Panama, Uraba and the Chocó. From the second half of the 18th century there are also reports of rice production in the southern Cauca Valley. Colmenares (1982) stated that on the big haciendas used for extensive cattle raising included small plots sown with plaintains and rice.

In addition, on the Colombian and Venezuelan plains (*llanos*), non-native crops were included early in the local agricultural system. Morey (1975, p. 45-56) mentioned rice as one of the crops, which was cultivated extensively in the area "even before the Spanish entered". Rice was grown on the banks of the Apure River "by at least the seventeenth century."

According to West (1957), rice was introduced only quite recently to the Pacific lowlands of Colombia. He has suggested that rice was produced along the lower Atrato River and also in a few other places for the first time during the 19th century. However, it is very likely that rice was grown much earlier in the Chocó. Between 1775 and 1800,

there were reports of Indians from Lloró, Tadó and Quibdó, vying with one another for exclusive rights on transport across the *Arrastradero de San Juan*, the swampy land between the upper courses of the San Juan and Atrato rivers, which connect the Pacific Ocean with the Carribean. These rights were considered to be very profitable, because the services were paid for in cash. It was decided to grant these rights to to Quibdó, who had held them traditionally, and also because Lloró made sufficient profit from selling the rice (*que Lloró ganaba suficientemente de sus ventas de arroz*) (Isacsson 1976 p. 31). This incident is noteworthy because, assuming that rice had been brought to the area by the Spanish, a very early cultural diffusion had taken place between the Spanish and the Chocó Indians, and also because these Indians were part of the money economy as early as this time.

The reason for Spanish presence in this inhospitable region was gold, and the history of gold mining in the Chocó is interrelated with the history of the supply of food for the Indian labourers and later the Negro labourers. It is noteworthy that rice was absent from the diet of the miners. Neither Colmenares (1982) nor Patiño (1969), both experts on the history of gold mining in the Chocó, have mentioned the crop in this regard. Patiño (1969, p. 79) cites Ortega as stating: "In 1688, maize and plaintain were the only foods known in Lloró." However, this was a century earlier, and seems to be an exaggerated statement, especially in view of the extremely diversified diets of local Indian groups as for example the Cuna (Duke 1970), who then inhabited most of the Chocó.

2.5 NINETEENTH CENTURY

By the end of the 18th century and the beginning of the 19th century, rice was a well-known crop throughout Colombia. By that time rice had become one of the basic foods in tropical regions. In 1822, a foreign visitor to the north coast of Colombia exclaimed: "you do not see wheat here, nor barley, but rice grows in abundance" (Baldwin et al. 1822 p. 173). However, the upper class in Cartagena preferred to eat bread made from imported wheat (ibid.). By about 1840 the area around Guacari in the Cauca Valley, had become an important rice growing centre. The techniques used for land prepara-

tion and irrigation in Guacari were unusual. The fenced field was first flooded, then cattle were driven onto it for a few days to churn up the soil into a muddy mass. After this, the animals were taken out and the rice seed was broadcast. There were two sowing seasons: between April and May and between September and October. When the rice plants had emerged, the field was flooded several times per week until the rice was harvested. Harvesting was done manually either by milking the heads, that is by stripping the grains from the ears by hand, or by cutting the ears individually with a knife and making bundles of the stalks. Threshing was done with a mortar and pestle. In addition, the technique of ratooning was employed (*soca*). After the rice crop had been harvested, the field was flooded again, and cattle were driven onto it. After two weeks of pounding by the cattle, the field was considered to be ready for another crop of rice, which grew from the remains of the rice plants from the previous season. After three months another crop could be harvested. In this way as many as six crops could be grown without resowing the field (Jennings 1961).

The knowledge of irrigation, or at least its use, had possibly been lost for a long period of time. In 1854, the botanist Horton was surprised to see irrigation being used in San Pedro in the Cauca Valley. This was the first time in his extensive travels throughout the country that he had seen an irrigated rice field (Patiño 1969). As already mentioned, irrigated rice was known in the Cauca Valley 200 years earlier.

The rice cultivation practices in the *llanos* were very similar to those described for the Cauca Valley. Land preparation was done by enclosing cattle in a corral a few days before the first rains of the wet season. The animals were not given water or food, and as a result the field was thoroughly churned up and well-fertilized. These fields were usually not bigger than one hectare. After removing the cattle, the rice was sown. With only rainwater, a satisfactory yield could be obtained. Weeding was not required and the crop was harvested by cutting the ears individually. Sometimes cattle were brought into the field after the sowing in order to trample the seed into the soil. Ratooning was also practised in the *llanos* (Jennings 1961).

It is difficult to say exactly when rice became a common food throughout Colombian society. For a number of historical and geographical reasons, the diffusion of rice did not proceed in the same way or at the same rate in all parts of the country. At present there are considerable differences in the consumption of rice and dietary habits between geographical areas. One economic factor which should also be kept in mind is that in some regions of Colombia, and especially among the poor, rice is still considered to be a luxury food. This is not true for the tropical lowland areas, as in many of these areas rice is the staple food. The assertion of West (1957) that in the Pacific lowlands rice is still a luxury food, is no longer valid. Rice is now a basic food crop of the Chocó Negroes and an important food item even for the lesser acculturated Indian groups such as the Embera, who grow it or buy it from the black Chocoans (Stipek 1976).

It is noteworthy that rice cultivation was adapted relatively early by some segments of the indigenous population, for example the Lloró and also by the Indian population in Panama. Patiño (1969) has suggested that the Chirigui were cultivating rice by about the middle of the 19th century. Most Indian groups who are acculturated to some extent with Colombian society, know of the crop and cultivate it, as for example the Cuna, Piapoco, Embera, Huananá, and Guahibo. Less acculturated groups such as the Barí (Motilones) do not eat or cultivate rice.

Although Patiño (1969) concluded that it has only been since the second half of the 19th century that rice has become generally diffused and accepted as a food crop in Panama and the rest of equinoctial America, this would appear to be too prudent a position. By the middle of the 18th century and possibly much earlier, rice was widely grown by farmers on the north coast and there is nothing to indicate that the situation in Panama would have been different. The various examples of the trade in rice during the 17th and 18th centuries presented demonstrate an early urban demand for this product, and even from outside the Vice-Royalty.

Perhaps an exception should be made for the temperate zones of Colombia, and especially for the poor classes. Economic factors may have prevented these classes from trying the new food. Prices, however, are not known. It has been shown that in Cartagena in the 19th

century wheat was preferred to rice by the upper class, which is in contrast to the situation elsewhere.

It is not easy to make comparisons with the present situation in Colombia. Rice consumption has increased considerably, mainly because of a remarkable increase in yields and production. The remarkable changes in rice production in recent years have been almost a logical continuation of the historical development. The introduction of rice into Latin America greatly changed food habits of the people and also had a significant effect on the cultural history of the New World.

2.6 RICE RESEARCH IN COLOMBIA

During the 20th century, rice production in Colombia has continued to increase. Sometimes the government intervened directly, as for example during the 1930s when President Olaya Herrera banned the import of bulk foodstuffs. As a result of this measure, the area under commercial rice cultivation was extended (West 1957) and by the 1950s, rice was being grown on virtually all tropical lowlands of Colombia. Apart from short periods, 1935-1938 and 1942-1946, when Colombia exported rice, imports exceeded exports until about 1964 (Leurquin 1967). After this time, rice was the only basic food crop, the production of which did not decrease per caput (Spijkers 1979).

During the first half of this century, there was little government support for agriculture in Colombia, and it was not until 1948 that the Ministry of Agriculture was set up. Before this time, agriculture was administered by the Ministry of Interior Affairs.

Although there is disagreement on specific patterns and historical explanations, it is generally agreed that present rural society in Colombia is characterized by a combination of capitalist and precapitalist elements (McGreevey, 1975; Fals Borda, 1977; Pearse, 1975; and Gilhodes, 1974). The rural structure has been described by Posada (1979, p. 2) as being typically dualist:

> "the coexistence in it of a modernized commercial sector who controls the best lands, employs wage-earning workers and has easy access to credit, agricultural support services and the organized internal and external markets, and a traditional sector composed of both the remaining large

> traditional enterprises and small farmers who, because of the tenure characteristics of the land they work and their production organization methods, remain isolated from technical assistance, financing sources and adequate marketing channels."

In the case of rice, this dualism began in the Cauca Valley during the 1920s with the introduction of innovations such as the steam threshing machine and the metal plough (Leurquin 1967). However, the foundations of modern commercial rice cultivation in Colombia were laid with the completion of the Tolima and Huila irrigation districts which were began before 1940. Leurquin (1967) has referred to the rice fever in Tolima in the period 1936-1939, when a frenzy of land transactions took place. Many urban professionals took a chance on rice farming on their newly acquired land and introduced innovations in farm management. They did not follow the traditional methods of rice cultivation but instead employed specialist agronomists. However the contribution of modernized rice cultivation to total production remained small until after the Second World War. In 1934, half of the total national production was cultivated in three departments on the north coast, where mainly swamp rice was cultivated (Leurquin 1967).

Rice research and extension in Colombia have contributed to the recent increase of production. This work is carried out by three agencies; the specialized agency of the Colombian Government, the Instituto Colombiano Agropecuario (ICA) and its rice program; a private organization of rice producers, Fedearroz; and the rice program of CIAT.

2.6.1 The Instituto Colombiano Agropecuario (ICA)

In Colombia, government sponsored agricultural research and extension is organized through a decentralized agency of the Ministry of Agriculture, the Instituto Colombiano Agropecuario (ICA). Before ICA and the ministry were established, government intervention in the rice industry was mainly limited to measures to control prices and exports but it also had some influence on technology. During the 1920s, new rice varieties from abroad were introduced at the agricultural experiment station in Palmira (Valle). According to Leurquin, "about 100 new varieties were introduced at Palmira from

all over the world in 1938-1939, and the Palmira Eight variety, a Fortuna adapted to the climatic conditions of Colombia, was developed" (ibid. p. 248). Government interest in agriculture was renewed at the end of the 1940s when the Ministry of Agriculture was set up and a research division was established within the new ministry. A national rice research program was set up with support of the Rockefeller Foundation in order to deal with two major problems. Firstly, the production of rice in Colombia was lagging behind the increasing demand (Leurquin 1967), and secondly, the sudden appearance of a rice disease, Hoja Blanca, which was destroying a major part of the harvest (Rosero 1974). In 1959, the Research program was expanded with the establishment of the first national research centre at Nataima, in Tolima Department. With the gradual diffusion of irrigated rice throughout the country, the research network was also expanded and additional research stations were established at the *llanos* (1962) and at Turipana (1963) near Cereté on the north coast. By 1975, six regional stations had been established, with a total staff of 16.

In 1963, ICA was formally set up with the task of agricultural research and extension. In general, research and extension activities of ICA operated independently and at present ICA carries out only a limited amount of extension work.

While expanding further research activities in an increasing number of locations throughout the country, ICA's rice research program also established important formal links with other organizations. Since 1962, staff from Fedearroz have participated in the regional programs of ICA, and later also provided financial assistance for regional trials (Rosero 1975). After 1967 also formal links were established with CIAT.

The present objectives of the rice research program of ICA are: "the raising of rice productivity, through the obtaining of new dwarf varieties and the improvement of cultivation practices." (Rosero 1974, p. 19). With regard to the first target, the acquisition of new varieties, the following criteria are considered to be important (ibid.): good yielding capacity; long grains with good milling and cooking characteristics; vigorous plants with short and strong stalks, well developed tillering, erect leaves which remain green until the ripening stage of the plant; resistance to shatter-

ing; precocious ripening; resistance to diseases; and resistance to insect plagues. With regard to the second target, the increasing productivity by the improvement of cultivation practices, ICA's rice research program has the following objectives: improving methods and densities of sowing; and the control of weeds, diseases, and insect plagues. Since 1968 ICA's rice program has had the additional, legally defined task of certifying rice seed, and defining from which seed commercial rice seed may be multiplied.

A brief look at the results of ICA's rice research program shows that it put an emphasis on selection and breeding. Research on resistance to the Hoja Blanca disease had begun during the 1950s. A selection and breeding program had been set up from a collection of more than 3000 varieties from the USA. It was found that Carlos Bello, Azuléno, Turco Pelao and several other native varieties were resistant to the disease (Jennings 1961). As a result of this program, the variety Napal was developed and in 1963 was distributed by Fedearroz, but was withdrawn the following year because of its high susceptibility to rice blast. In 1967, another variety, ICA 10 was released, but consumers preferred the cooking qualities of the commercial variety, Bluebonnet 50. In 1967, research in cooperation with CIAT began with work on new dwarf varieties imported from Asia. The varieties IR 8 and IR 22 were brought to Colombia and within a few years locally adapted dwarf varieties were introduced throughout the country.

2.6.2 Federación Nacional de Arroceros (Fedearroz)

This privately organized group of rice farmers has played a crucial role in the development of rice production in Colombia. Fedearroz works very efficiently and has maintained excellent relationships with political leaders throughout the 30 years of its existence. Leurquin (1967, p. 24) has described Fedearroz as "playing perhaps the most important role of any agency in modernization of the rice industry". The monthly rice review *Arroz* published by Fedearroz has been described as: "without any doubt one of the best specialized journals of Colombia's agricultural sector" (Gilhodes 1974, p. 150).

The goals of Fedearroz can be summarized in two categories, those which are externally-oriented and those which are internally-oriented.

The externally-oriented goals include: promotion of rice cultivation in Colombia by obtaining high prices for rice; low prices for inputs; and generally stimulating disincentives for the import of rice. The internally-oriented goals include: provision of technical assistance for its members; the carrying out of research on rice; the production, processing and distribution of rice seed; and the import, distribution and sale of inputs such as fertilizers, insecticides, herbicides and agricultural machinery.

Fedearroz was started in 1947 by a group of rice farmers in Tolima who felt threatened by government policies on prices and import regulations. It began as a pressure group, and as such has been highly successful. As its membership consists mainly of the larger rice farmers, the organization mainly represents the interests of this group. The membership also includes a significant number of rice farmers who are not themselves landowners. The political power of Fedearroz is demonstrated by the fact that during the 1960s it dominated the politically conservative Sociedad de Agricultores de Colombia (SAC) and even persuaded it to take a pro-land reform stand in the debate on land reform policies. Fedearroz has also been successful in influencing government price policies. In 1966, the federation took action when the rice industry was threatened by the low value of the Colombian peso which would have meant higher prices for fertilizers, insecticides, tractors, and spare parts for machinery, and thus higher production costs. The government assisted rice producers by augmenting credits for rice production and lowering import duties on insecticides and herbicides.

By 1950, Fedearroz had been recognized by the government and given the mandate and funds to provide technical assistance and extension in rice production throughout the country. However, it took more than 10 years before Fedearroz was put on an equal footing with other organizations such as the National Cotton Federation so that it could levy rice growers on the basis of unit produce. In 1964, an agreement was reached with the government that Fedearroz could collect a fee, from millers and from other buyers for each kg of rough rice milled. This money was to be used to support research, extension and other technical services.

In order to obtain its goals, the federation takes an instrumental, pragmatic standpoint. As already mentioned, during the land

reform debate, the rice growers sided with the adherents to land redistribution. Many rice farmers from Tolima and Huila Departments pressed for more productive use of the extensive cattle grazing lands by developing irrigation facilities for the cultivation of rice. When the claims for land became engulfed in a wider political wave of peasant unrest, Fedearroz backed down. On the issue of government intervention in export and import of food, Fedearroz has favoured protectionism with regard to food exports, while a rival group, the rice millers are strong advocates of the importation of other cereals such as wheat. The millers also have fought to prevent the federation obtaining the right to collect a levy from the rice producers. In the 1960s, attempts to set up a rival organization did not succeed.

As Fedearroz became more established, it received less government assistance and support. In 1970, when the government put forward higher quality norms for rice, Fedearroz applied for a higher support price for rice. However, the government refused to do so on the basis that it was not prepared to subsidize food exports, and choose instead to stabilize national rice production (Gilhodes 1974). Attempts by Fedearroz during the 1970s to increase the levy were also unsuccessful as the government was of the opinion that further government support was not necessary. In 1976, when the government did not authorize an increase in official support prices for rice, Fedearroz was successful in persuading its members to reduce the area under rice cultivation in order to prevent overproduction.

Fedearroz is organized on the basis of three divisions as set out below.

1. The Commercial Division which consists of two departments; the Agricultural Supply Department and the Machinery Department. The division is mainly concerned with the acquisition, distribution and sale of inputs such as seeds, insecticides, herbicides, fungicides, fertilizers and agricultural machinery, which are sold in its 34 shops throughout the country.
2. The Financial Division administers the money earned from commercial activities and also intervenes on behalf of its members in problems with credit, and offers technical assistance in finance and farm management.

3. The Technical Division is divided into three departments: the Technical Department, the Seed Production Department and the Research Department. At the regional level, 29 *comites regionales* coordinate technical services in the main rice growing areas in the country.

An indication of the growing importance of the technical assistance given by Fedearroz to its members can be found in the number of rice agronomists it employs. While in 1953 Fedearroz employed only two rice agronomists, by 1978 this number had increased to 81 (Leurquin 1967 and Fedearroz 1979).

As a result of the increased demand for rice and the higher quality levels required by government regulation, Colombia's rice industry has become increasingly dependent on the availability of good quality seeds. This implies that the rice growers must know that the seed material used is offspring of certified seed, of which the genetic identity and the varietal purity has been controlled by ICA. Fedearroz has played a major role in the introduction, multiplication and distribution of improved rice seed. In 1954, delegated members of Fedearroz brought seed of improved rice varieties, such as Rexoro and Bluebonnet 50, to Colombia. However, the increasing demand for improved seeds, together with the devaluation of the Colombian peso made it necessary to produce seed within the country (Leurquin 1967). At this time, the disease Hoja Blanca was also threatening the rice crop, but unlike traditional varieties neither of the two imported varieties was resistant to this disease.

In 1958, in addition to the experimental station, seed multiplication farms and sorting plants were established at Nataima, in Tolima Department (Leurquin 1967). The first seed processing plant was set up in Ibague in 1963 with facilities for storage, drying, and classification. During 1963, more than 400 t of rice seed was processed, supplying about 15% of the national demand. In 1977, more than 60% of Colombia's rice seed (worth 20 million dollars) was produced, processed and sold through Fedearroz, thus placing the organization in a powerful position with regard to the most important input for modern rice cultivation (Gonzalez 1975; and Fedearroz 1979).

As Fedearroz has almost a monopoly on the rice seed market in Colombia, the production process followed by the organization is

described in detail. Fedearroz enters into contracts with specific rice farmers to produce high quality seed. The land to be used for seed production is closely inspected by Fedearroz to make sure that it has not been sown with rice for the last two years. After approval has been given by an ICA official, the area can be sown with basic seed provided by ICA. Fedearroz agronomists make at least six visits to the seed plot during critical phases of the growing cycle, to check for the presence of weeds such as red rice, and also to check on the purity of the rice variety. When harvested, the rice seed is processed in one of the five Fedearroz plants where it undergoes a five phase processing procedure. Firstly, samples of the rice are examined for basic characteristics such as moisture content; presence of red rice per kg; presence of other rice varieties; weed seeds; percentage of dehusked seed grains; broken grains; seeds with spotted surfaces; unripe grains; and dirt. After this inspection, the seed mass is dried until the moisture content does not exceed 14%. The third phase consists of the classification of the seed material into the following categories: basic seed; registered seed; certified seed; and improved seed. The quality requirements for registered and certified seed are set in Table 1.

At this stage ICA officials compare germination rates of the seed with ICA seed samples. If the germination rate is higher than 80%, the seed is declared adequate for distribution to rice farmers. In the last phase, seed is treated with fungicides before it leaves the plant. Seed is distributed from the rice processing plants, each of which has its own special variety, to the 34 Fedearroz agencies throughout the country.

Table 1 Quality requirements for registered and certified rice seed as established by ICA

Quality requirements	Classification of seed	
	Registered	Certified
Pure seed (min %)	98	98
Inert material (max %)	2	2
Seeds of other rice varieties (max per kg)	2	5
Seeds of other crops (max per kg)	1	3
Seeds of main weeds (max per kg)	1	4
Seeds of obnoxious weeds (max per kg)	1	2
Total impurities (max per kg)	2	6
Moisture content (max %)	14	14
Germination rate (min %)	80	80

Source: Arroz No. 299, 1979.

Since 1962, Fedearroz has worked in cooperation with ICA on applied rice research. Varietal adaptation and cultivation practices are studied in the main rice growing areas on semi-commercial research plots. Since 1973, Fedearroz has had a separate budget for these regional trials. While the role of Fedearroz in research is limited in comparison to its other activities, its technical assistance and extension; its journal; its technical bulletins, and field days; its excellent organization; its vital role in the supply of inputs, and its performance in political lobbying, have contributed to the advancement of rice production in Colombia in a way which cannot be easily overestimated.

2.6.3 CIAT rice program

The rice program of CIAT started in 1967, when a specialist rice breeder was transferred from the International Rice Research Institute (IRRI) in the Philippines to the International Cooperation Program of ICA. CIAT was not set up until two years later. Although CIAT expanded considerably during the 1970s, the rice program remained relatively small. By 1981, the scientific staff of the centre consisted of about 60 expatriates, and about 150 Colombians. Even though only 18 members of staff were involved with the rice program, in terms of direct impact of the research on Colombian agriculture, the rice program has been the only program to have produced indisputably widespread results.

Since 1967, the main objective of this rice program has been to increase average national yields per unit area throughout Latin America. The core of the rice program has been the development of genetically improved varieties. At the end of the 1960s short-straw high-yielding varieties from Asia, which had been developed at IRRI in the Philippines were introduced in Colombia. This was done in collaboration with the ICA rice program. As already stated, in 1968 the variety IR 8 was released, which was resistant to the disease Hoja Blanca and after three years was being grown on about 30% of the irrigated rice area. This was a quick success, but the variety had serious disadvantages. It was not considered to taste as good as other varieties and had poor milling qualities, thus it only fetched a low price. Another IRRI variety, IR 22, was released in 1970. This had excellent milling qualities and from the point of view of the

consumer it had a good appearance, but it had one characteristic in common with many other varieties which were to follow. It was not sufficiently resistant to rice blast, a fungus disease caused by *Piricularia oryzae*, "the only wide spread pathogen capable of epidemic consequences" (Jennings 1977, p. 8).

Before discussing the achievements of the rice program and the breeding program in particular, the overall strategy of the program is described. From the beginning, there has been close collaboration with the ICA rice program, and indeed many of the field trials were carried out at the ICA research station, adjacent to the CIAT. Regional field trials of the new varieties are carried out in collaboration with ICA and Fedearroz. Attention had also been focussed on those rice growing areas and farmers which provided the best guarantee for quick success. This, in fact, meant that in the beginning and also during the 1970s, the rice program focussed exclusively on irrigated rice which was being cultivated in those areas where the rural infrastructure was relatively well developed. Thus efforts were mainly concentrated on Tolima, Huila and Valle departments, which can be considered the centre of modern commercial rice cultivation, and the centre of the rice growers organization, Fedearroz.

Breeding is seen as the most important factor for improving rice production in Latin America. In a list of "strategies to solve the problems that limit rice production in Latin America" (CIAT Highlights 78), the first priority was defined as: "to obtain rice varieties that have the characteristics of high yield, good adaptation, high grain quality, and resistance to diseases and insects present in production zones".

Over the years, the achievement of stable resistance to rice blast remained the main focus of the breeding program, as described in the Annual Reports of CIAT. The only solution to the problem of rice blast seems to be to stay ahead of the fungus which rapidly adapts to new, initially resistant or slightly susceptible varieties. In the last ten years this is what has been happening, a new variety has been developed every two or three years which only remained resistant for a few growing seasons.

After the introduction of the two varieties from Asia (IR 8 and IR 22), other improved varieties have been developed, based on imported lines. In 1971, the first of these, CICA 4, was released,

and under that name distributed in Colombia, Venezuela, Brazil, Panama, Costa Rica, Jamaica, Honduras and Guatemala. In Ecuador and the Dominican Republic, it was distributed under other names. In 1974, 28% of the irrigated rice area in Colombia was sown with CICA 4. Although this variety produced high yields and had good milling and cooking qualities, which are the decisive factors determining the price obtained by farmers, the variety suffered attacks from rice blast, especially in the *Llanos Orientales*, which at that time was becoming an important rice growing area.

During 1974, CICA 6 was released. The Colombian press reported that the variety was resistant to blast, but regional trials throughout Colombia showed that the new variety was susceptible to moderately susceptible to the disease. (CIAT 1976).

In May 1976, CICA 9 was released which was also reported to be resistant to rice blast. The leading Colombian newspaper *El Tiempo* recommended it in preference to earlier varieties such as CICA 4, because of its higher resistance to rice blast. CICA 7, a variety with similar characteristics to CICA 9 was released at the same time. Late in 1977, CICA 8 was released. Unlike the earlier high-yielding varieties this was a semi-dwarf variety. At present, the tendency to lodging, which occurs when high levels of nitrogen fertilizers are applied, is being investigated by testing lines which have better straw strength.

In addition, the rice program is carrying out studies in plant pathology, entomology, and agronomy, including field trials in collaboration with ICA and Fedearroz. During the 1970s, CIAT developed a "continuous rice production system". This project aimed at "blending the most adapted Asian wet land practices with Western industrial scheduling" (CIAT 1972, p. 159). The basic idea was to sow, cultivate, and harvest rice in blocks, by timing operations on each block, so that machinery, land and labour are continuously used throughout the year. For smaller operations, a special hand-operated threshing tool was designed. This was a small portable combine harvester, to be manned by two people, and consisting of nothing more than two oil drums, one functioning as a wheel, and the other cut in half and used as a receptacle for the threshed rice. Studies in time use, labour costs and cost of machinery have indicated the feasibility of:

"rice production systems at various levels of magnitude and labour intensity on a year round basis, from harvesting 0.2 hectares every 14 days, to a commercial 120 hectares operation, mechanized and employing 32 labourers steadily, harvesting 6 hectares weekly" (ibid. p. 159). The CIAT Annual Report (1978) included in the objectives of the rice program: "to stimulate the diffusion of the continuous rice production system developed at CIAT for level areas of Latin America; up to now the system has been adopted by some large- and medium scale farmers, but not by small farmers".

Finally, training courses for rice research and extension staff from Latin American countries should be mentioned. These courses have been held at CIAT, and also in Peru, Panama and the Dominican Republic.

As has been shown by Scobie and Posada (1977), the CIAT rice program has made a significant contribution to the increase of rice production in Colombia. They have concluded that the total rice production in Latin America was 14.4% higher than it would have been without the introduction of higher-yielding varieties. When Brazil which produces mainly dryland rice is excluded, the increase is even higher, 40%.

The principal strategy of CIAT's rice program has been to push upwards the technical ceiling as defined by CGIAR (1977) (see also Section 1.4). Varietal improvement has been the main focus of the rice program. The fact that this strategy is still prominent is also substantiated by the fact that the present senior staff consists of one agronomist, one plant pathologist and three plant breeders.

2.6.4 Results of rice research and extension in Colombia

While other factors such as the increase of irrigated land have contributed to recent increases in rice production in Colombia, the adoption of high-yielding rice varieties was one of the important causes for change (Chandler 1979).

Up until the 1930s, rice in Colombia was a typical peasant crop. It was cultivated mainly in two well-defined ecological areas: annually inundated areas, especially in river deltas on the north coast and other areas subject to flooding; and forest hillsides where *colonos*, in a process of slash and burn agriculture, pushed the agricultural frontier further away from the urban centres.

Commercial rice farming, using techniques such as water control by irrigation works and mechanized land preparation, was first introduced in the more developed departments in the interior, in the 1920s in the Huila Department, especially in the Campoalegre area, and later on, during the 1940s, in the Tolima Department (for details of the history of rice in Huila and Tolima see Leurquin 1967). Threshing machines were introduced during the 1920s, and fertilizers at the end of the 1940s and during the 1950s. At the end of the 1950s more than half of the rice farmers in Campoalegre were using mineral fertilizers, and of the 140 farmers, 75 owned tractors and almost as many owned combine harvesters (ibid.). In the Tolima Department irrigated mechanized rice production has increased with the construction of the Coello and Saldaña irrigation districts. In Coello, about 7000 ha of irrigated land was being cultivated with rice in the mid-1950s. During the earlier 1960s, half of the membership of Fedearroz came from Huila and Tolima Departments, including many small tenant farmers. Fedearroz was by then actively encouraging the use of the new technology. Government credits could be obtained by rice farmers who were cultivating between five and 60 ha on the condition that selected seed provided by Fedearroz was used, and that the crop was supervised by technical staff of Fedearroz. In addition, herbicides and other improved cultivation practices should be employed. Thus, before the introduction of improved technology based on high-yielding varieties, Colombia's rice industry had already modernized considerably.

With respect to rice growing in Colombia in the last 30 years two periods can be distinguished. The first is a period of steady growth between 1950 and 1968, and the second, a period of drastic change, from 1968 onwards. Between 1950 and 1968, the rice area increased from 133 000 to 277 000 ha and the yield per ha increased from 2.1 to 2.8 t per ha. Total rice production in Colombia increased from 291 000 t in 1950 to 786 000 t in 1968 (Scobie and Posada 1977), and the old dream of exporting rice took shape again.

> "The rice growers have, several times, declared themselves satisfied with the agricultural credits offered to them, but when the interior demand for rice is met, they start to look for export opportunities. In 1968 they intervened successfully at the agricultural exporters meeting, but

> refused to have rice included in the ALALC (free trade) list to maintain former privileges, which were denounced by the Minister of Agriculture: each rice export dollar would cost the national economy 25 pesos in comparison with a dollar price of 17,75 on the free market. The only way out of this situation would be yield improvement, [.....]. It would have to happen by searching for higher-yielding new varieties (Translated from Gilhodes 1974, p. 151).

With the introduction of new varieties from Asia (IR 8, IR 22) yields increased even more than in the past. By 1975, the average yield for Colombia had increased to 4.43 t per ha and yields for irrigated rice were as high as 5.4 t per ha. By then, 98% of the irrigated rice land in Colombia was sown with the new varieties. The total area sown with rice increased to 369 000 ha and the total production exceeded 1 630 000 t in 1975. These changes had taken place in only seven years.

However after 1975, there was a decrease in rice production for economic reasons. The top harvest of 1975 could not be sold on the domestic market. Although expectations were high for the export of rice, and 166 000 t were exported in 1975 (*El Tiempo*, 27 March 1976) Fedearroz announced to its members the following year that a decrease of 20% in the area under cultivation was necessary to avoid overproduction. International buyers could not be found, and the Colombian government was still unwilling to raise the support prices for rice which were at or below the world market price. Although a 20% decrease in the area under cultivation was not obtained, the 1976 harvest was 9% below the previous year and as a result Colombia had to import rice for the first time in 14 years (Chandler 1979).

On the whole, the non-mechanized sector has been declining since the mid-1960s (see Chapter 4) both in absolute terms and in relation to total production. These rice growers are generally small-scale farmers who, without modern means of production, and often without government-sponsored credits, produce rice both for home consumption and for the urban markets. Before 1966, the area cultivated by these farmers accounted for two-third of the total rice growing area, while ten years later only a quarter of the total area was cultivated by these farmers. Although the introduction of the high-yielding varieties is certainly partly responsible for the reduction in the number

of these small-scale producers, the decline was observable sometime before the release of IR 8, the first of the new varieties (see Table 2).

Regional changes have occurred in the pattern of rice cultivation in Colombia. Irrigated rice has increased in Tolima Department, and together with Meta Department accounts for more than 50% of the present national production. In addition, Cesar Department has become an important rice growing area. In terms of national production, the proportion grown on the north coast has decreased considerably. However, in rice producing departments such as Cordoba, dryland and swamp rice, which is grown entirely by small-scale producers, has remained at about the same level in absolute terms, after a peak period in production in the 1960s.

Prices have also been affected by the technological changes. Both average farm prices and production costs dropped by almost 30% between 1965-1969 and 1970-1974. However, other competing foodcrops continued to increase in price thus making rice relatively cheaper for the urban consumer in Colombia. Scobie and Posada (1977, p. 99) have concluded that rice prices were much lower than they would have been in the absence of the high-yielding varieties and hence: "Colombian consumers were the benificiaries of the research program. Both absolutely and relatively, the greatest net benefits went to the lowest income consumers. Fifty percent of Colombian households received 14 percent of the income, but captured 62 percent of the net benefits from the introduction of high-yielding varieties". Yet those who lost incomes as the result of the introduction of the new varieties were the rice producers themselves, especially the small-scale traditional rice producers.

Scobie and Posada also found that rice production was being concentrated on fewer and bigger farms. Their data reveal that by the end of the 1950s, farms larger than 100 ha represented 15% of the farms on which rice was the main crop, yet 53% of the total area of rice in Colombia was produced on these farms. In 1966, 32% of the farms were over 50 ha and produced 72% of the total rice output, 42% coming from farms over 200 ha (ibid.).

The distribution of rice output from the irrigated sector was much more skewed than in the non-irrigated sector: in 1970, the lower 50%

of the non-irrigated rice farms (meaning the smaller farms) produced 25% of the total non-irrigated rice but only 9% of irrigated rice was produced on the lower 50% of irrigated farms.

Table 2 Area, production and yield of upland and irrigated rice in Colombia and proportion of irrigated rice of total area (1966-1976)

	Area (1000 ha)		Production (1000 t)		Yield (t/ha)			Proportion irrigated rice (%)
year	Upland rice	Irrigated rice	Upland rice	Irrigated rice	Upland rice	Irrigated rice	National average	
1966	235	114	339	341	1.44	3.00	1.94	32.6
1967	180	110	280	381	1.55	3.47	2.28	37.8
1968	150	127	251	535	1.67	4.22	2.84	45.8
1969	135	116	220	474	1.64	4.09	2.77	46.2
1970	121	112	198	554	1.64	4.94	3.22	48.0
1971	109	144	174	731	1.59	5.06	3.57	56.8
1972	103	177	161	883	1.56	5.17	3.81	62.3
1973	99	192	155	1021	1.56	5.32	4.04	66.0
1974	96	273	150	1420	1.57	5.20	4.26	74.0
1975	96	286	151	1471	1.60	5.10	4.25	74.9
1976	95	261	148	1333	1.50	5.10	4.16	73.2

Source: Fedearroz cited by Chandler (1979)

Rice production in Colombia is dominated by large, progressive irrigated producers (Scobie and Posada 1977). The biggest concentration of these farmers in Tolima and Huila Departments has been referred to by Meertens (1979) as "hacendados new style". The historical basis of this new bourgeoisie is to be found in the class of tenants who, during the 1950s, succeeded in buying up land from the old landed elite. Meertens (1979) has also concluded that due to the loss of labour opportunities in modern rice farming (reported to be reduced to only 15 mandays per ha), the poor class of landless labourers who, formerly engaged in clearing land and expanding the pasture areas of the haciendas have retreated to their villages.
It cannot be concluded that there was a general displacement of labour throughout the country: "indirect expansion of the demand for off-farm labour following the large increases in rice production due to the high-yielding varieties could well have offset the decline in on-farm labour usage" (Scobie and Posada 1977, p. 32).

2.6.5 Rice research strategies

It is generally agreed by representatives of the three institutions, ICA, Fedearroz and CIAT, that while each has its own role to play, concerted action by all three organizations is necessary in order to ensure that rice production continues to increase.

Research strategies of ICA and CIAT have been aimed mainly at larger rice farmers in those areas where rapid progress could be made. These strategies also aimed at "raising technical ceilings" as set out in Chapter 1. This was made explicit by the co-ordinator of the rice program, Jennings (1974, p. 1088):

> "Once a breeding team has accepted increased yield potential as the prime objective it is imperative that it set high goals. Gains in productivity of 100 per cent are reasonable for all good crops in the tropics. We must seek quantum jumps in productivity and not be content with a cumulative series of minor improvements. It has been argued that the peasant farmers cannot handle abrupt changes in varietal types and their husbandry related to greatly increased yielding ability. The fact is that peasant farmers have adopted and benefited from radically new wheat and rice technology. Furthermore, the rate of adoption is proportional to the magnitude of improvement offered by the new technology".

It is doubtful if the term peasants may be used here in the usual sense of poor farmers, as related to and dependent on urban centres through levelling mechanisms such as markets, credit policies and land tenancy arrangements. Colombian rice farmers who have adopted the new varieties cannot be called peasant farmers. They are modern entrepreneurs, who realizing the need to organize themselves, had already done so before the introduction of the new technology.

The essential feature of agrarian structure in Latin America is still the relationship between latifundio and minifundio (Furtado 1970, p. 50) and: "land ownership is less a basis for the economic organization of agricultural production than a means of extracting a surplus from an economy with an extremely low level of productivity".

The coexistence of large numbers of peasant families, working on estates of the latifundistas, partly growing subsistence crops, partly providing labour for cash crops and/or stock raising, with a small

number of land-owners controlling the relatively underutilized land, does not provide a strong incentive for "raising achievement distributions" even when improved technology is available. According to Furtado (1970, p. 33), this type of organization:

> "makes it possible to invest in agriculture regardless of its low profitability in terms of the cash return. The families working on a subsistence plot on the large estate can be employed, in turn for a supplementary wage, to open up new lands, to build access roads, to plant permanent crops or to carry out other capital improvements. By these means the large estates are constantly incorporating new lands although, by and large, they utilise only a fraction of the lands appropriated earlier".

This, indeed, seems to be the case in many pioneer areas of Colombia, which coincide with the area under CIAT's mandate: the tropical lowlands such as the *Llanos Orientales*, parts of the Amazon and the northern lowlands. It will be shown in the following chapters that many small rice farmers are producing rice under such conditions. Over longer periods, and on the basis of the South American continent as a whole, agricultural expansion has depended more on the incorporation of new lands than on improved yields (Furtado 1970). This has been the case with most cereals, including rice. The increase in rice production between 1950 and 1974 was entirely due to the incorporation of new lands. During this period, the total rice area increased by a factor of 2.41 and the total rice production increased by the same factor, or even slightly less (Scobie and Posada 1977).

A further issue to be considered is the fact that by the very emphasis on breeding and on the development of new varieties, the research and extension network must draw on the success of future research and extension activities. In the situation in which rice seeds are no longer produced by the farmer himself, and in which every one or two years new varieties have to be developed and adopted, the farmers will become increasingly dependent on the future success of research and extension services. This "breeding for resistance" has been referred to by Wade (1974) as: "a treadmill from which there is no exit". The life expectancy of wheat varieties in the north-west of the United States is about 5 years, and Wade asks if "the plant breeders and seed suppliers in the less developed countries are

capable of handling this kind of problems?". His answer would be in the negative.

In the case of rice in Colombia the need to produce new varieties is even more urgent. Every two years, a new blast resistant variety has to be developed and tested, and sufficient quantities of seed have to be produced and distributed to the farmers. This process requires considerable planning. For example the CICA 6 variety, released in 1975 was the result of a crossing which started in 1969, and which was selected, isolated and purified until the 9th generations before it was considered suitable for distribution to farmers.

It would be unjust to reproof the researcher that he has done his job too quickly. Once genetic management of crops has left the peasant farmer, there are constraints other than biological factors which have to be considered. Improved technology will thus find its limits, not in quantum jumps to increased crop yields by 100%, but in the atunement and coordination of research, extension and other services.

Rice research strategies have been aimed at one category of rice producers. It is necessary to know how other farmers than those organized in Fedearroz produce rice, and to know the social context of their production systems. It is also important to investigate those peasant rice farmers who have adopted improved rice technology, and to analyse their problems.

3 *THE NORTH COAST AND THE COSTEÑOS*

3.1 GEOGRAPHICAL BACKGROUND

3.1.1 Location and landscape

The Atlantic coast of Colombia is known as the *Costa Norte* or *Costa Atlantica*. Culturally speaking it is a well-defined region, referred to locally as *La Costa* and the people who live in the region as *Costeños*.

Geographically, it is not difficult to define. The Colombian geographer Ernesto Guhl (1967) has described the region as follows:

> "The Caribbean plains are limited by the High-Andean (zone) and by the Caribbean Sea in the north and the south respectively; in the east it is bordered by the Sierra Nevada de Santa Marta and the Eastern Cordillera and in the west by the last spurs of the Cordillera Occidental - the Sierranía de las Palomas - which make up the transition zone towards the humid Pacific coastal plains. Its major extension SW-NE is about 320 kilometers and NW-SE, taking exception for the Guajira Peninsula, it runs for about 240 kilometers. Apart from the Sierra Nevada de Santa Marta the region is predominatedly a slightly rolling geomorphological structure which sometimes takes the form of low hills, and whose average heights do not surpass the 300 meter limit above sea level" (Translated from Guhl 1967, p. 108).

The north coast is located between 8° and 11° N latitude and 73° and 77° W longitude.

The coastal plain rises to about 200-300 m above sea level and is incised by rivers, especially the Sinú, San Jorge and Magdalena, which together with the countless swamps dominate the landscape. The alluvial river basins are separated by rolling hills, the *sabanas* on which vegetation, land use and human settlement is quite different.

3.1.2 Climate

Mean annual temperature on the north coast is 28°C, with regional variations of 36°C at Riohacha and 23°C at Pozos Colorados. There are two distinct seasons: the dry season (*verano*) with little or no rain from November until the end of April, and the wet season (*invierno*) from May until October. Sometimes there is a short dry period of several weeks in July and/or August (*veranillo*). The rainfall follows a strip pattern parallel to the coast, the nearer to the coast the lower the rainfall. Mean annual rainfall varies from about 1000 mm in Barranquilla to more than 2000 mm in El Cenizo further inland, and the mean annual rainfall for the major part of the north coast is 1300 mm.

During the dry season the north coast is under the influence of northeasterly trade winds (*alisios*) and wind velocities are higher than average. This air, moving across the Caribbean Sea from higher latitudes, brings very little rainfall to the lower parts of the Sinú Valley. As the air moves inland, it brings rain to the higher slopes of the cordillera. The most of the Sinú Valley receives about 1100-1500 mm of rain annually, which falls almost entirely between April and December (Leroy Gordon 1957).

Relative humidity is about 80-90%, but drops slightly further inland to about 76% in Montería. Rivas Rios (1973) also noted the strong relationship between the rainfall pattern on La Costa Norte and "semi-transhumance" pattern of grazing. During the dry season cattle are rounded up and driven to the swamps in the lower parts of the river systems in search of water and pasture, especially the Magdalena, Cesar and San Jorge rivers (ibid.).

Water is one of the major factors determining economic activities on the north coast. After the first rains in April and May, the creeks and swamps begin to fill up slowly until about June-July when a considerable proportion of the river delta lands are flooded. The degree of flooding varies from year to year, but it always causes local damage and changes to the courses of meandering rivers. In November the flood waters begin to recede.

3.1.3 Soils

In the Cesar Valley the soils are well-drained, of intermediate texture, low phosphorous levels and a moderate to regular acid content. In the vicinity of Morrosquillo in the lower Sinú Valley the soils are generally acid, but alkaline soils also occur. These soils are generally fertile clays, rich in potassium and nitrogen. The Sincelejo soil association, at the Sabanas de Bolivar, shows a clayish texture, with a pH varying from neutral to slightly acid, high exchange capacities, lower nitrogen content and a low permeability. In the area around Arache, Cereté, and Montería, soils are poorly drained clays and with pHs varying from alkaline to moderately acid.

Parsons (1952, p. 76) described the Sinú Delta as follows:

> "..... the principal structural depression within the zone of parallel, north-northeast trending Tertially hills that lies between the Magdalena trough and the Gulf of Uraba in northwestern Colombia. It has a tropical climate, sufficiently humid to support a luxuriant, semideciduous high forest in most undisturbed situations despite a marked dry season during the first months of the year. ..... The fertile, irregularly shaped flood plain of the Sinú extends inland from the coast for 100 miles to the point where the river emerges from a forested gorge cut in sandstone and shale. The plain is bounded on the east by the low maturely dissected Sabanas hills, which have much longer settlement history, and on the west toward Antioquia and the Gulf of Uraba by a series of higher, roughly concordant anticlinical ridges that near the mouth of the river are aligned in echelon parallel to the coast line. ..... The hazards of flood in the Sinú are greatly reduced by Cienaga Betancí and by the complicated grouping of old river channels and swamps associated with the bifurcation of the river between Cereté and Lorica, which serve as natural catchment or overflow basins during high water."

3.2 AGRICULTURAL DEVELOPMENT

3.2.1 Colonial period

The early Spanish chroniclers noted the dense population in the Rio Sinú Valley. The richness of the soils, together with the abundance of aquatic and other animals would certainly have been attractive to migratory tribes in pre-colonial times. The Gulf of Uraba and the Sinú Valley would no doubt also have been very attractive to migratory tribes from the north who were the first people to settle on the South American continent. This is especially so as the area is close to the Isthmus of Panama, through which all migrating tribes had to pass. This may possibly explain why the Sinú area developed into a focal point of trade between groups from Middle America and those who settled in the valleys of interior Colombia.

The north coast of Colombia was only of regional importance for a very short period of time during the history of Spanish America. This was during the crucial period between the arrival of Columbus in the Caribbean and the discovery of Mexico and Peru. The city of Cartagena was founded during this period and ever since has overshadowed the hinterland. No better testimony for this lack of interest in the hinterland could be given than the fact that between the middle of the 16th and the middle of the 19th century, the open man-made *sabanas* and valleys between Cartagena and the Cordillera of Antioquia became slowly overgrown with a dense rainforest. This was in sharp contrast with what the Spanish found when they arrived: well-organized cities, "with plazas at their centre and arranged in streets" situated in a "treeless savanna plain stretching beyond the horizon and of more than fifteen leagues circuit" (Pedro Simon, cited in Le Roy Gordon 1957, p. 36). The indigenous tribes Zenu, Finzenu, Zenufana practised slash and burn agriculture, and in some areas a form of irrigation was used. It has been estimated that about 80 000 people "and probably many times more" may have lived in the Ayapel region where remains of vast drainage systems were discovered (Parsons and Bowen 1966).

> "The farmers who supplied Finzenu and Ayapel would, rather than crop the cleared land continuously, move farther out where easier tillage and better yields were provided by recently cleared forest soil. Cities of persistent occupa-

> tion, associated with monumental cemeteries, would be as the Spanish depicted them, in spacious savannas. At the outer margins of the savannas, marking the more recent clearing for provision crops, lay small villages" (Leroy Gordon 1957, p. 39).

These people were easy and attractive targets for the looting Spaniards and diseases brought from Europe, probably because they were the first Indians on Tierra Firme to be discovered, because they were excellent gold miners, and also because they lived in concentrated urban settlements. By the time that the myth of gold in Sinú was proved not to be true and discoveries of gold in Mexico and Cuzco had been made known, the indigenous inhabitants of the Sinú had already been decimated and afterwards were easily integrated into European and later Afro-European society. All that remained from this early period was the political and administrative centre of Cartagena on the Atlantic Coast, and a thinly populated coastal plain.

The interpretation of the agricultural history of the area poses a problem which can be traced back to this early colonial period. Its early foundation gave Cartagena a position of importance which extended beyond the Vice-Royalty of New Granada of which present day Colombia was a part. Cartagena managed to maintain this position of prominence during the entire colonial period. The city came to be one of the three main centres in Spanish America for the import of slaves.

The north coast of Colombia was exceptional in the fact that, although Cartagena was located in this region, the economic activities of the region were controlled by other mining, trading and administrative centres in New Granada. While the short gold boom in Buritaca in the Cauca Valley and the gold discovered in northern Antioquia during the second half of the 16th century and the first few years of the 17th century brought prosperity to Cartagena, apparently this boom did not spark off additional agricultural activities of importance in the surrounding coastal area. Colmenares (1982) has pointed out that the regional variation in economic development of New Granada was much greater than has generally been assumed. However, one factor dominated all other economic activities during colonial times: New Granada was essentially a gold

economy. Yet, only the gold rush to Caceres and Zaragoza had any geographical relationship to the north coast (Hennessy 1978). Food for the miners (first Indians organized in *encomiendas*, and later also slaves from Africa) was either produced directly in the vicinity of the mines (Vasques de Espinosa 1969), or brought from *estancias*[4] from places further away such as Santa Fe, Tunja, Velez, Villa de Leiva (Colmenares 1982). The gold boom which occurred during the 18th century was centred on the Pacific Coast, and was administered from Popayan and other towns in the Cauca District. Again, while Cartagena profited from the slave market, this gold boom had little effect on the surrounding coastal area apart from a few settlements of slaves who had fled from the city and from the transport caravans. Thus the coastal area was only indirectly tied to New Granada's gold economy.

During the first century of the colony several *encomiendas* were also established on the north coast. By 1610, 35 had already been established between the Sinú and Magdalena rivers. Many of these were located on the Gulf of Morrosquillo (Fals Borda 1976), concentrated mainly in Tolu, San Bernardo and Lorica.

Land grants (*mercedes*) were made during the late 16th and early 17th century, and there is some evidence of cattle ranches being established. The extensive cattle ranches (*haciendas*) which were developed later, were established on these *mercedes* and *estancias* of the 16th century. Fals Borda (1976), in an attempt to illustrate the development of an early "señorial economy", stated that these *haciendas* would be converted "rapidly in important cattle estates, after an initial exclusive crop production". However, no evidence to support this assumption is offered.

Such an economy, perhaps on a scale much smaller than Fals Borda (1976) envisaged, may have developed in a later period than at the beginning of the 17th century. Further, it is difficult to accept that during the second half of the 16th century there were "wealthy coastal plantations", as put forward by Hennessy (1978). It is more probable that there were a few *haciendas* on the north coast owned by the Spaniards and worked by labour provided from the surrounding area and also by slaves. There were also Indian villages and a scattered population of both poorer and richer European settlers. Throughout the entire colonial period there were settlements of

escaped slaves throughout the region, even though the negro slaves had been given their freedom (Fals Borda, 1977; Leroy Gordon 1957).

It is almost impossible to estimate the number of inhabitants during the early colonial period. Sauer (1956, p. 62) noted that after the conquest:

> ".....the once heavily populous lands of eastern Panama and North Western Colombia, much of the lowland country of Mexico, both on the Pacific and Gulf side, became emptied in a very few years, was retaken by jungle and forest, and in considerable part remains such to the present".

Colmenares (1976) has estimated the indigenous population of "some regions of the Coast" in 1503 to be about 250 000, but in the years between 1558 and 1564 this number was reduced to 9900 tribute payers. If it is assumed that the ratio of the number of tribute payers to the total population is 1 to 3 (ibid.), then the indigenous population of the coastal area during this period would have been reduced to about 30 000. Most of these people lived in the triangle between the cities of Cartagena, Tolu and Mompox, as was the case in about 1670, a century later (ibid.).

By about the middle of the 19th century the total population on the coast had increased again to about 260 000 people (Kalmanowitz 1982). This is only a small proportion of the total population of Colombia, then estimated to be about two million. According to McGreevey (1975), about ten percent of the coastal population lived in urban centres. It is also thought that there were several important movements in population during the 17th and 18th centuries from Cartagena to the Sinú Valley, which was practically empty during the early colonial period. Parsons (1952) noted that in 1610 only 40 male tribute payers were mentioned in an economic account, but:

> ".....before the end of the seventeenth century, free *mestizo* and *mulatto* elements of the Sinú area had become numerically dominant over the Indians."

Parsons (1952, p. 74) has quoted a description of these free *mestizo* and *mulatto* elements given by a contemporary observer as:

> ".....descendants of army and navy deserters, stowaways, escaped slaves, murderers, and other criminals fleeing punishment or imprisonment who are scattered through the forest and swamps in small *rancherias*."

This picture is not totally different to those depicted by Torre de Miranda and Father Palacios de la Vega who visited the same region over a century later in about 1780. The woman harvesting rice on the Caño Varra (see 2.4) when asked by Father Palacios in 1787 for whom she was preparing food, replied:

> ".....that there were many, nine men and seventeen women, children of one or the other sex they had twenty three. They lived nearby on the edge of the Cauca river in three *ranchos* (huts)" (Reichel-Dolmatoff 1955, p. 42).

In these three houses lived a total of 49 persons in rather complicated kin relationships. The first hut contained four men from Ayapel, with their six women, and their off-spring, the second hut three *rianos* (people from the Sinú) with their seven women and their children, and in the third one lived the remainder. This group of people apparently fled from the mentioned places, lived in a retired place in the jungle. Three of them were accused of murder. They subsisted completely on a selfsufficient agriculture: the rice and a plaintain crop was all they had. For fishing they disposed of four canoes. Palacios was told that about 250 men fitting this description could be found in the neighbourhood "*viviendo como ellos*" (living like them). These were poor farmers living more or less independently on small plots of land. These "infelicious people" as he referred to them, lived at a subsistence level of:

> ".....slashed and burned parcels (*rozerías*), the biggest containing one *almud* and a half of maize, the same for rice, and a small lot of cassava" (ibid. p. 72).

Even now in the 20th century, it is not uncommon to hear Colombians talking about colonists as people who have good reasons to escape the law.

In 1772, the number of adult inhabitants of Tolu Province, comprising the areas around Lorica, Corozal, Sincelejo and Tolu, was 26 237. This is the first indication of an increase in population in the lower Sinú Valley and the Sabanas de Bolivar (Parsons 1952).

Agriculture during colonial times consisted of the cultivation of subsistence crops such as maize and cassava, but through the tribute system some produce found its way into the Cartagena market. Other crops were also grown. As already mentioned, rice was being cultivated by the end of the 16th century and by the beginning of

the 17th century in the area around Caceres, and in the northern parts of Antioquia. In the detailed accounts of Vasques de Espinosa (1969) other crops are mentioned as being grown during this period, such as: sweet potatoes, yams, beans, arracachas and ahuyamas. From the reports of the Ulloa brothers (1964) it is known that early in the 18th century commodities such as: live hogs, rice, maize, cotton, tobacco, plaintains, cassava and sugar were transported from the farmers on the Magdalena and Sinú rivers to the market of Cartagena, and sometimes exported to Caribbean islands as far away as Cuba and Santo Domingo, however, this did not seem to have been a regular trade.

During the second half of the 18th century, food for the mining centre of Zaragozza which was still in existence at that time, was produced in the area between the Mojana and Magdalena rivers. A priest in Ojo Largo, near the town of Majagual is reported to have told Palacios de la Vega (cited by Reichel-Dolmatoff 1955) in 1778 that for his "maintenance" he had a herd of more than 1000 head of cattle and also some swine, that his brother was occupied with preparing the meat and marketing it in Zaragozza. This seems to be, however, one of the few examples of a large farm. Other observers of this period, although describing the use of the land in minute detail (e.g. Miranda de la Torre) never mentioned such large-scale cattle enterprises.

As in all tropical frontier areas, and this is also the case in frontier areas in Colombia today, the pig was an important element in the economy. Pigs can walk long distances to markets, and can be fed on maize, often the first crop to be grown on the cleared forest Swine are also mentioned by Palacios de la Vega (in Reichel-Dolmatoff 1955) and Miranda de la Torre (in Sanchez Juliao 1970). Fals Borda (1977) noted that swine were often held on special rights, "*derecho de patio*", which are still in use in the north coast today.

It is probable that there was little commercial exchange of agricultural products between cities. The possible exception to this would have been the supply of meat to mining centres. In spite of Parsons' (1952) assertion that:
".....the Tolu towns throughout the colonial period functioned as the breadbasket of Cartagena, and occasionally Porto Bello.....", other data suggest that farmers on the north coast were not able to

do this. Colmenares (1982) has shown that until the beginning of the 18th century, cereals were supplied to Cartagena and other centres from central New Granada until the English intruded into this market with flour from their Caribbean colonies, which was shipped together with the slaves. This became an important political issue during the 18th century, because New Granada sought to protect its own wheat production. However, transport of wheat within the country was so expensive that monopolies granted to two Cartagena merchants could not withstand the cheaper imports from abroad. This remained the situation until the introduction of steam navigation on the Magdalena River early in the 19th century. Here again it becomes clear that the coastal plain remained wedged between the international seaport of Cartagena, and the faraway political centre of Bogotá, whose first concern was the well-being of the economy of the interior of the Vice-Royalty of New Granada.

This is not the image of a slowly expanding *hacienda* economy (Fals Borda 1976) with germs of capitalism, but a backward, virtually empty region, devoid of communications, left neglected until foreign entrepreneurs penetrated into the forest during the 19th century to make quick profits from new products for foreign markets. However, not even these people put their stamp on the development of the north coast.

3.2.2 Nineteenth century

Tropical hardwoods and other forest products in the Sinú area attracted foreign entrepreneurs during the 19th century. French and North American companies established enclaves in the Middle and Upper Sinú areas until resources were exhausted or transport costs became prohibitive. Later, at the turn of the century, they were joined by other companies, looking for oil. However, their activities were mainly confined to the east of the coastal area, and had less impact because of the nature of their operations and their relatively short stay in the area. During this period the flurry of industrial development around Barranquilla was in marked contrast to the relative economic calm of the north coast.

"The man who brought Guinea pasture to these provinces, merits a statue as high as the Statue of Liberty in New York", was the opinion

expressed by a 19th century Colombian landowner (Villegas 1978, p. 172). Guinea pasture (*Panicum maximum*), and the pasture called *admirable* or pará (*Panicum barbinode*) have the capacity to contain the weedy regrowth which appears after clearing and one-year cropping of the forest areas. The introduction of these new pastures and the introduction of barbed wire, made a more rational cattle industry possible (see 4.2). However, the most important stimulus for cattle production was the opening up of outside markets. The first move to rationalize the industry was to do away with the antiquated tenancy arrangements such as "open ranching" which was, and still is in isolated places, based on transhumance movements of men and cattle, especially in the lower San Jorge region (Fals Borda 1976 and Parsons 1952). Changes in land tenancy were made throughout the Sinú Valley and as a result attempts were made to establish a permanent large-scale meat-packing house at Coveñas on Cispata Bay.

Where there was a more established peasant population, new arrangements between landowners and labourers were made. The landowners allowed this new class of *colonos* to clear small areas of forest on their estates and to plant subsistence crops such as maize and rice for two consecutive years. After that the *colono* was obligated to sow his parcel of land with pasture: with para if the land was low-lying and susceptible to flooding, and with *puntero* (*Andropogon rufus*) on the better drained uplands. These arrangements are called *arriendo por pasto* (renting for pasture), *tierra por pastos* (land for pasture) or *monte por yerba* (forest for pasture).

Another group of colonists, referred to as *colonos espontaneos*, did not wait until they were offered a parcel of land to clear, but went in search of land for themselves. This happened, and still happens in the frontier area of the north coast. During the first half of this century, much of the forest areas in southern Córdoba and Bolivar fell under the axes of these small entrepreneurs. It should be added, however, that many of these colonists had to leave their homes as more and more land was sown with pasture. During the 1940s and 1950s, "four out of five *potreros* (pasture lands) in the Sinú area were sown with improved pasture" (Parsons 1952, p. 80). Mostly these independent *colonos* sold their *mejoras* (improvements to the land) to richer people, a local shopkeeper, a cattle farmer, or an intermediary, and went deeper into the forest.

From the end of the 19th century, forest clearance by the *colonos* followed a pattern of ever increasing concentric circles around the cities in the north coast. *Colonos* from the Sinú area are now spearheading into the northern parts of the Chocó. According to Parsons (1967, p. 72), there will be soon:

> "..... a second wave of settlement, following behind the montoneros who clear the forest with axe and machete, ... men with capital who are familiar with the land laws and who thus become the permanent benefactors of the sweat of those who have gone before them....."

Nevertheless, for the majority of the poor rural inhabitants of the north coast these changes still remained within the boundaries of a difficult but acceptable existence. Land could usually be found, if not in the immediate neighbourhood of the village, then there was always the possibility of clearing virgin land and making a lucky bargain by selling the *mejoras* to a rich buyer. In addition, relationships with landlords were still face to face and some protection in hard times could be expected. This situation changed with the rapid development of commercial agriculture in the north coast and in the Sinú Valley after about 1950. "*Cuando llegó el algodon, se acabó el mundo*" (When the cotton arrived here, that meant the end of the world), said one farmer from Cereté.

3.3 AGRICULTURAL DEVELOPMENTS AFTER 1950

3.3.1 Cotton

The most important phenomenon which occurred after the middle of this century was the emergence of a new class of farmers in the coastal area. Annual cotton crops were introduced during the late 1940s and became a new way of making money. The north coast, and especially the Sinú Valley proved to be free of most cotton plagues and the crops grown on fertile soils in the alluvial valley produced record national yields. Within three years, "the Sinú Valley was invaded by cotton planters" (Leurquin 1966, p. 161). Some came from other parts of Colombia, while others were farmers from the area. "The new area was supplied with the most modern types of equipment; one of the three cotton harvesters to be in use in South America, was in the Sinú" (ibid., p. 159).

Between 1947 and 1950, the area under cotton increased from 20 ha to 15 000 ha. However, in 1950 extensive flooding wiped out most of the crop, and cotton farmers from Cartagena sent plague-infested cotton to the gin in Cereté. Some farmer-entrepreneurs moved with their machinery to Cesar Department on the border with Venezuela, where there was also a similar short cotton boom. Cotton continued to be grown on small and middle-sized farms in the Sinú area. The majority of farmers grew the crop on the same terms as they had grown staple foods:

> "They entered into agreement with cattle farmers anxious to clear pasture invaded by brush. Each grower got from one-half to five hectares to till, with the obligation of returning the parcel planted with grass, usually guinea grass, after two or three years. These *roceros*, as they were called, first gathered together with friends for food and drink, and then cut the shrubs and trees, piled the branches and burned them to charcoal" (ibid. p. 153).

The cotton boom has been described by Parsons (1952, p. 82) as follows:

> "The pitch of the cotton fever can perhaps best be gauged in the lobbies of Montería's hotels, where equipment salesmen discuss delivery quota with suitcase farmers from Medellín who have come to bargain with the land owners for short-term leases. Cotton is for capitalists in the Sinú."

Although cotton has lost some of its earlier attraction, *Costeño* farmers still continue to grow it to the present day. Prices on world markets and export opportunities were the factors which stimulated cotton production in Colombia. By 1960 Colombia had changed from a cotton importer to a cotton exporter.

During the 1950s, dynamic agricultural entrepreneurs from the area started buying up available land in the middle and lower Sinú Valley and during the 1970s people from Huila and Tolima were also purchasing land in the Sinú. However, it was more usual for the cotton growers to hire land. This had not been done before in Colombia. For payment of rent in cash, land owners were prepared to hire out their *fincas* or parts of them, for the cultivation of cotton or other commercial crops.

It is obvious that this new type of agriculture would have an effect on labour relations. Although land preparation and sowing of cotton was mechanized, weeding and picking of the crop had to be done manually and soon became a new source of employment for the landless. It was feared in the early 1950s that a shortage of labour could become one of the limiting factors on cotton production in the Sinú area.

Cotton picking for wages brought many out of their villages as is shown in the case of La Doctrina (see Chapter 6). It also introduced many rural families into the money-economy, as it introduced labour for wages on a scale previously unknown. Women also began to work for wages.

3.3.2 Rice

The second crop which was to change the economy of the region was irrigated rice. As will be explained in more detail in Chapter 4, rice became another means for rural capitalist development on the north coast. During the 1950s, efforts were made to grow mechanized and irrigated rice in the vicinity of Cereté, but these efforts apparently failed. Even in the 1960s, Leurquin (1967) reported that mechanized rice farming west of the Magdalena River had proved to be impossible. It was not until the end of the 1960s that large-scale rice farming was established on the north coast.

During the first half of this century rice from the north coast contributed considerably to the total national production. During the 1950s more than 50% of rice consumed in Colombia came from the north coast. Only east of the Magdalena River did rice cultivation become modernized relatively early. In this area more than 45 000 ha of grasslands were taken over for mechanized rice cultivation. By 1975, irrigated and mechanized rice production had extended to much of the north coast. Of the 140 000 ha under rice, more than 90 000 ha was irrigated. In most areas the high-yielding dwarf varieties were sown. In many places irrigation works had to be constructed, but mechanized rice under dry conditions is also cultivated. Mechanized rice is now grown in: Cesar Department; in the Mojana area; the area around Ariguaní; the region between Cartagena and Barranquilla known as La Soledad; and in government constructed irrigation districts.

The initiative for these irrigation districts came mainly from the Land Reform Institute, INCORA, and it was intended that the land in these districts after initial expropriation from owners, be distributed among labourers and other landless or small farmers in the area. In practice, this irrigated land is farmed by a broad spectre of small to relatively big rice farmers, some holdings being larger than 100 ha. Mechanized irrigated rice is grown in irrigation districts: in Sevilla (Magdalena); around Montería and La Doctrina; and in Atlantico and Bolivar (Maria la Baja).

3.3.3 Cattle

Meanwhile cattle raising has remained the most important activity in the rural economy and about ten million hectares is devoted to cattle. Between 40-50% of all cattle in Colombia is to be found on the north coast (Rivas 1973). With the increase in the human population the number of cattle also increased. Jones (1929) estimated that during the 1920s Cesar Department, together with San Jorge and lower Cauca districts contained approximately two million head of cattle. The corresponding figure for the early 1970s was almost six million, one third from Cordoba Department (Rivas 1973).

Cattle are raised mainly for the production of meat, although smaller farms mostly in the vicinity of cities such as Cartagena and Barranquilla specialize in milk production. The sizes of cattle ranches vary considerably but a typical medium to large-sized hacienda would be 2000-3000 ha. Cattle raising in Colombia especially on the north coast is extensive rather than intensive.

> "The cattle raising of the north coast is of the traditional type, with low productivity parameters, although it has good potentials as it is richly endowed with two basic assets: land and cattle." (Translated from Rivas 1973, p. 134).

Recently, there have been few innovations in cattle raising on the north coast. The most important changes occurred earlier with the introduction of improved pastures, and better adapted cattle breeds. At present, Zebu which are ideally suited to the high temperatures and the dry season are raised in this area.

The relationship between this traditional land use and the emergence of commercial crops of cotton and rice lies in the fact that former pasture lands are now being used for a type of agriculture which is beneficial to others than the land owner.

3.3.4 Changes in land use

Mertins (1978) who has studied land use in northern Colombia, has divided recent changes into two distinct types. Firstly, the creation by the Colombian government of big, closed land reform projects such as the Atlantico 3, Bolivar 1, Cordoba 1 and 2, and Magdalena 1 projects. In these project areas irrigation and sometimes also drainage systems have been constructed for the crops in some type of rotation. The second type of land use changes consists of changes on large and medium-sized farms, which had formerly been used for extensive cattle raising, and are now devoted to cotton and irrigated rice farming. These changes were brought about by private initiatives, although strongly backed by government measures such as loans, export subventions, guaranteed prices. These farms are mainly concentrated in areas well-suited for these crops, with good transport facilities, and include the area around Montería and Cereté, San Pedro, Algarrobo, Caracolito, Valledupar, Codazzi and Becerril. These changes have brought about a sharp contrast between the progressive and the dynamic areas on the one hand and stagnant and passive areas on the other. This is also reflected in the disproportionally high increase in population in areas where changes in land use have occurred in contrast to the stagnant or even decreasing population in the regions where agricultural land use has remained virtually unchanged.

Northern Colombia became the cotton belt for the country in the 1970s, when it produced more than 70% of the national output. The larger cotton enterprises are also located in this area. The average size of a cotton farm in Colombia is 15 ha and on the north coast it is 56 ha. The average irrigated mechanized rice farm is also larger than the national average. While in 1970 the national average area under irrigated rice was about 10 ha (Scobie and Posada 1977), on the north coast this area was between 53 and 110 ha (Mertins 1978). More than 50% of these enterprises are carried out on the property of absentee owners. High income professional people, often lawyers,

doctors and judges are prepared to invest capital in a highly profitable crop. Very often an agronomist is employed for one season only to assist in the management of these crops. In agricultural centres throughout these areas there are considerable numbers of trained agronomists who look after cotton and/or rice crops for a number of absentee landowners.

3.3.5 Social structure in rural areas

A completely new class structure has evolved, which is partly based on the new type of agriculture and associated activities. Until now, the rural social structure consisted of three groups:

- owners of vast tracks of land (*haciendas*) used extensively for stock raising;
- a small group of land owners with medium-sized properties, very often also raising stock;
- a large number of small subsistence farmers; which could be those who had sufficient land to feed themselves and produce a small surplus to sell to urban markets; and those who had too little or no land and who lived as tenants (*colonos*) or labourers on or nearby the *haciendas*.

The 1950s and 1960s gave rise to a new class of agricultural entrepreneurs, with a different relation to the land and interested in the first place in making quick profits from new agricultural commodities. They rented land from the old elite, and hired subsistence farmers as labourers. A new class of wage-earning agricultural labourers began to emerge, but not as yet a free labour market.

The role of the state has become increasingly important in these regions, especially with regard to the needs of the new group of farmers. Technical assistance and agricultural extension were the most urgently required, but as the government has not been very responsive farmers have had to rely on their own organizations. The rice growers looked to Fedearroz for assistance. A new powerful organization, known as Fedealgodon was established by the cotton growers. New offices and local committees for both organizations have been set up in the Cordoba, Bolivar, Magdalena and Cesar Departments.

The growers also looked to the government for assistance with banking and marketing, but it is generally felt that only the state agency, Caja Agraria, has been able to meet the credit needs of the farmers.

3.3.6 Land reform

Since the beginning of this century land reform has been considered to be a high priority. In 1936, at the time when all over Colombia the traditional latifundio-minifundio complex began to show signs of weakening, the liberal president, Lopez Pumarejo, was the first to tackle the land problem. During this period the poor agricultural classes such as the *peones* (rural labourers), *arrendatarios* (tenants), *colonos*, and small subsistence farmers on land owned by their *patron*, began to loose rights that traditionally they had come to expect, such as loans, protection, security in land and work for cash payment. A more commercially-oriented agriculture began to develop. Apart from political motives, the stated objective of the land reforms of Lopez Pumarejo was to force big land owners to make better use, or at least some use, of the vast tracks of land which they sometimes held for speculation and thus were not being used. These reforms never materialized, partly because of the organized opposition of political adversaries, partly because of the long period of time allowed for the introduction of these reforms, and partly because of the political troubles which were just beginning and which ended in the *Violencia* in the 1950s.

At the beginning of the 1960s, a better program of land reforms was formulated and put into action with the support of a broad spectre of internal and external pressure groups. More important, various political and economic leaders looked upon these reforms as an essential element of an overall plan for the economic development of Colombia. One of the main features of this development plan was the promotion of Colombian industry, protected from foreign competition by a common tariff policy with other Andean countries. However, the fact that these reforms would open up local markets was equally important. Colombia should have a middle class of farmers, who earned a sufficient income from their crops to purchase other commodities and thus participate fully in the national economy, yet were only able to employ family labour. At the same time it was expected that a more healthy social structure would develop.

Thus the plan implemented by president Lleras Restrepo which was based on CEPAL[5] planning was designed to remove impediments to balanced economic development. These impediments included: dependency

on imports; lack of motivation for industrialization; lack of participation of the rural population in the national economy; lack of internal markets for locally-produced goods; ineffective bureaucracy; and political unrest among the landless. While this plan seemed to get well under way during the presidency of Lleras Restrepo, it dwindled away during the 1970s, when the land reform program was inactivated by later presidents. In the meantime, in spite of efforts to improve at least the more extreme cases of uneven land distribution, the situation in 1970 appeared to be worse than ten years before. The unevenness in land distribution had become more accentuated, and the number of the landless rural families had more than doubled.

The same phenomenon could also be observed on the north coast, where the need for land reform was perhaps most urgent. Of those included in the population census of 1960 in Cordoba Department, 60% of rural households had access to less than five hectares, which corresponds to 2.2% of the total land area, while 70% of the land was held or owned by only 7% of the population. Ten years later, the proportion of total land area held by those with holdings of five hectares or less had dropped to 1.6% of the total, and the proportion of land owned by the top 7% had increased to 74% (DANE 1974).

Several of the land reform programs of INCORA, the executive state agency for the land reform included the north coast, notably Cordoba Department but little progress was made in the redistribution of land. In fact, the mandate of INCORA to expropriate and redistribute the land was virtually confined to the irrigation districts (Findley 1972).

3.4 FAMILY AND HOUSEHOLD

The basic unit of social structure of the coastal area is the household. In this context household refers to the group of people who reside in the same dwelling, eat from the same cooking pot and operate as an independent economic unit. On first impression the *Costeño* household appears to be extremely loose and flexible in structure.

3.4.1 Household types

It is useful first to describe the household types as perceived from a synchronical perspective. In Colombia, both civil marriages and marriages in the Roman Catholic church are legal. However, in some regions including La Costa, the Pacific coastal lowlands, and the Magdalena, San Jorge and Cauca valleys, conjugal relationships without legal sanctions are the rule rather than the exception. This is not to say that marriage is not a cultural ideal - as far as it is associated with a "white" life style, consensual unions between man and woman (*union libre*) are often and especially in the rural areas the only way people can start and maintain a family and organize multigeneration households.

Three types of household can be distinguished. The first is the household in which the parental relationship is sanctioned by marriage. The number of these households, however, is small, and is almost negligible in the more backward rural areas. In the second type, the relationship is a consensual union, and their children are illegitimate in terms of Colombian civil law. Thus on this basis, it is estimated that more than 50% of the children in the coastal departments are "illegitimate" (DANE 1968). The third type of household could be referred to as "broken household", but the term mother-centred household is more appropriate. These households consist of a mother and her children often of different fathers. The woman is the constant head of this type of household but in the other two categories the woman is also often the head of the household. These mother-centred households may temporarily include a man, who may also belong to households in any of the three types. All households consist not only of the parent-child nucleus, but may also include: grandparents; cousins; married in-laws and their children; and very often adopted children who are not necessarily related to the family.

Legally sanctioned marriage is called a *matrimonio*, and the partners referred to as being *esposo* (husband) and *esposa* (wife). A consensual union is referred to as being "compromised" (*comprometido*) and the partners are commonly referred to as *compañero* (man) and *compañera* (woman). Relationships in the third category may sometimes be of the *compañero*-type, sometimes be referred to as headed by a *querido* (man) and a *querida* (woman). The household is referred

to as *mi casa* (my house), and also as *mi familia* (my family). In spite of the predominant role of the adult female in the household, her male partner is invariably called *el jefe* (the boss).

3.4.2 Stages of household development

A better understanding of the structure and function of *costeño* households can be obtained when the household is perceived as a domestic unit which goes through various stages which correspond roughly to various stages in the life of a woman. It should be noted that the following description of these stages is given to illustrate the pattern rather than to cover the range of variations in *costeño* households.

When a girl reaches the age of 15 or 16 years (sometimes earlier) a more or less stable relationship will be established with a man, which often results in the birth of the first child. Normally the girl stays with her family, and other children may follow from the same or from other fathers. When a serious candidate presents himself the couple may establish a separate household, but sometimes the young father, when accepted by the girl's parents, may at first move in with her family. It may also happen that the man will convince the girl to run away from her family and establish a new household, perhaps after staying with his family for a period of time. These *escapadas* may be followed by efforts by the girl's family to bring her back home.

An example of the attitude of fathers to their daughters is given in the case of a 55-year old tenant-farmer, and the father of ten children. His oldest son lives in another department but he has not heard from him for the last few years. He has another son working in Venezuela as migrant labourer, who occasionally sends him money. His eight daughters live in his house and help him financially by making and selling *enea* mats. His unsolicited comment on his daughters was: "*yo no estoy de acuerdo con tanta mujer, porque lo unico que hacen es llenar la casa con hijos*" (I don't like having so many women around because the only thing they do is filling the house with children).

The second stage begins when a woman sets up her own household (*hacer su casa*), but it is not unusual for her to return to the household of her parents after a quarrel with her husband which may

temporarily sever their relationship. In this situation, when the woman is the owner of the house and the site on which it is built she may remain in the house and be regarded as the head of an independent household. Several relationships with other men (of shorter or longer duration) may follow, sometimes a legal marriage is entered into, but this is not very often the case. If a legal marriage is entered into and a more or less stable relationship with her partner (*marido*) is established the structure of the household becomes similar to that of the first type of household. On the other hand, when the partners do not enter into a marriage contract, the structure of the household becomes similar to that of the second type.

The last stage in the life of a woman which influences the structure of the household is when her own daughters have children and remain with her for a period of some years.

The third type of household is the logical consequence of the (temporary) loose relationships which exist between the sexes. In almost every village on the north coast of Colombia there are a large number of households with a female head, often sole mothers (*madres solas*) living with their children and other relatives. In a sample of 75 women in one village, 49 were unmarried, of which 14 could be considered to be a sole woman (*mujer sola*) living without a spouse. It should also be added that the proportion of married women living without a spouse was about as high as the proportion of those who were unmarried. This would indicate that stability of the relationship between males and females is not necessarily dependent on formal and legal bonds. The important difference is status; when a woman is legally married and thus acquires the title *de* (which means belonging to Mr. .....) she has more prestige than a woman who has not acquired this prerogative.

According to Reichel-Dolmatoff and Reichel-Dolmatoff (1961), sole mothers (*madres solas*) very often become concubines of married men or men who maintain stable relationships with *compañeras* for economic reasons and also because such relationships are sanctioned in a generally machismo dominated culture.

> "This system of concubinage and short-term monogamous or polygamous unions, already established in the past century, continues today in the same form and is practiced not only by the placeros (those who live around the plaza)

> but by almost all inhabitants of the village. Even among the upper-class placeros who are married as Catholics, there is not a single man who has not at least one illegitimate child from such an extramarital union. Of course, there are some men with rather monogamous inclinations but they are openly ridiculed by all" (ibid. p. 146).

Examples of the various types of households in their successive stages are easy to find. The author met a man who claimed to be the father of nine children, each with a different mother. He acknowledged each child as his and felt responsible for their well-being. He brought gifts to them and their mothers, mainly chicken or small amounts of money. It is not unusual to find all the children of one mother, often conceived with a number of companions, living together in the one household. Men who have money to dispose of (including rich city dwellers) often have concubines who may live in a separate house provided for by them. The house and the site (*solar*) may eventually become the property of the concubine.

Stopnicka Rosenthal (1960) who has studied low income households and family life in Cartagena and who has claimed that the situation throughout the coastal area is essentially the same has concluded that:

> "The tremendous importance that women in this area attach to possessing a house, even if it is only a shabby hovel, becomes understandable when one realizes that it is often an indispensable condition for not dissolving the domestic group when the man abandons it." (ibid. p. 15).

In addition the data provided by Havens et al. (1965), that more than 54% of urban housing lots in Cereté were legally in the names of women, confirms this general picture. Patterns of residence for those who are forming a new independent household are sometimes neolocal, sometimes matrilocal.

Another striking feature of the composition of *Costeño* households is the frequent occurrence of adopted children (*hijos de crianza*). Some households include an adopted child who is not related directly to the household by consanguineal ties. However, more frequently maternal grandmothers, aunts, etc. adopt a young child who is related to them. These children may be adopted out of a felt responsibility for them and/or their parent(s), but more often children are adopted

for economic reasons. A maternal grandmother may find it convenient to raise a small boy who may help care for her when she is no longer able to provide for herself. The adoption of a child may follow as the result of a short visit to the household, or a short period of caring for the child. It can safely be assumed that at least one quarter of the poorer rural households include adopted children.

From the description of the characteristic structures of *Costeño* households and families it could be concluded that chaos reigns but this is far from the situation. Family structure on the Costa, best described by the term matrifocal, has its own dynamics and should be understood in its own right. In the beginning, the relationship between the parents is rather flexible, and especially during the first stages of the development of the household many options remain open, particularly for the man. As the family grows and more stable relationships develop between the parents, or between the several mother-daughter axes, the situation as it exists is generally accepted as a fact of life, and is taken for granted. It would appear that the young adult men come off best and that women sometimes have to fight for mere subsistence.

The following conversation, overheard in a local shop in a coastal village, may illustrate the feelings and the relationships between men and women in the area. The dialogue was between a relatively rich and successful farmer (at least considered to be rich in his village, where he grows cotton on a nine hectare plot; he is also the owner of one of the more fashionable houses in the village) and a young, beautiful slender girl of about 13 or 14 years old. The farmer was about 50 years old, and married with an oldest son 25 years old. Although it was not possible to note every word, the following report gives the essence of the conversation:

Farmer: *Que hubo negra, cuando es que vamos a vivir juntos?* (How are things my dear, when are we going to live together?)

Girl: *Con Usted no voy a ninguna parte* (I am not going anywhere with you.)

Farmer: *Por que?* (Why not?)

Girl: *Porque todos los hombres son iguales, no quieren sino engañar a uno.* (Because all men are the same, the only thing they want is to deceive you.)

Farmer: *Yo te compro una casita y sus chocoros.* (I'll buy you a little house and everything to go in it.)

Girl: *No, aunque me compre un granero.* (No, even if you bought me a big shop, the answer is still no!)

Farmer: *Bueno, yo le compro todo lo que tu quieras.* (Well, I'll buy anything you want.)

Girl: *Si? Pa'que despues venga su mujer y me eche del pueblo?* (Oh yes and then later on your wife will have me thrown out of the village?)

(The girl left the shop laughing, and he followed her to the door.)

Although the conversation was carried on half jokingly, half seriously, it illustrates the attitude of *Costeño* men and women to one another. Although the girl did not accept the proposal, she seemed not to be surprised at all. The direct and matter of fact approach of the man suggests the apparent ease with which relationships between men and women are sometimes established.

3.5 SOCIAL STRATIFICATION

Above the household level the social order on the Costa is typified by a multiclass structure. Groups of individuals have "defined chances for supplies of goods, external living conditions, and personal life experiences" and these chances "are determined by the amount and kind of power, or lack of such, to dispose of goods and skills for the sake of income" (Weber 1958, p. 181).

Class order alone, however, does not define social position. Status and ethnic identity are also parameters which influence social behaviour. However, *Costeño* social structure is predominantly determined by the organization of the economy.

Class structure is intimately related to land: those who possess or control more land are higher in the hierarchy. As already stated, the distribution of the land on the Costa is extremely uneven. A minority controls a major part of the land, as is shown in Table 3, which gives land distribution in Córdoba Department on the north coast.

Table 3 Distribution of land in Cordoba Department, 1970

Farm size*	Number of farms	Area (ha)
Total	50 611	1 824 447
Less than 5 ha	31 037	29 829
5-10 ha	4 227	27 972
10-50 ha	8 822	206 779
50-100 ha	2 945	207 099
100-500 ha	3 111	609 285
500-1000 ha	397	261 830
more than 1000 ha	222	482 153

Source: DANE 1974, p. 112

* For convenience, the term farm has been used. This concept does not always correspond with all forms of land tenancy in northern Colombia. There is no adequate English translation for the more general Spanish concept of explotación.

The rural hierarchy of the Costa is pyramidal and comprises of three classes; upper, middle and lower class. The upper class is mainly composed of Whites and *Mestizos*, and also a small group of people of Lebanese descent. This class can further be divided into two: the old landed elite; and a new group of agricultural entrepreneurs. The ethnic composition of the middle class is similar to that of the upper class, but the middle class is not as well off economically as the upper class.

The lower class is made up by *Mestizos*, the name given to the mixed descent of Negroes, Indians and Whites. In some areas the Negro element is slightly more dominant, while in others the Indian element is more dominant. Three distinct groups may be defined in the lower class. Firstly, an upper group who are mainly small farmers in terms of the amount of land they have access to, and who produce enough to participate in the commodity markets of agricultural crops and also sometimes cattle. Occasionally these farmers hire labour from other groups in the lower class. Secondly, there are those who have very little land or no land at all. These people live at a subsistence level growing crops and earning a little additional money from seasonal work. The third group which is virtually landless is becoming increasingly dependent on wages for their labour.

3.5.1 Upper class

Although the rural upper class owns most of the land, its members maintain strong ties with urban life. Most families of the old landed elite live in the larger cities (Cartagena, Montería, etc.) and employ staff to administer their rural estates (*fincas*). Some live on their estates for a part of the year, and travel between their houses in the cities and their *fincas*. Some of the very wealthy maintain houses in Bogotá and abroad. The landed elite has traditionally raised cattle on vast estates and only recently engaged in the cultivation of commercial crops. Members of this elite group, while still maintaining their large estates are also lawyers, politicians, medical doctors etc.

Some of the new group of agricultural entrepreneurs come from the old landed elite, and are thus only involved in new economic activities within the existing social framework. On the other hand, others have risen from the middle or lower classes. Although the pattern of residence of this group is the same as for the old landed elite, members of this group tend to spend more time on their estates because they tend to be more preoccupied with their economic enterprises.

Costeño deputees, senators, ministers and high officials of public corporations are mostly recruited from these upper class families. Top positions in the regional administration are also filled or controlled by these families. Members of this class meet socially in select clubs. They travel frequently and regard themselves as the logical and natural custodians of their estates.

3.5.2 Middle class

The ethnic composition and economic activities of the middle class are similar to those of the upper class, but this class does not have the same power, and the money to maintain their conspicuous and elegant life style. Middle-size land-owners, *ganaderos* (cattle owners), belong to this class, and just as the upper class, they may also pursue urban occupations such as agronomist, bureaucrat, merchant and shopkeeper. In addition, managers (*mayor domos*) and other better paid administrators of the larger *fincas* may be regarded as belonging to the rural middle class. This group may also own land or have a shareholding in estates of others.

Middle class farmers and cattle ranchers tend to live on their properties. Some may aspire to a house in the city, especially those who have risen from a lower economic status. Many rural middle class families live in the villages throughout the north coast.

3.5.3 Lower class

The rural lower class, estimated to be about 70% of the total population on the north coast, and about 90% of the total rural population, varies from being poor to extremely poor. They tend to be darker skinned people or of Indian descent, and refer to those from the middle and upper classes as *los platudos* (those who have money) or *los blancos* (the whites).

A number of those with no land of their own live as servants (*peones*), cowboys (*vaqueros*), milkers (*ordeñadores*), or labourers (*jornaleros*) on the big estates. They sometimes have rights to grow subsistence crops, and often the right to keep domestic animals such as pigs, the right of *patio abierto*. Their wives and children are seldomly employed on the estates. Occasionally they work as servants in the houses. Wages are paid in cash, but often supplemented with daily meals and goods.

Poorer rural families seldom live in isolation on their plots. Those who do not reside on these estates live together in villages.

The lower class rarely participates in the political process, except on election days when bus loads of voters are brought to polling centres.

The upper lower class are engaged in farming and small-scale cattle raising, but members of this group are also engaged in semi-skilled occupations such as construction workers, mechanical workers, drivers, local shopkeepers, musicians, primary school teachers. The middle lower class mostly lives at a subsistence level and are mainly occupied growing crops and fishing. Seasonal work on the large estates such as fencing and weeding, provides an important source of income.

The lowest group in lower rural class is entirely dependent on wages received for their labour. They work mainly as labourers on the agricultural plots of fellow villagers, or on large *haciendas*, and also on construction works, as bus driver assistants, waiters, water carriers, etc.. Many work as migrant labourers in Cesar Department and also in Venezuela.

Wages vary considerably, higher wages are paid on the bigger *fincas* and cotton and rice enterprises than by small land-owners who often pay their labourers with meals. Much labour in the villages remains outside the money economy (see Chapters 5 and 6).

Labour organizations do not exist in rural areas, although ad hoc peasant movements supported by the national FANAL syndicate developed in the 1960s and 1970s (Gilhodes 1974).

3.5.4 Class divisions

It is obvious that in the Costa there is a sharp division between a mass of poor illiterate peasants on the one hand, and a few wealthy families who control the political and economic system on the other. This difference is also reflected in perceived ethnic identities and status positions. Ethnicity and status follow the same division as the economic classes, but sometimes cut across these, or specify particular groups within the classes.

Most *Costeños* identify with the concept of *Costeño*, it is generally agreed that this implies a certain way of life, which is different from other Colombians, who are referred to by the *Costeño* as *Cachaco*, a word with negative connotations. Within the Costa, the word *corroncho* indicates that somebody is from a backward place, but as it also carries with it the connotation of being poor and dirty, it is mostly associated with poor peasant farmers. The use of this word is not restricted to people, it is also used to refer to speech, an object, and a way of dressing.

Members of the upper class, *mestizos* included, are designated as *los blancos*, meaning the rich and powerful. However, an individual from the upper class will be addressed respectfully as *doctor*, as is anyone whose appearance indicates that he is rich and accustomed to urban life style.

The people of Lebanese descent form a distinct ethnic group on the Costa. There are many families who have lived here for generations, while other are comparatively recent immigrants. The largest concentrations of Lebanese in Colombia are found in the cities on the north coast. Many of these people have also bought land, and have combined the growing of agricultural products with processing and marketing of these products, as for example rice. Lebanese are regarded as having a different life style to others in Colombia,

and have a reputation of being hard working and thrifty people. Particularly in commerce and politics, it is said that they form a united front to help and protect one another. The wealthiest families belong to the *Costeño* upper class, and others may be regarded as prosperous middle class. Rich or poor, urban or rural, Lebanese are referred to as *Turcos* (Turks) by the *Costeños*, a term which evokes a mixture of aversion and slight admiration.

3.5.5 Factors mitigating class resentment

Resentment between the classes of *Costeños*, which certainly does exist but not to the extent which may be expected, is mitigated by several factors. One of these is the fact that many lower class families live and work on the estates of middle and upper class, and have direct face-to-face relationships with the estate owners. Some labourers have special priviliges, such as the rights to cultivate small plots with subsistence crops, to keep domestic animals which scavenge around the house, or have a certain amount of milk every morning. Other labourers do not have such rights. "They don't even give you the milk", was a complaint made by one labourer about a *hacendado* in the area near San Marcos.

These contracts between labourers and land-owners may be lifelong. The *administrador* who is in charge of the day-to-day operations on the *finca*, may have a strong attachment to the owner, or to the family. The relationships between the estate owner and the labourers thus tend to be of a personal nature, and sometimes the owner establishes a godfather-type relationship with his labourers. He may give proof of his benevolence by for example giving monetary help in cases of illness, providing shoes for a son who is attending school or arranging urban employment. The attitude of the labourers to the estate owner tends to be one of servitude and devotion and the owner's attitude towards his labourers is one of benevolent paternalism.

Feelings of hostility and resentment between the classes are also often mitigated by the fact that sexual liaisons between men of upper and middle classes and young girls of the lower class occur quite frequently (see also 3.4). Such liaisons are overlooked tolerantly by the upper class and, when adequately compensated in a material way, are accepted by the lower class.

A third institution which helps to soften the differences between the classes is the annual bullfight festival (*corraleja*), which is held in most villages on the Costa under the patronage of local *hacendados*. For a period of three to five days a special program of bullfights is held in a wooden corral especially erected for the occasion. The bulls (*toros de lidia*) are donated by local *hacendados* and afterwards the people discuss the qualities of the animals of Doctor X or Don Y, praising the fine bulls and the excellence of their training. The zenith of the festival arrives when adolescent boys swarm into the arena in the hundreds, harassing the bulls, and running serious risks of being trampled by one of the five or six enraged bulls who charge at random into the crowd of youths. *Costeños* are enthralled by the *corralejas*, even though some people may be severely wounded or killed. They do not condemn the practice of the *hacendados* who have donated the bulls and who, seated in the balcony above the entrance to the arena, throw handfuls of one-peso bank notes into the arena at the moment the bulls enter.

Nevertheless, from time to time serious conflicts occur between the landed classes and the peasants. Illegal squatting on estates has occurred in parts of the Costa, just as was the case in other areas of the country. The owners of large estates are not always the target, as for example in Valencia, a typical frontier village in southern Córdoba. A big landowner gave 120 ha of his land to his *mayordomo* who had always been a loyal servant to him. After the death of this *mayordomo*, the land was distributed among his five sons, who lived in Bogotá. A group of landless labourers invaded this land, but not the 500 ha of the *hacendado* family.

In the early 1970s squatters settled on many estates in the Costa; in the Sinú Valley, southern Córdoba, Sucre, and Bolivar. They were driven off as a result of decisive and repressive action by the police and the army in Cereté, Chuchurubí and elsewhere.

Squatting does not only occur on the lands of the upper and middle classes. It may also happen that the small plots of other peasants fall victim to squatters, as for example in 1970, a group of squatters near Cereté succeeded in invading a big estate. With the help of INCORA they obtained land titles to a number of 5 ha plots. In 1975, they were invaded in turn by another group of landless, who

wanted to stake out two to three hectare parcels of the original invaders' land. Neighbouring cotton farms, 200-400 ha in total, remained untouched.

Asked to comment on inequality of land possessions, one *colono* from La Boca de la Metra explained:

> "..... one would like to have so much land as well, but as Our Lord Jesus Christ does not give this power to have what the other has. Well, there you are."

4 *RICE CULTIVATION ON THE NORTH COAST*

In this chapter rice growing as an adaptive process in the ecological and socio-cultural environment of the region is examined. Emphasis is given to the historical role of *criollo* rice cultivation and its role in the expansion of the cattle economy in the tropical lowlands of Latin America during the last century, particularly on the north coast of Colombia.

The four mayor systems of rice growing on the north coast are described in order to provide a background to the case studies of rice cultivation in Los Monos and La Doctrina presented in Chapters 5 and 6. Finally, the local social institutions which are related to rice growing on the north coast are discussed, especially those institutions which show how the economics of rice cultivation affect and help shape the social structure of the *Costeño* peasantry. It is shown how general patterns of social behaviour have emerged around rice cultivation, and that these patterns are of a regional character.

4.1 RICE GROWING AS AN ADAPTIVE PROCESS

During the four centuries in which rice has been grown by *Costeño* farmers much has been contributed to the local variability of the crop. More than 120 local rice varieties are found in the region between La Guajira and the Gulf of Uraba (see Appendix I). These rice varieties differ in characteristics such as plant height, yield, resistance to disease, taste, suitability to various soil types, resistance to flooding and labour requirements for cultivation. *Costeño* farmers have actively contributed to a continuous process of selection, diffusion, and local adaptations of rice varieties to climate, soils, disease etc. Only a few of these local varieties (also called land races) have been introduced by public or government institutions. *Costeño* peasant farmers have acted as plant breeders *avant la lettre* especially with rice which they have been able to adapt to their needs within their ecological and social environment.

4.2 OUTLINE OF THE HISTORY OF RICE CULTIVATION ON THE NORTH COAST

Geographers and historians have drawn attention to the importance of technological improvements in cattle raising during the 19th century for the agricultural development of the tropical lowlands of Latin America. Before that time, vast areas had been used for extensive cattle production in the open ranch system inherited from the Iberian peninsula. This system allowed:

> "..... the animals to stray freely through the peripheral belts and into Indian cultivations beyond. In Spanish practice this unrestricted grazing at certain times of the year was customary and necessary. In Spain the law required most arable land to be opened to grazing after the harvest was gathered. In New Spain the same rule was enacted; but in practice vast, half-wild, untended flocks and herds, on unfenced ranches, might invade cultivated land at any time. Indians constantly complained to the courts about the resulting damage to their crops. Both the *Juzgado general* and the *audiencias* made many orders forbidding trespass and awarding damages, but often the means of enforcement were lacking" (Parry 1966, p. 218).

In a study on the frontier society of Latin America, Hennesy (1978) showed how technological innovations, such as the introduction of barbed wire, gradually brought about the end of the open ranch system. Fencing of the pasture lands led to a more rational production of cattle and also stimulated the introduction of further innovations such as selective breeding of cattle and the improvement of pastures with the introduction of grasses such as Pará or *admirable* (*Panicum barbinode*), *puntero* (*Andropogon rufus*) and guinea grass (*Panicum maximum*). The latter proved to be of great importance for the opening up of forest areas. During the second half of the 19th century, clearing of woodland became economically attractive. After a few pioneer crops had been grown in an adjusted "shifting cultivation" system, new grasses were sown and the land was turned over to cattle production.

Leroy Gordon (1957) has shown that the gradual opening up of the north coast to agriculture started during the 19th century. Interestingly, he has also shown that this was not the first time that

this happened. The Spanish invaders found the coastal area to be relatively open, indicating that it had already been cleared by Indian tribes. During the 16th-18th centuries, large parts of the north coast slowly became reafforested as a consequence of the lack of interest of the Spanish in this area. According to Parsons (1952), it was not only the availability of improved pastures but also overseas markets that gave cattle raising in Bolivar (now the departments of Cordoba, Sucre and Bolivar in Colombia) its boom period.

In order to understand the role of subsistence crops in this colonization process, it is necessary to distinguish two areas on the north coast. Firstly, the lowlands which are subject to flooding and which have become the centre of wet rice cultivation. Farmers in these areas are a sedentary group and live on subsistence agriculture, seasonal employment on the cattle ranches, and fishing. Secondly, there is the hilly area adjacent to the deltas and swamps around the Sinú, Magdalena and San Jorge Rivers, known as the *Sabanas* of Sucre and Bolivar, which was settled during the colonial period. It also includes the northern flanks of the Andean mountains, where colonization is still going on at the present time.

A relatively new type of agriculturalist, the squatter (*colono*) settled in these areas either alone or with his family. The squatter selected an area of forest and slashed and burnt the vegetation. Rice was often chosen as a first crop, but maize was also grown. The situation in Southern Córdoba has been described by Leurquin (1967, p. 283) as follows:

> "Rice fields extend to the edge of the virgin forest. Small farmers clear one or two hectares of land and plant the virgin soil with a combination of rice and maize. The same system is applied on the large cattle farms, where small farmers are given about two hectares of land covered with brush for a period of two years, under condition of returning it to pasture at the end of the second year".

For the *colono* farmer, two factors are important. The first is the virgin forest, and the second is the secondary vegetation (often on titled land) which is used for cattle. Often the land is in poor condition for grazing because sown pastures have been taken over by brush vegetation. The problem of these grasses became clear to the author when a rice farmer in Chimá complained about the vigour of

the pasture varieties which are used at present. The pasture competes so forcefully with the native vegetation that it is no longer attractive for the land-owners to give out these parcels again for a second clearing, as had been done before. In Arache, in the same region as Chimá, one landless farmer commented: "From 1955 onwards the *Pangolas* (new pastures) began to come out and controlled the cattle land."

A *colono* from Boca de la Metra explained how he worked his land as follows:

> "Look, I got this land for the pasture. For this they give the land to you. For your crop, you know. They give this plot in brush. They don't even give you the food for getting out the brush, but you have to work for your own account.
>
> Well, then you clear the land, you clear the brush, you slash and burn it, so that nothing remains and you sow your rice. I got my rice crop this year. How do I explain it? I am now in my first year. I got this piece of land for two years, so this year I already got this crop, and I have this piece of brush, which I have cleared already. Next year I will repeat it, give it a clearing, and so I move ahead.
>
> Next year I will sow only one crop on the other plot and afterwards I sow the pasture on the whole plot.
>
> On the plot I am sowing this year, I will have maize next year. When the maize reaches your belt, well then I sow the pasture.
>
> They only give you the land, the barbed wire and nails, nothing else. The land I got for this and next year is two hectares, which is pretty hard to get nowadays. Here nobody is willing to hire out land. Only for the *blancos* themselves, they want to grow their own crops. What land they have, they have everything!
>
> After these two years on the pasture, I don't know what I am going to do. What I am going to do, you better tell me!
>
> When I am finished with this plot, my hope is that they will let me go ahead for another year. There is enough land in brush. I don't know how much land the owner has.

> But what they are saying here is that he has more than four hundred hectares. He has land but he doesn't have many cattle".

This system of rice production is mainly found in the southern frontier areas of Córdoba, Sucre and Bolivar. In central areas of Cordoba which were settled early this system is still in operation, as for example in Arache, Corozalito, and Sitio Viejo. However, in places in Campo Bello and Chimá the land has already been sown with pasture.

The *colono* quoted above, together with about 12 others had applied to the land-owner for land. According to Fals Borda (1976), a land-owner more often recruits a group of *colonos* through the services of a labour contractor. The conditions include selling their crops of maize or rice to the land owner "in such a form that they stayed indebted forever" (ibid. p. 39). This system of tying labour to the land-owner in terms of credit is used by Fals Borda to explain the gradual spread of *Costeño haciendas* and is referred to as "the Law of the Three Phases" (ibid. p. 41). In the first phase the marginal *colono* clears a plot and then moves on to other plots. In the second phase the *colono* sells this improved parcel (*mejoras*) for a low price to the land-owner or a middleman who may to some degree improve the land for cattle production. Finally, in the third phase the land is incorporated into a big *hacienda*, whose owner has bought the land from the middleman.

In the area of Turbo around the Gulf of Urabá, a wave of colonization is presently taking place. It began about 20 or 30 years ago and has now reached the northern parts of Chocó Department. Often for colonists from Córdoba and Sucre land was no longer available in their villages, and therefore they had to move further away. These colonists have been described by Parsons (1967, p. 69-70) as follows:

> "The overwhelming majority of the immigrants are *Sinuanos* accustomed to the tropical lowland climate and steeped in the traditions of stockraising. Montería and Cartagena, not Medellín, are their cultural hearths. They are swarthy *mestizos* or *mulattos* who wear broadrimmed *sabanero* hats, eat rice, and have a reputation of good workers."

Montería and Cartagena are, indeed, the "cultural hearths" of the *colonos* who work as independent *colonos* on land they assume to be *tierra baldía* (waste land, state domain) and for the *colonos* working

in a *arriendo por la hierba* arrangement, as already described. However, this is certainly not so for the future owner who will do the "stock keeping". These people are mainly from Medellín and other places in Antioquia. They are capitalists, who buy *mejoras* from the *colonos*, or buy land from the middlemen. In the Law of the Three Phases (Fals Borda 1976) those in the first phase are mainly Costeños, and perhaps also in the second phase, but the third phase consists mostly of Antioqueños.

Gilhodes (1974, p. 326) also gives an example of *colono* agriculture in northern Colombia, on the upper course of the San Jorge River, near Monte Libano:

> "this region knew a property of about 10 000 hectares, belonging to an ex-mayor of Montería, and president of the departmental direction of the Conservative Party. He maintained on his place some farmers who had to clear the land, had the right to produce a harvest of maize or rice (they gave the owner 2.5 quintals per hectare they cultivated) and returned the land sown with pasture."

The *llanos* frontier of eastern Colombia shows the same phenomenon. The colonization in Planas, Meta Department during the 1960s has been summarized as follows:

> "Land is put into production through the system of payment in kind, given to an Indian, so that he opens up a couple of hectares and cultivates it, with rice generally. For this he is offered some pieces of clothes, tools and seed, by way of 'advancement' through which he is declared indebted; at the time of harvest he has to pay the "*racional*" (that is the white or *mestizo* moneylender) and generally remains indebted." (Translated from Perez Ramirez 1971, p. 183).

This system of rice cultivation is not only found among colonists in the tropical lowlands of northern Colombia, but also throughout the tropical lowlands of Latin America. In Brazil, which is the sixth largest rice producer in the world, 86% of the total area under rice cultivation is upland rice (almost 5 million ha). One way in which rice is used as a pioneer crop in Brazil is described by Johnson (1979, p. 55) as follows:

> "Upland rice is grown during the rainy season on the newly-cleared land, most often without benefit of fertilizer. After two or three years, other crops such as maize or soybeans or pasture grasses are cultivated in place of rice. Planting of grasses is related to the development of new lands for extensive large scale cattle raising. Upland rice is grown as a cash crop, with most of the production shipped to markets elsewhere in the country."

Rice is also produced by small farmers in the State of Maranhao:

> "There plots of forested lands are rented by the owners to small farmers, under either a cash rental or share-cropping arrangement. The farmers clear the plot by hand, plant upland rice and other subsistence crops for about two years. Then they are obligated to plant pasture grass and return the land to the owner, who in turn proceeds to use it for cattle grazing. The farmers then move into new areas and repeat the process. Thus they remain at the leading edge of the agricultural frontier, leaving behind them grazing lands and an agricultural landscape dominated by cattle raising" (ibid.).

Elsewhere in Brazil, as in the state of Sao Paolo, the propertied class will ultimately make a profit from colonization by acquiring lands beyond the agricultural frontier in the hope of increased land prices in the future, by making arrangements with *colonos* to sow pasture, or simply by buying already improved land for cattle production (Lynn Smith 1947).

In the tropical lowlands of Mexico the same phenomenon has been observed. In the states of Quintana Roo and Chiapas, many small-scale colonists have moved into recently opened up forest areas. Hundreds of hectares have been handed out to these colonists for farming. It is quite common for these people to make agreements with landless farmers to sow pasture in return for the use of the land for one or two cropping seasons. As in Colombia or Brazil, the first crop after clearing and burning is rice and/or maize.

Some evidence of the same type of phenomenon in Venezuela and Panama is provided by Watters (1971, p. 315): "In Panama vast terrains formerly under forest were converted through slash and burn in pasture land", and in Venezuela:

> "where in the lowlands near La Grita, big landowners frequently employ migrant farmers to cut the forest and after these farmers have cultivated the land for one or two years plant pasture" (translated from ibid.).

It would seem that present and past colonization on the north coast in Colombia are part of a general pattern to be observed in many tropical lowland areas in Latin America. This pattern of colonization and the cultivation of rice is also to be found in other parts of Colombia, such as San Jose del Guaviara, and the area around Florencia in the southern Caqueta Department (Schuurmans 1979; and INCORA 1974).

Thus it may be concluded, that upland rice is an important factor in the conversion of forest land to pastures and other crops. This has been the case for centuries (Simón 1882-1892). However, the process became more widespread during the second half of the 19th century, when cattle production became more lucrative after the introduction of innovations such as barbed wire and improved pastures, and also with the opening up of foreign markets. Further, upland rice as an element of the colonization system is essentially a poor man's crop. It provides a meal for the poor *colono* in Colombia; the *conuquero* in Venezuela; the *campesino* in Mexico; and the *caboclo* or *roceiro* in Brazil. At the same time rice provides the means for the accumulation of capital by the *hacendado* in Colombia and elsewhere in tropical Latin America. In short, rice has become the crop of a class society in turmoil.

4.3 SHIFT FROM MANUAL TO MECHANIZED RICE CULTIVATION

Colombian rice statistics distinguish two main categories of rice production: irrigated rice (*arroz de riego*), and dryland rice (*arroz de secano*). However, data on mechanized dryland rice are often included in the category of irrigated rice. Swamp rice is often included in the category of dryland rice, probably because like upland rice it is produced manually. *Arroz de riego*, irrigated and mechanized dryland rice is replacing other types of rice production, certainly in terms of the total production and total area cultivated with rice but more rice farmers are still involved in the cultivation of dryland rice and swamp rice (*arroz de secano*). This is especially the case on the north coast.

The earliest reliable data on rice production in Colombia date from the 1930s when the northern departments were the main rice producing regions. The proportion of the annual rice crop produced in various regions of Colombia is given in Table 4.

More recent data on area under rice cultivation, average yields, and production is provided in Appendix II.

Table 4 Proportion of annual rice crop produced in various regions of Colombia (%)

Region	Category of rice production	Proportion of annual rice production (%)			
		1934	1949	1963	1975
Northern Colombia: Antioquia, Córdoba, Bolivar, Atlantico Departments	Mainly not irrigated (swamp rice and dryland rice)	52	28	17	32
Eastern Llanos: Caquetá, Meta Departments	Mainly dryland	5	6	14	17
Middle Magdalena Valley: Huila, Tolima, Cundinamarca, Caldas Departments	Irrigated	11	35	40	40
Cauca River Valley: Cauca, Valle Departments	Mainly irrigated	13	15	10	3
Other areas	----	19	16	19	8

Sources: Leurquin 1967, p. 261; Fedearroz

The decline of the number of small rice farmers on the north coast has been balanced by the considerable increase in rice production as a result of improved technology on the modern rice farms. Since the middle of the 1960s the proportion of national rice crop grown on the north coast has remained at about 30%.

Since the early 1960s, the production of irrigated rice has increased, as for example Cesar Department, which only started producing rice during the 1960s, by 1975 was producing about 15% of the national output. This was practically all irrigated rice, or mechanized upland rice, often produced on middle-sized and large-scale farming enterprises. Farmers producing 50-200 ha of rice are no exception. These farms are often run by a foreman (*capataz*),

sometimes with the assistance of a hired agronomist. Very often, these farms were started by entrepreneurs from other areas, especially from Huila and Tolima who moved in and hired land from *Costeño* land-owners because of a shortage of land, high land rents, or because of increasing salinization in the older irrigation districts of Coello and Saldaña. They also brought with them skilled labourers from places such as Tolima, Huila, Valle, who knew how to lay out a modern rice farm, to construct and repair irrigation works, to tend a rice crop, and to regulate the irrigation water. These often landless entrepreneurs were referred to as "tractor-gipsies" by a Colombian politician. The cultivation of irrigated rice increased in many areas of the north coast including Córdoba, Sucre, Bolivar, and Atlantico.

Other factors were also responsible for the rapid changes in rice cultivation on the north coast. After about 1966, there was a dramatic decline of the number of subsistence rice farmers in the country as a whole and also in the northern departments. Unfortunately no data are available for the north coast for the period before 1965, but it is generally agreed that production of non-irrigated rice reached a peak in 1966 (CIAT 1974). During that year, more than 110 000 ha of rice was planted in the northern departments. By 1971, the area cultivated with upland rice had been reduced to about 50 000 ha, and has remained at that level in subsequent years (see Appendix II).

There are many reasons which can be put forward for the decrease of dryland rice production (*arroz de secano*) in Colombia. It has been suggested that changes in credit policies of the Colombian government with regard to cattle production at the end of the 1950s may have had an effect on rice cultivation. As a consequence of increasing the area under cattle production, there was a wave of settlers on virgin land in various parts of the country, especially on the north coast (Leurquin 1967). However, at the same time other policies began to have an effect, in particular the Land Reform Laws of 1961. As a result of these laws, large land-owners became reluctant to have more *colonos* on their lands as these *colonos* began to claim rights to the land, in expectation of new share-cropping laws, which would give them rights of ownership to the land they had cleared and cultivated. These laws only came into force in 1968, but the effects

were devastating for the *colonos*, land-owners would no longer allow *colonos* on their lands under the terms of the old agreement. It has also been suggested that during the 1960s the limit of available and more or less easily accessible virgin forest had been reached. For whatever reasons, the decrease in dryland rice cultivation was already underway when the first improved, higher-yielding rice variety was introduced in 1968. This was a short-straw variety from Asia, IR 8.

Thus by the beginning of the 1970s, traditional rice cultivation was declining and less rice was being produced as a pioneer crop. New varieties and new methods of cultivation were being developed in association with the rise of a new type of agricultural entrepreneur. Scobie and Posada (1977) have concluded that one of the social consequences of the new rice varieties in Colombia was that:

> "Producers of rice would have received higher prices and would have had higher incomes in the absence of the new varieties. Small upland producers were the most severely affected, but numerically they are a minor group (about 6000 in 1970)."

It is highly probable that the number of "upland" rice farmers was not 6000 but 60 000, and also that this category of farmers was, and maybe still is, the biggest category. During 1976, extension officers and other agricultural technicians who could be regarded to be experts on rice growing were surveyed. For that year a lower limit of 22 000 "traditional" rice farmers was found (those cultivating manually dryland and/or swamp rice).

On the other hand according to Fedearroz' journal *Arroz*, the total area of "*arroz de secano*" cultivated in Colombia in 1975 was 95 000 ha. If it is assumed that an average "upland" rice producer has 1.5 ha, the total number of farmers must have been about 65 000. If a more conservative estimate of two ha per farmer is made, the number of farmers would still be about 47 500. In 1970, the year on which the conclusions reached by Scobie and Posada are based, the total area of "upland" rice was 120 000. Again, taking an average area of 2 ha per farmer, the conclusion must be that the number of "upland" producers is about tenfold of that assumed.

The question remains as to whether the average "upland" rice operation ever exceeds a few hectares. The survey showed that on

average manual dryland rice plots were 1.8 ha, and swamp rice plots 1.2 ha. Scobie and Posada stated that "upland" (manual) rice plots are sometimes larger than 60 ha. In the experience of the author, manually cultivated plots do not exceed four hectares. In cases where 60 ha of "upland" rice were reported on one farm, these must have been conglomerates of small rice plots, cultivated by tenants, *colonos*, or share-croppers. It can be concluded that the number of traditional rice farmers is higher than suggested by the statistics. The shift from manually produced rice to mechanized irrigated rice has affected many more farmer families than has been assumed previously.

4.4 TRADITIONAL DRYLAND RICE CULTIVATION

Traditionally, dryland rice (*arroz criollo*) has been grown on the north coast and is still grown on newly cleared land as a first crop, as well as in settled areas. The amount of rice produced in this way is rapidly declining.

4.4.1 Land preparation

Land preparation is done by clearing and burning the vegetation on a plot of land during the dry season. As already stated, this land may be virgin forest, however rice is also grown on a system of bush-fallow. For example, in the rice growing district in La Mojana west of the city of Magangey, rice is grown on land which has been allowed to become overgrown with secondary vegetation for a period of about six years. A similar fallow system is followed in areas east of the Cienaga Grande, near Cacaotal and Chimá. Fallow periods shorter than six years also occur.

The felling of trees is called *tumba*, *tala* or more generally *desmonte*. Before the very large trees can be felled it is necessary to cut down the lower vegetation (*picada*). When there are no big trees on the land only one *picada* is sufficient, although a second cutting (*repicada*) may sometimes be necessary. Clearing an area of forest is extremely heavy work and it may take up to a month to clear one hectare. The timing of the *tala* and *repicada* is important. The vegetation should be felled allowing sufficient time for it to dry out in the sun, so that it can be burnt before the onset of the wet season. Suitable wood is used as domestic fuel.

The tools used in land preparation include an axe (*hacha*) for cutting the larger trunks and branches, and various types of machetes. Burning (*quema*) may have to be repeated, when all trees have not been burnt sufficiently, or when the vegetation has been wet.

4.4.2 Sowing

Sowing which takes place at the beginning of the wet season, or later according to the growth duration of the variety, is done by making a small hole in the soil with the aid of a long, pointed stick, called *chuzo*, *palanca* or *espeque*. These holes are made at more or less regular distances apart, often between the ashes and half-burnt debris. A number of seeds are dropped in each hole which is then covered with soil by the planter with his toes. When asked about the number of seeds put into each hole, the answer is invariably: *quince, veinte poco más o menos* (about 15 or 20). However, when counted (as has been done on a number of occasions by the author) the actual number is 40-60 or even higher. The sowing distances are quite large, 60-80 cm or even greater. Emergence occurs after 7 to 10 days.

4.4.3 Crop pests and diseases

The rice plants are attacked by a number of pests and diseases and there is competition with weeds for nutrients, light, and space. Crop protection measures have to be taken against birds (*pajareo*) in most areas. Migratory birds from the north invade young rice plantations, and it is necessary to have someone to frighten the birds away during this period. Slings, stones, yelling at the birds and scarecrows are all used in efforts to prevent the birds taking away a part of the crop. Sometimes small watchtowers are erected for the "bird watcher" to oversee the rice field, and also to protect him from the sun.

Caterpillars (*Spodoptera frugiperda*) may wipe out a part of the rice crop within a few days, sometimes without any measure having been taken to prevent this, either because the farmer does not know what measure to take, or because extension services are not available. Other insect pests, such as *Oebalus poecilus* (bugs), occur sometimes unnoticed by farmers who may declare the harvest to have been a "bad year" (Diaz Diaz 1967).

Damage to the rice plants is also done by rats. Diaz Diaz (1967) reports of a dryland rice area near the border of Panama, that rice farmers try to control rat damage as well as all other rice pests with Paris green. "They apply this insecticide, because it is the only one they can get hold of in the shops, and they ignore insecticides for specific plagues." (ibid. p. 28).

Plant diseases in dryland rice cultivation are not reported to be a serious problem on the north coast, although the occurrence of rice blast, *Pyricularia oryzae*, locally known as *mancha de hierro* or *chamusco*, and *Cercospora oryzae*, locally known as *alquitran*, were occasionally observed. The economic consequences of these diseases are not important (ibid.).

4.4.4 Weeding

The number of times a rice crop will need to be weeded depends on the soil and on the vegetation cleared from the land before sowing. Weeding may have to be done once or twice, or even maybe three times. Usually it is done with a machete together with a *gancho*. This is a bent piece of wood about 30 cm long which is used to isolate a small quantity of weed. The *gancho* is held in the left hand while the weed it contains is cut with a machete held in the right hand. Where the weeds are low, only a machete is used.

Where the crop is planted on land which was virgin forest (*monte biche*) the previous year, one weeding is usually sufficient as the rice plants do not have to compete with many other plants. This is because much seed has been burnt and the well-spaced rice plants find enough nutrients in the ashes to grow rapidly.

No fertilizers of any kind are applied to *criollo* rice grown on the north coast. The crop is totally dependent on rainfall. Although the demand for water is not great the temporary dry period of two or three weeks in August (*veranillo*) may sometimes affect the crop adversely.

4.4.5 Harvesting

Harvesting generally follows a definite pattern, although exceptions have been observed. The crop is harvested by cutting the mature rice stalks individually. This is done with a small knife, which is held between thumb and the fingers of the right hand. With the left

hand, the harvester collects the stalks to form a bundle (*manotada* or *bajada*) of rice. As the stalks are of about the same size, 1.40 m or more, the work is done easily. However, sometimes there are complaints of sore hands from the sharp edges of the leaves. The flag leave is situated a considerable distance under the ear, so that the stalk can be cut about 20 cm under the ear and the *bajadas* can be formed easily. *Este arroz pela bien* (this rice cuts nicely), is the general opinion of farmers about traditional varieties. Two or three *bajadas* are tied together with a stalk to form a *puño*. This system of rice harvesting is used throughout the north coast and especially in the departments of Córdoba, Sucre, Bolivar, Cesár, Magdalena and northern Antioquia. In a survey of 17 villages on the north coast, it was found that this system of harvesting was practised in 15 of the villages. Occasionnally, when stalks are difficult to cut because of excessive weed growth, or lodging, they are cut with a machete.

4.4.6 Drying and threshing

Generally the moisture content is too high to store the rice immediately after harvesting. According to Grist (1965), the grains contain about 23% moisture at harvesting. The moisture content has to be decreased to about 13-14% before the rice can be stored. Generally, this is the level of moisture content considered to be acceptable by Colombian rice mills. If the moisture content is higher, farmers must accept a considerable reduction in price. Usually, *Costeño* rice farmers allow the rice to dry in the field, or near their houses. The rice *puños* are placed upside down in the sun, so that the grains are spread out on the surface and evaporation can take place easily, assisted by the wind.

Diaz Diaz (1967) noted that in Acandí, rice *puños* were placed to dry for 15-20 days alongside the trunks of trees remaining in the field after the burning. This seems to be an excessively long period, as under average weather conditions, rice can be dried in only one sunny day. However, for early maturing varieties his observation may well be correct.

Where the weather conditions are adverse for drying the *puños* in the field immediately after harvesting, the rice is first threshed. On the western lowlands of the Pacific Coast where there is rain throughout the year, methods of harvesting vary slightly from other

coastal areas. In this area, the harvesters who are often women work in pairs to cut the rice with a machete and to thresh it immediately afterwards. The rice is threshed in a big wooden box about 1.20 × 0.80 × 0.80 cm. The bottom is constructed with one side slighly higher than the other so that it can be pulled easily across the field by one person as a sleigh. After a handful of long stalks has been cut, the cutter hands the stalks to her partner who then knocks the grains loose against the inside of the box. The stalks are left in the field.

Other threshing practices on the north coast include the threshing of the *puños* on the patio of the farmer's house, or on a cement floor in someone else's house where the grains can be beaten loose from the stalks with sticks. Sometimes the rice is threshed on ground which has been covered with sacks, and the grains are collected in these sacks afterwards.

Where the quantity of rice is very small, threshing is done by spreading out the rice stalks sometimes still in *puños*, on the ground or on the floor of a canoe, and by trampling the grains loose with the foot. Sometimes small quantities are not threshed. A *puño* of rice is put into the mortar for dehusking the grains with a pestle, and the stalks are just pulled out after the process (*pilonada*).

4.5 SWAMPLAND RICE CULTIVATION

Swamp rice (*arroz forastero*) is produced on lowlands, on the edges of swamps, in swamps, and on river banks. There are many such areas on the north coast which, in fact, is an enormous delta, where rivers, creeks, swamps, and lakes form an intricate system of waterways. During the wet season the water level rises continuously until the onset of the dry season when it subsequently drops. Just as the transhumance movements by cattle from dry-land to wet-land was the optimum adaptation of beef production to this area, *forastero* rice production is the ideal adaptation for the small settled farmers who live in these areas. The cultivation of swamp rice is quite different from *criollo* rice at the beginning of the growing cycle, but after weeding the cultivation of both crops is similar.

4.5.1 Seed-bed

The first step in *forastero* rice cultivation is to select a site for the seed-bed (*semillero*). This is usually a site near the farmer's house so that it can be tended easily. The seed-beds are not flooded so that the seedlings can be kept under control. The length of time the seedlings remain in the seed-beds depends on the weather, that is the rise in water level on the land to be cultivated, and also the availability of land. Some landless farmers need time to find land on which to grow their crops.

4.5.2 Transplanting

Transplanting (*transplante*) is only done when the plot of land intended for cultivation has been flooded sufficiently. Land for *forastero* rice is called *tierra anegadiza* (floodable land). A few weeks after the onset of the wet season, when the water level has risen visibly (*cogió agua*), the plot is prepared for transplanting the seedlings.

In *forastero* land preparation, which is called *guachapiar* (splashing), weeds are cut with a machete. The seedlings are hauled from the seed-bed in big bundles, sometimes transported by canoe, or tied to a large pole which is carried on the shoulder. In the field, the leaves are pruned so that the plants are reduced sometimes to about half the size. The seedlings are then put into holes in the soil made under the shallow water with an *espeque* or *chuzo*, just as is done with *criollo* rice seed. Generally, the space between the seedlings is smaller than with *criollo* rice.

Sometimes the rice plants are transplanted a second time in order to space out the crop. For example, when the wet season takes a long time to set in, the seedlings may be temporarily transplanted into a bigger seed-bed until there has been sufficient rain to flood the rice field. This first transplanting is known locally as *poner a rendir* and also serves to give the rice plants a head start in competing with weeds.

4.5.3 Weeding

As with *criollo* rice, weeding is necessary when the field is considered to be "dirty" (*sucio*) and requires "cleaning" (*limpieza*).

When land preparation has been done thoroughly only one weeding is sufficient, but sometimes it may be necessary to weed the field two or three times.

4.6 MECHANIZED IRRIGATED RICE CULTIVATION

As already stated, mechanized irrigated rice cultivation is a relatively recent innovation on the north coast. In 1959, the Colombian government introduced a credit program for agriculture which encouraged entrepreneurs in Magdalena Department to invest in irrigation works. To a limited extent irrigated rice farming had been tried out in the irrigation districts in the banana belt near Sevilla and Aracataca. In 1962, west of the Magdalena River "irrigated rice growing has on the whole failed" (Leurquin 1967). However, ten years later mechanized irrigated rice was being cultivated extensively.

4.6.1 Introduction of new varieties

The most popular rice variety grown was Bluebonnet 50, which was considered to have an excellent taste, good cooking qualities, and which fetched a good price. Tapuripa, a variety introduced from Surinam was also grown during the 1960s, but was later discarded. Sometimes the farmers themselves took the initiative in introducing new rice varieties:

> "One farmer in Aracataca, worried about declining yields, visited American experiment stations in Stuttgart, Arkansas, and in Crowley, Louisiana, in order to study selected varieties there. He returned with 24 varieties of seed. After experimentation he continued to cultivate six of them, including Bluebonnet and Rexoro, both of which found a good market in Colombia and Venezuela." (Pulgar Vidal 1956 cited by Leurquin 1967, p. 249).

These varieties were later hit by the *Hoja Blanca* disease which spread throughout the Caribbean area. The Federation of Rice Growers had advised farmers to change to Fortuna and Canilla, known varieties in Colombia which were also grown on the north coast. Another serious disadvantage of these imported varieties was their susceptibility to lodging.

The initial successes with short-straw varieties in other parts of the country also diffused to the north coast. In 1976 nearly all mechanized irrigated and dryland rice grown were short-straw varieties. The first such variety to be grown on the north coast was, as elsewhere in Colombia, IR 8. In spite of its high-yielding capacity and its adaptability, its milling and cooking qualities are so poor that only very low prices are paid for this variety. Another short-straw variety, IR 22, which was one of the first varieties to be introduced, is still grown in the area. Varieties developed in the ICA-CIAT program for Colombia, as for example CICA 4, are now sown throughout the north coast. One disadvantage of CICA 4, and possibly other CICA varieties is their susceptibility to rice blast (*Pyricularia*). In recent years, other CICA varieties have replaced CICA 4. However, every two or three years plant breeders need to come up with improved varieties to counter susceptibility to the disease.

4.6.2 Cultivation practices

With irrigated rice double-cropping is feasible, however double-cropping is not practised everywhere on the north coast. When two crops are sown per year, the first is grown between April and September, and the second between October and January-February.

Land preparation is done by ploughing, and harrowing which is done two or three times. After sowing, a system of ditches and furrows has to be laid out in the rice field. The number of irrigation ditches to be constructed depends on the slope of the field. Very often these ditches are constructed mechanically, but maintenance has to be done manually during the period after the sowing.

Sowing is also done mechanically, often by the same contractor who does the land preparation. Usually 200-300 kg seed per ha are broadcast.

Some farmers obtain water from specially constructed irrigation canals, such as those farmers in Montería, Lorica, Maria La Baja, Sevilla irrigation districts. Other farmers have invested in powerful pumps in order to obtain water directly from rivers, creeks, or swamps. The water level is maintained in the field from a few days after sowing until one week before harvesting.

Fertilizers, mostly urea, are applied two or three times, usually manually broadcast. Excessive salt in the soil is sometimes neutralized with ammonia. Other inputs include fungicides (Kasumin); insecticides (Toxafeno, DDT 2040 and methyl parathion); and herbicides (Stam F-34 and Esteron). In the bigger rice growing areas these chemicals are applied by aerial spraying. Manually operated sprayers are also frequently used.

Weeding is done manually, and although it is no longer of prime importance as a labour input in this type of rice cultivation, it is still important. Where neighbouring small farmers still grow Galillón because of the taste they attribute to the rice, the larger rice producers consider it to be weed (*arroz rojo* or *arroz peludo*) which has to be removed.

The borders around the fields and the irrigation ditches have to be cleaned occasionally to prevent rats or other vermin breeding. Birds are a serious problem for the growing crop, especially during the first cropping season.

Harvesting is done with combine harvesters (*combinada*). Initially it was necessary for land-owners to bring in skilled labourers from other areas to operate these combine harvesters. Specially recruited labourers are required to carry the sacks of rice (60 to 80 kg in weight) to the roadside, where they are picked up by the buyer or rice contractor who is often a representative of the rice mill owner.

On occasions, the *tagua* system of gleaning rice from the remaining stalks is still used. Where the combine harvester cannot be brought into the field because of severe flooding farmers have returned to the old methods of harvesting. However, it is not possible to use the traditional types of knives to harvest dwarf varieties and rice plants have to be harvested with a sickle.

4.7 MECHANIZED DRYLAND RICE CULTIVATION

Mechanized dryland rice (*secano mecanizado*) is cultivated in areas where it is not possible to control the water supply. This may be the case where insufficient water is available, such as in the Cordialidad region between Cartagena and Barranquilla, but also in areas with an abundant water supply but with no irrigation systems such as in the Mojana area, or in colonized areas in southern Córdoba, Sucre and Bolivar.

Mechanized dryland rice is cultivated in much the same way as *criollo* rice, but using short-straw varieties, and inputs such as fertilizers, herbicides and other chemicals, with the result that the area of *secano mecanizado* under cultivation is much larger than the area of *criollo* rice.

4.8 SOCIAL INSTITUTIONS RELATED TO RICE CULTIVATION

Several social institutions which are related to traditional *Costeño* rice cultivation, have been identified in this study. Firstly, the social custom of inviting people to harvest *criollo* and *forastero* rice is discussed. The second refers to the system of paying rice harvesters, especially with regard to distributional aspects of the crop. In addition, the selling of a rice crop to local buyers and moneylenders, before it is harvested is discussed. Although this is not necessarily related to rice, and as such different from the first two institutions, its inclusion can be justified in terms of giving a more complete picture of rice cultivation on the north coast.

4.8.1 Inviting rice harvesters

The institution of inviting people to harvest the rice crop has been reported in many rice growing regions in the world, notably in Asia and Africa. Vink (1941) reported that in Indonesia, women who had worked as rice transplanters obtained the right to a larger share of the harvest. Although Vink was not explicit about the recruitment of the rice harvesters, his observations substantiate the fact that labourers personally known to the farmers were the first to be recruited. Collier et al. (1974, p. 175) has described how rice harvesting is organized in Javanese villages: "Usually, (the rice owner) will give both relatives and neighbours advance notice of when he will harvest and a larger *bawon*" (*bawon* is a share in the rice harvest). He referred to the *bawon* tradition as: ".... a safety mechanism to support everyone in the village" and over the years it has become a moral factor in its own right (ibid. p. 174-175). It is interesting to note that the *bawon* system was already in use at the beginning of the 19th century. The system of inviting labourers to participate in the rice harvest and to share in the harvest is summarized as: "incorporation of the farmer's social concern and the

patron-client relationship". Traditionally, the rice grown in the village is supposed to be shared by all the people in the village. (ibid. p. 173).

Stoler (1977, p. 691) concluded that the invitation system is not a matter of sharing poverty with everyone who lives in the village. She has shown that in a year when limited opportunities were available for harvesting:

> "..... harvesting rights were more limited than in the previous harvest, patrons reserved harvesting rights for a small group of clients, and while clients retained rights on their patron's land, they were often denied harvesting rights further afield .....".

It could be said that the sharing of poverty may still be operative but is and always was intended for small groups, in the first place for those related to the rice farmer through kin or other direct face to face relations.

Barnett (1969) described an interesting case of an Ibaloi farmer in the Philippines who had given notice to the people in a neighbouring village of the day on which his rice crop was to be harvested. Too many harvesters showed up on the appointed day but "he had to accept them all". In previous years, few people had answered his call for help with his harvest, and now he had apparently cast his net too wide. Barnett also mentioned that in this Ibaloi village, the rice farmers were very often dependent on the whims of the harvesters: "when an average rice variety is to be cut, nobody comes, but when a favored rice is going to be harvested, the field is swarmed by harvesters." (ibid. p. 286).

A very similar system of inviting labourers to participate in rice harvesting for a share of the crop is found in many places on the north coast, in other parts of Colombia, and also in parts of Panama (Gudeman 1978).

A distinction should be made between two categories of rice harvesters. The first work in itinerant groups of 10-20 young men and sometimes women as well, who travel from village to village during harvest time. The second category are inhabitants of the same village, who are invited directly by the rice farmer to harvest his crop. From interviews with farmers from 17 villages on the north coast, it became clear that harvesting by itinerant groups was more

usual in the past than it is now. Harvesting is sometimes done by itinerant groups in five of the villages. In the majority of the villages rice is harvested by invited labourers. It was said by some that "poor people" especially are invited to do the rice harvesting, while others said that neighbours and relatives would become "angry" if they were not invited to cut a few bundles of rice. One farmer stated: "*No soy un ser asocial*" (I am not an unsocial being), thereby indicating that friends and neighbours should be considered for the rice harvest.

Of the 12 villages listed where rice was harvested predominantly by invited labourers: in six villages preference was given by rice farmers to members of his family. In three of the villages, only people from the same village were invited; and in a further 6 villages people from neighbouring villages were reported to have helped with the harvest.

The system of labour used for harvesting rice in 12 villages on the north coast can be summarized as follows:

Cacaotal: on some farms by family only, and on other farms people from the village are invited;

Arache: by family, friends and other people from the village;

Maracay: by itinerant groups of harvesters from other villages, including San Bernardo del Viento, Lorica, Puríssima, and also women participate in the harvest;

Los Corrales: almost everyone in the village participates in the harvest;

Los Amarillos: mostly family members, but groups from Gallinazo, Palo de Agua, Playón and Puríssima are also invited to participate;

Boca de Tinajones: new short-straw varieties are grown in this area which are harvested manually with a sickle by members of the family; and other varieties are harvested by itinerant groups from other villages such as Momíl and Puríssima;

La Icotea: mainly by members of the family, but farmers complain that it is difficult nowadays to get labour for harvesting;

Sicará: during December, the peak period for rice harvesting, it is felt that there are not sufficient people in the village to cut all the rice, and thus groups of people from Lorica and San Antero are recruited;

Boca de la Metra: family members and neighbours;

Sabaneta: mostly by groups of people from the village itself, but occasionally people are recruited from outside the village;
Los Monos: family members, neighbours and friends; sometimes groups from other villages;
Tierralta: rice is harvested by people in the village and sometimes single women from outside the village also participate.

It would appear that in the Córdoba, Sucre and Bolivar departments rice harvesting is essentially a social affair. Rice farmers have to be careful to invite family members, friends and neighbours to participate in the harvest.

4.8.2 Payment for rice harvesting

In this section payment for rice harvesting is discussed, with emphasis on paying harvesters in kind, that is a share of the crop. Payment for rice harvesting is made in one of three ways: a share of the rice harvest; cash payment (per *puño*); cash payment made on a contract basis (*por tarea*). In 16 of the 17 villages, harvesters are given a share of the harvest as payment for their labour. They are given one *puño* for every five *puños* cut. In La Icotea, where only few farmers pay their harvesters in rice, one farmer remembered that in his youth harvesters were not paid at a rate of one *puño* out of every five, but six out of 25. This payment was supplemented with food for the whole day: "water, coffee, breakfast, lunch and an evening meal". Now there is only one village where the rice farmers provide three meals a day in addition to the customary one fifth of the harvest. This is consistent with the fact that it is difficult to get people to come to this village, Sicará, to harvest the rice. Meals are not provided by the rice farmers in any of the other villages.

In 4 villages farmers pay a fixed amount of money per *puño* harvested, which varied in Gallinazo from 2 to 5 pesos per *puño*, and in Los Amarillos from 3 to 5 pesos.

With the *por tarea* system, a contract is made between rice farmer and harvester, a fixed amount is paid for a certain number of bundles of rice harvested. In the village of Cacaotal, rice harvesting is done on this basis.

In 4 villages, all three methods of payment are used. In Campo Bello, cash payment per *puño* is rare; in Arache, harvesters are

usually paid in cash, a daily wage or a fixed amount per *puño* (2 pesos). Contract harvesting in Los Corrales was described by one farmer as follows:

> "If you have a couple of hectares of rice to harvest, you look for a responsible person and you ask him how much he will charge for harvesting this rice. Then it is arranged."

A *tarea* of rice in the village of Sabaneta is a fixed number of *puños*, 15, and harvesters are paid a daily wage of 25 pesos to harvest this amount of rice. Harvesting on a contract basis is also known as *por ajuste*. Sometimes the *ajuste* is paid as a proportion of the harvest, which is similar to the first method of payment described, but usually a cash payment is made.

In addition, a system of labour exchange (*ganar dias*) is sometimes used in the rice harvest (for details see Chapter 5), as for example in Boca de la Metra and Sabaneta. In these villages the rice farmers preferred to use the *ganar dias* system rather than to pay the harvesters a proportion of the crop or in cash, however, those harvesters who do not have rice crops themselves prefer payment to be made as a proportion of the crop.

Costeño farmers had definite ideas on what they considered to be the best method of payment. In general, the rice farmers preferred to pay harvesters in cash (although not always explicitly stated). Rice harvesters, many of whom also had rice fields themselves, generally preferred to be paid in rice. In 16 of the 17 villages, rice harvesters preferred to be paid in rice rather than in money. A rice harvester in Chimá stated: "We are poor and we want to earn a few small *puños* of rice for our children." A rice farmer in the village of Tinajones stated flatly that if cash payment was offered no one would come to harvest, or if they did come, they most certainly would not work as hard as they did when offered a proportion of the crop as payment. In Marín no one wanted to be paid in cash. One rice harvester in the village of Los Corrales, when asked what his preference for payment was, responded: "Some want rice to eat, others want money to buy necessities such as sugar, coffee, coco, and salt". A rice farmer in Los Corrales added: "Most of the time I only want a very small quantity of rice for myself, so I like to pay the harvesters in rice". When asked what he would do if he had, for example 4 ha of rice, he answered: "If I had the money, I would

rather pay in cash, because later on in the season I can get more money for my rice". In Los Amarillos, rice harvesters preferred to be paid in cash, especially when the situation was such that they could cut large quantities in one day and in addition, the farmers in this village did not pay in rice. In Sicará, the groups of harvesters recruited from Lorica and San Antero preferred to be paid in cash, possibly because of the convenience of not having to sell their rice or having to transport it. These people work continuously as rice harvesters.

It happens occasionally that the harvested rice is sold back immediately to the rice farmer. In Maracayo village, it was reported that younger people sold the three, four or five *botijas* which they had earned immediately to the rice farmer, while the older people (those who had families to feed) took their rice home. In the village of Boca de Tinajones sometimes as much as 50% of the rice earned is sold back to the farmer in order to obtain cash. The farmers pay less than the going price for the rice sold back to them, because the rice is not threshed. In 1976, the price paid for this rice was 3-5 pesos less than the going price for rice of 35 pesos per *lata* (volume measure of threshed rice). In Recula, rice is also sold back to the farmers in a similar way.

In La Icotea, Marín and Sabaneta, the farmers were explicit in their preference for paying their harvesters in cash. Farmers in Marín, when short of money, have to sell their rice crops before they can pay their harvesters. In Sabaneta, harvesters are only paid in rice when money is not available. Farmers in this village felt that if the harvesters were paid cash they harvested the fields thoroughly and were more careful not to disturb the crops sown between the rice (cassava, sweet potato). They felt it was necessary to keep a close watch on the harvesters, because they have a tendency to cut the longer and more easily accessible rice stalks, and to leave the smaller stalks.

A farmer in La Icotea offered the opinion that "rice for rice" was a better, more socially equable system, and useful to poor people. However, he also realized that the four *puños* for the farmer were often the usual size, while the fifth, the rice share for the harvester himself, was conveniently made extra large. Thus, instead of quarrelling about the size of the *puños*, he preferred to pay in

cash. In addition, he felt that for a cash payment in return for the amount of rice harvested, the entire crop would be harvested, and the smaller stalks would not be left in the fields. In Gallinazo, the farmers were aware of the fact that harvesters often made bigger *puños* for themselves, but it is an accepted practice. A farmer from Recula remarked that if he saw harvesters leaving the smaller stalks he would deny them access to his field in future.

In conclusion, it can be stated that *Costeño* rice farmers prefer to pay harvesters in cash, at least when they themselves have the money. If they do not have the cash, then they prefer to let the labourers wait for payment until the rice has been sold. On the other hand, virtually every rice harvester would prefer to be paid in rice, which provides them with a cheap supply of food. This is also the case with those farmers who participate in the rice harvest of others. Thus, while the rice-for-rice system is embedded very clearly in a social structure of close ties of kinship, friendships and neighbourhood, this system is also important for economic reasons. People are very much aware of this redistribution aspect of the rice harvest. Further, many people feel that richer farmers should allow others to benefit from their relative wealth by paying the harvesters in rice, but few of the farmers, however, are of the same opinion.

4.8.3 Sale of rice before harvesting

A widespread custom among *Costeño* peasant farmers is the selling of the rice before it has ripened and has been harvested. Perhaps the word custom is not appropriate here, since the potential sellers sometimes go through a good deal of trouble to hide the fact that they do this. This is the only recourse some farmers have if they require money urgently, as for example money for medical expenses in the case of sudden illness in the family, or money for educational expenses, or for more mundane things, such as alcohol. The selling of a rice crop before it has ripened or has been harvested is called *en la hierba* (local synonyms are *en verde* and *adelantado*). Mostly money is borrowed from people in the same village but occasionally from people outside the village.

Information on this practice, naturally enough is difficult to obtain, since no one wants to admit that such an important resource as the annual crop is controlled by a local moneylender. (It is not

unusual that such business deals are made at night, when it is supposed that no one will notice).

A typical situation may be described as follows. A farmer has sown rice in April, and then suddenly needs money in June but the rice will not be harvested until August. He offers a local moneylender part of his rice harvest in return for an immediate cash loan. The loan is given against an agreed number of *quintales* of rice, to be delivered at harvest time. In June the value of a *quintal* of rice is 200 pesos. In August, the farmer has to repay the debt and deliver the *quintales* of rice as agreed to the moneylender. However, by that time the price per *quintal* will have risen to 300 pesos. In other words, the rate of interest charged is equivalent to 50%.

In seven of the 17 villages surveyed, it was stated that rice was sometimes sold in this way; in 2 villages it was stated that this occurred rarely; and in 5 other villages it was stated that this no longer occurred, although it had occurred in the past; and in 3 further villages it was stated that no one had ever sold rice *en la hierba*.

It became clear that sometimes not only rice was sold before the harvest, but also other crops, such as maize. In one village, only one cash crop, yams, was sold in this way. A comparison of prices obtained per kg rice before and after the harvest, together with calculated interests, is given in Table 5.

Table 5 Prices (Colombian pesos) obtained for rice en adelantado (before the harvest) and a la vista (after the harvest), and interests in selected villages on the north coast, 1976

Village	Price per kg unthreshed rice (Colombian pesos)		Interest (%) rate
	En adelantado	A la vista	
Campo Bello	2.7-3.6	4.0	11-48
Arache	2.7-3.6	3.9	11-44
Boca de Tinajones	2.7-3.3	4.7	42-74
La Icotea	3.1	4.3	39
La Subida	3.3	5.0	52
Boca de la Metra	2.4	4.0	67
Los Monos	3.3	4.6	39

A variation in La Icotea on the practice of selling rice before it has been harvested is based on a "point system". Thus, if a farmer wishes to sell his rice before it has been harvested the price would be discounted by a number of points according to the number of weeks before the crop was due to be harvested.

The high interest rates may well be one of the reasons that fewer people enter into these agreements. Complaints from moneylenders suggest that nowadays fewer debtors are willing to hand over the entire amount of rice agreed upon. It often happens that the rice is sold to someone else. The agreed amount of the loan instead of the product is offered to the moneylender, under the pretext of having "lost" the crop. In La Subida, it was reported that less rice is sold *en la hierba* than a few years ago. One moneylender stated that he had stopped lending money against rice to be harvested because nowadays loans were being paid in cash without interest. His opinion was that: "the people are becoming rebellious, they don't pay". In Tierralta, the practice of selling rice *en la hierba* has also declined in recent years. The following story was told by one inhabitant of the village:

> "I had about one *cuarteron* of rice, and had to sell some rice *en verde* because of an emergency. I sold one *quintal* of rice before the harvest for half the price I expected to get for the harvested rice. I paid my rice, although I didn't really want to. But I must keep my promises, because if I don't, I won't be able to borrow money another time. Besides, everybody knows if you don't pay it back. If I really had lost my crop? Then I could have taken the man who lent me the money to the field, so that he could see for himself. He would say, okay, you owe me 200 pesos, give me 100. But you have people who wouldn't even pay back 100."

Although deviations from the norms appear to occur, the selling of rice before it is harvested still operates as a social institution. Some still regard it as morally valid and binding.

5 *RICE IN A TRADITIONAL NORTH COAST VILLAGE*

In this chapter, the role of rice and rice cultivation in a north coast village, Los Monos is analyzed. As was argued in the first Chapter, relationships between crop characteristics and social structure should also be studied at the micro level.

The first part of this chapter provides a social sketch of the village, and discusses social stratification, land tenancy, rural credit and other aspects of the local society. In the second part rice and rice cultivation in Los Monos are discussed and the relationships between the crop and the social structure of the village are analyzed. In addition, the two main rice cultivation systems are compared.

The analysis of Los Monos is based on three sets of data. Firstly, a census of all households who grow rice, including the area of land owned or to which the household has access. Secondly, a sample survey of 42 of the rice-growing households, and thirdly, data obtained by participant observation in the village.

5.1 ORIGINS OF LOS MONOS

Los Monos means "the white people". Some villagers think the name originates from early colonial times when the Spanish occupied these areas. This fact corresponds with the widespread presence of rich and poor Spanish settlers in the Sinú Valley from early colonial days onwards (Fals Borda 1976 and 1977).

Fals Borda (1976) has shown that the region south of Lorica, including the area around Los Monos, was part of the *hacienda* economy during the 18th century. This is also in agreement with the observation of Exbrayat (1971, p. 269), writing about the nearby township of San Pelayo, that white people inhabited these areas:

> "Founded in 1742 ..... its first inhabitants were nearly all Spaniards whose descendents are still living dispersed throughout the area called Las Guamas."

At present, however, the inhabitants of Los Monos do not distinguish themselves from other *Costeños* with regard to ethnic origin.

5.2 ELEMENTS OF SOCIAL STRUCTURE

5.2.1 First impression and description of the village

Los Monos is one of hundreds of small villages on the north coast where life does not seem to change at all. While the local inhabitants may be curious about what a *gringo*, or more probably a *cachaco*, may want in their village, on first impression they are welcoming to a foreigner who has taken the trouble to walk, drive, ride or wade (according to the season) the five kilometres or so to the village from the main road between Cereté and Lorica.

Los Monos is situated on the edge of La Cienaga Grande, an enormous swamp; one of the biggest on the north coast. Just as in other areas on the north coast seasonal variations in water level have considerable effect on agriculture.

The village has clearly developed from a cluster of houses built at a road crossing which is now the central *plaza* of the village. From this crossing, one road goes eastwards into the *cienaga* and the other goes south through the Tierralta settlement, about seven kilometres from Los Monos, before it rejoins the main road between Cereté and Lorica.

Newer streets have been added to the older routes through the village. The houses are mostly constructed of wattle and daub with thatched roofs and there are only a few cement houses. In 1976, the total number of the houses was 184, and the estimated number of inhabitants was 1343.

In spite of the cosy, almost intimate atmosphere one perceives when entering the village, Los Monos is far from a monolithic entity, made up of more or less equal units. Differences between the households exist, and people are aware of these differences. For example not everyone owns land, a considerable number of farmers have to rent land on an annual basis; some villagers manipulate large quantities of capital in the buying and selling of agricultural products; and differences in wealth exist. However, these differences do not create sharply marked boundaries between social categories as they are mitigated by other factors, such as family ties, friendships and the simple fact of being neighbours. Los Monos with its complex internal differences is a typical village on the north coast. Its inhabitants remain on the other side of the fence to big land-owners

and those connected with urban power. Neither "the ability to manage urban cultural forms, the prestige necessary to do business", nor "an entree to the bureaucracy" (Pearse 1975, p. 255) are to be found in Los Monos. It is a typical relatively poor, peasant cummunity, originating from the early or middle colonial period, where perhaps "the quiet joys of a selfprovisioned life" have begun to pall but where these still have a meaning in their own right. The son of the household is still ready "to labour for his father in return for his keep, and to offer his labour without a salary to a neighbour in the expectation that the latter will return the day's work to the family economy" (ibid. p. 254).

Physically speaking, the village economy depends almost entirely on the water regime of the *cienaga*, the agricultural cycle neatly fits the rise and retreat of the water. However, in years of heavy flooding, which are said to occur every seven years or so, the flood waters play havoc with the crops in the fields, turn the streets into canals and the plaza into a small lake. Bicycles and donkeys are replaced with tucked-up trousers and makeshift rafts of banana plants. The wet season brings large numbers of mosquitoes, even more than are present throughout the rest of the year. The clouds of mosquitoes which appear at about 6-7 p.m. as it is becoming dark cause a public ballet of clapping and scratching people who gather in the street to chat after dinner. During the wet season (April to October) when rainfall is heaviest, the mornings may be very chilly in spite of the tropical climate.

As already stated, the *cienaga* is of great importance to the villagers. Cattle are grazed on it during the dry season, and the edges are intensively cultivated with rice and maize during the wet season and with cowpea during the dry season. Fish are caught in reasonable quantities, and seasonal delicacies such as turtles (*icoteas*) and iguana eggs are collected in the weeks before Easter.

There seem to be no apparent social differences with regard to the settlement pattern of the village. However, the proportion of land-owners as opposed to those who rent land or who are share-croppers seems to be higher on the eastern side which is relatively higher than the western side and is thus less subject to flooding The eastern side is presumably the older part of the village.

The area exploited by Los Monos farmers is not easy to estimate because during the dry season the pasture area extends deep into the *cienaga* and in the wet season, activities such as fishing and hunting extend the area exploited considerably. The main crops grown are rice, maize, and cowpea. In 1976, of the 42 farmers surveyed the average area cultivated was 2.46 ha.

5.2.2 Administration

Los Monos has the administrative status of *corregimiento*, and is part of the *municipio* of Lorica. The neighbouring hamlets of La Subida, La Peinada, Rodeito and Recula are also in the same *corregimiento*. The only government official in Los Monos is the police inspector. No other government institutions operate in the village. Farmers have to travel to Lorica to obtain agricultural loans from the state agricultural bank, the *Caja Agraria*. Contact was made with INCORA only once, when a group of farmers went to Montería to plead for more land. Shortly afterwards an INCORA commission visited the village, but nothing further happened. According to many farmers, the agricultural extensionists of ICA have never visited the village.

5.2.3 Social stratification

Social stratification in Los Monos is related to access to land and to land use. Access to land and use of the land are the main indicators for social status. From the complete census of 179 households, 140 reported to cultivate rice, and of these 79 did not have land of their own. About half of the households in Los Monos reported not to own land. Land can be used for growing crops or be dedicated to cattle grazing. All owners of cattle in Los Monos have more than 2 ha of land. Table 6 summarizes the village's social stratification.

Table 6 Estimated number of households in lower, middle and upper social strata in Los Monos (1976)

Social strata	Number of households
Lower stratum: households with access to less than 1 ha	105
Middle stratum: households with access to 1-2 ha	47
Upper stratum: households with access to more than 2 ha	18

Not all the inhabitants of Los Monos are farmers. There are a large number of non-agricultural occupations in the community which are very often related to social class. For example, poor and often single women earn money by threshing rice and beans; collecting and selling *totumas* (shells of the fruit of the *totuma* tree *Crescentia cujete*, which are used as food containers) in Lorica market; buying and selling fish; repairing and washing clothes; and producing *bollo* (bread made from fresh maize). This work which is of short-term duration (*el rebusque*) is considered fitting for those who cannot participate in the more serious and prestigious activities generated by having access to land.

"Shortage of work" is often given as the explanation for working outside the village. Labour for weeding and cotton picking is recruited from the village by contractors from nearby Cereté and sometimes from Cesar Department. Good cotton pickers can earn as much as five times the usual day labour wage in Los Monos. Many young men go to Venezuela to work and some stay as long as six months. Girls from Los Monos frequently work in Lorica, Montería and Cartagena as domestic help.

5.2.4 Share-cropping

Those who do not own land, grow crops on a share-crop basis. Although many variations exist, there are two basic types of share-cropping. Firstly, there is the output-share lease, in which the land-owner leases his land to the share-cropper in return for a share of the harvest. The share-cropper produces the crop on his own and pays all costs including labour. Normally, the land-owner receives one-third of the harvest, and the share-cropper two-thirds. This system is called *a tres partes*.

Secondly, there is a cost-share lease, in which costs and labour are shared by both owner and share-cropper. The crop is divided equally between land-owner and share-cropper, this system is called *a medias* or *a partir*. A variation to the output-share lease occurs when the harvest is divided into three, as the owner has hired a third person to contribute his share of the labour and production costs. In a variation to the cost-share lease, the land, and half of the production requirements including labour are provided by the

land-owner, and two other people contribute the other half of production requirements (seed and labour). In this case half of the harvest goes to the land-owner and the other half is divided between the other two.

The general term used for all these arrangements is *trabajar en compañia*, working together and also extends to stock raising.

Sometimes land-owners do not have enough land themselves to cultivate a specific crop and need to lease extra land for a specific purpose or during a specific time of the year and thus enter into a share-cropping arrangement.

Examples of landless and land-owners involved in share-cropping arrangements of the four types listed above are given in Table 7 and 8.

Table 7 Areas of rice, maize and cowpea cultivated by landless share-croppers in Los Monos (ha)

Example No.	Rice	Type of share-cropping**	Maize	Type of share-cropping	Cowpea	Type of share-cropping
1.	- *		- *		.25	1
2.	- *		1.25	1	.25	1
3.	.5	1	3.	1	-	
4.	1	1	.5	1	1.25	1
5.	1	1	1	1	1.	3
6.	1	1	.25	1, 4	.5	1
7.	1	1	2.	1	1.5	1
8.	1	1	.5	2	1.5	3
	.5	4				
9.	2	1	-		1	1

* Farmer was working in Venezuela as migrant labourer.
** Type of share-cropping system:
1: output-share lease
2: cost-share lease
3: modified output-share lease
4: modified cost-share lease

Table 8 Areas of rice, maize and cowpea cultivated by land-owners on own land and on a share-cropping basis (ha)

Example No.	Rice			Maize			Cowpea		
	own	share-crop	type of share-cropping*	own	share-crop	type of share-cropping	own	share-crop	type of share-cropping
1.	-	1	2	-	-		.25	-	
2.	.25	1	1	-	1	1	-	2.25	1
3.	-	.75	1	.25	-		.5	-	
4.	.5	.75	1	.5	-		.5	.75	1
5.	-	1.5	3	1	.5	2	-	1	2
6.	1	-		-	1		-	1	2
7.	1	3-4	1	1	-		.5	-	
8.	-	3	1	1.5	.5	2	1	.25	1
9.	-	.5	2	.25	-		-	.5	2
10.	1.5	1	2	2	-		2	-	
11.	2.5	-		2.5	-		2.5	1	1

* Type of share-cropping system:

1: output-share lease
2: cost-share lease
3: modified output-share lease
4: modified cost-share lease

From Table 7 and 8 it would seem that there is a marked preference for the *a tres partes* form (output-share lease) of share-cropping, which is more advantageous from the viewpoint of the land-owner. At the beginning of the cropping season when negotiations for the lease of land are going on, land-owners are in a strong position. The general complaint is that the richer farmers do not want the poor to have land to farm, but on the other hand, land-owners want to make sure there is sufficient labour to work their land. The largest land-owner in Los Monos (9 ha) has a long-standing arrangement with three landless farmers, who refer to him as their *patrón*. This suggests that their relationship is more than just strictly business. Other larger land-owners have similar types of arrangements. The output-share lease (*a tres partes*) is found usually between persons of different social status, and expresses a vertical social relationship. In contrast, the cost-share lease (*a medias*) is used between persons of equal social status, for example two brothers, two friends, or a father and a son. Through this share-cropping system very often younger landless farmers are able to gain access to land.

5.2.5 Loans and credit

One important aspect of the economic system of Los Monos is the organization of credit mostly for agriculture, and often directly tied to the marketing of the products concerned. Agricultural loans can be divided into two categories: cash loans, and loans in kind. Cash loans are made by the *Caja Agraria*, and by local moneylenders. Financial assistance from friends and family also fall into this category.

In 1976, only four relatively wealthy farmers in Los Monos succeeded in obtaining a *Caja* loan. These loans which were for rice and cowpea crops ranged from 2500 pesos to 15 000 pesos. One major obstacle to obtaining a *Caja* loan is the requirement to present a legal title deed to the land as colateral. Most farmers from Los Monos do not have title deeds to their lands. Loans can also be obtained from local moneylenders and are usually within the range of 500 to 2000 pesos. Interest is calculated usually on a monthly basis and varies between 5 and 10%. Cash loans made available by family members and friends are usually small, up to about 1000 pesos and sometimes interest of the same order as charged by the moneylenders is paid. Although evidence of only a few such loans could be found, they play an important role in everyday life, as cash is a scarce commodity in Los Monos.

Credit in kind is a major element in the economic life of Los Monos. Three categories can be distinguished in this respect all of which typify the relationships existing between groups and classes of people in the village. The first has already been described, the system of selling a crop to a local moneylender several months before it has been harvested (*vender en hierba* system, see Chapter 4). Moneylenders in Los Monos are farmers, and by local standards are considered to be rich. They own land varying from 2 to 8 ha, and 15 to 30 head of cattle. Although money is lent, the loan must be repaid in kind, an agreed quantity of rice or cowpea. In 1976, only six of the 41 farmers interviewed reported having entered into such an arrangement with a moneylender. It is highly probable that the number is much higher especially as this type of loan is not looked upon favourably. Both parties are well aware of the high interest charged, sometimes more than 30% per month. In addition, the fact that a part of the following year's food supply is offered as a

colateral, places a taboo on this type of loan. During a discussion with a group of farmers, the usual evasive answers were given about the *vender en hierba* system when suddenly one young farmer stepped forward and said: "I will be honest, I have done it several times. I know that I will do it again when I am forced to. I also know that a lot of others have to." A Los Monos farmer once remarked: "I will not boast, I sold 50 kilos *en la hierba*."

Another widespread practice is the giving of credit in kind by shopkeepers. Many people are obliged to turn to this practice in order to obtain food, especially when there has been a poor harvest. An hour before the evening meal, it is quite common to see small girls walking to a shop with *totumas* in their hands to buy a *totuma* of rice, a *totuma* of oil (for one peso), or one plaintain. Often these articles are purchased on credit. It is noteworthy that this shopping is done by girls or women, never by men. One particular form of credit given by shopkeepers is that given to migrant labourers before leaving for a prolonged period in Venezuela. Quite a few men from Los Monos work as migrant labourers and in this way they make sure that their families will be cared for during their absence. It sometimes happens that the debt is so high that upon return all the money earned has to go to the shopkeeper.

A common practice among Los Monos farmers is the exchange of labour (*ganar dias*). Mutual help is given at peak periods of land preparation, sowing, and weeding. About half of the farmers in Los Monos have worked in this way to varying extents. One farmer reported that during 1976 he had only worked two days on this exchange system of labour, while another reported that he had exchanged about 100 working days. Return labour does not necessarily have to be done by the recipient himself, it can also be done by his son, or by anyone in his debt from a previous labour exchange.

5.2.6 Religion and education

The only inhabitants of Los Monos actively practicing a religion are a small group of adherents to the Adventist Church, who meet every Saturday morning in the house of one of the group. The rest of the villagers are nominally Roman Catholic but there is no church in the village. Marriages and baptisms take place in Lorica. Some

villagers are said to have magic powers and lead "prayer" services (*rezandero*) to drive away illnesses and all types of economic adversity.

During the 1960s, a government-sponsored primary school was started in Los Monos. Children attending the school vary in age from five to 18 years. Not every child completes primary school and many children and adults in Los Monos are illiterate. Some of the children of richer families have attended secondary schools in Lorica, and two of the sons of the richest farmer in the village have completed university courses in Montería. For the poor in Los Monos, the costs of prescribed school uniforms, shoes, books etc. are often prohibitive.

5.3 RICE CULTIVATION

Rice is the most important crop grown in Los Monos and is eaten at almost every meal. While in terms of area under cultivation and labour input rice is the most important crop grown, it is only one of the elements in a complex agricultural system. In order to understand the place of rice in the village economy, the agricultural system in Los Monos is described briefly.

5.3.1 Outline of agricultural system

Cropping land falls into two categories: floodable land (*tierra anegadiza*) and non-floodable land (*tierra alta*). This distinction determines which crops and which varieties are grown and it also reflects the fertility and the mineral content of the soil. Soils of the higher areas which do not flood are acid (pH of 4.8); contain a high proportion of organic material (5.6%); are low in phosphorus (13.7 ppm); low in aluminium, and high in potassium. The soils of the lower areas which are susceptible to flooding are extremely acid (pH of 4); the proportion of organic matter is also high (8.2%); are lower in phosphorus (3.8 ppm) and rich in potassium (data from soil samples taken in Los Monos, and analyzed by CIAT).

In Los Monos, agriculture is characterized by the cyclic pattern of land use, seasonal distribution of labour, and the purpose for which crops are produced. The land use pattern in turn is largely

determined by topography, soils and climate. This means that agricultural activities are quite different in the dry season to those of the wet season in several parts of the area around Los Monos. In the wet season, the important crops grown are rice and maize, while during the dry season only cowpea (*frisol*, Vigna sp.) is grown. Other minor crops also fit into the agricultural pattern, such as cassava, and occasionally yams.

Both maize and rice are grown throughout the wet season. Maize is planted twice a year, once in April with the arrival of the first rains (*maiz de primera*), and when land is available, a second crop (*maiz de segunda*) is planted at the end of August and harvested at the beginning of January. Rice is grown throughout the wet season, from early April to December and January of the following year. The only dry season crop, cowpea, is planted at the end of the wet season in October/November and harvested during the dry season, in January/February or even later. For higher elevated lands, farmers must choose between cultivating *criollo* rice and maize during the wet season, and between cowpeas and a second crop of maize (*maiz de segunda*) during the dry season. The main wet season crop of rice (*arroz forastero*) is the only crop grown on the flooded *cienaga* and in other inundated natural depressions, and thus is not interchangeable with other wet season crops.

Rice and maize are produced mainly for domestic consumption; rice mostly for human consumption, and maize also for feed for pigs and chickens. These animals are kept for local consumption, but a substantial number are also sold outside the village, especially pigs. Surpluses of rice and maize are sold in the village or in Lorica. Cowpea is grown as a cash crop which gives the villagers some income at a period of the year when cash resources dry up. The crop also provides money for the purchase of seed for other food crops to be sown in the following season and also for the payment of other agricultural activities, such as labour for land preparation.

Another activity which produces a cash income during the dry season is fishing. In January and February, large shoals of *bocachico* swim up the Sinú River and the *cienaga*. These fish are collected with home-made nets (*attaraya*) and sold to traders from the interior, who come to the fish market which is conducted for a period of two to three weeks on the riverside near Lorica.

In October/November, the water on the surface of the *cienaga* disappears and a vast natural pasture appears. The owners of cattle in Los Monos use the pasture for extensive grazing, but parts of the *cienaga* are also used by cattle owners from neighbouring villages. Only very few of the villagers own cattle and then mainly for investment purposes. Most inhabitants have too little capital to consider cattle raising to be an economically viable activity. However, most households keep chicken and pigs.

5.3.2 Types of rice cultivation

Both *criollo* and *forastero* rice are cultivated by Los Monos farmers. The terms *criollo* and *forastero* refer to varieties, and also to systems of cultivation. As already stated in Chapter 4, the principal difference between *criollo* and *forastero* rice is the amount of water required during cultivation. *Criollo* varieties require little water and adapt easily to higher areas, while the *forastero* rice varieties are better adapted to wet conditions.

While no definite evidence can be offered, it is generally accepted that *criollo* rice has been grown for the longest period. Firstly, as *criollo* means "native" or "indigenous", and *forastero* means "foreign", it is suggested that *criollo* was grown first, and *forastero* is a more recent introduction. Some farmers claim that Galillón, the *forastero* variety now extensively grown, was only introduced about 15 years ago, and others claim that it was introduced earlier. In an article published in 1955 in "Arroz", mention was made of a rice variety called "Forastero". It was stated that this rice was being introduced in an accelerated way, particularly in the swampy regions such as Córdoba. From the description, it is very probable that the variety mentioned was Galillón (Anon. 1955). A second reason for assuming that *criollo* is the older system of rice cultivation in the area is that in historical documents no explicit references are made to *forastero* cultivation systems. References have been made to rice growing in Colombia in previous centuries which indicate that *criollo* rice was cultivated (Sanchez Juliao 1970; Simón 1882-1892; Jennings 1961).

Criollo rice is on the decline in Los Monos, or at least it seems to be declining. Of the 140 farmers who reported growing rice, only 36 said they grew some *criollo* rice, and very few grew only *criollo*.

In 1964 the frequency of *criollo* varieties had been twice as high as in 1976. The *criollo* cultivation of Los Monos is only partly comparable with *criollo* cultivation in the frontier areas of southern Córdoba and other similar regions in Colombia. Around Los Monos virgin land is no longer available, thus rice is not used as a pioneer crop as it was several decades ago. This may also be a further reason for the relative decline in *criollo* rice cultivation.

5.3.3 Cultivation of criollo rice

If the land for a *criollo* crop is covered with shrubs (*rastrojo*) or with a stand of older trees, about four to six weeks before the end of the dry season the vegetation is cut, allowed to dry and then burnt. The term used for these activities is *picar* (select and cut), and in the case of older vegetation the term used is *socolar*. When the vegetation has to be cut a second time this is called a *repicada*. At present in Los Monos there is very little difference in land preparation between *criollo* and *forastero* rice. For *criollo* rice, land which is not covered with shrubs and which is not floodable, the year-old vegetation is cut with the machete. In the case of *socolar* the burnt and dried trees and branches are removed to the edge of the field, and the best are taken home for firewood. Land preparation for *criollo* rice is timed to fit in with land preparation and sowing of other crops such as *maiz de primera* which are intercropped with the rice.

The farmer, together with his work group, sows the crop by walking through the field making holes in the ashes with the dibble stick and dropping a number of seeds in each hole. The seed is kept in a container (*choco*) which may be half a *totuma* or just an old tin, tied around the waist of the sower.

Usually *criollo* rice crops need to be weeded twice and occasionally three times. The use of herbicides is becoming an accepted practice for *criollo* rice. Of 18 *criollo* rice crops, 7 had been treated with herbicides (*matamalezas*), which were applied manually with a backsprayer. Most farmers were ignorant of the name of the product. Weeding is also done manually, usually by family labour with additional hired labour when required.

Insecticides are seldom applied to *criollo* rice; only on three occasions was Aldrin reported to have been used against ant plagues.

Young boys and also older men are especially employed to scare away the birds. For several rice varieties, it is essential that for a period of two to three months there is some one to scare away the birds.

Harvesting (*recolección*) is also labour intensive and is done in the traditional manner as described in Chapter 4. Immediately after harvesting the rice is dried. After one or two days, the rice is sufficiently dry to be stored. Usually the *puños* are hooked to the ceiling beams in the kitchen area of the farmer's house, where further drying takes place. Here the rice is said to be protected from insect attack. The rice is threshed and winnowed just before it is to be consumed, that is on the same day.

5.3.4 Cultivation of forastero rice

The unpredictable weather and especially the unreliable rainfall on the north coast cause the Los Monos farmers to adopt a risk avoidance strategy with the cultivation of *forastero* rice. This is particularly so during the sowing and transplanting stages, as explained in Chapter 4. The importance of the due arrival of rain and floodings is underlined by the existence of magical practices which surround it. In Tinajones, a farmer was seen to bury a life toad, placing flowers and a small bottle of water on top of it "to speed up the rain". However, it is more common to "throw out" a prayer (*echar el rezito*).

Land preparation for *forastero* rice consists only of cutting down (*guachapeada*) the vegetation on the floodable land. As compared with *criollo* rice, growing *forastero* rice means a further step in the controlling of the water regime. The cultivator is less dependent on the weather as he is able to decide for himself when to plant and when to transplant.

The time the seedlings remain in the seed-bed varies considerably depending on the weather and sometimes on the availability of the land for transplanting when the seedlings are ready. Seedlings may remain in the seed-bed for as long as eight to ten weeks. The timing of transplanting is not so important as *forastero* rice is not grown in an intercropping system.

As may be expected, weeding is not so important as rice plants can compete successfully with other aquatic plants. In Los Monos,

only 14 of the 32 farmers in the survey weeded their *forastero* rice crop more than once, and several *forastero* crops were not weeded at all. The use of herbicides was proportionally as high as with *criollo* rice and only 3 of the 32 farmers used insecticides.

Migratory birds are less of a problem with *forastero* rice than with *criollo*. As the crop is sown later, the bird plague is not so severe especially during the ripening stages of the crop. Nevertheless, a considerable amount of time has to be invested in scaring away the birds.

Forastero rice land in Los Monos is sometimes fertilized. This is done with *tierra blanca*, a mineral-rich silt which is allowed to flood on the rice fields in some parts of the *cienaga*, when the water level starts to rise. According to some, this is a relatively new practice related to the higher water levels of the *cienaga* during the last fifteen years, just as the earlier mentioned shift from *criollo* to *forastero* rice varieties. According to some farmers, this soil improvement technique, known locally as *calzeo*, has brought with it the introduction of other rice varieties such as Galillón, which are better adapted to deep water.

5.3.5 Units of measurement

One of the major problems in making economic comparisons between *criollo* and *forastero* rice cultivation, or between any varieties of rice on the north coast is the fact that standard measures are not always used. Some measures are given in volume units, such as quantities of rice (*puño*, *botija*) and others are given in weight units (kilograms, tons). These volume units cannot easily be converted to weight units, because of differences in characteristics such as grain size and grain density.

In Los Monos, rice yields are given in *botija* per *cabulla* (*botija* per *cuarterón*). A *botija* consists of 25 *puños* which in turn consist of two or three handfuls of rice stalks (*bajadas* or *manotadas*). In Los Monos, a *cabulla* is an area of land of 100 × 100 yards (*yardas*) and one *cuarterón* is a fourth of a *cabulla*[6]. Threshed rice is usually measured in volume units *latas*.

The problems with measurement in Aritama as summarized by Reichel-Dolmatoff and Reichel-Dolmatoff (1961, p. 39) also holds true for Los Monos:

> "..... there is often considerable confusion as to the "correct" extension, weight, or length of the different items in question. Even the more sophisticated inhabitants have difficulties converting leagues into kilometers, *cabullas* into acres, or *brazas* into meters, and most people are unable to do so. There is doubt and insecurity with regard to the common units, and at the same time the local system is thought to be antiquated and somehow "indian".

According to Reichel-Dolmatoff and Reichel-Dolmatoff the *cabulla* in Aritama is 80 × 80 m. In another report on north coast agriculture in the one and the same village about 25 km from Los Monos, two interpretations of a *cabulla* are given; 90 × 100 m; and "for other farmers" as 80 × 80 m (Havens et al. 1965). Other reports refer to a *cabulla* as being 100 square yards (Triana et al. 1973).

5.3.6 Rice varieties grown, yields and varieties preferred

The system of rice growing in Los Monos is complex. Not all varieties are planted at the same time, and most farmers grow more than one variety. Some are grown for special purposes as for example arroz setentano (70-day rice). This variety is known to be a poor yielder, but is said to ripen in 70-90 days, just quickly enough to miss the *veranillo* (the short dry period of two or three weeks in August) which may ruin a crop. Other quick-ripening varieties, such as Mono ligerito, can be sown twice a year and also provide the villagers with rice early in the season. The variety Arta muchacho, found only rarely in Los Monos, is considered to be a "filling" rice, especially for young boys who eat a lot, and therefore do not feel hungry "again" after a meal of such rice. Each variety has its own taste, and the farmer takes this into account when deciding which variety to grow.

Ligerito can be sown in April-May and harvested in July-August. Galillón seed-beds are prepared so that seedlings can be transplanted in July and the crop harvested late November or early in December. For Mono recao, seed-beds are prepared in May-June, the seedlings transplanted in July and the crop harvested in November. The *criollo* rice Ina is sown directly in the field later during the season. Chile, another *criollo*, is sown in May and harvested in September-October.

Table 9 Frequencies of cultivation and average yield of rice varieties grown by farmers in Los Monos (n = 42)

Variety	Type*	1976		1964		Ever grown	
		No. of farmers who grew the variety	Average yield (botija/ cabulla)	No. of farmers who grew the variety	Average yield (botija/ cabulla)	No. of farmers who had ever grown the variety	Average yield (botija/ cabulla)
Galillón	F	36	13	30	29	42	24
Ligerito	C	2	35	13	24	11	22
Mono Recao	F	4	15	8	27	20	25
Chile	F	6	4	17	29	20	27
Mono Bola	F			1	40	2	42
Majagual	F			4	18	2	27
Fortuna	C	4	12	3	17	10	19
Ligerito Mono	F			1	40	5	23
Mono Collá	F					1	
Ina	C	4	10	9	23	14	23
Barranquilla	F	1	12			1	20
Ina Blanco	C	1	20	1	25	1	25
Grano de Oro	?					1	5
Ligerito Forastero	F					3	35
Ina Mono	C					3	
Turca Hembra	?					2	
Presidente	C					1	
Tres Colores	F					1	
Presidente Mono	C					2	
Pablo Barrios	C					1	
Ayaso	C					1	
Moralito	?			1	13	1	20
Mono Pantanero	F					1	30
Mono Blanco	F			2	30	1	30
Caiza	?					1	50
Azuleno	F					1	50
Chiminico	F	1	17	2	32	1	30
Ambrosino	?					1	0
Macho en la Valle	C					1	40
Mono Lizo	F			1	25		
Mano Caballo	F			1	10		
Japones	?			1	13		
Ministro Mono	F			1	20		
Ministro Blanco	C			1	20		

* F = Forastero
C = Criollo

From Table 9 it can be seen that only a few varieties have been widely grown in Los Monos in recent years. These varieties are: Galillón, Ligerito, Mono Recao, Chile, Fortuna, Ina, and to a lesser extent Ligerito Mono and Majagual. Farmers have experimented with many other varieties, which were probably not all recalled in the interviews. As already stated, yields of Galillón in 1976 were low in comparison to the consistently high yields in previous years. The prolonged dry season in 1975 can be considered to be at least partly responsible for the low yield of this variety and also for the poor yields of *forastero* rice varieties such as Mono Recao and Chile. In the case of Galillón, five farmers reported they had not been able to harvest a crop because there had been insufficient rain. They had optimistically started sowing or transplanting too early. The yields presented in Table 9 are consistent with the general observations of the farmers that yields of *criollo* varieties such as Fortuna and Ina, are lower than *forastero* varieties.

Generally speaking, farmers in Los Monos have preferences for particular rice varieties for different field or water situations. In the shallow water on the edge of the *cienaga* near the village, Mono Recao, Mono Pantanero and Cheja are planted. At present the variety most widely grown is Galillón, a typical deep water rice. It is planted further into the *cienaga*, as it is resistant to inundation. In the villages of Recula and Rodeito which are located farther into the *cienaga*, virtually only Galillón is grown. During 1976, only Galillón was grown by many farmers of Los Monos. This was an exceptional year, as the year before severe flooding had swept away all crops, so that rice seed had to be purchased from elsewhere. Seed was purchased mainly from these neighbouring villages and it was also thought that in case of severe flooding in the subsequent year Galillón would be more likely to survive. While most *forastero* rice grown in 1976 was Galillón, there were many varieties of *criollo* rice grown. Although farmers express definite preferences for certain varieties, they cannot always grow these.

These observations can be illustrated by examples of a number of farmers in the area:

Example 1: A farmer who has been cultivating rice for about 28 years. He is not considered to be a very poor farmer, as he owns his own land. He planted one ha with Galillón and Barranquilla (both

forastero varieties); about three-quarters ha with maize and cowpea on a share-cropping basis with his mother; and a quarter ha with yams. The seed which he had purchased for the rice crop was not of the variety preferred by his household of 13 living in Los Monos. The variety preferred was Mono Recao (a *forastero* variety) but apparently because of a shortage of seed he had to plant his second choice. *Forastero* rice suffered more disasters than dryland *criollo* rice.

Example 2: A farmer who has been cultivating rice for 18 years. In the year of the survey, he had planted Galillón and Fortuna (a *criollo* variety), but he preferred to eat Mono Recao. However contrary to the previous example, this farmer had planted his own seed of Galillón which he had apparently set aside from his crop the previous year. Furthermore, he is not a rich farmer by Los Monos standards. He grows rice as a share-crop (*a tres partes*) about two kilometres east of Los Monos, that is deep in the *cienaga*. If he had grown Galillón there the previous year, he would have lost his crop. Thus it must be concluded that the seed came from another area less subject to flooding than Los Monos. He indicated that Galillón yields about 30 *botijas*, whereas Mono Recao only yields about 20 *botijas*. Thus he must have strong reasons for his preference for Mono Recao.

Example 3: A farmer who has been cultivating rice for 28 years in the Los Monos area. He stated that, although Fortuna usually yielded about 25 *botijas* from his land and Galillón about 30 *botijas*, in the year of the survey, the reverse was the case. Galillón had yielded about 15 *botijas*, and Fortuna 25 *botijas*. He preferred Fortuna. As he owns two *cabullas* of floodable land, on which he has lost *forastero* rice crops in the last few years, perhaps his preference for Fortuna is based on this year's outstanding harvest.

Example 4: A share-cropper who had been cultivating rice for 30 years. In 1976, he planted Galillón and Chile, but when asked for his preference he stated Ina.

Example 5: A land-owner, who grew both Ina and Galillón expressed the same preference as the previous farmer. Although Galillón yielded more, Ina was preferred.

Example 6: A land-owner who in the year of the survey grew Galillón which yielded about 40 *botijas* per *cabulla* and Ligerito which yielded 5 *botijas* on half a *cuarteron* from purchased seed.

When asked which rice variety he preferred, he answered: "Ina is the more tasty, but we also eat Galillón".

The majority of Los Monos farmers stated that they preferred Galillón for home consumption. But it never occurred that when a farmer grew another variety, he said to prefer Galillón to the one he grew. This seems to suggest that yielding capacities of varieties are at least as important to farmers as the qualities ascribed to the grain.

Thus, it is of interest to note which varieties are preferred for home consumption (see Table 10). *Forastero* varieties were sometimes considered inferior because of the quality of the grains which are generally shorter than those of *criollo* varieties and for that reason considered less attractive.

The price paid for sowing seed may also give some indication of the varieties preferred. Even though some farmers had been able to reserve seed from the previous harvest, the bad harvest had made it necessary to purchase sowing seed. Prices were not uniform. On average, about 70 pesos was paid for one *lata* of Galillón seed, although it was sometimes sold at lower prices. For Ina, 100 pesos per *lata* was paid.

Table 10 Rice varieties preferred for home consumption by farmers in Los Monos in 1976 (n=42).

Rice variety	Frequency of first preference
Galillón	20
Ina	8
Mono Recao	4
Fortuna	2
Chiminico	1
Mono Blanco	1
Mono Pantanero	1
Chile	1

It is clear that although Galillón is the variety grown most frequently by farmers in Los Monos, they have greater preference for other varieties. This suggests that a considerable number of farmers may not have been able to obtain seed, or that they are unable to obtain access to land suitable for cultivating the preferred varieties.

5.3.7 Labour and labour costs

Labour is defined and restricted by cultural norms. In Los Monos it is not considered acceptable for women to work outside of the house on agricultural tasks. A notable exception is the participation of women in harvesting cowpea. The cultural ideal is that women should work at home and that men should work in the field. However, women may work in the processing and marketing of agricultural produce, and in the care of domestic animals. When asked if women helped with the rice harvest, one farmer answered:

> "No señor, las mujeres solamente para preparar la alimentación, atendiendo los pelaos y atendiendo la casa pa' cosiná los alimentos y eso. Atendiendo el pollito, el puerquecito, los animalitos".
> (No sir, the women here only work in preparing the food, taking care of the kids and keeping the house, cooking the food and those kind of things - taking care of the chickens, the pigs, the animals).

Several categories of labour can be distinguished. Firstly, labour which is outside the monetary economy. The most obvious in this category is the labour provided by the family of the farmer and which is usually considered to be "free" that is, from the viewpoint of the farmer. Sons, fathers, brothers and other male relatives living in the same household work on the cultivation of the rice crop without monetary renumeration. A second form of labour outside the money economy is that provided by labour exchange (*ganar dias*). Thirdly, labour for harvesting paid in rice accounts for about 25% of the total labour and is usually invited. Finally, there is labour which is rewarded with an agreed quantity of cash and sometimes supplemented with a meal. Work is carried out on the basis of a fixed amount of money per time-unit, or on the basis of renumeration for a piece of work (*por tarea*).

Even though a considerable number of mandays is provided by the family of the farmer, this labour only accounts for less than 50% of the labour required for both *forastero* and *criollo* rice. An hectare of *forastero* rice during the season of 1976 required on average a total of 95 mandays, of which 40 were provided by the family, and 55 from other sources. For *criollo* rice, the number of mandays was amazingly high, 125 of which 53 were provided by the family and 72

from outside. Control of birds and weeding accounted for the high number of mandays (see Table 11).

As various systems of payment are used and the length of the manday varies with the task, it is difficult to estimate renumeration for various tasks. Weeding and sowing follow the usual pattern of the *Costeño* working day from about 7 a.m. until noon or one p.m., but those watching for birds work a longer day. The length of the working day for harvesting varies also according to the time of the year. When a farmer invites relatives early in the season to harvest a few *puños* to meet immediate needs of both the harvester and the owner, only a few hours per day are worked. However, in the case of Galillón, when larger areas of rice have to be harvested in a relative short period of time, harvesters work a longer day. A summary of mean number of mandays worked per hectare of *criollo* and of *forastero* rice in 1976 is presented in Table 11.

Table 11 Mean number of mandays required for various activities in the cultivation of one hectare of rice in Los Monos (1976)

	Mean number of mandays required for forastero rice		Mean number of mandays required for criollo rice	
	Family labour	Hired labour	Family labour	Hired labour
Land preparation	11.8	16.1	14.3	12.9
Sowing	5.0*	7.5*	5.8	5.8
Application of inputs	0.4	0.4	0.7	0.3
Weeding	7.8	7.6	10.8	21.8
Scaring away birds	7.3	9.4	11.4	18.2
Harvesting	7.1	14.4	9.5	12.5
Other activities	0.6	0.0	0.1	0.5
Total	40.0	55.4	52.6	72.0

* Including mandays required for transplanting.

Family labour is considered to be a free commodity in Los Monos, and it goes without saying that farmers with many sons are in an advantageous position with regard to production costs, but on the other hand more rice is required to feed the household. Nevertheless it is difficult to establish a relationship between the area of rice cultivated and variables regarding the availability of

family labour, such as the total number of people belonging to a household, the number of people actually living in the house, the available labour force (males over the age of 12 years). Although all three variables were found to correlate positively with the area of rice cultivated by a household (all three within the range of $r = .15$ to $r = .20$) these correlations are too weak to warrant a "Chayanov" effect in Los Monos rice farming (Vink 1941). In this respect it should be added that although rice is not the only crop in the agricultural system of the village, it is an important indicator of the total agricultural production, and it is quite certain that the area cultivated with rice will be expanded when more land becomes available. (Rice area correlated positively with total land sown, $r = .52$). That rice area is the better indicator of total agricultural production is shown by comparing it with maize, the other important food crop of Los Monos. The total area cultivated with maize shows a lower correlation with the total area sown ($r = .29$).

Exchange of labour is very common in Los Monos. On average, Los Monos farmers exchanged in 1976 about nine days of labour. This exchange of labour occurred more frequently with *criollo* rice than with *forastero* rice crops. The total area of rice was positively correlated with the frequency of exchange ($r = .45$), and was higher than with the area of maize ($r = .30$), but more or less the same as with cowpea ($r = .47$).

The exchange labour system is a second choice to family labour. This is reflected in the negative correlation between the number of agricultural workers per household and the exchange frequency ($r = -.29$). Further the value of paid labour, that is agricultural wages in Los Monos, is positively correlated with the exchange frequency, and more so with *criollo* rice than *forastero* rice ($r = .35$ and $r = .26$, respectively). Thus as wages become higher, more farmers tend to use labour on an exchange basis. This implies that rice farmers in Los Monos prefer to continue cultivating rice on a subsistence level, and that they consider rice to be a basic food crop which is too important to become entangled in the monetary economy over which they have little control.

In Los Monos, labour on an invitation basis (*al ganar*) is only recruited for the rice harvest. Usually members of the family who do not live with the household are the first eligible to assist with the harvest but neighbours and friends may also be asked to participate. Only when the situation is considered to be urgent are invitations extended to outsiders. The farmer will try to harvest as much as possible of his crop himself with the assistance of his sons. This struggle for personal gain is thwarted, however, by the social pressure to provide work opportunities for other villagers, who may not have grown a rice crop.

All farmers in Los Monos harvest rice in the traditional way, that is stalk by stalk, and almost all farmers paid their harvesters in rice: one *puño* for every five harvested. Two-thirds of the farmers claimed that they would prefer to pay the harvesters in cash, but on the other hand 91% of that same group said that they would prefer to be paid in rice when working for someone else. This suggests that class position is an important factor in rice harvesting, even though these positions are easily interchangeable. This only applies to those who are in the more comfortable position of being an owner of a rice crop and who may choose, or at least be invited, to be a harvester for a short period. In this respect it is important to analyse distribution of rice to harvesters from another point of view. Land-owners are less eager to invite others to participate in the rice harvest than share-croppers (see Table 12).

Table 12 Comparison of distribution of rice harvests of land-owners and share-croppers (%)

	Distribution of rice crop of share-croppers (%)	Distribution of rice crop of land-owners (%)
Sale	1	1
Home consumption	48	88
Given to others	4	2
Land rent	33	0
Payment of harvesters	14	9

If all rice was harvested by invited labour, it would then follow that 20% of the harvest would go to these labourers. At present approximately 9% of the rice harvest of land owners goes to pay invited

harvesters and 14% of the rice harvest of share-croppers is distributed in that way (see Table 12). It could be suggested that the poorer people are more prepared to share than those who are better off. The poor need to invest more in maintaining relationships with others, and the rice harvest is one of the few resources they have at their disposal.

The number of *puños* to be paid to a labourer is sometimes adapted to meet the urgency of the situation or the unattractiveness of the work. For example, when a ratoon crop of *criollo* rice is harvested only a third of the crop is taken by the owner, and two-thirds go to the harvester. However, in these situations the productivity of the harvester is low and the stalks which are harvested with the machete (*a la vaca*) are not easy to cut. The number of *puños* a harvester is able to cut in one working day varies considerably. Some people are known for their high productivity, while others admit to poor performances. In a group discussion with farmers, each farmer gave the number of *puños* he was able to cut in one day. This number varied from 15 to 45, the average for the village being 23 *puños*. The average number of *puños* received in payment is 4.6 per day.

The average off-farm price for rice from Los Monos was 450 pesos per *quintal*, or 64 pesos per *lata*. As one *lata* contained 4 *puños* of unthreshed rice, the average daily wage for harvesting is estimated to be 74 pesos.

Logically harvesters prefer to be paid in rice and in fact only two of the 42 rice owners interviewed paid their harvesters in cash. Payment of harvesters in rice may be irrational from a strictly economic point of view, but from a sociological point of view it suggests that Los Monos rice farmers are prepared to give up immediate monetary gain in favour of maintaining harmonious relationships with their neighbours. For a farmer it is worthwhile foregoing a considerable part of his main food crop - up to a sixth (see Table 12) - and distributing it among fellow peasants, in the knowledge that in the event of a disaster the following year, custom dictates that he will receive similar assistance.

Hired labour can be divided into two categories: labour paid per day, and labour paid for a given piece of work. In the first category when a meal is included the payment is called *libre*, and when a meal is not included, the payment is called *sin comida*. Land

preparation and weeding are sometimes carried out on a piece work basis. More frequently, however, labourers are hired on a fixed daily rate, of about 30 to 40 pesos. The task of frightening the birds away from the rice crop is paid at a lower rate of 10-20 pesos per day, but mostly a meal is included. A somewhat higher paid category of work is the application of herbicides and insecticides, because the work is considered to be more difficult. Average daily wages paid for various activities in the cultivation of rice are given in Table 13.

Table 13 Average daily wages for various activities in the cultivation of criollo and forastero rice in Los Monos, 1976 (Colombian pesos)

Activity	Criollo	Forastero
	average daily wage	average daily wage
Seed-bed preparation		34.5
Sowing and cleaning seed-bed		36.6
Land preparation	35.7	33.9
Sowing or first transplanting	36.4	34.7
Second transplanting		37
Weeding	35	37.3
Application of herbicides	50	50
Scaring birds[a]	19.4	14.5
Harvesting[b]	45	
Threshing	40	40

a. All respondents specified that the daily wage for scaring birds included a meal.
b. In two cases, the daily wage included a meal.

5.3.8 Change from criollo to forastero rice cultivation

It is often argued that the change from dryland to wetland rice is related to the fact that wetland rice cultivation is more labour intensive (Hanks 1972, and McNetting 1974). Under conditions of limited land resources wetland rice tends to develop (Geertz 1963), in which increasing inputs of labour are rewarded with higher yields per unit area (McNetting 1974).

This does not apply to the situation in Los Monos. Although also a shift from dryland to wetland rice is taking place, dryland rice

is more labour intensive than wetland rice. The higher labour input for *criollo* rice crops is due to the need to protect crops from birds and to extra labour required for weeding. These two factors account for 50% of total labour in the case of *criollo* crops but only about 30% of the labour for *forastero* crops (see Table 11). The fact that *forastero* rice also yields more makes the change even more logical.

The question remains as to why *forastero* rice, especially varieties such as Galillón, have not been cultivated earlier. There are two possible explanations. Firstly, it is only now that extra land for the cultivation of dryland rice is no longer available, as all suitable land has been turned into pasture for cattle. Another explanation may be found in the fact that the level of the *cienaga* has been slowly increasing as a result of changes in the strongly meandering course of the Sinú River between Cereté and Lorica. Farmers themselves attribute the emergence of *forastero* rice in Los Monos to this factor.

At present, higher areas around Los Monos are mainly used for stock grazing and thus the area of *criollo* rice has decreased. In the future, when the population of Los Monos increases and less land for upland crops is available, the farmers will have to find a solution to the problem. The only solution would seem to be to expand into the *cienaga*, but these lands have been traditionally claimed by cattle-owners. During the dry season they claim the right to all dry land on the *cienaga*, that is right up to the edge of the retreating water. With the expansion of wetland rice cultivation conflicts with the cattle-owners have arisen. Parts of the *cienaga* have been occupied and planted with *forastero* rice, with a growing cycle extending well into the dry season.

Generally, *forastero* rice growers are in a weaker socio-economic position than *criollo* producers. *Criollo* farmers often have more land of their own, while *forastero* farmers tend to be landless and need to find share-cropping arrangements[7]. After having prepared a seed-bed during the dry season which is done by nearly all households, efforts have to be made to obtain land. As already stated, land-owners tend to live in the older, higher parts of the village. The village and the land cultivated by its inhabitants is extending slowly into the *cienaga*, and at the same time the system of rice cultivation is being adapted and changed.

5.3.9 Economic results

The economic results for both *criollo* and *forastero* rice for 1976 are given in Table 14. It is noteworthy that labour accounts for about 60% of the production costs and that only in the case of *forastero* rice, when no allowance is made for family labour, that there is a small net gain.

Table 14 Economic results per ha of criollo and forastero rice cultivation in Los Monos, 1976[a]

	Criollo rice (Col. pesos per ha)	Forastero rice (Col. pesos per ha)
Production costs		
Land rent	1943	1039
Seed	478	255
Other inputs	176	95
Labour	3746	2857
Other	143	76
Total	6486	4322
Gross value of crop[b]	3402	3444
Net gain	- 3094	- 878
Net gain when no allowance is made for family labour	- 1501	315

a Based on data obtained from 23 criollo and 24 forastero rice farmers.

b Yield: criollo rice, 972 kg/ha; and forastero rice, 984 kg/ha.

In 1976, yields for *forastero* rice varieties were low, while for the *criollo* varieties they can be considered about the same as usual. Posada (1982) reported yields of 2 t/ha for *forastero* rice and 1 t/ha for *criollo* rice. Only *forastero* rice can be considered to be economically viable. Los Monos farmers continue to grow *criollo* rice, even at a loss. The higher production costs for *criollo* are mainly due to two factors, land rent and labour costs for weeding and scaring birds. As *criollo* rice competes for land with cowpea and maize, land rent is higher than for *forastero* rice because these varieties are grown on the *cienaga* or other floodable land where other crops cannot be grown.

For rice farmers in Los Monos the provision of sufficient food is their greatest concern. Rice is grown for domestic consumption

and when there is a small surplus it is sold "to buy other food, such as meat", as one farmer explained. On the other hand, it is not unusual for rice farmers to buy additional rice when harvests are poor (CIAT 1977).

5.3.10 Share-croppers and rice

The pattern of differences between the group of share-croppers and land-owners in Los Monos can be expanded to give a better insight into the relationships between social structure and rice farming in Los Monos.

Share-croppers grow more rice than land-owners. This becomes more meaningful when related to the fact that most of the land which share-croppers have access to is used for the cultivation of rice. As the basic subsistence crop in Los Monos, rice is the main crop for the poorer farmers who are not in a position to grow other crops such as cowpea or maize as do land-owners. Share-croppers have access to less land, yet more than 70% of their land is devoted to the cultivation of rice, while on the other hand land-owners only grow rice on 34% of their land. Share-croppers have to invest more of their energy and resources in relationships with other villagers than do land-owners. This becomes obvious in the recruitment of labour for the rice harvest and also in the *ganar dias* (the exchange of labour between equals on a non-cash basis). Share-croppers exchange more than twice the number of mandays as compared to other farmers. In addition, the giving away of rice as a present is more common in the case of share-croppers than in the case of land-owners (see Table 12).

The poorer people must respond more readily to the concept of "shared poverty", at least more so than those who possess a piece of land and are thus better off.

6 *LA DOCTRINA AND THE NEW RICE*

La Doctrina is one of the few places on the north coast where peasant farmers have started to use new rice technology. After serious social conflicts about land rights during the 1960s the Colombian state land reform institute (INCORA) intervened with a land reform program, which included redistribution of lands and the introduction of improved rice technology. In this chapter an account is given of the INCORA intervention, against the background of the social structure of the village. Rice cultivation in La Doctrina is then examined in detail. The data on which this chapter on La Doctrina is based, include the results of a survey of 68 rice farmers, to whom the same questions were asked as to the farmers of Los Monos. Other data were collected by participant observation, while living in the village for prolonged periods.

6.1 ORIGINS AND BRIEF HISTORY OF THE VILLAGE

There are virtually no historical documents which give information on the history of La Doctrina. The name, La Doctrina, indicates that the village may have been originally a religious settlement, not uncommon during colonial times. A *doctrina* was a more established settlement which followed a *reducción*, a mission to Indians. As it was thought that after a number of years the course of civilization, both in the civil and religious sense had become sufficiently manifest, the name *reducción* was changed to *doctrina* or *parroquía de indios* (Mörner 1970). Mörner has also suggested that there was a subtle difference between a *parroquía* and a *doctrina*, the latter being used in the context of an *encomienda*.

It is known that during the 18th century, the area west of the Sinú River remained Indian territory. There is evidence of recurrent efforts by Spanish missionaries to establish religious outposts, and efforts by administrators such as Miranda de la Torre (Sanchez Juliao 1970) to reorganize settlements along the northern frontiers of New Granada.

As early as 1719, Roman Catholic missionaries "had succeeded in establishing a number of towns on the Atlantic Coast and upon the rivers flowing into the Gulf of San Miguel, but they were all destroyed by the Indians" (Wassén 1940, p. 123) and "the Indians arose against the Spaniards and the few *doctrinas* or missions that had been established were broken up" (ibid. p. 123).

De la Torre described how in 1776, when entering the Sinú River, he founded the village of San Bernardo del Viento: in the area of the place he selected for settlement he gathered about 2990 *vecinos* (Spaniards) and 1370 *almas* (Indians) (Sanchez Juliao 1970) which indicated that the region around La Doctrina was already fairly well populated even in those remote days. La Doctrina was not included on the map produced by De la Torre, but San Bernardo was marked (Fals Borda 1976).

During the 18th and 19th century, the villages along the Sinú River remained part of a virtually forgotten frontier society. The Indians from Darien (the present Cuna groups from Darien and San Blas) kept the Colombians out of their territory.

The small coastal fringe between the mouth of the Sinú River and the city of Cartagena was an important area during colonial times. Tolú and neighbouring villages served as the breadbasket for Cartagena and for occasional foreign Corsairs (Parsons 1952). Economic developments in the south had more decisive effects on the region, when cities in the interior such as Montería and Cereté became important foci for new enterprises directed at national and international markets, cattle raising on improved pastures (ibid.). The inhabitants of La Doctrina must have seen numerous cattle transports passing by on the river on the way to Cispata and Cuba long before the village itself became engulfed in the cattle industry, early in the 20th century.

One of the oldest inhabitants of the village who was born in 1896 remembered the village from his childhood as having "very few houses". As a young man, he was engaged in the cultivation of rice and yams. He also mentioned that his father was born in La Doctrina which indicates that the village existed at least in the middle of the 19th century.

Contact with the outside world was maintained mainly through traffic on the Sinú River, until the gravel road which connects La

Doctrina with Lorica and San Bernardo was constructed in the 1960s. There seems to be no reason to suppose that earlier *Doctrineros* preferred another settlement pattern to the present day pattern of a cluster of houses situated on the more elevated parts near the river.

Further information on the history of La Doctrina can be obtained from local stories and recollections about "El General" Torralbo. Torralbo, who was also a senator of the Republic, obtained vast land areas around La Doctrina at the beginning of the 20th century. "He became the owner of all the lands from Lorica to the Caños and Cispata Bay". Older villagers like to evoke the memory of a cavalier impeccably dressed in white, who, when visiting his lands, distributed money and who intervened on behalf of the villagers in civil matters, as for example getting sons of *colonos* out of the army and back to La Doctrina. Information about the tenancy system under the general is conflicting. Some villagers say that people were free to use the land and then to sell their improved lands to the general, while others say that the "sowing for pasture" system was already in operation. When the general's son inherited the land, he imposed the *terraje* (land rent) system on the *colonos*. For the use of one *cabulla* of land, a peasant had to pay two *quintales* of rice. During the 1940s and 1950s, the general's son sold the land to absentee landlord families from Cartagena.

6.2 INTERVENTION BY INCORA

When INCORA started its program in the early 1960s, most of the land around La Doctrina had been incorporated in five big estates. Apart from a small group of houses on the Caño Muerto and a few groups of houses on the hillsides, all *Doctrineros* lived in the village:

> "in humble huts, constructed with cane and palm leaves, with or without kitchen, in a complete disorder and under the most unhygienic conditions one could imagine" (INCORA, 1965).

In the backswamps and *caños* of La Doctrina, San Bernardo del Viento and San Antero, which make up the intricate delta of the Sinú

River, for the last few decades hundreds of squatters have eked out a precarious living growing rice. Some of these squatters still live in El Viento and La Doctrina while others have built huts in the mangroves. The seemingly never ending quest of the *colonos* for new land was not stopped by the mangrove. The *colonos* cleared mangrove, and by digging small canals through the natural levees, they used the alluvial sediments from the flood waters to improve their plots, and even to raise the level of the fields. Ownership of these *mejoras* became one of the main sources of conflict between the absentee land-owners who claimed these lands, and the *colonos* who held them as state domain[8].

Another source of conflict arose in 1942, when the Sinú River suddenly changed its course and formed a new delta at Tinajones. This natural disaster caused many *colonos* to move from the areas along the river at the Cispata end when the soils were quickly becoming saline and to move to Tinajones, Sicará and Marín. These people squatted on lands owned by big *hacendados*, some of whom were the new land-owners of the La Doctrina area.

During the 1950s, conflicts between land-owners and *colonos* were the rule rather than the exception. In 1960 and 1961, massive land invasions organized by peasant leagues took place throughout the Sinú Delta area, in places such as Rio Ciego, Sicará, Palermo, Tinajones and Isla de Guarino[9]. Early in 1961, an INCORA mission from Bogotá concluded that urgent measures had to be taken to prevent further bloodshed. Letters were sent by both parties to the leading Bogotá newspaper, *El Tiempo*, and in May 1961, a group of peasants was confined to "a sort of concentration camp" by the Mayor of San Bernardo (Duica 1964). In September 1962, by ministerial decree INCORA created the Córdoba Nr. 1 Project on the lowlands of Córdoba in order to:

> "find a solution to the socio-economic problems created in the areas adjacent to the new river mouth whereto the occupants of the old rivermouth had moved" (INCORA 1972, p. 5).

The decree stated that INCORA was to acquire land, either by purchase or by expropriation, and that the land was to be redistributed in small to medium-sized plots to the poor. In addition, water control and land reclamation programs were to be started immediately

(Bonilla 1967, p. 20). Land parcels were to be given firstly to landless labourers, and then to small landholders.

Although the original plans for reclamation and land redistribution encompassed 17 000 ha on both sides of the Sinú River, INCORA concerned itself mainly with the La Doctrina irrigation district of 2600 ha bounded by the Sinú River, Caño Sicará, Cienaga La Soledad and the village of La Doctrina.

In 1964, an embankment was constructed around the district and a start was made to construct a system of irrigation and drainage ditches, to level the land, and to construct a road. By 1968, about 1000 ha was ready for cultivation and by 1972, this area had increased to 2300 ha. In addition during 1964, INCORA succeeded in obtaining at high prices land from four of the absentee land-owners in La Doctrina, totalling about 3470 ha (Gilhodes 1974). The actual assignment of land parcels to the farmers seems to have been far from simple, and virtually impossible to reconstruct after the event. However, it would seem that although assignment policies and administrative procedures were explained, in practice these procedures were not followed explicitly[10].

Of those who received land (*parceleros*), some retired voluntarily from the project often with heavy financial losses, while others were expelled not always for clear reasons. Communal enterprises were organized sometimes against the will of farmers. The size of the parcels was changed several times, many *parceleros* were moved from one parcel to another, and some received also food plots (*pancogeres*). In summary, the distribution of land was very haphazard, demonstrating insufficient organization on the part of the authorities, and the uncertainty of how to respond on the part of farmers and aspirant farmers.

The opinions of several inhabitants of La Doctrina about that period illustrate the equivocal feelings. A 45 year old migrant labourer stated:

> "When INCORA started people said it was communism. I enrolled but in the afternoon when I had to go, I didn't go because I was afraid. I missed the opportunity, just for being a bloody fool (*por pendejo*). If they offered me the opportunity now, I would take it".

A 55 year old migrant labourer, who had just returned from two months cotton picking in Cesar Department stated:

> "I worked three years with INCORA from 1966. I grew maize and rice. The first year I sowed maize, then they changed my *parcela* and I sowed maize again. The last year, 1968, I sowed maize and rice on another *parcela*." (He retired from INCORA after a conflict with credit supervisors whom he accused of theft.)

A 60 year old farmer, who has a one-hectare food plot, was particularly bitter about his experiences with INCORA. During a period of four years, he worked on two different *parcelas*, once as a member of a communal enterprise. He was forced to leave his plot because, as he said:

> "I made fuss to the area director, about a tractor to prepare our land. This tractor was sent to us without notice. Then the *jefe* talked to the selection committee and they kicked me out. I would like to see INCORA investigated."

On the other hand, a successful *parcelero* about 35 years old claimed:

> "Some people did not succeed because of bad luck, and technical problems with the water works. Some were just lazy, didn't know how to manage credit, or just didn't understand what a modern enterprise is all about".

6.3 THE VILLAGE AND ELEMENTS OF SOCIAL STRUCTURE

6.3.1 First impression

When approaching La Doctrina along the undulating dusty road from Lorica, the hilly shrub-covered landscape suddenly changes a few kilometres from the village to a bright green rice plain, stretching as far as the eye can see. Only close to the village is the abundant tropical vegetation of shrubs, palms, bananas, and plaintains to be found. Occasionally, a bougainville can be seen in front of a peasant hut.

Nearer the village, the road runs along an irrigation canal. This is where the visitor is first likely to meet any of the inhabitants,

a number of naked brown children, splashing in the muddy water. By this stage one has already passed through the "suburb" of Santa Lucia, about 500 metres from the village. This is a Dali-type housing conglomerate of rows of shabby buildings around an enormous square.

The tree-lined road which enters the village has an aspect of stateliness and along it are to be found a shop, a bar, and the cemetery. By choosing any of the dirt tracks, the visitor by now accompanied by a train of children, will arrive at a triangular-shaped plaza around which are to be found the older houses and a small church. The few houses in this part of La Doctrina are wooden and often spatious, while the rest of the houses have been built with cane walls and thatched roofs and a few are constructed of cement. Behind the plaza the vegetation rises again, but through it there is an open space, the Sinú River, to which the women and children go each morning to fetch water. The visitor may be lucky to see a giant iguana basking in the sun on a branch of a tree, or perhaps a vulture on top of a carcass slowly floating by on the river.

La Doctrina is not a quiet place, but neither is *Costeño* life in general. Music from radios is to be heard everywhere throughout the day. One hears a child crying here, a woman yelling there, a dog barking, or if not, the unnerving howl of a donkey which sounds as if it is suffocating. During the afternoon and at night, cicades and frogs fill the air with sound. However in spite of the apparent nonchalance, the village gives an overall pleasant impression, at least during the dry season. In the wet season, there is daily rain, myriads of mosquitoes, snakes, muddy roads and a hot, damp atmosphere.

La Doctrina is not a very small village; including Santa Lucia it contains about 350 houses, built close together along a number of dirt roads, some narrow, some wide. The settlement pattern is uniformly rectangular by intention, but somewhat chaotic in appearance. The houses open directly onto the street, and from the street one can see through them to the patios at the back. People, chickens, pigs and turkeys move freely in and out of the houses. The backyards which are separated by woven cane fences, are mostly large enough for animals to scavenge in and are sometimes planted with fruit trees.

6.3.2 Administration

Administratively speaking, La Doctrina is a *corregimiento*, part of the larger *municipio* of Lorica. The only government representatives in the village are the police inspector and two police officers. However in everyday life, they have only token functions. Occasionally it is necessary for the authorities to settle a dispute, but mostly the people themselves take care of their own affairs. INCORA which has established an office near the village deals with most agricultural matters such as supply of land and water, dissemination of agricultural information, and provision of agricultural loans.

6.3.3 Agriculture and other occupations

The village economy is entirely dominated by agriculture. Most male heads of households declare themselves to be either farmer (*agricultor*); food plot cultivator (*"tengo un pancoger"*); day labourer (*jornalero*), or even in some cases: "I work with INCORA", indicating that one has a land parcel in the irrigation district. Those not directly involved in agriculture follow traditional occupations such as shopkeeper, butcher, carpenter, and teacher. Recently, occupations such as tractor driver, assistant topographer, and mechanic have been introduced.

In the economic structure of the village three broad types of farming can be distinguished: cultivation of market-oriented cash crops on INCORA parcels; cultivation of subsistence crops on small plots; and the traditional subsistence farming on the hillsides east of the village. These three categories differ in use of capital, labour, and technology, and in the market they supply.

Those cultivating cash crops on parcels in the INCORA irrigation district form a new group of small to middle-sized farmers. This type of farming is highly capitalized and mechanized, and the farmers make use of agricultural credits which they often obtain from state institutions. The main crops grown are irrigated rice, cotton and sorghum. Very often arrangements are made with rice millers before the crops are harvested. The farmers have a keen interest in official agricultural price policies. The knowledge of the newly acquired techniques and practices has been diffused by government or semi-government institutions.

Subsistence crops are grown on small plots (*pancogeres*) of one to 2.5 hectares scattered throughout the irrigation district. These farmers live either in La Doctrina or on their plots, which are cultivated mainly by family labour, but occasionally an extra hand is hired. In contrast to cash-crop farmers who produce mono crops, many crops are grown together on these plots, making mechanization virtually impossible. Generally, capital inputs are low, and agricultural know-how is handed down from father to son. Marketing of these crops tends to be limited to the village and the local area, although increasingly more food is being trucked to markets further afield, as for example to Lorica. The main crops grown are: cassava, maize, plaintains, egg plants, cowpea, melons and to a lesser extent, onions, achiote (*Bixa orellana*) and peppers.

Subsistence crops are also cultivated on older and larger farms, still to be found on the hillsides. Generally, traditional methods of cultivation are followed on these farms and some still use the slash and burn system followed by a period of fallow.

Although in the past, stock raising was almost exclusively confined to the big *hacendados*, some of the land in the irrigation district is now being used for cattle, mostly in communal enterprises sponsored by INCORA but some individual farmers have also bought cattle. While farmers from all three categories aspire to have cattle for fattening and for the domestic supply of milk and meat, most of them are unable to buy cattle.

Clearly at present in La Doctrina, farming is predominantly small-scale and intensive. There is only one big proprietor who could, according to the Land Reform Act, retain about 100 ha in the irrigation district for his own use. This farmer does not actually live in the village, even though he has a big house on his land. He plays an important role in La Doctrina insofar as he provides machinery for land preparation and also owns a combine harvester. He is also politically active in the region and in La Doctrina.

A few Doctrineros are involved in other commercial activities. There are a number of shops in the village, including a *granero*, that is a larger store where agricultural products are also sold and bought. One young man who has recently acquired a truck with a loan from merchants in Lorica and Montería, buys plaintains, cowpea and sesame from the farmers in the area. One widespread economic

activity, exclusive to women, is the weaving of mats from dried reeds (*enea*). The reeds are collected by the women themselves, and brought home on the head or on a donkey. Every Saturday morning, the women assemble at the entrance of the village, waiting for a truck to take them and their mats to the Lorica market.

6.3.4 Social stratification

The diversity in the village economy gives rise to considerable variation in the distribution of incomes. Those rice farmers who have successfully managed their newly acquired INCORA plots have become almost overnight wealthy people, with incomes sometimes higher than academically-trained INCORA officials. The wealthiest of these farmers, together with shopkeepers, restaurant keepers and some cotton growers make up the top stratum in La Doctrina, about 5% of the total population. The second stratum is made up of the less successful *parceleros*, employees of INCORA and a few hillside farmers, about 30% of the population. Landless labourers and small *parceleros* including the owners of the food plots form the third stratum, about 40% of the total population. Households consisting of single women with their children and the aged are at the bottom of the socio-economic hierarchy, about 25% of the population. This stratification as related to income will be discussed in Chapter 7.

There are few formal organizations: the FANAL group, a farm labourers union; and a group of *Accion communal*, a civic action organization. A group of young farmers who have been involved recently in a land invasion, have organized themselves more or less as a formal group. Political parties do not exist in La Doctrina, although during election periods, factions of the Liberal Party are active. Other social groups include two musical bands and a small group of members of the Evangelist Church.

6.3.5 The households

A systematic study of household and family composition in La Doctrina was not carried out. However, a complete household census in a nearby village, and close observations in La Doctrina and other villages on the north coast have provided sufficient evidence to conclude that 15-20% of the rural households consist of a mother and her children, or a mother and children plus visiting man. This was also

confirmed by a water construction census in 1977 of all households in La Doctrina. (For a classic account of Colombian north coast family and household structure see: Reichel-Dolmatoff 1961; Guttierrez de Pineda 1968; and Stopnicka Rosenthal 1960).

The basic social unit of the village is the household, insofar as its members occupy the same dwelling. As with other villages on the north coast, the concept of household in La Doctrina is not the same as elsewhere in Colombia. Many households include adopted children (*hijos de crianza*) and very often the basic unit mother and children is the result of more than one conjugal relationship. The size of the household may vary throughout the year, especially in the period December to February, when a considerable number of people work outside the village on the cotton harvest. The rather loose family structure can be illustrated by the examples given below.

- A 26-year-old adult, unmarried, is already the father of three children, each with a different mother. Of these children, one lives outside of the village, one died shortly after birth, and the third lives with his mother in a house on a plot of land (*solar*) which the man has bought for her. These facts are well known in the village, and the situation is considered to be socially acceptable. At present, he has a relationship with another woman (mother of two children), but as yet he is not thinking of marriage.

However, relationships between men and women do not always run smoothly, as for example:

- A 55-year-old *parcelero* lives with his wife and four children in La Doctrina from Monday to Friday. A few years ago he became acquainted with a woman in Lorica, with whom he now lives with during the weekends. She already had seven children by several husbands, and, as a result of this relationship she has had an additional four children. The man and his wife have not spoken to each other for several years and the other woman suffers from periods of serious nervous depression. Even though the situation has caused deep anxiety for those concerned, the existing situation is accepted by the local society.

These examples of family life are not representative but nor are they extreme cases. They are given in order to provide an insight into family life on which to base discussion of the possible implications of the redistribution of resources accompanying the introduction of a new agricultural system.

6.3.6 Religion and education

The majority of the inhabitants of La Doctrina are nominally Roman Catholics. Services are held in the local church only once a year, when a visiting priest celebrates Mass on the day of the Patroness of the village, *la Virgen del Rosario*, but few people attend. Baptism is a generally accepted practice and when children are ill they are rushed to Lorica for baptism. Religious celebration of marriages and burials are rare. However, before someone is buried in the local cemetery, a funeral procession through the village is considered to be essential. A handful of villagers are members of the Evangelist Church or have become Jehovah Witnesses. While they are known for their strictly moral behaviour (no alcohol and only one woman), they co-exist harmoniously with the rest of the villagers.

There is one government-supported primary school in La Doctrina and three privately run primary schools. The government school has about 350 pupils, of which those in the first grade range in age from five to 14 years. The teachers commute daily from Lorica. The teachers in the private schools are themselves villagers and provide education for a further 100 children. It is estimated that about 30% leave school before completing all five grades. About 50 young people from La Doctrina attend secondary schools in Lorica. Some commute daily, while others stay with relatives in Lorica during the week. One Doctrinero, the head of a primary school, has studied at the University of Montería.

Nearby La Doctrina, there is a SENA (*Servicio Nacional de Aprendizaje* - apprentice school) which offers vocational training in agriculture and related technology. A few boys from La Doctrina have attended courses in tractor driving and other agricultural skills, but it is considered that there are insufficient job opportunities for them in La Doctrina.

In spite of the good educational facilities, many Doctrineros are still illiterate including several who need to be literate to carry out their jobs adequately.

6.3.7 Migrant labour

One source of extra cash income is the annual cotton picking in January and February in Cesar Department. In the boom years of cotton, as many as 200 inhabitants left the village during this period. Generally, cotton pickers are recruited in December by representatives of the cotton farmers who visit the village and make arrangements with local shops for the women who stay behind to purchase on credit. It is usual for the cotton pickers to leave the village together in a busload and to stay together on the same farm, as they sometimes find it difficult to relate to others from Tolima, Valle or other departments from the interior. In February and March, they return in small groups to the village, with or without money. An increasing number of Doctrineros do not return after the cotton season but cross the border into Venezuela illegally in an effort to find work as land labourer. Labourers are better paid in Venezuela than in Colombia.

6.3.8 Daily life

The men leave for the fields at about 7 a.m. and return to the village at about noon. Those who work on irrigated rice crops return to the fields for a few hours in the afternoon. Others may idle around the village, or do domestic odd jobs. Between 5 and 6 p.m. many can be seen sitting in chairs propped-up against the outside walls of their houses, watching the passers-by and chatting with friends and neighbours. The only interruption to this is the evening meal which is quickly eaten. At about 10 p.m. the groups begin to break up and most people are in bed by about 11 p.m.

Women work mainly within the house, except for the task of fetching water during the morning. *Tinajes*, large earthenware jars, are filled with water from the Sinú River and carried home on the head. Some women earn extra cash by fetching water for other households.

Children attend school during the morning, however sometimes boys accompany their fathers to the field or play around in the streets. Girls help their mothers from an early age with cooking, carrying water, caring for smaller children and making mats.

Generally on Sundays, apart from essential work such as rice harvesting, no agricultural work is done. Most people stay at home, visit acquaintances or, when they can afford it, drink beer or rum in one of the local bars.

6.4 RICE CULTIVATION

6.4.1 Irrigation district

Agriculture in La Doctrina is dominated by the irrigation district. Although a large proportion of the food supply for the village is produced on the *pancogeres*, small plots scattered throughout the irrigation district, the main commercial crops are irrigated rice and to a lesser extent cotton and cattle. INCORA has classified the soils in three groups: soils considered to be fertile, about 1% only; soils of marine origin, with a lighter texture, and with severe limitations for crop cultivation, about 50%; and heavy clay found in lower swampy areas where drainage is poor, and agricultural use is limited.

The agricultural calendar for rice is only determined to a minor extent by the climate. Social factors, such as the regulation of the supply of irrigation water, the availability of credit, technical assistance and also man-induced ecological changes are all factors which determine the time to plant, cultivate and harvest. Double-cropping, that is two crops of rice in one year, is possible, and is sometimes realized. The first crop is planted in April and harvested in August. The second crop is planted during the dry season in September or October and harvested in January or February.

Most of the land suitable for rice cultivation in the area designated for irrigation has been served with an irrigation system by INCORA. Water is pumped from the Sinú River by three engines.

Cotton, in contrast to irrigated rice, depends on the weather. It is sown at the end of the wet season, and harvested during the dry season, in January or February. The canal system, which was originally designed to serve both as a drainage and irrigation system, is sometimes also used to drain excess water from the cotton fields. Some cotton farmers alternate their crop with sorghum, which is planted immediately after the cotton harvest and harvested in July, a few weeks before the cotton is sown. Parts of the irrigation

district are used for livestock. Irrigation canals provide drinking water for the cattle and water for the maintenance of the pasture during the dry season.

Taking exception for the food plots, all crops produced in the irrigation district are cash crops. Although rice farmers may retain a few sacks of rice for home consumption, virtually all rice, cotton and sorghum produced is sent to the market.

Of the total area of 3400 ha acquired by INCORA, only 2600 ha was to be irrigated a part of which was designated for cattle raising. By 1976, about 2300 ha had been prepared for commercial farming. This area has never been put into use in its entirety. For example during the first semester of 1976, 500 ha were used for irrigated rice farming, 40 for unirrigated rice, 218 for cotton, 12 for sorghum and 497 for livestock production, giving a total of 1267 ha. The remainder was unused or semi-used (extensive cattle holding, some minor traditional crops). During the second semester the irrigated rice area dropped to 410 ha. Although originally the individually handed out parcels for crop production were of the size of 10 ha (so-called Familial Agricultural Units) and those for cattle production of 20 ha, most rice farmers, for a host of reasons, do not manage to cultivate them all.

A sample of abandonment during the year 1977 was provided by INCORA officials. The data were given on groups of farmers, not for individuals. The group "El Esfuerzo" did not sow this year for reasons of internal conflicts: abandoned 55 ha. The group K derecho left to sow 61 ha. The group J Derecho did not sow rice on 32 of its 112 ha. The group H Izquierdo left to sow 27 ha. La Palma nearly 60 ha, La Pizarra 3 ha. The farmer P.D. left his entire parcel: 9 ha. The group Las Icoteas did not sow 4 ha etc. The ultimate reason for this behaviour was, in the eye of the INCORA-official, the fact that "*el material humano no sirve*", the human material was not worth anything.

The rice area per farmer calculated from the La Doctrina survey gave an average of slightly more than 7 ha of irrigated rice; it varied between one half of an hectare till 20 ha.

The tenancy status of rice land (and of other land in the district as well) has remained vague. INCORA, as the state agency in charge of the implementation of the Land Reform laws, has expropriated the land and distributed it among those it considered entitled

to receive land parcels. In due course the new possessors would redeem the value of the land to the institution, and thus become the new owners. Ownership, however, should remain restricted to one person: new owners were not entitled to divide the land among buyers or among heirs. Whenever a new owner would sell his parcel, INCORA would have preferential rights to be the first buyer.

Until now only a handful of La Doctrina *parceleros* have started to pay off their debts. In 1976, INCORA witheld agricultural credits to those who had not made the first repayment for the land.

Some *parceleros* are in such a bad financial shape as a result of crop losses at the beginning of their agricultural entrepreneurship, that they are unable to even start thinking of paying the land to INCORA, others have abandoned their parcel and returned it to INCORA, others have fled from the area in order to escape debts, and a final category just refuses to pay by referring to political ideologies which state that the land belongs to those who work it. Through its instrument of credit management, INCORA is charging now about 2000 pesos per ha for land rent.

6.4.2 Rice varieties

"We do not sow one single grain of rice, if it is not on mechanized land". This is the proud statement of one rice farmer interviewed in La Doctrina. This statement is almost true, most rice grown in La Doctrina is irrigated and mechanized rice but some *forastero* and *criollo* is produced, mainly outside of the irrigation district. Sometimes, but very rarely, a farmer may plant a small area of traditional rice for his own pleasure and domestic consumption. During the year of the survey, the only variety sown in the irrigation district was CICA 4. All farmers interviewed claimed to be acquainted with other high-yielding varieties. In fact, Bluebonnet 50 and IR 22 were extensively grown until the beginning of the 1970s, when yields became very low because crops were severely attacked by rice blast and farmers changed to other varieties. Until 1977, CICA 4 remained relatively free from attacks from rice blast, although it has been observed earlier in some plots. In 1978, most farmers changed from CICA 4 to CICA 9.

The rice varieties preferred for domestic consumption in La Doctrina, or at least as expressed by the farmers, tend to correspond

largely with those planted by the farmers. While the majority preferred CICA 4, there was some preference for varieties grown previously (see Table 15).

Table 15 Rice varieties preferred for domestic consumption by farmers in La Doctrina in 1976 (n = 68)

Rice variety	Frequency of first preference
CICA 4	59
Mono Recao	7
Ina	4
Bluebonnet 50	3
IR 22	1
Fortuna blanco	1
Mono Collà	1

6.4.3 Cultivation practices

Frequently land preparation and sowing is done on a contract basis. Farmers with small rice areas have to wait until the contractor comes to a neighbour with a bigger area, as usually a contractor will not come to farms of less than 3 ha. The starting date for such activities depends on the availability of a loan and a tractor. Sometimes land preparation is postponed until measures to control red rice have been taken. The land is ploughed once, and harrowed three times. Some groups of farmers have their own tractor and implements, which they hire to other groups. The seed which is broadcast and not planted in rows, is purchased from Fedearroz. INCORA is responsible for seeing that seed from previous harvests is not used.

After sowing, the field is divided into smaller sections by furrows and ditches which are prepared mechanically a few days after sowing. Then the field is flooded with water pumped from the Sinú River. The rice fields are flooded twice a week, until one or two weeks before harvesting. It is essential that furrows and ditches are kept in good condition, especially during the first month. Maintenance is carried out by semi-skilled labourers (*paleros*), who work almost daily to deepen the ditches and elevate the furrows.

Often areas of the rice field have to be resown where the rice has not come up well, and also rice plants are transplanted from areas where the crop is too dense.

The use of fertilizers is necessary in order to obtain the high-yielding potential of the short-straw varieties. The fertilizer most commonly used is urea. The amount applied is dependent on the number of years a field has been cultivated with rice, usually two applications are made, however, in some places three applications are necessary.

Weeds are removed manually, or chemically using a portable back-sprayer. Manual weeding is necessary for the removal of red rice, which is now a serious problem in La Doctrina. It is suggested that red rice is mixed in the rice seed, and is also brought into the fields from other regions by the tractors and combine harvesters. As already stated, the planting of CICA 4 was sometimes delayed until control measures such as manual weeding had been carried out. The weed *Coquito* (*Cyperus rotundus*), which was unknown before the introduction of the irrigated mechanized rice, now presents a problem. Some weeds are removed manually with the aid of a machete. At least once during a growing period, the rice crop is sprayed with herbicides, the most commonly used being Stam and Esteron, which are applied when the fields are not under water.

Farmers have not been able to control rice blast. Applications of insecticides are made to control *Sogata*, which causes mechanical damage to the rice plant. Occasionally accidents occur as a result of ignorance about the toxicity of a product, or as a result of negligence.

During the dry season, there is no need to take measures to protect the rice crop from birds, and even in the wet season, birds are less of a problem than they have been in the past. The farmers attribute this to changing ecological conditions. There are fewer trees and shrubs around the rice fields and thus fewer nesting places for the birds. It is also said that many birds are killed by the poisonous inputs now so widely used.

Rice is harvested mechanically with combine harvesters. These are hired from private farmers or from entrepreneurs who lease out agricultural machinery. About six combine harvesters were previously available in La Doctrina, but now harvesters have to be brought in from other regions, as for example Montería. In 1977, a part of the rice crop was lost because of the shortage of harvesters and machines had to be brought from places as far away as Fundación, in Magdalena

Department. The hire of a combine harvester includes a driver and an assistant. There is no one in the village with the skill required to operate one of these machines. The work is considered to be difficult, as it is necessary to determine where the machine can be used safely in the field because of the numerous inundated depressions. These parts of the field are harvested manually.

It is not practical to harvest the new dwarf varieties using the traditional method of cutting individual stalks with a knife. As the new varieties are lower the person harvesting has to stoop when cutting the plant. In addition, as a result of the higher planting distance and also the denser and more erect foliage from which the rice ears do not rise pronouncedly out of the rice plant as in the case of traditional varieties, it is not possible to make *manotadas* and *puños*. The harvesters claim that the grains of CICA 4 shatter more easily than those of traditional varieties, which is a further reason for not using the traditional harvesting method. At present, in those areas where for some reason it is not possible to use a combine harvester, the rice is cut with sickles, that is the whole rice plant including the leaf is cut and thrown on heaps.

When the moisture content of manually harvested rice is not very high, it is threshed in the field, however, very often the rice has to be dried first, before a buyer can be found. When the rice is harvested with a combine harvester, the sacks are left scattered throughout the field, and additional labour has to be hired to take the sacks to the edge of the field, or to the road, where the buyer picks up the sacks with his truck.

Small quantities of rice which are not harvested mechanically are collected by the poor. Another related phenomenon is the volunteer rice (*morqueña*) which sometimes just grows after the main crop has been harvested. When two crops are grown per year, *morqueña* is not possible. However, in some very moist places in a field, a second crop is not grown because it is difficult to get a tractor into these places. *Morqueña* rice is sometimes left for the poor, but when the yield from the *morqueña* rice is substantial, a part of the harvest (half or a third) has to be paid to the owner.

A not unimportant activity is the guarding of the sacks of rice when the buyer himself is not present on the day of the harvest.

The harvest has to be guarded against theft in the night. INCORA officials emphasize the fact that this is a new phenomenon in La Doctrina.

6.4.4 Organizational aspects

In contrast with the situation in Los Monos, rice farming in the La Doctrina area is not possible without an institutional infrastructure organized specifically for irrigated rice farming. Of course, rice farming in Los Monos is also surrounded by many social institutions, but the difference with La Doctrina is that in the latter case all sorts of assistance is provided for and organized by the Colombian state and semi-official bodies.

As large monetary inputs are necessary for the production of irrigated, mechanized rice, adequate credit facilities are required, a resource the village alone cannot provide. These credit needs are provided by organizations established by the state, private enterprise and by the farmers. To make credit operations more flexible, rice farmers are organized into groups or *empresas*, and credits are given to these groups, and sometimes they are liable as a group. During the starting phase of the irrigation district decisions on when and where to plant were taken by functionaries of INCORA, now more initiatives are taken by the farmers themselves. The same has happened with the contracting of land preparation and sowing equipment, input application, harvesting and marketing activities.

As far as water control is concerned, which determines the time of planting and to a certain extent the result of the whole enterprise, they are largely dependent on INCORA, on the availability of water, on the functioning of the pumps, the maintenance of the feeder canals etc.

Another institutional area they become more and more dependent on is the market. Subsistence farmers such as in Los Monos can easily retreat into rice production for family consumption. They have not betted on a given price on the market, and have not invested high amounts of money in order to make a profit on the investment. The only costs they should recuperate are land costs and hired labour. In La Doctrina rice farmers must keep an eye on the national rice prices, and even on costs of inputs which are imported from abroad. Such input prices are subject to oscillations of the value of the Colombian peso vis-a-vis the US dollar.

Availability of inputs and machinery are other concerns of the La Doctrina rice producer. Solutions to these problems can only be found through organizations, often supported by and dependent on government organizations and bureaucracies. Also the change into a new variety of rice is outside the knowledge and competence of the individual grower.

6.4.5 Labour

The recruitment of labour is at present organized quite differently than previously. The mutual exchange of labour by farmers in rice cultivation has virtually disappeared from La Doctrina. Only a very few farmers (four out of 68) stated that they had used exchange labour in their rice crop.

All labour which is not provided by the farmer himself is paid for on a daily basis, and even the sons of farmers often are paid on this basis. Most farmers take a weekly wage of about 300 pesos which is deducted from their INCORA credits. Usually a rice farmer has a small number of labourers who work for him on a more or less regular basis. When labour is concentrated for short periods of time, as with land preparation, weeding, harvesting, the farmer's main task is supervision.

As skilled or semi-skilled labour is required for many tasks in the new system of rice farming, farmers cannot select their labourers themselves as labour is often tied to the new technology (irrigation system, tractor combine harvester). Particularistic relationships between farmers and labourers, which exist in traditional systems of rice cultivation are becoming less a basis for labour recruitment.

The hiring of labour for a particular job (*por tarea*, piece work) is quite common, as for example the maintenance of irrigation furrows and ditches, land preparation, sowing and weeding. Other work such as the handling of the filled rice bags, and the carrying of them to the roadside is paid for on a piece rate. The cultivation of irrigated rice in La Doctrina is less labour intensive than traditional systems of rice cultivation. It has been estimated that in 1976, for the cultivation of one hectare of irrigated CICA 4, a total of 46.4 man-days were required, of which 16.4 were provided by the farmer or by

members of his family. The construction and maintenance of irrigation works together with weeding accounted for about 60% of the total labour. Mandays usually means work done by one man from about seven or eight in the morning until five in the afternoon. It is no longer the custom to pay part of the day's wages in food. Only five out of 68 farmers reported to have provided meals, and then only for those workers employed to frighten away birds.

Regional norms regulating division of labour according to the sexes are still adhered to. Women do not work in the rice fields. It is only considered acceptable for women, and then only the poor, to weed and harvest cotton. Boys and adolescents work in the rice fields when they do not attend school. The average daily wages paid for various activities concerned with the cultivation of irrigated rice are given in Table 16.

6.4.6 Loans and credit facilities

Rice farmers may choose, at least in theory, from a wide range of possible sources of agricultural credit. Rice cultivation, as with other capital-intensive crops, is financed by a number of government-sponsored credit institutions. Often these loans are supplied to groups of farmers, in order to avoid paperwork. Nevertheless, except in a few cases, individual farmers are responsible for the repayments.

Table 16 Average daily wages for various activities in the cultivation of irrigated rice in La Doctrina, 1976 (Colombian pesos)

Type of work	Average daily wage
Land preparation	39
Sowing	40
Maintenance of irrigation works	43
Application of inputs	43
Manual weeding	40
Frightening away birds	45
Harvesting	
Combine harvester	55
Manual	45
Drying rice	48
Weighing rice bags	57
Guarding rice bags	70

Loans are given on a short-term basis (six to 11 months) and the interest rates vary from 14 to 18% p.a. These loans cover financial expenses for mechanical land preparation, sowing and harvesting, the purchase of improved seeds and other inputs, and also labour costs including renumeration of the farmer himself, cost of irrigation, technical assistance, mechanical harvesting and land rent.

Various types of loans can be drawn from the *Caja Agraria* including the *Fondo Financiero Agrario* (FFA) which provides credit for groups of small farmers; and *Credito Planificado*, a scheme designed to help small farmers in INCORA irrigation districts make rational use of their resources. In La Doctrina, *Credito Planificado* is generally is given as a supplement to the FFA fund credit. During 1976, credit for irrigated rice from *Credito Planificado* and the FFA together amounted to 10 000 pesos per ha. In 1977, this increased to 11 000 pesos per ha, and in 1978 to 14 000 pesos per ha.

Credito Planificado is supervised by INCORA. *Caja Agraria* credit officials very seldomly visit La Doctrina, supervision is left to INCORA. INCORA serves as a guarantee for FFA credits, and it will assume outstanding debts of farmers in the irrigation district. It is also responsible for checking that the money is used for the purpose for which it is given. Many farmers do not receive all their credits in cash, but instead receive written authority for the purchase of inputs. Often only part of these inputs are applied to their own fields and the rest is sold (for less than the market price) to other farmers who have not received INCORA credits.

Many farmers are not aware of the differences between the various loans, for them obtaining a credit means going to the INCORA office, and requesting a loan. "I have to talk to INCORA (*tengo que hablar con INCORA*)" often simply means asking for a financial loan. The selection of farmers for the award of credit is made by INCORA credit supervisors. Farmers whose debts exceed the 100 000 pesos limit are listed on the *cartera morosa* (listed as poor risks) and are not eligible for further INCORA credits, or for other government credits, as this information is passed on by INCORA to the *Caja Agraria* in Lorica. These debtors have to make repayments under an INCORA repayment schedule, or look for other sources of finance.

Another source of institutional credit for rice farmers is the *Desarollo Rural Integrado* (DRI) program, a nation-wide integrated

rural development program established by the Colombian government in 1976. One of the aims of DRI is to increase the amount of food produced by small farmers in selected areas of the country. Farmers who have access to less than 20 ha, derive more than 70% of their income from agriculture and have few capital assets, are entitled to cheap credits from DRI funds. In the La Doctrina area, the DRI program has been used to finance the installation of water pumps.

INCORA can guarantee loans from the *Caja Agraria* for the purchase of agricultural machinery. One group of rice farmers has thus acquired a tractor and other implements. DRI funds can also be used for such loans. As a minimum amount of land is required before such a loan is granted, farmers have grouped together to share ownership of such machinery.

Loans can also be obtained from banks other than the *Caja Agraria*, family, friends, or moneylenders such as shopkeepers, rice buyers, or owners of rice mills (see 6.4.8).

Table 17 Credit facilities available to rice farmers in La Doctrina

Source of credit	Number of farmers[a] obtaining loans	Average loan per farmer (Col. pesos)
Government loan through Caja Agraria	18	98 000
Government loan through INCORA (Credito Planificado and Fondo Financiero Agrario)	22	65 600
DRI	17	60 000
Private banks	2	27 500
Family and/or friends	4	31 200
Other private loans	6	8 000

a Several farmers had loans from more than one source.

From the various sources of credit available to farmers in La Doctrina for the cultivation of rice given in Table 17, it can be seen that a considerable proportion of production costs is financed from outside funds. The official credits available are insufficient to meet all production costs and farmers have to find additional sources of finance for themselves. Of the 66 rice farmers who provided data on their financial position, 41 stated that they had outstanding debts with INCORA, but from INCORA it was known that most

of the 66 had such debts, even though only for land. The stated debts were for land and crop losses including accumulated interest from previous years. For those who provided specific information on their debts, in total 34 farmers, the average debt amounted to 48 700 pesos, including long-term loans for machinery for a small group of farmers which, in contrast to the majority of farmers in La Doctrina, is considered to be solvent by INCORA officials. Although farmers are generally unwilling to give precise information on their debts, it can be concluded that the financial position of many farmers is somewhat precarious.

6.4.7 Rice yields

Rice yields are high in La Doctrina, although below the national average for irrigated rice. It has been estimated that in 1976 the average yield was 3.6 t per ha. It is noteworthy that in La Doctrina no one talks about *botijas* or *cabullas* of rice any more, the expression *bultos per hectarea* (bags per hectare) is used, as in Tolima and Huila Departments. Farmers are somewhat reluctant to state their yields precisely. They do not want INCORA officials to know how much money they make, lest repayments of loans be accelerated. The reports on quantities of rice harvested which drivers of combine harvesters are required to provide, are often inaccurate and based on an arrangement made with the farmers.

Yields vary considerably; in 1976, yields varied between 0-8 t per ha and in 1977, between 0-6 t per ha. Factors which contribute to these variations include not only physical conditions such as the soil and crop pests but also the amount of labour, experience and personal skills of the farmer, and the assistance received from INCORA and Fedearroz (Posada 1982).

6.4.8 Marketing

When the irrigation district was first established, the marketing of rice was handled by INCORA. After 1967, many farmers from La Doctrina joined a multiple service co-operative, organized by the Central de Cooperativas de Reforma Agraria (CECORA), which is a central co-operative of Colombian land reform beneficiaries. This multiple service co-operative, which covered the lower Sinú Valley, bought agricultural produce from the farmers for resale on the

national market and also provided agricultural inputs for its members. The organization functioned well until it was disbanded in 1976, because of fraudulent practices. Many farmers in La Doctrina were left with debts and financial claims. Another marketing organization set up by CECORA has also apparently met the same fate (CECORA 1982).

Since 1976, all rice has been sold by the farmers themselves, quite independently of INCORA. Irrigated rice is sold to rice mills in San Bernardo del Viento, Lorica, Sahagún, Tolú, Montería and Barranquilla. Prices during the second part of 1976 fluctuated between 3700 and 3800 pesos/t delivered to the roadside. However, the price increased in January-February 1977 to 5000 pesos, and in March 1977 to 5300/t. In August 1977, the price/t was 6300 pesos. Transportation costs are assumed by the buyer, who also provides the rice bags.

The proportion of red rice and moisture content reduces the price considerably. The rice is sometimes sold long before it is harvested and advanced payment is made to the grower. In 1976, about 25% of farmers sold their rice crops to *particulares*, that is people who do not have rice mills. Although systematic data were not collected, it is known that advanced payments are also made by *particulares*. Those farmers who sold rice to *particulares* did not differ from those who sold to the mills with respect to price obtained, area cultivated or known debt to INCORA. Some *particulares* are shopkeepers who buy rice, dry it themselves, and then have it milled in Lorica or San Bernardo and sell it in retail.

A number of bags (varying from 5-50 bags) are kept by the farmer for home consumption. From the survey, it was estimated that 95% of the rice cultivated was sold, four percent was kept for home consumption and one percent was given to family and friends.

6.4.9 Production costs and economic results

Data provided by Fedearroz on production costs of irrigated rice in 1976 were found not to be applicable to the situation in La Doctrina. According to Fedearroz, average production cost for rice in that year were 22 000 pesos per ha. However, from a survey of 68 farmers costs were found to be much lower (see Table 18).

Table 18 Production costs per ha irrigated mechanized rice in La Doctrina area, 1976 (n = 68)

Cost categories	Cost per ha (Colombian pesos)
Land rent	1585
Land preparation	1800
Water	526
Seed	1242
Chemical inputs	1912
Harvest (combine harvester)	1800
Technical assistance and interest	901
Transport	300
Labour, including own labour	2012
Total	12 078

The economic results of all farmers are compared with the average of a relatively successful co-operative group of farmers in Table 19.

Table 19 Comparison of the economic results per ha of irrigated mechanized rice for a co-operative group, and all individual farmers in La Doctrina in the first half of 1976

	La Doctrina	Cooperative
Yield (kg/ha)	3 600	5 140
Gross value of the crop (Col. pesos/ha)	13 320	18 258
Production costs (Col. pesos/ha)	12 078	15 819
Net profit (Col. pesos/ha)	1 242	2 439

The average net profit for rice was very low in 1976, however, it should be noted that rice prices almost doubled the following year. During the first part of 1976, 25 out of 68 rice farmers made a loss and had to face further debts with credit institutions. The most successful group made an acceptable profit; if prices had been higher, as was the case in earlier and later seasons, their performance may well have demonstrated that the new rice technology, together with sufficient land and adequate services provide the basis for reasonable incomes. When conditions are less favourable it seems that mechanized, irrigated rice cultivation in this part of Colombia is a risky business for small and medium farmers.

7 *RICE AND SOCIAL CHANGE*

In the preceding chapters, rice cultivation as it has developed on the north coast of Colombia was examined. Attention was given to the various ways rice cultivation is related to the social structure of the region, and how *criollo* rice had a specific role in the agricultural development of the north coast. Chapters 5 and 6 dealt with rice farming in two villages.

Now it is possible to make comparisons and to examine into detail how new rice technology has contributed to social change on the local level among *Costeño* peasant farmers. Consequences of the introduction of this technology are divided into two categories. Firstly, it is examined how the new rice technology as part of a broader incorporation process has affected the life of rice farmers in La Doctrina. These consequences include changes in social stratification, income and status positions, size and composition of rural households, migrant labour, employment and aspirations for the future. Secondly, social change as related directly to characteristics of the new rice varieties is described and discussed. Emphasis is given to changing harvesting methods and related systems of rice distribution. Finally, incomes derived from rice cultivation are examined.

The analysis is made by comparing groups of rice farmers during various recent periods of La Doctrina, and also by referring to rice farmers of Los Monos.

7.1 STRATIFICATION IN LA DOCTRINA

About 30 years ago, only two categories of peasants existed in La Doctrina: a large group of *colonos*; and a handful of small land-owners. Most of the land around the village belonged to five absentee land-owners. Every year, the villagers rented plots of land from these land-owners which they cleared and planted with rice, maize, cassava and other subsistence crops. A small group of farmers who were slightly better off cultivated their own land on the hillsides around the village and in the hamlet of Los Platanales. One

inhabitant, now a rich rice farmer described La Doctrina before the arrival of INCORA as:

> "a hamlet of about 60 houses. Most people dedicated themselves to the colonization of land, by clearing it for the big land-owners. The area cultivated by each farmer varied according to his labour force. One or two rice crops were grown before the land was handed back to the owner. The rice was often sold *en la hierba*, a disadvantageous system for the farmer. Sometimes, for the money received for one *lata* of rice when the crop was still green, one had to deliver two *latas* of rice in repayment when the rice was harvested."

According to Bonilla (1967), when land became scarce around La Doctrina, the landless *colonos* were not only required to pay for the use of the land by sowing it with pasture but also by fencing the field, and paying a land rent in cash or kind (*terraje*), an obligation still referred to by present inhabitants with dismay. As land became scarcer, land-owners reduced the size of the plots they leased to *colonos* and sometimes did not allow crops with long growing cycles to be planted such as cassava and yams. This is confirmed by one inhabitant who stated: "They rented the land to us when they felt like doing so. Sometimes we had to pull out young cassava plants (*yuca biche*) because they wanted to put their cattle on the land. In the end, they would not lease land to anyone." *Colonos* were only permitted to grow annual crops. The planting of perennials such as fruit trees or plantains would give a *colono* certain implicit rights to the land, extending beyond the two years required to convert land covered with brush into pasture. For this reason, a few small land-owners specialized in growing plantains, a staple food in the local diet, on the higher area surrounded by an ox bow of the Sinú River now known as Los Platanales.

> "We planted rice, maize, cassava and sometimes yams on the land of all the *gamonales*, the big land-owners. You sowed one, two, or three *cabullas* and those who had enough labour sowed three *cabullas*. They did not permit the sowing of plaintains. The situation then was better than it is now. In those days you gave the land-owner his share and you had enough left for yourself. Rice produced 20 *quintales* per *cabulla* and you had to pay 2 *quintales* to the owner."

An aged inhabitant, who once worked as an administrator on one of the five big estates, stated:

> "There was a time of abundance here in La Doctrina. The canoes arrived loaded with rice, fish, plantains, cassava, yams, which had to be sold at very low prices, or even given away. At harvest time rice from the year before was unhooked from the ceiling, in order to make way for the rice being harvested. It had to be thrown away or given away, or fed to the animals. There was work for everybody. Every Sunday morning I rode to the village to recruit labourers. Everybody who wanted to work on the *finca* was noted in the book and received an advance in cash."

Before the arrival of INCORA, vertical relationships dominated social life of La Doctrina. The inhabitants were treated harshly by the big land-owners, and complained among themselves about this treatment. Yet at the same time, they felt protected by such legendary personages as the General Torralbo. He allowed them to take wood from his land for house construction and *colonos* on his land were not always obligated to sow pasture. The general had "his good and bad sides", as recalled by a 75-year old Doctrinero.

In addition there was a more inwardly directed economy between the *colonos* and the small land-owners which was in many aspects similar to that existing in Los Monos today. Rice was the main subsistence crop, sown by the *colonos* and the small land-owners. In the 1960s, in addition to the shortage of land, the shortage of harvest labour was listed as a major problem limiting rice cultivation in the area. At harvest time the labourers turned out to be rice producers and labour recruiters themselves. Rice farmers had to pay harvesters in rice (INCORA 1965). Horizontal relationships among *colonos* and small land-owners and vertical relationships between the big land-owners and the *colonos* dominated the structure of the local economy.

This situation has come to an end in La Doctrina. The large land-owners have gone and, according to many, government officials have taken their place. Many, including INCORA officials themselves, mention the institutions's paternalistic attitude to the farmers. Another stratification in the micro-society of La Doctrina has evolved. The central axis of the society now consists of a bundle of vertical

relationships between those farmers cultivating irrigated rice and labourers who work for them. Horizontal economic relationships still exist especially among those cultivating food plots, but are decreasing in importance. At the apex of La Doctrina society is now a small group of successful irrigated rice farmers. The position of the small land-owners, who have been superseded by these farmers is now not much better than that of many cultivators of food plots.

In summary, La Doctrina began as a typical latifundio-minifundio society with the classical structure of a benevolent landlord surrounded by a mass of tenants ekeing out an existence on his land in exchange for preparing the land for his cattle. Over the years, a few became small land-owners but the overwhelming majority remained landless tenants. Unrest built up gradually over a period of about 50 years in which the landlords placed harsher demands on their tenants. Finally, the Colombian government was forced to intervene, and land was expropriated and redistributed among the landless. With the introduction of new technology a small local elite of relatively rich farmers came into existence. The many immigrants attracted by the employment opportunities on the new agricultural infrastructure meant that the majority of the inhabitants of La Doctrina became landless labourers. An intermediate class of small peasant farmers wedged itself between the rich rice farmers and the landless.

As already stated, much of the expropriated land has been left idle, mainly because of indebtedness with INCORA. Some parcels have changed ownership without the legally required consent of INCORA. Although the legal owner is obliged to sell his parcel preferentially to INCORA, it now occurs more frequently that parcels of unsuccessful *parceleros* are ceded to the more successful. In this way, some farmers have been able to acquire as much as 20 ha irrigated land. One case is reported of a rice farmer obtaining an additional plot by coercion, the wife and children of the absent owner were not able to withhold the intruder. Small food plots in the irrigation district are also considered to be an attractive investment. Some farmers are known to have purchased as many as seven of these plots. A few rice farmers have been so successful that they have been able to purchase land outside the irrigation district for cattle raising, and to employ a manager.

Criteria for social ranking have also changed. Previously, belonging to the group of *blancos* meant belonging to the highest class. By definition these people did not live in La Doctrina, but had a place in the local society as large land-owners. For example, the Torralba family resided in the capital, Bogotá, but had a summer residence on its estate. A more or less egalitarian social structure predominated within the village comparable to that in Los Monos at the present time. In La Doctrina, power, prestige and high income, which were the criteria for classifying people as belonging to the old landed elite, tend to make way for one single criterion: money.

7.2 INCOME AND STATUS IN LA DOCTRINA

Four broad income groups can be distinguished in La Doctrina (see Table 20). The first is a small elite group of about 15-20 rich rice farmers which has evolved as a result of efficient use of recent technological innovation. The rice farmers are well aware of this disparity in income which they attribute mainly to the shortcomings of INCORA, the less successful consider that they have not been in a position to make use of the new technology. Complaints about INCORA range from disregard for their needs for machinery, problems with obtaining credits, to straightforward accusations of theft by INCORA officials. Farmers frequently expressed the opinion that INCORA has favoured a small group, and thus neglected the majority. According to one farmer, this small group consists of: "Those who shouted harder; they were listened to, and received all they wanted. You can find them every day in the offices of INCORA. They get what they ask for, but not the others."

Those in the highest income group are beginning to display their wealth with the purchase of articles, such as television sets, bicycles, luxury furniture, and constructing better and more spacious houses. To own a house constructed of cement bricks (*una casa de material*) instead of wattle and daub with a palm leaf roof is considered to be a clear indication of wealth in the village.

The majority of farmers in the irrigation district forms a second income group. Many of these farmers have debts and are only able to continue farming with loans from INCORA and other sources. Others such as teachers, the butcher and some shopkeepers can also be included in this group. The incomes of the remainder of the villagers

are very low, often not exceeding 10 000 pesos per year. At the very bottom of the income distribution are the households without a steady monetary income, mainly those households consisting of single women or some of the aged.

Table 20. Income groups in La Doctrina

Group	Proportion of population (%)	Estimated income[a]
I		
Rice farmers Shopkeepers Itinerant trader	5	60 000-120 000 pesos 30 000-60 000 pesos when only one rice crop is cultivated
II		
Rice farmers Cotton farmers Cattle farmers Butcher Teachers Shopkeepers Hillside farmers	30	Less than 10 000 pesos
Migrant labourers Plaguero		80-100 pesos per day
III		
Hillside farmers Landless labourers Hairdresser Carpenter Bricklayer	40	5000-8000 pesos
Landless labourers		40-50 pesos per day
IV		
Women without husbands Aged	25	water carrying 1 peso per tinaje rice husking one pound of rice for four husked, washing, making enea mats, petty buying and selling

a Figures are yearly unless otherwise stated

The richer owners of INCORA land parcels do not regard themselves as peasant farmers, who sometimes work for a daily wage on the land of others. One of these farmers said:

> "Can you image me working on the land of Mr A.? Cutting rice for 50 pesos a day? I have seven children". (A. is the only one of the former land-owners who has kept a 100 ha rice plot in the district). "Me, working for a day wage? Not any more, of course not, I have to farm my own land" (Yet he cultivates only one irrigated rice crop per year).

Like most women in La Doctrina, the wives of the rice farmers make and sell *enea* mats. The cutting of the raw material is a very dirty job, as one has to stand sometimes up to the waist in the swamp where the reeds grow. Among the wives and the daughters of the richer farmers mat making is a diminishing activity, as they regard it as a low prestige occupation. The wife of a successful rice farmer said: "My daughters don't know how to weave mats, and I will not teach them. This is very bad work. I don't want them to do it. This is work for the older people, not for the young." However, most poor women in La Doctrina are obliged to continue making *enea* mats, as there are few other opportunities for them to earn money.

Less successful farmers sometimes have strong opinions about the group of richer rice farmers. One member of this group, who is generally considered to be spokesman and leader, is a target for much criticism and envy. He is one of the farmer's representatives on the local INCORA committee which advises on credit assignment. The following was said of this man:

> "He is one of those who has filled his pockets with money, today he has *fincas*, cattle, a house but he is no better worker than I am. He became rich through the misery of the *campesinos*. His parcel is four times bigger than those of the rest of us. [In fact, his parcel has the same size as the others]. He is the little god (*el Dios chiquito*) of La Doctrina and is now called *Don*. When I lost the crop on my parcel, I fell ill, and I did not go back to INCORA. This man told INCORA that I would be better off going to Venezuela" [working as a migrant labourer].
>
> "When I left INCORA, they [the farmer's representatives in the committee] did not say one word. If they spoke, it was only for themselves."

The local director of INCORA, speaking about this elite group, said: "There is one group you can lend all the money they want, because they have shown themselves to be solvent and responsible. At present, we are preparing a loan for them for the purchase of a combine harvester".

7.3 COMPARISON OF HOUSEHOLD COMPOSITION IN LA DOCTRINA AND LOS MONOS

During the last 20 years, the number of inhabitants of La Doctrina has increased considerably. In 1960, the estimated number was 800 (INCORA, 1965) and by 1968, this number has increased to 1400, and in 1977 to 2030. This population increase of about 40% in ten years is not due entirely to natural increase. During the 1960s and 1970s many people from villages in the surrounding area, San Bernardo del Viento, Purísima and San Antero attracted by the INCORA project settled in La Doctrina. In fact, many farmers who received an INCORA land parcel were not born in the village. Of the rice farmers surveyed in 1976, 49% were not born in La Doctrina.

The composition of households of rice farmers requires further examination on the basis of four sets of data: the size of the nuclear family, including all members of a biological two generation unit, actually living in the same dwelling; the household size, those belonging to the group living in the same dwelling; the actual household size, the number of people actually living in the household at the time of survey; and the number of household members who were temporarily absent at the time of the survey, mainly those working as migrant labourers.

The average size of the nuclear family of rice farmers in La Doctrina was larger than that in Los Monos. However, in many cases daughter's children are counted as children of the mother. Thus it seems more appropriate to compare the differences between actual size of the households in both communities. The mean number of people actually living in a household at the time of the survey in La Doctrina was 7.7, and in Los Monos 6.6.

It can be concluded that the mean size of households of rice farmers in La Doctrina has increased during the last ten years. This is supported by the data of 1968 and by the data of Los Monos[11]. The

differences between these household sizes can be explained by two mechanisms. Firstly, it is highly probable that the birth rate in La Doctrina has been higher in the last ten years than in Los Monos. Also the number of children desired by farmer families was slightly higher than was the case in Los Monos (see Table 21). Secondly, the number of people in the household who are not actually members of the nuclear family has increased especially in comparison with households in Los Monos. More siblings and adopted children are to be found in households of farmers in La Doctrina than in Los Monos.

Table 21. Comparison of the composition of households in La Doctrina and Los Monos (1976)

	Los Monos	La Doctrina
Mean size of nuclear family	6.7	7.4
Mean size of the household	7.5	8.7
Mean number actually living in the household	6.6	7.7
Mean number temporarily absent from the household	1.1	0.8
Mean of ideal number of children	4.3	4.7

These data suggest that the households of rice farmers in La Doctrina are becoming stronger in the sense that more income is produced by and shared among more people. It seems that with increasing incomes and better resources, economic relationships between the households are losing importance, while relationships within households are becoming more important, especially so in relation to the distribution of income, food, labour and other basic needs. This is consistent with other findings (see Chapter 5) indicating that in more traditional communities such as Los Monos social relationships between the households are important. In addition, the fact that the poorer households in Los Monos (those who cultivate rice on a share-crop basis) shared rice with other households and exchanged labour more frequently than richer households supports this general conclusion. These findings suggest the existence of an increasing process of atomization of peasant households on the north coast. They are also congruent with the general notion of the incorporation effects on Latin American peasants (Pearse 1975). In posing

the question as to whether increasing differentiation among peasants will lead to class antagonisms within the group of smallholders Pearse (ibid.) has concluded that this group as a social system is becoming increasingly conflictive and atomized. Elsewhere he indicates "the breakdown of the land group and the loss of its inner logic and conduct guiding power, and the attachment of the individual rural person (withdrawn from both family and land group matrix) to age-sex peer groups and vertical social aggregates and circuits" (ibid. p. 264).

The present study of La Doctrina suggests that an intermediate stage can be distinghuished between the traditional situation with its "quiet joys of a selfprovisioned life" (ibid. p. 254), and the new situation in which the individual rural person would relate to age-sex peer groups, vertical social aggregates and cricuits, rather than to his family. In this stage individuals do not become detached from their families or households but on the contrary, households are strengthened and become stronger as the basic unit of social organization.

The question should be posed as to whether a valid comparison has been made between households in Los Monos and La Doctrina. The age distribution of female heads of households in each village should not be dissimilar. If this were the case then differences in family and households size could possibly be explained by the fact that households were at different stages of their life cycle. The mean age of female heads of the households surveyed in La Doctrina was 35.8 years and in Los Monos 38.1 years. The age distribution curves showed the same shape for both groups. The lower mean age of women in La Doctrina suggests that a larger number of children born in La Doctrina households is not due to the fact that women had statistically more chance of giving birth to more children because they belong to a higher age cohort. On the contrary, they belong to a lower one.

7.4 MIGRANT-LABOUR AS SOURCE OF EMPLOYMENT

Although employment opportunities have increased in La Doctrina during the last 20 years, a fact of which the strong immigration gives ample proof, migrant labour has remained on a stable level, and even seems to increase.

While the main reason for migrant labour is money, there is also a certain element of adventure especially among the younger people. They relate in painstaking detail the experiences on their first trip; how they managed to survive in such a strange and unfamilar environment; their encounters with workers from other parts of the country; how they had to work extremely hard, and to endure cold and heat in order to bring back their hard earned pesos. The illegal crossing of the frontier with Venezuela adds a special thrill to their experiences. On return to La Doctrina, it is quite usual to organize a big party, which may go on for several days, and which may absorb a substantial part of the labourer's earnings.

Three groups of migrant labourers can be distinguished: *parceleros* who became indebted to INCORA and have been forced to try their luck elsewhere; young landless labourers, probably the biggest group; and single women who work as cotton pickers outside the village. Data on migrant labour from La Doctrina as a whole are not available but some information can be obtained from data collected on the composition of households of rice farmers. On average, one person from each of these households was temporarily absent from La Doctrina. If this figure was to be extrapolated to the village as a whole, it could be estimated that about 350 people were working as migrant labourers. Assuming that some of those absent have regular jobs as for example young women who work as domestic servants in larger towns, it could be estimated that about 200-300 inhabitants work as migrant labourers during the peak period for cotton picking in December. On the other hand, some migrant labourers return from Venezuela for the holiday period between Christmas and New Year. A few typical cases are presented below.

An ex-*parcelero* has described his experiences as follows:

> "I worked for three years with INCORA. The first two years everything went well, but in the third year I lost money. I went to Venezuela for six months, and after that I have worked as a migrant labourer nearly every year. My oldest son goes with me."

A 52 years old ex-*parcelero* with nine children worked with INCORA, growing rice and maize for several years and lost his money. He got into an argument with INCORA credit supervisors whom he accused of instructing people how to evade paying back credits by not declaring how much rice they had produced. As a result his parcel was given to

someone else:

"I go to Cesar every year, I went there for the first time 34 years ago. Sometimes I go twice a year, first in August for *ralear* work (thinning of cotton) and then in December for cotton picking. In the last few years I have taken my whole family with me to Cesar, where my wife has established a *fonda* (a field restaurant for cotton pickers). Normally I receive a cash advance before leaving La Doctrina. I leave this with a daughter who stays behind to look after the house. This year (1977), they gave me an advance of 1000 pesos.

During our last trip, my wife earned 3000 pesos, and also bought two big aluminium pans worth 700 pesos each, and the family had free food. Together we made 18 000 pesos. Every year I buy a radio which I sell here in La Doctrina. This year I bought a big tape recorder, which I could not have done when I was working here as a *machetero*."

A young migrant labourer and the son of a labourer stated:

"When I was 15 years old I went to Cesar for the first time. Since then I have gone every year. They came looking for workers and they met me in the street. They noted down my name, and gave me a cash advance of 100 pesos. That year, 50 of us went from La Doctrina. Cotton picking is a very heavy work, but you earn a lot of money. This year, I worked 34 days and I earned 5300 pesos. I came back with 4500 pesos. I have never been to Venezuela."

Another migrant labourer stated:

"You can save more money in Cesar, but it is very lonely there. I don't want to go again. You get old quickly travelling around so much."

A migrant labourer to Venezuela:

"I have been to Venezuela three times. The last time was in 1977, when I stayed for six months. My job was to clear pasture land with the machete. I can make more money in Venezuela than I do here. Last year, I bought a house for 16 000 pesos and also sent money to my wife. When you come back you always have to settle debts. I have 3000-4000 pesos to pay to the shopkeepers here for my wife while I was away."

When he was away the last time, his wife managed to get a DRI credit to raise cattle on the 10 ha she has with INCORA. When he is not in Venezuela he has to work as *machetero*, or find work carrying rice bags.

Migrant labour is an important source of employment for Doctrineros. Through migrant labour many villagers have learned about other regions of their country and another country as well and have amplified their vision of the outside world considerably. While at times the net financial gains of migrant labour may be minimal, the opportunity to leave the village, to bring back an impressive radio or impressive stories, to walk around in a highly esteemed new suit of outlandish fashion, at least serves as a mechanism to increase their prestige and status. For young Doctrineros, it serves as a mechanism to bring them from childhood into a more serious position of adulthood.

7.5 EMPLOYMENT IN LA DOCTRINA

With the development of the irrigation district, employment opportunities have increased greatly in La Doctrina. Although the number of mandays required to produce one hectare of rice has decreased from aproximately 100 to 45, the larger area under cultivation per farmer has offset this loss in work opportunity. A farmer cultivating 7 ha of rice provides 315 mandays of work of which he works 105 mandays himself. It is estimated that innovations in rice cultivation have provided an additional 147 000 mandays, thus providing work for about 72 people. When all crops and related activities are included, it is estimated that the irrigation district has provided about 150 to 200 extra jobs.

The division of labour in rice cultivation has also changed considerably. Less work is done now by the farmer himself, and more work is done by paid labourers. However, in real terms rice farmers in La Doctrina spend more time working in their own rice fields (on average 105 mandays per year) than do rice farmers in Los Monos (on average 40 mandays per year). In La Doctrina division of labour between the sexes has not changed very much but a division of labour on the basis of social class is slowly emerging as a result of the changes in renumeration. As already stated, in La Doctrina most labourers are paid in cash, while in Los Monos a substantial part of the labour is paid in kind.

People in La Doctrina are very much aware of the increased employment opportunities: "Rice provides for everybody" (*Arroz da para todos*) was the opinion of the assistant driver of a combine harvester. Changes in rice cultivation have introduced new occupations some of which are well-paid. These occupations include combine harvester driver; haulers of rice bags; tractor drivers; mechanics for the maintenance of the machinery. Transport in general has increased which has provided work for drivers, assistant drivers etc.

7.6 COMPARISON OF THE LEVEL OF EDUCATION AND ASPIRATIONS FOR THE FUTURE IN LA DOCTRINA AND LOS MONOS

In general, rice farmers in La Doctrina enjoy higher levels of living than they did before the arrival of INCORA, and certainly higher than rice farmers in Los Monos. One indicator is the level of education which for farmers in both villages is not very high: on average farmers in La Doctrina have spent 1.3 years at school and their wives 1.5 years, and farmers in Los Monos, 1.2 years. However, there is evidence that the children of rice farmers in La Doctrina are staying at school longer than their parents and also than children in Los Monos. At present, farmers in La Doctrina spend three times as much on the education of their children than those in Los Monos, the mean expenditure per year per family being 3410 pesos and 1097 pesos, respectively.

The awareness of rice farmers in La Doctrina of the improvement in their situation is reflected in their answers to the survey question as to whether they considered their general situation to be better, worse or the same as it was 10 years previously. More than 80% answered that their situation had improved, the majority explained this in terms of their improved land situation and better crops. In Los Monos, only 51% of the farmers surveyed considered their situation to have improved and 10% said it was the same.

Generally this felt improvement in La Doctrina is also supported by the answers given to the open-ended question as to whether they had plans for the future to build or to buy a house away from La Doctrina. Approximately 55% of farmers interviewed indicated that they had such plans, of which 45% had plans to build houses in the regional cities of Cereté, Montería and Lorica. On the other hand, when a similar open-ended question was asked about their willingness

to take a job in a nearby town for the same monetary income as they had now, this proportion dropped to 18%. Most farmers thought that urban life was more expensive, and thus they would not be as well off in a town on the same income as they had in the village. Views on urban life were often negative, including: living in a town is more expensive; inadequate for farmers to live in; they had insufficient education or information to undertake such an enterprise; and the advantages of living in the country were extolled. Life in La Doctrina was considered to be more tranquil, more pleasant, happier, and above all much cheaper. Several farmers also explained that they did not want to be told what to do by others. A typical answer was: "I don't want to be ordered about, here I am my own boss."

Rice farmers in Los Monos gave quite different answers. Only 21% stated that they had plans to build or buy a house in an urban centre, but an additional 20% said that they wanted to move to the *montaña* or *monte*, indicating that they wanted to work as *colonos* in virgin forest areas. The proportion of farmers who preferred to live in cities or towns with an equivalent income as they had now was about 40%. This was regardless of the present economic situation, as no difference was found between land-owners and share-croppers. Also Los Monos farmers often expressed negative views on living in a town.

These data indicate that rice farmers from La Doctrina have more positive expectations of their future economic activities. They also appear to aspire living patterns similar to those of the landed elite.

These conclusions are also supported by the reported aspirations for their children, especially their sons (see Table 22). As may be expected, there were considerable differences between what farmers wanted for their children and what they actually expected would happen. In general, the expectations of farmers in La Doctrina were higher than those in Los Monos. In La Doctrina, 82% of farmers wanted their sons to have urban occupations, and only 8% wanted their sons to become farmers. While in Los Monos, 56% had aspirations for their children to follow urban occupations and 30% wanted them to become farmers, but 20% thought that their sons would eventually have non-agricultural occupations. In contrast, in La Doctrina only a very small proportion of farmers wanted their sons to become farmers, and only about a quarter thought their sons would become farmers. Undoubtedly, farming as a way of life has lost some of its meaning for them. A better economic position is considered to be more important than the means used to achieve this end.

Table 22. Occupational expectations for their children of rice farmers in La Doctrina and Los Monos

	Rice farmers (%)	
	Los Monos (n = 42)	La Doctrina (n = 68)
Occupations farmers would like their children to follow:		
Professions which require university training	43	54
Intermediate career	13	28
Farmer	30	8
Not applicable*)	15	10
Occupations farmers thought their children would follow:		
Professions which require university degree	11	18
Intermediate career	9	24
Farmer	47	26
Not applicable*)	34	32

*) No children, or already older children

7.7 DISTRIBUTION OF THE RICE HARVEST

It has been shown that traditionally the generally accepted practice throughout the north coast is that rice is harvested by those invited by the farmer, often family and friends and that they are paid in kind (rice). Both farmers and harvesters, agree that payment in kind is more advantageous to the harvester. In general, changes from cultivating *forastero* and *criollo* rice varieties to the new short-straw varieties have brought changes in the method of harvesting which in turn have brought changes to the system of payment. In La Doctrina virtually no payment is made to harvesters in kind, nor is it done elsewhere on the north coast, where this change in rice varieties has occurred. However, the question remains as to why rice farmers have suddenly changed the method of payment. The answer to this question is partly socio-economic, and partly technical. The

answers given by rice farmers in Los Monos to questions regarding preferences for payment for rice harvesting were framed in social terms such as: "Because this is the custom, and nobody would harvest for money", "Because this is the custom, and the harvesters work better", "This is a custom from our ancestors", "Because this is a custom in this village, and only seldomly you see it done otherwise". It is conceivable that La Doctrina farmers when changing so abruptly from one technological system to another have taken the opportunity to do away with the traditional system of payment which is disadvantageous to them.

Most of the 66 rice farmers interviewed in La Doctrina harvested their rice mechanically with a combine harvester. Rice is only harvested manually where the farmer has too little land to justify the use of such machinery, or where it is not possible to get the machinery into the field. This happened in 20% of the cases. Harvesters are paid a daily rate or on a contract basis. Six of the 14 rice farmers who had rice harvested manually paid a daily wage of 40-50 pesos; four paid 30 pesos per bag of threshed rice; two had contracts with harvesters to pay 2500-3000 pesos per hectare; in one case the harvested rice was divided equally between the owner and the harvester but this was only a very small rice field, one tenth of a hectare; and finally one farmer harvested the rice himself. These wages are considerably lower than the monetary value of the rice given in the traditional system of payment as in Los Monos. It is not surprising that all except one of these farmers stated that they would prefer to be paid in rice if they themselves were harvesting someone else's crop. The fact that 85% of farmers in La Doctrina would prefer to be paid in rice demonstrates that farmers are well aware that the wages they pay are lower than the monetary value of the rice.

A second reason for the change in the method of paying harvesters is found in the fact that manual harvesting is no longer done with a small knife, but instead with a sickle. When a sickle is used the harvested rice plants are put together in heaps and at the end of the working day the rice is threshed. It is only after threshing that the rice eventually could be divided into portions and transported, thus making it difficult to pay harvesters under the traditional system.

In a discussion on the changing system of manual harvesting with farmers in La Doctrina, one farmer commented:

> "You cannot pay with this rice, because it is a very low rice, and it is almost impossible to cut the stalks one by one and make *puños*. This rice is difficult to cut, the rice ear does not come out well."

Traditional rice varieties also vary in this respect, but not to such a degree that it is impossible to cut stalks individually. When farmers in the village of Sabaneta were asked which factors determined the performance of harvesters, one farmer replied:

> "It depends on how the rice plant comes up. When the rice ears are well positioned (*bien engajado*) there are people who can cut 25 to 30 *puños* per day. It depends on the rice, if the stalk is well developed (*se levanta gruesa la caña*), it rises nicely (*pela bastante la caña*)."

A farmer in La Doctrina, when asked about changing harvesting methods explained:

> "We used to cut our rice with a knife, now we use a sickle. You cannot make *puños* when you use a sickle. It doesn't work (*no sirve para hacer puños*), with a sickle you cut all the leaves of the plant (*eso lo hacemos en hierba*). It is better to cut the old rice with a knife, the leaves bend backwards, which is more convenient for cutting. The ear comes out more conveniently, which makes it easier to cut."

A rice farmer and his wife contributed the following:

Farmer: You take the old rice in your hand, and you cut it with your knife. You mostly harvest CICA 4 with a sickle, if you can't find a combine. You thresh it with sticks. Some farmers organize work groups to thresh the rice in the field, there they start beating at the rice (*lo dan palo ahí*).

Interviewer: I have seen rice hanging under the ceiling in some houses.

Farmer: Ah, because they hang it in *puños*, beautiful!

Woman: Beautiful!

Interviewer: Why don't you collect CICA 4 in *puños*?

Farmer: Because it has such small stalks and ears. The ears are plentiful but small, but the *monito* [old rice] is different.

Woman: Ah, also this small one is not like the old one, it is so low for the harvesters, that they work very slowly. They make *puños* with the *monito* but with this one they don't.

Interviewer: How do you pay the people who harvest your rice?

Farmer: Well, sometimes you pay in shares (*al ganar*).

Interviewer: And for CICA 4 as well?

Farmer: This small one [CIAC 4] you pay in money, you pay 30 pesos for a harvested and threshed bag of rice. Listen, you have to thresh it, the guy who is harvesting works during the whole day, cutting, cutting, cutting, and after that, in the afternoon he starts threshing.

Interviewer: Which is the better system, paying in rice or paying 30 pesos per bag?

Farmer: In rice of course (*al ganar*).

Interviewer: But which one do you prefer yourself if you contract rice harvesters?

Woman: Paying in money! To think that they should go away with all that rice! If we don't have the money they have to wait until we can pay them. Also you may be better off waiting to sell the rice because perhaps the price will increase, and we would rather sell it ourselves.

From these examples it can be seen that changes in the manual harvesting system and the concomitant system of payment are related directly to the characteristics of the rice plants, in this case the dwarf size, erect foliage, and the abundance of rice ears.

The group of rice farmers from La Doctrina who harvested their rice or at least part of their crop manually are compared to rice farmers in Los Monos. Most of the farmers in La Doctrina who harvest their rice manually have only small areas under cultivation, on average 4 ha as compared to the average of 7.1 ha of all rice farmers in La Doctrina. It could be expected that these smaller farmers would favour the system of distributing rice to the harvesters as do the poorer, smaller farmers in Los Monos (share-croppers) but this is not the case. Distribution of rice as payment for harvesting has disappeared in La Doctrina.

The consequences of these changes in the system of payment for harvesting should not be underestimated. In the hypothetical situation in which all rice in La Doctrina were to be harvested under the system operating in Los Monos, between 100 and 175 t rice would be distributed among the inhabitants of the village as payment for harvesting. This would be of extreme importance, particularly for the poorer inhabitants who would be provided with a cheap supply of a basic food. However, assuming that there had been no changes in rice cultivation in La Doctrina, and assuming that about 300 farmers each cultivate a hectare yielding on average 1 t as was the case in Los Monos in 1976, then a total of about 300 t rice would have been produced. At least 30 t would have been distributed directly as payment for harvesting. Even assuming that only 200 farmers in La Doctrina grew rice, that is not allowing for the increase in population as a result of the development of the irrigation district and the new employment opportunities, then still more than 20 t of rice would have been distributed among the poorer households in La Doctrina.

At present, in spite of the large quantities of rice produced in La Doctrina (approximately 1750 t in one growing season), the amount of rice which is distributed directly to co-villagers is equal or less than the amounts distributed by farmers in Los Monos. A comparison of the distribution of harvests in La Doctrina and Los Monos is given in Table 23. In Los Monos there is a difference in the distribution of rice between land-owners and share-croppers. The poorer group of share-croppers saw themselves as being in a position of having to invest more of their resources in maintaining social relationships with others in the village. They did this through the frequent exchange of labour, and through inviting others to participate in the harvest of their rice crops on a more regular basis. In addition, share-croppers generally shared more of the rice crop with their co-villagers through the system of payment in kind for harvesting, while those who owned land kept more rice within the family by harvesting the crop themselves. Share-croppers also gave more rice to friends and relations as gifts than did land-owners. This, in fact, means that share-croppers as a group kept less than 50% of their rice crop for home consumption. This is also possibly the reason why share-croppers planted proportionally more rice on the total area of land they had access to than did land-owners.

Table 23. Comparison of distribution of rice harvests in Los Monos and La Doctrina

	Distribution of rice crop in La Doctrina (%)	Distribution of rice crop in Los Monos (%)	
		Land-owners	Share-croppers
Sold	95	1	1
Home consumption	4	87	49
Gifts	1	2	4
Payment of land rent	0	0	33
Payment of harvesters	0	9	14

In La Doctrina, the distribution of the rice harvest has changed drastically partly because of changes in the system of paying harvesters. Most of the harvest is sold and only about 1% (approximately 17.5 t) is distributed as gifts to relatives and friends.

The gathering of volunteer rice (*morqueña*) can be regarded as another mechanism of distribution. Relationships between crop owners and gatherers are quite different from those between crop owners and people invited to participate in the harvest, which are labour relationships based on social equality. Between crop owner and gatherer there is an element of benevolency. The decision of a rice owner not to allow collectors of *morqueña* rice on his field, or to collect the *morqueña* rice himself if the effort seems worthwhile, is made easily, and no social sanctions are placed on collecting the rice himself.

In summary, mechanisms of "shared poverty" as have been operative in the recruitment and payment of harvesters have been replaced by asymetrical labour relationships.

7.8 DISTRIBUTION OF ECONOMIC RETURNS

Rice varieties grown in La Doctrina are characterized by their high-yielding capacity, and the necessity to apply expensive inputs in order to bring out these capacities. These rice varieties only achieve their high-yielding capacity when a number of conditions are met, such as adequate irrigation facilities; availability of machinery for land preparation and harvesting; availability of inputs, such as seed, fertilizer, herbicides and insecticides; credit facilities and an adequate extension service. In La Doctrina the yield capacities of these varieties are only partly realized.

In 1976, average gross revenues of the rice enterprises were slightly higher than 13 000 pesos per hectare, but production costs were slightly higher than 12 000 pesos, thus making the average net income per hectare only 1000 pesos (see Chapter 6).

Of the 66 rice farmers surveyed in La Doctrina 25 made a loss; four had losses of more than 50 000 pesos, two had losses between 20 000 and 50 000 pesos, and 19 had losses of less than 20 000 pesos. Undoubtedly, 1976 was a very bad year for rice farmers in La Doctrina. About 45% of the farmers made a loss, or a very small profit. It is estimated that 72% of the farmers earned only 19% of the total income from rice in La Doctrina, while on the other hand, 10% received 45% of the total income derived from rice production.

An insight can be obtained into this skewed distribution of economic returns by comparing those who earned more than 50 000 pesos per year with those who lost more than 20 000 pesos per year. Both groups at the extremes of the income distribution have more land (10 ha) at their disposal than the average land size of rice farmers in La Doctrina.

The top earners, as may be expected, realized a higher yield (5.1 t per ha) than those who suffered losses (2.6 t per ha). In several cases farmers fetched a lower price for their crop due to the occurrence of red rice. As the cost-benefit equilibrium point is high, the new technology is a rather risky enterprise for many. It is possible to make a reasonable profit, but it is also possible to make a loss and the odds are that the loss will be quite high. This becomes more obvious when the incomes of the farmers cultivating less than 2 ha (n = 11) and farmers cultivating more than 10 ha (n = 14) are compared. Although average yields were similar, the average net gain was 638 pesos per hectare on the larger farms but on the smaller farms the average net gain was 2656 pesos per hectare. This also indicates that production cost is a decisive factor in determining income. Those on smaller farms have been able to reduce these costs and it could also be said that they have used the new technology more efficiently. They require fewer credits, on average 5400 pesos per hectare, and 6 out of 11 small farmers surveyed did not use institutional credit at all. The bigger farmers used double this sum in credits per hectare.

Thus, it would seem that those with smaller areas under rice cultivation made moderate to high economic gains per hectare, although a few made a loss, and those with larger areas under rice either made a large profit or a loss. Those who did not lose nor win much were generally smaller and medium size farmers in terms of La Doctrina land distribution.

Posada (1982) has concluded that a rice technology which was supposedly designed for large-scale farming can also generate reasonable profits, if used by small-scale farmers in northern Colombia. The data in this study show that if costs remain low, this indeed is a possibility, even in years of low prices. On the other hand, in situations of existing resource inequalities, this technology may enhance a deepening of these inequalities.

8 *SUMMARY AND CONCLUSIONS*

Rice has been grown as a food crop in Latin America from early colonial times. In Colombia rice became a prominent subsistence crop especially on the north coast where it has been grown since the 17th century, sometimes also as a commercial crop. During the last twenty years there has been a sharp increase in rice production, especially in the irrigated sector. This increase can be attributed largely to the work of three organizations: the government-sponsored rice research program of the Instituto Colombiano Agropecuario (ICA); the internationally-sponsored rice program of the Centro Internacional de Agricultura Tropical (CIAT); and an efficient and politically well-supported organization of Colombian rice growers, Fedearroz. In order to sustain rice production in Colombia it is necessary for these institutions to keep ahead of one major technical problem, susceptibility of rice varieties to the viral disease rice blast (*Piricularia*). Every two or three years a new variety which is resistant or moderately resistant has to be introduced. Thus farmers, especially those who have adopted the new rice technology, have become increasingly dependent on these institutions.

Increasingly decisions regarding criteria for improvement of tropical foodcrops are taken on institutional levels far beyond the control of the cultivators concerned. Programs aiming at increasing yield potentials also contribute to social change in the farmer's lives.

In this study relationships between crop characteristics and the social contexts in which crops are produced have been explored. The main objectives were:

- to investigate the relationships between peasant systems of rice cultivation as part of the agricultural system and of the wider social and economic structure of north coast community;
- to investigate the social consequences for the farmer and the community of new systems of rice cultivation in this area.

Historically, rice has played a specific role in the process of incorporating virgin land into the cattle economy of the region. *Costeño* peasants distinguish two types of rice varieties with corresponding cultivation systems: *arroz criollo* (dryland rice grown

with rain water only); and *arroz forastero* (rice which is transplanted to floodable areas). Dryland rice varieties are grown especially by *colonos* who clear small patches of woodland, plant rice as a first crop, and after one or two cropping seasons sow the land with pasture. Sowing with pasture's is a land rent if the *colono* leases the land from a large land-owner. If the *colono* cultivates public domain land, he may claim a legal title, and sell the rights and the improvements made to the land. This use of *criollo* rice varieties which generally preceded the *forastero* rice varieties in time, forms part of the more general pattern of transforming virgin land into pasture in tropical lowlands not only in Colombia but also in other regions of the continent. Thus improvements to *criollo* rice cultivation would not only benefit colonizing farmers in these lowland areas, but accrue to cattle ranchers who ultimately become the owners of these lands.

Apart from a limited number of farmers on small plots in the irrigation districts developed in the INCORA-sponsored land reform programs, mechanized irrigated rice cultivation has been adopted mainly by wealthy farmers with access to large areas of land, sometimes up to several hundred hectares.

It has been shown that the importance of the peasant rice farming sector in northern Colombia is grossly underestimated, partly because of the way official statistics on rice in Colombia are organized.

It has also been shown that traditional rice cultivation on the north coast of Colombia is highly diversified and adapted to the local situation. There are more than hundred varieties known, often with characteristics which are significant for the farmer and his community.

Several social institutions have evolved around peasant rice cultivation, as for example the widespread custom of farmers inviting friends and relatives to harvest their rice crops and the social pressure for farmers to pay harvesters with rice. Traditionally, rice has been harvested on the north coast by cutting the rice stalks individually and tying them together to form a *puño*. Rice can be easily dried and stored in these *puños* until it is actually threshed, dehusked and consumed. The system of paying a fixed share of *puños* to the invited harvester, often somebody without a rice crop himself although

not necessarily so, functions as a distribution system on the local level providing cheap rice for others than the owner.

Traditional systems of rice cultivation were studied in detail in the north coast village of Los Monos. Rice is the most important crop grown in this village and in the last twenty years more than 20 varieties of *criollo* and *forastero* rice have been grown.

The social structure of the village is intimately related to rice cultivation, especially so with regard to local credit structure and labour patterns. Farmers regard rice as a subsistence crop, and endeavour to keep it outside the monetary economy. They grow rice for domestic consumption and are only willing to sell if they have a surplus.

In the last 20 years, there has been a gradual change in Los Monos from *criollo* to *forastero* rice cultivation. This change is related to demographic pressures in the village, which meant that the swampland in the *cienaga* had to be cultivated. Previously, most of the land in the *cienaga* was used by large land-owners in the dry season for cattle grazing, but recently pressure has been building up among landless in Los Monos to use these lands for crop cultivation, especially *forastero* rice. A recently introduced variety, Galillón, which is more resistant to floodings, is being grown increasingly, especially by landless share-croppers.

The comparison of land-owners and share-croppers in Los Monos has revealed other significant characteristics with respect to rice farming. Share-croppers tend to invest more in social relations with other villagers as in the case of inviting others to assist with the rice harvest and the distribution of rice in payment of labour. Share-croppers also cultivated more of their land with rice than did land-owners and participated more in the local practice of exchanging labour on a non-monetary basis.

The study of rice farmers in Los Monos has shown that without the intervention of government or other institutions traditional agricultural systems are not necessarily stagnant.

It could be deduced from this study that improvements in *forastero* rice cultivation would benefit the poorer farmers (in this case share-croppers), and that greater economic gains could be made with this system of rice cultivation. A further advantage of extending this system of *forastero* rice cultivation would be that it does not compete for land with other local crops. If regulation of land tenure

on swamplands on the north coast of Colombia were to favour small-scale farmers, then *forastero* rice cultivation would be an ideal target for research on peasant rice cultivation in Colombia, and possibly in lowlands elsewhere in Latin America.

The consequences of the introduction of new rice technology on a rural community were investigated in a detailed study of the village of La Doctrina. In this village, irrigation and new rice varieties have been made available as part of a land reform program. Agriculture in La Doctrina is dominated by the irrigation district, on which the most important crop grown at present is rice. On average, farmers in La Doctrina cultivate considerably larger areas of rice than do farmers in Los Monos. However, within the regional context, rice farmers in La Doctrina can be considered to be small producers.

As rice farming in the irrigation district is mechanized it is not as labour-intensive as rice cultivation in Los Monos. Both yield per hectare and total production have increased considerably. Rice farmers are largely dependent on the assistance of several government institutions including credit institutions, and those providing irrigation water.

Production costs for rice in La Doctrina are low in comparison to national averages. However, when rice prices are low, the increased yields do not guarantee reasonable profits to a majority of the rice farmers. In 1976, more than 30% of rice farmers suffered a net loss. Many farmers of La Doctrina became entangled in debts with government credit agencies, and as a consequence a part of the irrigation district has remained unused.

Comparison between La Doctrina inhabitants and Los Monos rice farmers revealed the following social consequences of the introduction of new rice varieties and corresponding cultivation practices. In La Doctrina the traditional latifundio-minifundio structure has altered with the emergence of a new class of agricultural entrepreneurs and an increasing number of landless labourors. From a village dominated by vertical social relationships between absentee landlords and a mass of colonos and share-croppers, a number of vertical relationships have evolved between a few relatively wealthy rice farmers, and subsistence farmers together with an increasing group of landless labourers. Status differentiation within the former internally equalitarian situation has emerged. A select group of successful rice farmers has been able to earn incomes previously unknown of in

the village. New status symbols have appeared, including cement built houses, and the material goods of modern urban life such as television and luxury furniture. A few successful farmers have acquired more land and cattle outside the irrigation district.

There is evidence to suggest that the households of farmers in La Doctrina have increased in size in recent years. The birth rate is higher and more adopted children are included in households of rice farmers in La Doctrina as compared to Los Monos. Stated opinions on the "ideal number of children" for a family by both Los Monos and La Doctrina male heads of households support this evidence.

Possibly, *Costeño* rural households pass through a phase in which relations between households become weaker when higher levels of material wellbeing are reached, and at the same time households as units of social organization become stronger. This phenomenon becomes clearer by comparing the socio-economic classes of Los Monos to the La Doctrina rice farmer's households. The poorer households of Los Monos showed more signs of "shared poverty" than the class of land-owners: the former invested more in social relations than the latter. The La Doctrina group of farmer's households may represent a further case of an atomization process, as sharing mechanisms such as sharing rice during the harvest, exchanging labour without direct monetary renumeration are absent. Further evidence supporting this process of increasing atomization is the fact that the households of share-croppers in Los Monos included on the average fewer non-nuclear family members than the households of land-owners, which in turn included fewer than households in La Doctrina.

The construction of the infrastructure for the irrigation district and the scale of cultivation has increased employment opportunities for the inhabitants of La Doctrina and has attracted many outsiders to settle in the village. Although the cultivation of mechanized rice requires fewer mandays per hectare, the larger area under cultivation has increased employment opportunities.

In general, La Doctrina farmers expressed higher expectations for the future than rice farmers in Los Monos. However, more farmers in La Doctrina thought that their sons would have non-agricultural occupations, and indeed expressed the wish that they preferred their sons not to become farmers.

Social changes in La Doctrina as related directly to the characteristics of the new rice technology and the new rice varieties in-

cluded the following. Firstly, consumption of rice, the most important local food item, is presently less diversified as it was before and as it still is the case in other *Costeño* villages.

Further, the social custom of inviting relatives and friends to participate in the harvest and of paying them in kind (rice) has largely disappeared in La Doctrina. Most of the new dwarf rice is harvested mechanically. It is difficult to harvest these varieties in the traditional way, the short stems cannot be cut easily with a knife and put together to form *puños*. If the rice is not harvested mechanically, a sickle is used. Many farmers attribute the disappearance of the system of paying rice harvesters in kind (*puños*) to the introduction of the new dwarf varieties. The system of payment in kind has virtually disappeared in La Doctrina and in other villages on the north coast where the dwarf varieties were harvested manually. The disappearance of this system of sharing the rice harvest with fellow villagers has had a serious negative effect on the distribution of rice to poorer households on the north coast.

It has been demonstrated that irrigated rice cultivation for farmers in La Doctrina is a rather hazardous affair. This is directly related to the fact that the new rice technology involves high production costs in order to realize the high-yielding potential of the new rice varieties.

From the results of this study it can be deduced that future agricultural research on rice in Colombia can lead to a further unequal distribution of the benefits between farmers. If future research would be directed not only to those who have access to irrigated land, it is recommended that research should focuss on the improvement of *forastero* rice systems. Advantages are:

- it is a crop which is grown by poor farmers, who might thus participate in benefits of rice research
- *forastero* land usually has less opportunity costs; it is less suited for other crops
- *forastero* rice varieties seem to have higher yield potentials than *criollo* rice varieties
- *forastero* rice improvement may contribute to a more intensive use of the fertile and promising parts of the North Colombian coastal plains
- if research would focuss on *criollo* rice, at least a part of the benefits would accrue to the future owners of the land; often

large land-owners, who are more interested in cattle raising and very often possess land for reasons of capital investment.

The study also shows that more adequate criteria are indicated for the organization of rice statistics, than those presently used. Further it can be concluded (see Chapter 4) that the study of motives and possibilities of *colono* farming in fronteer zones of tropical Latin America would be useful for the process of agricultural development of these regions.

It is important to make more use of the social sciences in the process of agricultural research. A useful perspective for social scientists may be the "crop sociology" approach, as explained in Chapter 1. Pragmatic considerations indicate that social scientists should start with the study of those characteristics of crops which might be expected to be malleable by agricultural researchers. In that way it will be possible to take into account possible technological alternatives, from the first stages of research.

GLOSSARY

al ganar:	rice harvesting paid in rice shares
arroz criollo:	dryland rice, manually cultivated
arroz de riego:	irrigated rice, often mechanized
arroz de secano:	dryland rice, cultivated manually or mechanized
arroz forastero:	rice grown in swamps and other floodable areas
a tres partes:	system of share-cropping
bajada:	handful of rice stalks, also *manotada*
baldío:	land of public domain
botija:	measure of volume, harvested rice, equal to 25 *puños*
cabulla:	measure of land equal to an area of 100 × 100 yds
chocó:	container of rice seeds, used during sowing
chuzo:	dibble stick
cienaga:	swamp
colono:	landless farmer, squatter
cuarterón:	a quarter of a *cabulla*
cuchillo:	knife for rice harvesting
derecho de patio:	right of tenants to keep domestic animals
desmontar:	slash and burn
enganchar:	(to tie) used when a farmer must deliver his crop to a moneylender
espeque:	dibble stick
finca:	rural property, often large farm
gamonal:	large land-owner, powerful person
hacienda:	large estate, often used for extensive cattle raising
hierba:	pasture, weeds, green crop
lata:	measure of volume, often for threshed rice
manotada:	see *bajada*
mejora:	(improvement) investment in rural property
montaña:	virgin forest land
monte:	woodland, also weeds

monte biche:	virgin forest
morqueña:	volunteer rice
palanca:	dibble stick, also political influence through patronage
pancoger:	small plot for production of food crops
picada:	slashing of vegetation
pilón:	wooden rice mortar
poner a rendir:	first transplanting of *forastero* rice
por tarea:	amount of work
puño:	bushel of rice, consisting of two or three *bajadas*, see also *botija*
quintal:	measure of weight, one *quintal* of rice equals seven *latas* unthreshed rice, or four *latas* of threshed rice
rastrojo:	shrubs
rebusque:	odd jobs, anything to make some money
vender a la vista:	to sell a crop after the harvest
vender en la hierba:	to sell a crop before the harvest

CECORA	Central de Cooperativas de Reforma Agraria
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
FEDEARROZ	Federación Nacional de Arroceros de Colombia
ICA	Instituto Colombiano Agropecuario
INCORA	Instituto Colombiano de Reforma Agraria
IRRI	International Rice Research Institute
SAC	Sociedad de Agricultores de Colombia

NOTES

[1] The results of these studies should not be limited necessarily to agricultural research management but should also include agricultural planning.

[2] In colonial times a fanega was used as a measure of (maize)land on which 25 pound of maize seed was sown, but it was also used as a measure of weight (Delgado 1976).

[3] In colonial times a suerte of sugar cane land corresponded with an area of about 150 x 150 metres (Delgado 1976).

[4] Estancias are land grants dating from early colonial times, which were given to Spanish settlers by cabildos, local councils often composed of encomenderos. These rights were precarious, as they were not derived from Royal Decrees, as were the mercedes de tierra.

[5] CEPAL: Comite economico de planeación para America Latina. This centre was the cradle of a new school of economic planning for Latin America. One of the objectives was to reduce dependency on foreign imports by developing local substitutes and establishing common policies with neighbouring countries.

[6] In a rice growing village near the regional capital, Montería, farmers referred to these measures as old-fashioned. "These were used in the old days", they say.

[7] Of the 36 Los Monos rice farmers who had a criollo crop, 20 had land of their own. Of the 149 forastero rice farmers only 68 owned land.

[8] These conflicts became acute on several occasions when the large land owners if not sending troops as in 1934 and 1962, wiped out rice harvests by stampeding cattle through the fields of the colonos (Duica, 1964; Bonilla 1967, p. 15)

[9] For an account of these peasant movements on the Colombian North Coast, see Gilhodes 1974, p. 295-303.

[10] In fact, during the author's efforts to locate the application forms at the local project office, the regional office in Montería, and the national office in Bogotá, one of the INCORA officials who was responsible for the assignment of land in La Doctrina, remembered that in the turmoil of the situation these forms were never filled in. Parcels of land were handed out at a certain time to anyone who showed interest.

[11] In an INCORA survey (1968), the number of people per household was estimated to be 6.5, a figure remarkably close to the mean household size in Los Monos today.

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APPENDIX I TRADITIONAL RICE VARIETIES ON THE NORTH COAST

Name	Type	Locations	Yield[1)]	Growing cycle	Observations
1. Ambrosino		Los Monos			
2. Arupia	Forastero	Los Monos		July-December	
3. Ayaso	Criollo	Arache, Montería San Carlos			Inferior quality
4. Azuleño	Forastero	Aracataca, San Sebastian Arache, Tierralta, Los Monos, San Carlos, Toluviejo, Sucre	50	July-December	
5. Azuleño blanco	Forastero	La Subida		June-December	
6. Azuleño gallilón	Forastero	La Subida		Sown in May	
7. Bartón	Criollo	San Carlos			
8. Barragán	Forastero	San Carlos			
9. Barranquilla	Forastero	Los Monos, Arache	16	June-December	
10. Cacao blanco	Forastero	Córdoba, Montería, Lorica, Cienaga, Planeta Rica			
11. Cacao mono	Forastero	Córdoba			
12. Caiza		Los Monos	50		
13. Candela	Forastero	San Carlo, Montería Lorica, Cienaga Planeta Rica			
14 Cañuela	Criollo	San Carlos			
15. Cartagena	Criollo	Cereté, Tierralta			
16. Cheja	Forastero	La Subida, Lorica			

1) Botijas per Cabulla

	Name	Type	Locations	Yield[1)]	Growing cycle	Observations
17.	Chile	Forastero	Córdoba, Sitio Viejo, Arache, La Subida, Recula, Los Monos, Montería, Lorica, Cienaga Planeta Rica	27	June-December	Resists flooding and requires less weeding than other varieties
18.	Chile pando	Forastero	Córdoba			
19.	Chilimico	Forastero	La Mojana, San Carlos Magangué, Achí		May-December	Long-grain rice,"good for the kitchen"
20.	Chilimico pepón	Forastero	La Mojana			
21.	Chiminico	Forastero	Los Monos, Bolivar	21		
22.	Chino rabón	Criollo	Acandí			
23.	Chucha pelua	Criollo	Los Monos		From july onwards	Needs much water
24.	Contra las Plagas	Criollo	San Sebastían, Montería, Lorica, Cienaga, Planeta Rica		5 month	
25.	Fortuna	Criollo	Costa Pacifica, Los Monos Ceretê, Los Amarillas, San Sebastián, Cacaotal, Corozalito, Toluviejo, Lorica, Cienaga, San Antero, Puríssima, San Bernardo del Viento, Momil, San Andrés	17	May-October	Resistant to rice blast Sown in low terrains
26.	Fortuna blanco	Criollo	Acandí, San Sebastián Campo Bello, Arache, La Subida		April-Sept. also from June-Oct/Nov.	Long grain, highly preferred for its taste
27.	Fortuna ligerito	Criollo	San Antero		May-August	
28.	Fortuna mono	Criollo	Arache			
29.	Fortuna morado	Criollo	Acandí, La Subida		April-Sept.	Long grain

	Name	Type	Locations	Yield[1)]	Growing cycle	Observations
30.	Fruta Turca	Forastero	Los Monos, Sitio Viejo, Tierralta		June-December	
31.	Galillón	Forastero	Los Monos, Cereté, Recula, Rodeito, Sitio Viejo, Tierralta, San Carlos Lorica	24	May/June-November	Resists very high floodings
32.	Grano de oro		Los Monos	5		Old variety
33.	Guana blanco	Criollo	Acandí			Short grain
34.	Guana morá	Criollo	Acandí			Short grain
35.	Guayaquil	Criollo	Córdoba, La Mojana, Cereté, Magangué, Bolívar	20		Drought resistant
36.	Harta muchacho	Criollo	Palo de Agua, La Doctrina			"Good for boys"
37.	Ina	Criollo	Los Monos, La Doctrina Magangué, Achi	23		
38.	Ina blanco	Criollo	Córdoba, Chimá, Arache, Corozalito, Los Monos, Rio Atrato, Montería, San Carlos			
39.	Ina mono	Criollo	Córdoba, Cacaotal, San Onofre, Campo Bello, Chimá, Los Monos, Montería, San Carlos, Sincelejo, Toluviejo, Lorica, Cienaga, Planeta Rica, Sucre, La Doctrina, Los Platanales	22	May-October	Highly preferred, resistant to lodging
40.	Ina morado	Criollo	Campo Bello			
41.	Japonés		Los Monos	13		
42.	Ligerito	Criollo	Bolívar, Los Monos Lorica and surroundings	22		"Sown to provide early rice for labourors in later rice crops"

	Name	Type	Location	Yield[1)]	Growing cycle	Observations
43.	Ligerito azuleño	Forastero	Tierralta, La Subida		May-November	
44.	Ligerito forastero	Forastero	Campo Bello, Los Monos, Montería	15		
45.	Macho en la Valle	Criollo	Los Monos	40	July-November	Needs more water than other varieties. Therefore not sown before July
46.	Majagual	Forastero	Córdoba, Los Monos, La Subida, Lorica, San Antero, Purísima, San Bernardo del Viento, Momíl, San Andrés, Los Platanales, Sicará	18		
47.	Manos negras	Forastero	Cereté, Córdoba			
48.	Maria Angela Blanco	Criollo	Acandí, Nariño, San Carlos, Lorica, San Antero, Purísima, San Bernardo del Viento, Momíl, San Andrés		Early maturing	High prices. Highly preferred bij rice millers
49.	Maria Angela Mono	Criollo	Acandí			Short grain
50.	Maria la baja	Criollo	Campo Bello			
51.	Mata Vieja	Criollo	San Carlos			
52.	Mete la puya	Forastero	Nariño, Los Amarillos San Sebastián, Los Corrales		5½ month	Sweet rice, very high prices
53.	Milanés	Criollo	Sincelejo, Sucre			
54.	Ministro	Criollo	Córdoba, Cereté, San Antero, Los Monos		May-September or June-Nov.	
55.	Ministro blanco		Los Monos	20		

	Name	Type	Locations	Yield	Growing cycle	Observations
56.	Ministro mono		Los Monos	20		
57.	Mochuelo	Criollo	Córdoba			
58.	Mondongo		San Marcos			
59.	Mono Avila	Criollo	Los Amarillos			
60.	Mono bajero	Forastero	Los Monos		July-December	
61.	Mono blanco	Forastero	Los Monos La Doctrina, Los Amarillas, San Sebastián, Campo Bello, Chimá, Sitio Viejo, Bolivar, Lorica and surroundings	30	From June onwards	
62.	Mono Bolá	Forastero	Cereté, Los Amarillos, Lorica, San Antero, Puríssima, San Bernardo del Viento, Momíl, San Andrés	40		
63.	Mono caballo	Forastero	La Doctrina, Los Monos	10	July-December	
64.	Mono collá	Forastero	Nariño, San Sebastián, Los Monos, La Doctrina, Los Platanales, Lorica		6 month	
65.	Mono collá blanco	Forastero	Córdoba			
66.	Mono colorado	Forastero	Sitio Viejo, La Doctrina			
67.	Mono Espanol	Criollo	Córdoba			
68.	Mono ligerito	Forastero	Los Monos, La Doctrina Los Platanales, Lorica, Córdoba	23	May-August	Early maturing, said to germinate only in May or December
69.	Mono liso	Forastero	Los Monos, San Sebastián	25		
70.	Mono pantanero	Forastero	Los Monos	30	July-December	

	Name	Type	Locations	Yield[1)]	Growing cycle	Observations
71.	Mono olaya	Criollo	Lorica, San Antlero, Purísima, San Bernardo del Viento			
72.	Mono recado	Forastero	Córdoba, La Doctrina Los Monos, Los Amarillos, San Sebastián, Corozalito, Tierralta, San Carlos, Toluviejo, Lorica, Cienaga Montería, Planeta Rica	18	July-Januari	
73.	Moralito		Los Monos	16		
74.	Mula		San Marcos			
75.	Negro ligero	Forastero	Los Monos, Recula		May-August	
76.	Nisperus	Criollo	Los Monos		May-September	
77.	Pablo Barrios	Criollo	Los Monos, Montería, Lorica, Cienaga, Planeta Rica			
78.	Pablo Montes	Forastero	Acandí, Chimá, Córdoba			Short grain, resistant to Hoja Blanca disease
79.	Pachero	Forastero	San Marcos, Los Gomez, No Cabes, Palo de Agua		June-October	
80.	Palmira	Criollo	Valencia(Cord.) La Mojana			
81.	Panela	Forastero	San Sebastián, Campo Bello, Sitio Viejo, Corozalito, Los Monos, San Carlos		July-Januari	Early maturing

	Name	Type	Locations	Yield[1)]	Growing cycle	Observations
82.	Presidente mono	Criollo	Acandí, Montería, Lorica, San Antero, Purísima, San Bernardo del Viento	20		Long grain, preferred by farmers, not by millers
83.	Puntas claras	Criollo	Recula, San Carlos			
84.	Rabo de caballo	Forastero	Nariño			
85.	Salva tu casa	Forastero	Aracataca			
86.	San Jeronimo	Criollo	Córdoba, Montería, Lorica, Cienaga, Planeta Rica			
87.	Siete colores	Forastero	Acandí, San Carlos			Short grain
88.	Tesoro	Criollo	Acandí			Long grain
89.	Tres colores	Forastero	Acandí, Cereté, Arache, San Carlos, Montería, Lorica, Cienaga, Planeta Rica			Short grain
90.	Turca hembra		Montería			
91.	Turco	Criollo	Cereté, Rio Atrato			
92.	Tureno	Criollo	Acandí			Long grain,considered the best variety in the Urabá area

Other rice varieties were: Arroz llanero, Blanquillo, Bomba, Brum, Cacho de chivo, Campeon, Canilla, Carlos bello, Chino, Chino pintao, Chino Rongoy, Collar blanco, Commun de muzo, Guacarí, Lucinda,Macarito, Manta en el hombro, Marfíl, Mira blanco, Mira mono, Panameño, Rengifo, Tres mesino, Turco pelao, Vasquez commún, Zenith, Reselta, Mamon.

APPENDIX II Rice area, production and yields in Northern Colombia - 1966.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA		
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND	AVERAGE
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced			
Atlántico	150	100	250	100	350	400	250	650	100	750	2.600	1.000	2.145
Bolívar	800	1.000	1.800	30.000	31.800	2.720	1.680	4.400	48.000	52.400	2.444	1.600	1.648
Cesar													
Córdoba		150	150	60.000	60.150		350	350	105.350	105.350	2.333	1.750	1.751
Guajira	1.000	1.500	2.500	300	2.800	2.800	4.200	7.000	300	7.300	2.800	1.000	2.607
Magdalena	7.700	7.800	15.500	10.000	25.500	23.900	22.000	45.900	18.000	63.900	2.961	1.800	2.506
Sucre				10.000	10.000				15.000	15.500		1.550	1.550
COLOMBIA	61.500	52.500	114.000	236.000	350.000	186.470	154.930	341.400	338.600	680.000	2.994	1.435	1.943

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1967.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	200	100	300		300	500	300	800		800	2.666	
Bolívar	500	800	1.300	29.650	30.950	1.200	2.200	3.400	50.400	53.800	2.615	1.700
Cesar	4.100	5.600	9.700	2.500	12.200	13.300	17.200	30.500	3.500	34.000	3.145	1.400
Córdoba				44.000	44.000				71.300	71.300		1.620
Guajira	800	1.500	2.300	400	2.700	2.300	4.700	7.000	400	7.400	3.043	1.000
Magdalena	3.900	2.100	6.000	700	6.700	10.950	6.750	17.700	1.100	18.800	2.950	1.571
Sucre	200		200	10.300	10.500	450		450	16.500	16.950	2.250	1.601
COLOMBIA	55.850	54.400	109.850	180.850	290.700	185.950	195.000	381.000	280.500	661.500	3.468	1.551

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1968.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico												
Bolívar	100	275	375	28.000	28.375	250	1.100	1.350	59.500	60.850	3.600	2.125
Cesar	4.500	6.200	10.700	1.000	11.700	18.050	29.700	47.750	1.400	49.150	4.462	1.400
Córdoba				32.400	32.400				57.500	57.500		1.774
Guajira	1.000	1.100	2.100	400	2.500	3.500	4.000	7.500	400	7.900	3.571	1.000
Magdalena	4.000	550	4.550	700	5.250	13.250	1.500	14.750	1.100	15.850	3.241	1.571
Sucre				10.300	10.300				23.800	23.800		2.310
COLOMBIA	71.650	55.275	126.925	150.200	277.125	298.900	236.750	535.700	250.600	786.300	4.220	1.668

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1969.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	90	300	390			250	750	1.000		1.000	2.545	
Bolívar		2.000	2.000	27.070			6.700	6.700	52.300	59.000	3.350	1.932
Cesar	6.250	3.750	10.000	880		30.150	17.535	47.685	1.230	48.915	4.768	1.398
Córdoba		1.940	1.940	28.470			4.850	4.850	50.540	55.390	2.500	1.775
Guajira	1.160	450	1.610	350		3.200	2.000	5.200	350	5.550	3.230	1.000
Magdalena	6.950	490	7.440	620		14.750	1.530	16.280	965	17.245	2.188	1.556
Sucre		360	360	10.300			1.045	1.045	20.920	21.965	2.903	2.031
COLOMBIA	72.710	43.180	115.890	134.570		281.543	192.668	474.211	220.275	694.486	4.092	1.632

a) Including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1970.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	200	250	450		450	596	725		1.321	1.321	2.940	
Bolívar	1.460	1.910	3.370	24.363	27.533	4.688	7.051	11.739	47.069	58.808	3.480	1.932
Cesar	7.070	4.010	11.080	792	11.872	36.193	23.686	59.879	1.107	60.986	5.400	1.398
Córdoba	1.290	560	1.850	25.623	27.473	3.234	1.350	4.584	45.481	50.065	2.480	1.775
Guajira	250	780	1.030	315	1.345	875	4.608	5.483	315	5.798	5.320	1.000
Magdalena	3.040	600	3.640	558	4.198	14.022	2.740	16.762	868	17.630	4.600	1.556
Sucre	450	50	500	9.270	9.770	1.350	150	1.500	18.827	20.327	3.000	2.031
COLOMBIA	57.980	54.120	112.100	121.113	233.213	267.793	286.554	554.347	198.248	752.595	4.945	1.637

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1971.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	90	350	440			265	1.029	1.294		1.294	2.940	
Bolívar	4.100	2.000	6.100	21.500		16.400	8.000	24.400	39.345	63.745	4.000	1.830
Cesar	11.000	7.500	18.500	780		62.810	42.825	105.635	1.084	106.719	5.710	1.390
Córdoba	950	550	1.500	23.060		3.325	1.925	5.250	39.202	44.452	3.500	1.700
Guajira	1.170	1.030	2.200	280		5.335	4.697	10.032	283	10.315	4.560	1.010
Magdalena	2.800	990	3.790	500		15.400	5.445	20.845	775	21.620	5.500	1.550
Sucre	2.810	290	3.100	8.900		11.802	1.218	13.020	18.087	31.087	4.200	2.030
COLOMBIA	81.600	62.780	144.380	109.130		401.485	329.167	730.652	173.696	904.348	5.060	1.590

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1972.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	100	300	400		400	285	870	1.155		1.155	2.900	
Bolívar	5.400	3.100	8.500	20.200	28.700	24.300	12.400	36.700	35.350	72.050	4.320	1.750
Cesar	13.500	12.300	25.800	800	26.600	78.975	69.495	148.470	1.112	149.582	5.760	1.390
Córdoba	1.500	700	2.200	22.200	24.400	6.600	2.730	9.330	36.630	45.960	4.240	1.650
Guajira	1.300	800	2.100	200	2.300	6.240	3.360	9.600	202	9.802	4.570	1.010
Magdalena	3.000	2.800	5.800	450	6.250	17.100	15.260	32.360	697	33.057	5.580	1.550
Sucre	4.100	400	4.500	8.500	13.000	17.630	1.600	19.230	16.575	35.805	4.270	1.950
COLOMBIA	95.300	75.320	170.620	103.220	273.840	496.910	385.850	882.760	160.524	1.043.284	5.174	1.555

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1973.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	100		100		100	290		290		290	2.900	
Bolívar	4.000	1.200	5.200	19.800	25.000	17.200	5.280	22.480	35.640	58.120	4.320	1.800
Cesar	12.500	11.500	24.000	1.000	25.000	72.500	63.250	135.750	1.400	137.150	5.660	1.400
Córdoba	2.100	1.200	3.300	21.500	24.800	10.710	5.160	15.870	34.400	50.270	4.810	1.600
Guajira	1.200	800	2.000	150	2.150	5.040	3.440	8.480	150	8.630	4.240	1.000
Magdalena	6.000	1.800	7.800	400	8.200	34.800	9.360	44.160	600	44.760	5.660	1.500
Sucre	2.500		2.500	8.000	10.500	10.500		10.500	15.600	26.100	4.200	1.950
COLOMBIA	115.920	76.100	192.020	98.840	290.860	608.312	412.790	1.021.102	154.769	1.175.871	5.320	1.566

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1974.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	500	200	700		700	1.600	620	2.220		2.220	3.170	
Bolívar	8.700	4.800	13.000	19.500	33.000	37.410	21.120	58.530	35.100	93.630	4.340	1.800
Cesar	18.500	17.000	35.500	800	36.300	107.300	93.500	200.800	1.120	201.920	5.660	1.400
Córdoba	3.600	2.800	6.400	21.000	27.400	18.720	12.600	31.320	33.600	64.920	4.890	1.600
Guajira	2.200	600	2.800	200	3.000	9.680	2.520	12.200	210	12.410	4.360	1.050
Magdalena	8.000	3.000	11.000	300	11.300	46.000	15.900	61.900	450	62.350	5.480	1.500
Sucre	4.200	100	4.300	7.500	11.800	18.060	400	18.460	14.250	32.710	4.290	1.900
COLOMBIA	177.200	95.750	272.950	95.600	368.550	912.950	507.160	1.420.110	149.830	1.569.940	5.200	1.570

a) including mechanized dryland rice
b) criollo and forastero

APPENDIX II (Cont.) Rice area, production and yields in Northern Colombia - 1975.

Departments	CULTIVATED HECTARES					TONNES OF RICE					YIELDS KGS/HA	
	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED[a]			UPLAND[b]	TOTAL	IRRIGATED	UPLAND
	First Harvest	Second Harvest	Total Annual	Total Annual	Annual Area	First Harvest	Second Harvest	Total Annual	Total Annual	Produced		
Atlántico	200	1.000	1.200		1.200	700	3.300	4.000		4.000	3.330	
Bolívar	10.800	2.700	13.500	20.000	33.500	48.600	11.880	60.480	36.000	96.480	4.480	1.800
Cesar	27.300	18.300	45.600	500	46.100	152.880	100.650	253.530	700	254.230	5.560	1.400
Córdoba	3.700	1.300	5.000	21.500	26.500	18.870	6.110	24.980	34.400	59.380	5.000	1.600
Guajira	800	1.000	1.800	100	1.900	3.600	4.300	7.900	100	8.000	4.390	1.000
Magdalena	7.700	2.900	10.600	400	11.000	41.580	15.370	56.950	600	57.550	5.370	1.500
Sucre	5.300	100	5.400	7.300	12.700	23.850	410	24.260	13.870	38.130	4.490	1.900
COLOMBIA	181.550	104.400	285.950	95.500	381.450	921.260	549.860	1.471.120	151.110	1.622.230	5.145	1.580

a) including mechanized dryland rice
b) criollo and forastero

Source: Federación Nacional de Arroceros, Departamento de Estadistica e investigaciones economicas.

SAMENVATTING

In deze studie wordt nagegaan in hoeverre eigenschappen van gewassen invloed uitoefenen op de sociale context waarbinnen die gewassen worden verbouwd. Deze vraag is van belang omdat in het hedendaagse landbouwkundige onderzoek bij het ontwerpen van nieuwe landbouwtechnologie niet altijd rekening wordt gehouden met de sociale betekenis en de rol van gewassen in het leven van de boeren. Vooral voor de tropische boer, die vaak een ingewikkeld landbouwsysteem heeft, kunnen eigenschappen van verbeterde gewassen dysfunctioneel zijn. In verschillende historische fasen van de landbouw heeft de relatie tussen landbouwkundige verbetering van gewassen en de organisatie van die verbetering zich gewijzigd. Momenteel spelen internationale onderzoeksinstellingen een belangrijke rol bij het vaststellen van voor produktieverhoging noodzakelijke kenmerken van gewassen. In het eerste hoofdstuk van deze studie wordt deze gedachtengang nader uiteengezet, en wordt door voorbeelden aangetoond dat in vele gevallen een directe relatie bestaat tussen eigenschappen van gewassen en de sociale structuur van agrarische samenlevingen.

In het vervolg van de studie wordt dit inzicht verder uitgewerkt met een onderzoek naar de lokale en regionale gevolgen van de introductie van nieuwe rijstrassen in Noord-Colombia. Twee nadere doelstellingen van het onderzoek waren: 1) welke zijn de relaties tussen traditionele systemen van rijstverbouw en de sociale structuur van dorpen aan de Noordkust van Colombia; 2) tot welke sociale gevolgen heeft de introductie van nieuwe systemen van rijstverbouw bij peasant boeren, aanleiding gegeven.

Uit historische gegevens blijkt dat rijst sedert de vroege koloniale periode van Colombia een belangrijk gewas is geweest, met name aan de Noordkust. Uit hoofdstuk 2, waarin dit historische overzicht wordt gepresenteerd, blijkt verder dat gedurende de laatste twintig jaar drie organisaties bijdragen hebben geleverd tot de verandering van rijstrassen en rijstteelt systemen in Colombia: deze zijn het Colombiaanse instituut voor landbouwkundig onderzoek ICA, het internationale onderzoekscentrum CIAT, en de organisatie van grote, vaak

politiek invloedrijke, rijstboeren Fedearroz. Toename van produktie en areaal onder geïrrigeerde rijst heeft bijgedragen tot het verdwijnen van kleine, deels voor zelfvoorziening producerende rijstboeren. Rijststatistieken in Colombia, waarvan de indeling in verschillende categorieën van systemen van rijstverbouw niet overeenkomen met bestaande categorieën, hebben aanleiding gegeven tot een vertekend beeld van de omvang van de uitstoot van subsistence rijstboeren.

In hoofdstuk 3 wordt een overzicht gegeven van de agrarische ontwikkeling van de Noordkust van Colombia. Onder andere door de invoering van handelsgewassen als katoen en geïrrigeerde rijst is de bestaande sociale structuur, vroeger gekenmerkt door latifundio-minifundio verhoudingen, nu verbreed door het ontstaan van nieuwe sociale klassen, zoals ondernemers in de genoemde gewassen, en een toenemende groep van landlozen, die afhankelijk is van loonarbeid. In hoofdstuk 3 wordt tevens een portret geschilderd van de huidige samenleving in het gebied.

Hoofdstuk 4 geeft een overzicht van bestaande systemen van rijstteelt. Hierbij wordt aangetoond dat een van die systemen, *arroz criollo*, een speciale rol heeft gespeeld bij de landbouwkundige ontwikkeling van het gebied, waarbij voormalig met bos bedekte gebieden in extensief gebruikt weideland werden omgezet.

Tevens wordt in dit hoofdstuk aangetoond dat de rijstteelt omgeven is met sociale instituties, zoals het uitnodigen van vrienden en verwanten voor de oogst van het gewas, en het verdelen van rijst op lokaal niveau door uitbetaling van oogstarbeid in vaste proporties van de oogst.

In Hoofdstukken 5 en 6 worden gedetailleerde studies gepresenteerd van twee dorpen aan de Colombiaanse Noordkust. In Los Monos (hoofdstuk 5) wordt uitsluitend rijst verbouwd met de hand, worden geen nieuwe, verbeterde rijstrassen verbouwd en is de verbouw hoofdzakelijk gericht op zelfvoorziening. Het bleek dat in de lokale rijstteelt een langzame verschuiving plaats vindt van droge naar natte rijst. Er zijn aanwijzingen dat vooral armere deelbouwers uit Los Monos meer van natte rijstteelt *(arroz criollo)* gebruik maken. Uit nader onderzoek bleek dat het meedoen aan verdelingsmechanismen van rijst bij de oogst samenhing met sociale positie in het dorp. Blijkbaar participeren deelbouwers meer in mechanismen van "gedeelde armoede" dan boeren die eigenaar zijn van land.

In La Doctrina (hoofdstuk 6) is geïrrigeerde gemechaniseerde rijstteelt geïntroduceerd als onderdeel van een landhervormingsprogramma. Hier wordt rijst voornamelijk geproduceerd als handelsgewas. Deze vorm van rijstteelt vereist een institutionele infrastructuur, waarbij overheidsinstellingen een belangrijke rol vervullen.

De dorpsstudies maken een vergelijking mogelijk waarbij sociale veranderingen die in La Doctrina zijn opgetreden worden onderscheiden in veranderingen die direct gerelateerd zijn aan eigenschappen van het gewas, en veranderingen die deel uitmaken van een algemener veranderingsproces waarin het dorp zich bevindt. In La Doctrina heeft de vernieuwde landbouw geleid tot een andere stratificatie waarbij grotere inkomens- en statusverschillen tussen de boerenhuishoudens, ontstonden. Er zijn aanwijzingen voor een verandering in de grootte en de samenstelling van de huishoudens, die verwijst naar een proces van atomizering onder boerenhuishoudens aan de noordkust van Colombia. Hierbij treedt een fase op van vergroting van huishoudens (en wellicht van het gezin) in het proces van modernisering.

Bij een nadere analyse van oogstarbeid en de betaling daarvan blijkt dat verdelingsmechanismen van rijst niet meer voorkomen. Dit verschijnsel blijkt samen te hangen met eigenschappen van de nieuwe rijstrassen zoals planthoogte, plant-type en de wijze waarop de rijst aar voor de oogster bereikbaar is. De noodzaak om dure produktiemiddelen aan te wenden voor de verbouw van de geïntroduceerde rijstrassen is een factor die van belang is voor het ontstaan van inkomensverschillen en een veranderde sociale stratificatie.

Uit de studie blijkt dat toekomstig onderzoek naar de verbetering van rijst in Colombia tot een verdere ongelijke verdeling van baten kan leiden. Indien ook minder bevoordeelde boeren dan degenen die reeds tot irrigatie toegang hebben tot de doelgroep van rijst-onderzoek zullen gaan behoren is het aan te bevelen, het onderzoek te richten op verbetering van de z.g. *forastero*-rijst. De voordelen hieraan verbonden zijn:

- het is een gewas dat verbouwd wordt door armere boeren, waardoor ook deze categorie van rijstboeren van toekomstige verbeteringen kan profiteren.
- het land waarop *forastero*-rijst wordt verbouwd draagt in het algemeen een lagere opportunity cost; het is minder geschikt voor andere gewassen

- *forastero*-rijst heeft schijnbaar betere opbrengstmogelijkheden dan *criollo*-rijst
- indien het onderzoek zich zou richten op verbetering van *criollo*-rijst, dan zal althans een gedeelte van de opbrengsten ten goede komen aan de toekomstige bezitters van het land. Dit zijn meestal grootgrondbezitters, die meer geinteresseerd zijn in veehouderij en vaak land bezitten uit oogpunt van belegging.

Uit het onderzoek blijkt tevens dat het aanbeveling verdient meer adequate indelingscriteria te gebruiken voor systemen van rijstteelt dan thans in Colombia het geval is.
Ook kan geconcludeerd worden (zie hoofdstuk 4) dat het van groot nut zou zijn voor de landbouwkundige ontwikkeling van tropisch Latijnsamerika de motieven en de mogelijkheden van *colono*-landbouw in z.g. 'fronteer'-gebieden nader te onderzoeken.

Het is van belang in de toekomst meer gebruik te maken van sociaalwetenschappelijk onderzoek in het proces van landbouwkundig onderzoek. Een nuttig perspectief voor sociaalwetenschappelijke onderzoekers is hierbij de in het eerste hoofdstuk aangeduide "crop sociologie". Om pragmatische redenen wordt daarbij uitgegaan van het bestuderen van eigenschappen van gewassen die met behulp van landbouwkundig onderzoek manipuleerbaar zijn, en waarbij van te voren zoveel mogelijk met de gevolgen van de verschillende technologische alternatieven rekening wordt gehouden.

RESUMEN

En este estudio se investiga la relación que las differentes características de cultivos tienen sobre el contexto social en locual se encuentran. El hecho que la investigación agricola contemporánea ha llegado al punto de poder determinar e influenciar características de los cultivos hace importante este proposito. Esto dado la circunstancia que la investigación agricola no siempre toma en cuenta la significancia y el papel de los cultivos en el sistema de agricultura y en la vida social de los campesinos. En especial para el cultivador tropical, quien frecuentamente cuenta con un sistema de agricultura complejo, las características de cultivos mejorados puedan tener efectos disfuncionales. La relación entre el mejoramiento en los cultivos y la organización de aquellos mejoramientos ha cambiado profundamente durante las fases historicas de la agricultura. Actualmente, nuevos centros de investigación agricola juegan un papel importante en la identificatión de características de cultivos, necesarias para el aumento de la produción.

En este estudio se desarrolla esta perspectiva a traves de una investigación sobre las concecuencias locales y regionales de la introducción de nuevas variedades de arroz en la Costa Norte de Colombia. Además, se formularan dos objectivos del estudio, investigar:

- Cuales son las relaciones existentes entre los sistemas tradicionales de producción arrocera y la estructura social de comunidades campesinas en la Costa Norte de Colombia.
- Cuales han sido las consecuencias sociales de la introducción de nuevos sistemas de cultivos de arroz de mayor rendimiento.

Datos históricos muestran que en Colombia el cultivo de arroz ha sido un cultivo importante desde épocas coloniales remotas. En el Capitulo 2 se presenta una reseña histórica del cultivo del arroz en Colombia y se demuestra que durante los ultimos 20 años hay tres instituciones que han contribuido hacia un cambio en las variedades y las practicas culturales en este cultivo: el Instituto Colombiano Agropecuario (ICA), el Centro Internacional de Agricultura Tropical (CIAT), y la organización de grandes, y políticamente poderosos, arroceros de Colombia (Fedearroz).

Incrementos en la producción y en el area de arroz de riego, han contribuido al desaparacimiento de pequeños arroceros, quienes frecuentamente producían arroz para autoconsumo. Las estadísticas arroceras Colombianas, cuya organización de las distintas categoriás de cultivación no corresponden con las categorías de hecho, han dado lugar a una imagen distorcionada, ocultando la magnitud de la expulsión de campesinos arroceros de subsistencia.

En el Capitulo 3, se presenta y se discute el desarrollo agrario en la Costa Norte de Colombia. A causa de la introduccion reciente de cultivos comerciales como el algodón y el arroz de riego la sociedad costeña, anteriormente caracterizade por una estructura de latifundios y minifundios, ahora se ve amplificade por la inclusión de nuevas clases sociales, como empresarios de los cultivos mencionados, y un grupo creciente de campesinos sin tierra dependendiente de su mano de obra asalariada. En el capitulo 3 tambien se hace un retrato de la sociedad costeña.

En el Capitulo 4 se describe los sistemas de cultivos de arroz en la Costa Norte. Se demuestra que uno de estos sistemas, el arroz criollo, ha jugado un papel decisivo en el desarrollo agricola de la region. Arroz criollo era (y aún lo es) un cultivo transitorio en el proceso de tranferir areas anteriormente cubiertos con bosques en pastizales con uso extensivo. En esta capitula además, se muestra como el cultivo de arroz está envuelto en una red de instituciones sociales, tales como el invitar amigos y familiares para colaborar en la cosecha de arroz, y la distribución de arroz a nivel local a traves de sistemas de pago corespondientes, que consisten en pagar la labor de la cosecha con una quinta parte del arroz cosechado.

En los Capitulos 5 y 6 se presentan estudios detallados de dos comunidades en la Costa Norte Colombiano. En Los Monos (Capitulo 5) solamente se cultiva el arroz manualmente, no se cultivan variedades de alto rendimiento y la produccion se dirige esencialmente hacia el autoconsumo. En la producción arrocera local se encontró que existe un proceso de cambio lento del cultivo de arroz de secano (arroz criollo) hacia el cultivo de arroz de cienaga (arroz forastero). Tambien se encontró que la participación en los mecanismos de repartición de arroz como pago en la cosecha estaba relacionada con la posición social del campesino en el pueblo. Aparentamente campesinos

con recursos más escasos como los aparceros participan más en mecanismos de "pobreza compartida" que campesinos que tienen tierra.

En La Doctrina (Capitulo 6) se ha introducido el arroz de riego mecanizado como parte de un programa de reforma agraria. Aquí el arroz se produce como cultivo comercial. Esta forma de producción de arroz requiere una infraestructura institucional iniciada por el gobierno.

El estudio de estas comunidades permite hacer una comparación que facilita la explicación de los cambios sociales ocurridas en ellas. Se distingue dos tipos de cambio. Primero, aquellos que forman parte de un proceso de cambio mas general; y segundo, aquellos que se relacionan directamente a las características del cultivo. En La Doctrina, la agricultura modernizada ha causado una nueva estratificación entre las familias campesinas, entre las cuales se puede distinguir mayores diferencias de ingresos y estatus social que anteriormente. Tambien, se encontró indicaciones de cambios en el tamaño y la composición familiar, lo que está relacionado con un proceso de "atomización" entre familias campesinas costeñas. Tal vez la familia compesina costeña está aumentando su tamaño durante el proceso de modernización.

Cuando se analiza la labor en la cosecha del arroz y su pago, resulta que los antiguos mecanismos de distribución ya no existen. Este fenómeno esta íntimanente ligado a las características de las nuevas variedades de arroz y su sistema de cultiva, tales como el tamaño de la planta, el tipo de la planta y la forma en que está conectada la pluma al gajo. Las nuevas variedades son mas dificíl de cortar manual y individualmente que las tradicionales. La necesidad de invertir en costosos insumos en el caso de las nuevas variedades de arroz, es un factor que ha contribuido a la mayor diferenciación en los ingresos campesinos y en la estratificación social.

De este estudio se puede concluir que la futura investigación de arroz puede llegar a una mayor desigualdad entre los productores de este cultivo. Si la investigación futura se dirigiría no solamente hacia los campesinos que ya tienen acceso a tierras con sistemas de riego, sería recomendable de enfocar la investigación con preferencia hacia el sistema de arroz forastero. Desde un punto de vista social, esta politica tendría las ventajas siguientes:

- El arroz forastero es un cultivo de campesinos con escasos recursos, quienes así podrían participar en los beneficios de la investigación agrícola.
- Variedades de arroz forastero parecen tener potencias de mayor rendimiento que las variedades de arroz criollo.
- El mejoramiento de arroz forastero puede formar un estímulo para hacer un uso más intensivo de regiones fertiles y promisorias de la Costa Norte de Colombia, que ahora carecen de infraestructura social y fisica.
- Si la investigación enfocaría hacia el arroz criollo, por lo menos una parte de los beneficios llegaría a los propietarios futuros de la tierra, que casi siempre son grandes propietarios. Su interes en estos tipos de tierra (sabanas y/o tierras onduladas) en muchos casos se basa en motivos de invertir capital, y menos en perseguir una mayor producción de la tierra.

La investigación tambien mostró que puede ser util mencionar explicitamente en las estadísticas arroceras las categorías 'arroz manual' (criollo) y 'arroz manual de transplante' (forastero), ya que son categorías con diferencias importantes. La categoría 'arroz de secano' que se utiliza ahora para los sistemas de arroz sín riego y sín mecanizar, es un concepto confuso, aún más si el arroz secano mecanizado se incluye en la categoría de 'arroz de riego', tal como es la practica ahora.

Es importante hacer un uso más frecuente de las ciencias sociales en el proceso de la investigación agricola. Una perspectiva util puede ser aquella qua se ha expuesto en el capitulo 1 como "la sociología de cultivos" (crop sociology). Por razones pragmáticas, los cientificos sociales deberían empezar a estudiar aquellas características de cultivos que son sujetas a modificaciones en la investigación agrícola. Así será posible de contar de antemano con alternativas technológicas, desde la primeras etapas de la investigación agrícola.

CURRICULUM VITAE

Petrus Adrianus Nicolaas Maria Spijkers was born in 1945 in Goirle, The Netherlands. He attended the Paulus School in Tilburg and obtained the HBS-B Certificate in 1962.
In 1974 he graduated in Rural Sociology of the Tropics and Subtropics at the Agricultural University, Wageningen.
The course of study also included sociological aspects of development planning in rural areas,development economics, and agricultural credit and rural co-operatives in developing countries. During his studies he carried out field-work in the irrigation settlements of La Joya-San Isidro, Peru.
Between 1974 and 1978, he worked as a FAO associate expert at the Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia. During this time, the field-work for this thesis was carried out.
In 1978 he was appointed as a research assistant in the Department of Rural Sociology of the Tropics and Subtropics, Agricultural University, Wageningen. In 1981, he was appointed to the staff of the Department of Cultural Anthropology, University of Utrecht. His work includes lecturing in various subjects related to rural development, the co-ordination of student field-work in Latin America, and the supervision of student field-work in Colombia. He has carried out several short-term consultancies in Peru and Colombia for the Netherlands Ministry of Development Co-operation.