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THE DEVELOPMENT POTENTIAL OF NEW LANDS SETTLEMENT IN THE TROPICS AND SUBTROPICS: A GLOBAL STATE-OF-THE-ART EVALUATION WITH SPECIFIC EMPHASIS ON POLICY IMPLICATIONS

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and
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CONTENTS

CHAPTER 3

METHODOLOGY

CHAPTER 4

THE DYNAMICS OF THE SETTLEMENT PROCESS

CHAPTER 5

NEW LANDS SETTLEMENT AND INTEGRATED AREA DEVELOPMENT

CHAPTER 6

BASIC ISSUES ASSOCIATED WITH STAGE ONE
(PLANNING, INITIAL INFRASTRUCTURAL DEVELOPMENT, AND RECRUITMENT)

CHAPTER 7

BASIC ISSUES ASSOCIATED WITH STAGE TWO (TRANSITION STAGE)

CHAPTER 8

BASIC ISSUES ASSOCIATED WITH STAGES THREE (ECONOMIC AND SOCIAL DEVELOPMENT) AND FOUR (HANDING OVER AND INCORPORATION)

LIST OF TABLES AND FIGURES

TABLES

FIGURES

PREFACE

In 1977 I prepared a research proposal on human settlement in new lands which was submitted through the Institute for Development Anthropology to U.S. AID's Development Support Bureau (Office of Rural Development and Development Administration) as an unsolicited research proposal. After a number of revisions and alterations, this was funded for the period May 15, 1979 through October 1, 1980. Subsequently a no-cost extension was granted until September 1981, at which time this manuscript was submitted.

Though the project was planned from the very start as a global evaluation of new lands settlements in the tropics and subtropics, U.S. AID requested two amendments prior to funding. The first was that site visits and field research be restricted to Asia, the Middle East, and Africa, with all of Latin America omitted. The second was that I make a special effort to recruit consultants to the project (hereafter called "the global evaluation") trained in agronomy and agricultural economics. Though I am not sure why the decision was made to eliminate funding for Latin America, I assume it was because the proposal was considered too ambitious as written, with Latin America dropped because that was the region with which I was least familiar. Granted the global nature of the evaluation and the hypotheses on which it was based, I personally believe that this omission was a mistake. I have tried to correct for it by paying

special attention to the written literature on new lands settlement in Latin America and to contacts with settlement experts with Latin American experience. Especially helpful here have been Craig L. Dozier, Robert Eidt, David W. Hess, Lowell S. Jarvis, Maxine Margolis, Michael Nelson, Sutti Ortiz, James Parsons, William Partridge, and Judith Tendler. As for the second amendment, that proved to be a very wise one. Two senior consultants agreed to serve in an advisory function. One was André Guinard, an agronomist and former director of France's Centre National d'Etudes d'Agronomie Tropicale, while the other was Randolph Barker, an agricultural economist and currently Professor of Agricultural Economics at Cornell University.

Many other people have contributed to this study as it has evolved over the years. I am especially grateful to three other consultants to the global evaluation who accompanied me during different site visits. These are Dr. Hussein Fahim of the University of Utah with whom I traveled in the Sudan and Egypt, Dr.Mohamed Osman El Sammani of the University of Khartoum with whom Fahim and I traveled in the Sudan, and Professor Sediono M. P. Tjondronegoro of Bogor Agricultural University with whom I traveled in Sumatra and Sulawesi. Special thanks also go to the seven Institute for Development Anthropology grantees who undertook research in connection with the global evaluation. These are Mukhtar Ibrahim Agouba, Mohammed El Hassan El Tayeb and Muneera Salem-Murdock who worked in the Sudan, Zeinab Gamal Hassan and Mohamed Fikri Abdel Wahab who worked in Egypt, Kapila P. Wimaladharma who supervised a major research project at Minneriya in Sri Lanka and Tulsi P. Uprety in

Nepal. I am especially indebted to Wimaladharma, Head of the Land Settlement Department of the Ministry of Lands and Land Development with whom I traveled extensively on three separate occasions to visit land settlement areas throughout Sri Lanka and to Uprety with whom I traveled in the Central and Eastern Tarai, and in the foothills of the Himalayas, of Nepal. Special thanks also go to my three research assistants, Miriam Chaiken, Tom Conelly and Sethu Palaniappan. They abstracted most of the source materials while Chaiken and Conelly invited me to visit them on the West Coast of Palawan, Philippines, where I benefited from their fieldwork among recent spontaneous settlers. As for Palaniappan, he did all the coding of the abstracts and the computer analysis. I would also like to thank Bernard Riley for bibliographic assistance.

Throughout the global evaluation many scholars have given me the benefit of their experience. In particular I would like to thank Abdel Ghaffar Mohammad Ahmad of the University of Khartoum, Tunku Shamsul Bahrin of the University of Malaya, Robert H. Bates of the California Institute of Technology, Elizabeth Colson of the University of California, Berkeley, Gloria Davis of the World Bank, James Eder of Arizona State University, Tempe (the Eders invited me to stay with them in Puerta Princesa on the East Coast of Palawan), Colin MacAndrews of PAE-RMI, Jakarta, P.D.A. Perera of the University of Sokoto, Rangit D. Wanigaratne of the Agrarian Research and Training Institute, Colombo, and my fellow directors at the Institute for Development Anthropology -- David W. Brokensha and Michael M. Horowitz.

At the United States Agency for International Development many officials have facilitated the global evaluation. I am especially grateful to Alice Morton whose initial interest and assistance translated the global evaluation from an idea to an actuality. She was followed as project officer by Ronald Curtis and then by Robert Simko both of whom gave invaluable assistance (with Simko arranging for my recent visit to Somalia). I have also benefitted from discussions and field trips with John Eriksson, Jeffery Evans and Douglas Tinsler, while Frederick E. Machmer, Jr. arranged my Indonesia visit and Arie W. Supit traveled with me to Luwu District in Southern Sulawesi.

Aside from U.S. AID and the Institute for Development Anthropology, I am also indebted to assistance from the Ford Foundation and the California Institute of Technology. Prior to the commencement of the global evaluation, the Ford Foundation gave me the opportunity -- as a consultant evaluating their social science program in the Middle East — to visit the Rahad Project in the Sudan and the Jordan Valley Authority. Caltech has provided salary support during most of the write-up period and some of the fieldwork, while I have worked together in preparing the manuscript on the word processor with Joy Hansen, Chris Smith, Edith Taylor and Sue McCloud, to all of whom I am indebted. While practically all of the manuscript is newly written, in places I have incorporated paragraphs from earlier unpublished reports that I have written for U.S. AID on new lands settlements.

In many respects, this book is the product of my twenty-five years of experience with new lands settlement in the tropics and subtropics. Its a personal statement in which I have tried to develop a four-stage analytical framework for the study of new lands settlements, with special emphasis on settler families, on new lands settlement as a stimulus for integrated area development, and on the policy implications of current knowledge. Needless to say, the opinions are those of the author only.

CHAPTER 1

GOALS AND INITIAL DEFINITIO!

I. GOALS

This global evaluation of new lands settlements in the tropics and subtropics has had two major goals throughout. The first was to provide a "state-of-the-art" analysis of new lands settlement as a development option for settler, farm laborer and nonfarm families; national development agencies; and international donors. The second was to demonstrate the development implications of current knowledge in order to provide information which could be used for improving settlement design, implementation, management, and evaluation.

An initial assumption was that the settlement process throughout the tropics and subtropics has fundamental similarities irrespective of differences in agro-ecological zones and production systems, and irrespective of the individual and sociocultural backgrounds of both spontaneous and sponsored settlers -- and in the latter case of the policies and organizational structures of the sponsoring agencies. Since subsequent analysis has supported this assumption and since it has major scientific and policy implications which will be elaborated in detail, it is important to bring it into the open at the start and to invite informed readers to critique it in the light of their own experience.

II. NEW LANDS SETTLEMENT DEFINED

A. INTRODUCTION

New lands settlement is defined as the spontaneous and sponsored settlement of areas which are largely uncultivated at the time of their occupation. It includes what has been referred to in the literature as "colonization" (especially in Latin America and in Indonesia prior to independence), "resettlement," and "transmigration." All these terms emphasize the settlement of land by people rather than land reclamation or land preparation as such. The implication is that these people, hereafter called settlers, see the land that they are working as their own even though they often have neither secure rights of ownership nor use. Since settlers are not wage laborers, settlement as here defined does not include most state farms, plantations, joint ventures, and other types of estates worked with hired labor even though they involve the clearing and cultivation of new lands areas. Such distinctions, however, are not always clear, especially where state farms and estates are linked with settlement.

One example is where worker/settlers are recruited on the assumption that eventually the land will be handed over to them. An example is certain desert reclamation projects of Egypt where worker/settlers were recruited on the promise that they would be given holdings within a specific time period. In the interim they would be treated as hired laborers on a state farm, the intention of the government being to hand land over to the worker/settlers only when its productivity had been brought up to a certain level. Even though

this period may last over a decade (as it did with Tahaddi in Egypt) during which many worker/settlers drop out, the project is still defined as a new lands settlement provided the eventual land allocation to the settlers occurs. Another type of linkage occurs when an estate or state farm is designed and implemented in such a way that it includes a settlement component. In this case, only that component would be defined as a new lands settlement.

The above definition says nothing about the size of the holdings farmed by the settlers, or about the extent to which family labor versus hired labor is used. Through time some settlers will lose all or some of their land while others will expand the size of their holdings. At the same time, the relative importance of family labor may change significantly over the years. Throughout the tropics and the subtropics, the majority of settlers are small scale operators. In irrigated settlement areas, the size of their holding rarely exceeds five hectares. In areas of rainfed cultivation, variation in holding size is much greater due to such factors as land availability, preferred farming system, and government policy. In Latin America, holdings on government sponsored settlements tend to vary between forty and one hundred hectares while they rarely exceed forty hectares in Asia, Africa, and the Middle East. Though the emphasis of this report will be on small scale operators, reference will also be made to middle-scale holders (as in the case of the Gezira and New Halfa projects in the Sudan) and to projects designed to include a "middle-class" component (as in Sri Lanka and Egypt).

Though the term "settler" will be used time and again, it is essential to emphasize from the start that this term refers to the settler family as a production and social unit. Though this may seem to be so obvious as to not require special attention, national and international planners alike all too often write about the settler as if he was a single male, with the term "farmer" used time and again. Not only does this usage emphasize farm activities for the male head of household while neglecting the farmwife and the children, but it also emphasizes the agricultural component to the neglect of the off-farm component of the farming system, the recruitment of settlers with nonfarm skills, and the development of community diversification. A major weakness of government sponsored new lands settlements throughout is that all too often they have been designed for men by men to the neglect not just of the wife but of the settler family and the community in which that family lives.

B. THE HOST POPULATION

In the definition of new lands settlement, the phrase "largely uncultivated" is important since most new lands are in fact occupied by others (hereafter called the hosts) at the time of settlement or, if currently unoccupied, are almost always subject to rights of customary use and tenure by the hosts. In spite of this, such lands are considered "new lands" by the settlers and the settling agencies both because they are thinly occupied by host populations and because they are considered underutilized due to the absence of intensive systems of land use.

Frequently the host population is very different from the settlers in regard to modes of production, ethnicity, and influence and power. In the humid tropics, the commonest production systems of the hosts combined shifting or bush-fallow cultivation with gathering, fishing, and hunting while transhumant pastoralists may be the host population in arid and semi-arid habitats, and more settled farmers the host population in woodland savannas. In most cases, however, population densities tend to be relatively low. For this reason, and because the hosts also tend to have relatively low social status and little regional (let alone national) influence and power, their lands are frequently taken away without adequate compensation during the settlement process. And even if they do not lose most of their lands, rarely is a systematic attempt made to incorporate the hosts within the settlement design, hence increasing the chances of host/settler conflict.

C. SPONTANEOUS AND SPONSORED SETTLERS

The distinction between spontaneous and sponsored settlers refers to whether or not the settlers are self-recruited or respond to the recruitment initiative of a sponsoring agency. It has nothing to do with the reasons or motivation for leaving current residence for a settlement area. In that sense both spontaneous and sponsored settlers alike are often "pushed out" of their previous communities because of a lack of economic opportunity for themselves and their dependents. They may also be forced to move because of natural disasters such as earthquakes, volcanic eruptions, floods, and

drought. In such cases, government assistance is often forthcoming, as when Somali government agencies settled 120,000 drought-stricken Somali nomads in three agricultural settlements and a number of fishing settlements during the mid-1970s. And increasingly people are forced to move because of ethnic and political disputes within and between nations.

Spontaneous settlers are defined as individuals, families, kin groups, and communities who settle an area on their own initiative and primarily through the use of their own resources. Sponsored settlers are selected by settlement agencies which usually provide some assistance during the settlement process. Again, those selected may be individuals, families and more extended kin groupings, and communities, while the sponsoring agencies are either public or private sector. While most sponsored settlement is currently carried out by government agencies, during the current century profit-oriented private sector corporations and religious agencies have also been major sponsors with and without government assistance. Examples of the former are the Sudan Cotton Syndicate (a major initial partner in the Sudan Gezira Scheme) and the Companhĩa Melhoramentos Norte do Paraná (CMNP), which was the lead agency in Northern Parana, Brazil — considered by a number of settlement experts to be the most successful example of regional development in Latin America. Examples of the latter are Mennonite colonization in Mexico, Paraguay, and Bolivia; colonization undertaken in South America by the Jewish Colonization Association and settlement in the Philippines sponsored by Christian organizations. Though the numbers of settlers sponsored by such

private agencies are relatively small, their success relative to government sponsored settlement deserves more analysis.

While the distinction between spontaneous and sponsored settlers is relatively clear in most cases, exceptions occur. These relate to individuals and families whose settlement is sponsored by other individuals. Where sponsorship is primarily due to the assistance of the settlers' relatives who provide some capital and/or labor while remaining permanently resident in the "home" village, such settlers would be considered spontaneous. But, where they are recruited and assisted by businessmen to clear land on the frontier (as not uncommonly occurs in the humid tropics of Latin America) as a joint venture, the settlers are better considered sponsored.

Though settlement which brings people across oceans or from subtemperate mountain valleys down into the humid tropics may be more appealing to the imagination, actual distances traveled by new lands settlers may in fact be relatively short. On the one hand, we have Japanese settlers crossing the Pacific and Jews crossing the Atlantic to settlement areas in South America, Nepalese peasants descending the Himalayan foothills to the forests of the Tarai, and Andean small holders colonizing the Amazon Basin. On the other hand, we have members of many African tribes as well as small holders in the humid tropics of Latin America moving less than one hundred miles from an existing village to a new lands settlement area in a similar agro-ecological zone. African examples over the past fifty years would include the Nigerian Tiv, the Tanzanian Sukuma (who successfully converted the tsetse-ridden bush of Geita District into a cultivation

steppe), and the Gwembe Tonga of Zambia. Latin American examples would include small scale settlers in the Santa Cruz area of Bolivia and the Caqueta area of Colombia. In the latter cases, some small holders have made successive moves from one settlement area to another, seeking the retreating frontier time and again by leaping over their neighbors who subsequently filled in the open space around them.

All of the above qualify as new lands settlers. While distance may be an important factor to consider prior to becoming a settler, and while lengthy moves are more apt to require either sponsorship or savings, the success of the settlement process itself is more dependent on the length of time it takes settlers to become familiar with their new habitat. Even where distances are relatively short, settlers moving from one agro-ecological zone to another can be expected to take longer to adapt than settlers who are familiar with the habitat into which they move, even though they may have moved a greater distance to get there.

Though government administrators with settlement experience often remain skeptical, evidence from different parts of the world suggests that generally speaking spontaneous settlers make better farmers in less time and at a lower financial cost than do government sponsored settlers. The comparison here is with pioneer settlers, that is, those who arrive during the first time phase (hereafter called the pioneer phase) of the settlement process. Studies include James (1978) for Palawan in the Philippines, Uprety for the Eastern Tarai of Nepal (1981), and Nelson's comparative evaluation of new

lands settlement in Latin America (1973). A range of factors appear to be involved, the proportional importance of which varies from area to area. They include settler motivation, background, and resources as well as the absence of the type of poor management which so often characterizes government sponsored settlement. There is considerable evidence that spontaneous settlers have access to more resources than do the majority of government sponsored settlers. In spite of the exceptions (which include settlements for retired members of national security forces and for secondary school and university graduates), most government sponsored settlers are poor. They are more apt to be landless laborers or sharecroppers than spontaneous settlers whose resources often place them above the lowest 20 percent of the sending population in terms of income. Under such circumstances, it makes sense to combine both types of settlers in the settlement process rather than favoring one type to the exclusion of the other.

D. TYPES OF NEW LANDS SETTLEMENT

Throughout this monograph, the primary focus is on the settlers with a wide range of such factors as settlement management and farming systems considered primarily in relationship to settler families. In classifying settlement types, emphasis is placed on both the type of settler and on the nature of the involvement of the sponsoring agency or agencies. Four types are separated out for purposes of analysis, although several different types may in fact be represented in a single settlement. These are the following:

1. Spontaneous settlement with very little government or other assistance.
2. Spontaneous settlement facilitated by government and other agencies.
3. Voluntary settlement sponsored by government and other agencies.
4. Compulsory settlement sponsored primarily by government agencies.

1. Spontaneous Settlement with Very Little Government or Other Assistance

In this era of project and program planning and of national development plans, we tend to forget that inhabited portions of the world have been largely populated by spontaneous settlement. Our earliest ancestors presumably moved as small gathering and hunting bands from Africa to Asia, peopling the Middle East en route. Subsequently they migrated into Europe, Siberia, Australia, Melanesia, and Polynesia -- continuing on to people North, Middle, and South America during a sequence of population movements. Though assisted spontaneous migration became of greater importance during the era of colonization by the European powers, spontaneous migration still dominated the peopling of the Americas, Southern Africa, and Australia and New Zealand by settlers of European stock from the seventeenth into the twentieth century. Even today the majority of settlers moving into the last frontiers of the humid tropics are primarily spontaneous, whether to locales in South America, the equatorial belt of Africa, Nepal, Indonesia, or the Philippines. Though there are exceptions, like Malaysia, they are just that -- exceptions.

Even when settlement of the entire range of agro-ecological zones in the tropics and subtropics is taken under consideration, sources consulted by the World Bank in the preparation of an issues paper on Agricultural Lands Settlement (1978b) indicated that approximately 75 percent of new lands settlement in the late 1970s was spontaneous versus 25 percent sponsored. Even in Indonesia with its massive program of sponsored settlement (first as colonization under the Dutch and more recently as a series of transmigration programs under the Indonesian government), MacAndrews (1978) estimates that over 50 percent of recent settlers are spontaneous. In Nepal the figure probably exceeds 80 percent. Unless special controls exist or adjacent areas are unsuitable for settlement, spontaneous settlers tend to congregate around sponsored settlements. Hence in Colombia, Tinnermeir (1965) generalizes that spontaneous settlers "always" can be found close to the boundaries of sponsored settlements (p. 17).

Though spontaneous settlement continues to dominate in the humid tropics, the situation varies to a much greater extent in the savannas and in the arid and semi-arid portions of the tropics and subtropics. In African savanna woodlands, government sponsored settlement tends to dominate in areas of West Africa infested with river blindness (onchocerciasis) and in Tanzania with its national ujamaa program based on agricultural settlement. On the other hand, spontaneous settlement probably predominated in settling areas inhabited by the tsetse fly carriers (Glossina sps.) of both livestock and human trypanosomiasis. As for arid and semi-arid lands, government sponsored settlement tends to dominate because of the high

costs for providing water for domestic use, irrigation, and livestock. Even here, however, it is important to keep in mind spontaneous settlers who reclaim land at the edge of currently irrigated lands through their own initiative and with their own resources. In a recent report on the technical and economic feasibility of new lands productivity in Egypt for the United States Agency for International Development (U.S. AID), Pacific Consultants (1980) concluded that joint ventures (between government and private firms) and "homesteaders" were financially the most viable, followed in order by small holder government sponsored settlers, middle-class settlers, and, finally, by state farms which showed heavy losses. Homesteaders are spontaneous settlers who use their own resources to "sink a well" in order to irrigate perhaps 50 feddans along the margins of the Nile Delta (p. 15).

2. Spontaneous Settlement Facilitated by Government and Other Agencies

To date this type of settlement has been comparatively rare, for reasons which are not altogether clear. While the evidence is impressive that spontaneous settlers time and again make better farmers in less time and at a lower financial cost than do sponsored settlers, nonetheless there are major disadvantages associated with spontaneous settlement — as planners, agronomists, supporters of the rights of host populations, and ecologists have pointed out. Three reasons in particular have been stressed. These are the low yields and environmental degradation associated with spontaneous settlement

and the tendency of spontaneous settlers to displace the host population. The first and second reasons often go together. Agronomists and ecologists, for example, point out that the process of settlement in the Amazon basin (which is dominated numerically by spontaneous settlers) is replacing the high biological productivity of humid rain forests with the comparatively low productivity of extensive systems of agriculture — systems which frequently are based on several years of annual cropping followed by conversion of exhausted soils to pastureland. Similar arguments have been made against many of the tribally based shifting cultivators of southeast Asia. Hence the Hmong are criticized for having converted thousands of square miles of forest into wastelands during their spontaneous migrations. The same criticisms have been made of spontaneous settlers in Nepal's Tarai, in Palawan in the Philippines, and in the forested areas of eastern Panama. Should there be host populations "in the way," spontaneous settlers are also criticized for causing their displacement — and even extinction.

While these criticisms are serious, they need to be placed in historical perspective. While systems of bush fallow or shifting cultivation (such as practiced by the Hmong, for example, and many spontaneous settlers in the humid forests of Latin America) certainly have lower biological productivity than primary forests, they also provide the cultivators with the highest yields per unit of labor within the limits imposed by their current technology. Though there were exceptions, most shifting cultivators alternated periods of cultivation with periods of fallow, the length of which was intended

to restore the fertility of the soil under a cover of either grassland or secondary growth. Through the productivity of such alternating forms of vegetation did not replicate that of the original humid forest, such systems of land use did eliminate the danger of widespread environmental degradation; indeed, a strong argument can be made that they actually increased environmental diversity. Unfortunately, with population increase, this is less commonly the case today because of the progressive reduction in the length of the optimum fallow period. At the same time, more people and the increased frequency of untimely burning have accelerated the spread of grasslands in the humid tropics of Latin America, in Indonesia (where there are new extensive zones of Imperata cylindrica), and elsewhere.

While a historical explanation does not alter the fact that increased degradation is occurring today, it may lead to a more understanding awareness of the ecological and demographic bind that confronts increasing numbers of spontaneous settlers. Relatively low income people, the majority show initiative and enterprise in seeking a better life for themselves and their children under conditions of extreme hardship. The fact that they stream into the less utilized areas of the tropics and subtropics in itself is an indication of the failure of national development programs to provide economic opportunities in their communities of origin.

In relating to this influx of spontaneous settlers, governments have tended to emphasize one of three responses. These are (1) to condemn the process and vilify the settlers, (2) to ignore or even encourage such movement but with no provision of assistance to

individual settler families, and (3) to facilitate the process of settlement. The first two responses have been historically dominant, although there appears to be a growing awareness of the need for the third. Condemnation and vilification has been a relatively common response of governments in a number of countries in Africa and Asia. Examples are Upper Volta where spontaneous settlers are called "pirates" and in Sri Lanka where they are labeled "encroachers." They are also condemned in Nepal.

In all three cases, the existence of spontaneous settlers definitely interferes with the implementation of national development plans. In Upper Volta such settlers are occupying river valleys that are being cleared of river blindness much faster than government can implement its ambitious program of sponsored settlement. In Sri Lanka, encroachers move into upper catchment basins, irrigation reserves, national parks, and areas set aside for large scale government sponsored settlement (as in the case of the Accelerated Mahaweli Programme). In Nepal, movement from the foothills of the Himalayas into the Tarai interferes with government plans to establish forest reserves and carry out a process of sponsored settlement following the controlled lumbering of the land in question. Though governmental concern is warranted, in each case, none of the three governments have the ability to stop, let alone evict, spontaneous settlers except in limited cases. Furthermore, the hostility toward spontaneous settlers is often not justified by the facts. In Sri Lanka, for example, a significant number of encroachers are the children of an earlier generation of government sponsored settlers.

Experienced farmers, they are nonetheless unable to acquire land on the government scheme, so they encroach on public lands where they eventually establish viable farms combining crop diversification with livestock and off-farm employment. Crop diversification here combines "home gardens" (a range of tree crops and vegetables) and the cash cropping of paddy with chillies, onions, and other food crops. Such diversified systems are not only resilient but they are more ecologically stable than most other forms of agriculture (see, for example, Goodland, 1980:15).

The second response is a relatively passive one. It is especially characteristic of Latin America where governments have allowed and even encouraged spontaneous settlers from overcrowded highland and other areas to settle the humid forests. This response is often seen as a policy alternative to carrying out major land reform programs or as a low-cost mechanism for settling border areas and occupying national space. Though assistance is not given to individual families, the process may be speeded up by building major access roads into or through forested areas -- as has been the case in the Amazon Basin of Brazil and Colombia (Tinnermeir, 1966:17). Though such a policy may help the government in power realize political goals (both in regard to appeasing large scale landowners and settling relatively empty areas), the opportunity to increase agricultural surpluses, to accomplish integrated area development in the settlement zones, and to improve settler living standards over the long run is significantly reduced.

Without assistance, most spontaneous settlers continue to be primarily subsistence farmers. As their numbers multiply, the dangers of environmental degradation increase — hence jeopardizing even subsistence levels of existence. Furthermore, research by Roberts (1975), Ortiz (written communication), and others indicates that unassisted spontaneous settlement is not even an effective mechanism for land redistribution since over the years the vulnerability of small holders causes increasing proportions to sell out to both rural and national elites, hence replicating the situation of landlessness and tenancies in the settlers' areas of origin. This is a major problem which also jeopardizes small holder sponsored settlement. We will return to it in a later section.

The third government response is to facilitate the process of spontaneous settlement. Since a major recommendation of this study is that this approach is essential if higher returns (at lower financial costs) from new lands settlement are to be achieved in the future, its comparative rarity to date needs more analysis. Though I have already mentioned the major disadvantages associated with the spontaneous settlement of new lands, these are also frequently associated with sponsored settlement. Though ecological costs tend to be lower, on a case-by-case basis agricultural productivity of sponsored settlers is also comparatively low (if not lower), and the rights of host populations tend to be more abused by sponsoring organizations (which have a greater ability to displace them than do individual settler families). Granted this, other factors must be influential. One, I believe, is the general ignorance of government officials about the

land and water use systems of spontaneous settlers and the sociocultural matrix in which these systems are imbedded. Not only are officials apt to be unaware of the initiative and enterprise on the part of families which settle spontaneously, but they also tend to be unaware of the generally greater economic and social viability of their communities in regard to the communities of sponsored settlers.

In my own experience, I have also found this ignorance compounded by the arrogance of administrators, planners, and decision-makers who believe that they know what is best for the settler and that the "development models" that they wish to superimpose upon them are inevitably superior. Such is rarely the case; indeed, a major theme of this monograph will be that the global experience with new lands settlement in the tropics and subtropics indicates that the development strategies of spontaneous settlers and sponsored settlers alike tend to be more dynamic and resilient than those of the planners. There is a major need here for improved two-way communication and understanding.

Fortunately, understanding at least is improving. Indonesia, in particular, has a long history of facilitating spontaneous settlement, with the Directorate General of Transmigration recently establishing a special section to promote spontaneous settlement. Convinced by the increasing research evidence, the World Bank in particular is pushing for the incorporation of spontaneous settlers within government plans for implementing new lands settlement. Drawing on previous experience with Bank assisted and other projects, a major impetus here may have been the Bank's 1978 Issues Paper on

Agricultural Land Settlement, which emphasized the conclusion of Nelson (1973) that for Latin America the viability of spontaneous settlement, generally speaking, exceeded that of sponsored settlement -- and at less financial cost. In its general conclusions and recommendations, the Bank Issues Paper noted that "a major reason for Bank involvement is to develop approaches which avoid the most adverse socioeconomic and ecological problems of spontaneous settlement" (p. 8). Though this statement is ambiguous and the point is not spelled out in subsequent paragraphs, I interpret it to mean that such spontaneous settlers, granted their numbers, should be assisted in the future along with sponsored settlers. Certainly, that approach has been incorporated within two projects in which Bank financing is involved. The first is the Caqueta Project in Colombia where the government focus through time has shifted from government selected settlers to spontaneous settlers who are assisted through the provision of credit and land titles. The second is the Indonesian government's transmigration program, where spontaneous settlers are assisted with transportation costs from Java and the Sunda Islands to Sumatra, Sulawesi, and Kalimantan — and with a range of services and other assistance after their arrival. Though governmental assistance to spontaneous settlers predates the Bank's financial assistance in both cases, presumably the Bank's involvement has strengthened the assistance program.

Assistance can take a variety of forms, of which the Colombian and Indonesian cases illustrate the range of possibilities. While clearly planners must take into consideration situational factors

peculiar to each settlement area, some generalization about priorities and their phasing is possible. All-weather access roads and potable water supplies are crucial, as is credit and some sort of mechanism to provide the settler with secure use rights to the land in question. Access roads and potable water may be best provided through a site and service approach such as has been so successful in a number of low income urban communities in parts of Africa and Latin America. Credit and secure land use rights are much more influenced by national ideologies and the capacities of both government and private sector organizations (including settler organizations which can ensure repayment of loans).

An especially attractive approach would be for governments to establish communities of sponsored settlers around which spontaneous settlers would be encouraged to take up residence. The communities of sponsored settlers initially could serve as local service centers for both sponsored and spontaneous settlers alike. They might also be used to demonstrate appropriate farming systems and other research based programs concerned with community and settlement development.

3. Voluntary Settlement Sponsored by Government and Other Agencies

Proportionately the importance of government sponsored voluntary settlement has been increasing in recent decades in comparison to settlements sponsored by commercial firms and religious organizations. Settlements planned and implemented by religious organizations have never been particularly common, while those that

exist rarely if ever have the necessary numbers of families to catalyze a process of integrated area development. Not only do families number in the hundreds rather than the thousands, but they often prefer to live out their lives in relative isolation from their neighbors. Though Jewish settlers would appear to have had a greater developmental impact than members of fundamentalist Christian sects, since the founding of the State of Israel immigration there has probably reduced the numbers of Jewish settlers in the tropics and subtropics.

Investment of commercial firms appears to be undergoing a change from investment in new lands settlement to an investment in land development. Prior to World War II some of the most "successful"* settlements involved the private sector, examples being the Gezira Scheme in the Sudan and the CMNP in Brazil. As those two examples indicate, investments occurred both in the colonies and in independent nations. As Nelson (1973) points out, such investment continued in Latin America (especially Brazil) during the 1950s and the 1960s. Nonetheless it appeared to have run its course during the 1970s. Currently there appears to be a growing interest in joint ventures which involve a partnership between government agencies and commercial firms, with the latter providing management and technical expertise in return for a share of the profits. Though few joint ventures have been implemented to date, those that have (as in Egypt) suggest that the emphasis will be on capital intensive land

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* Definitions of success are discussed in Chapter 2.

development with a hired labor force rather than on new lands settlement as defined in this monograph. There are, however, a range of options here. In one type of situation the land might eventually be handed over to settlers. In another type settlers might be located around the periphery of the joint venture so as to benefit from the availability of processing facilities and a range of infrastructure and services.

Aided by international development assistance, many national governments have attempted to plan and implement sponsored settlements as one of a variety of mechanisms to realize various economic, social, and political goals. Generally speaking, settlers are selected from established communities according to a relatively narrow set of age and other criteria and then are required to follow a closely supervised program of agricultural development for the production of annual and perennial crops. To date, returns have been disappointing, while costs per settler family have increased steadily. Even in the more "successful" cases such as the Federal Land Development Authority (FELDA) settlements in Malaysia, multiplier effects have not been impressive, while the Gezira Scheme (Sudan) is stagnating, with low production and a management system that is out of touch with the settlers.

It would be a mistake, however, to conclude that new lands settlement has insufficient potential to warrant government investment with or without international finance. Though I leaned toward that conclusion when I started this evaluation two years ago, it is far too simplistic. Certainly a wider range of alternatives need be assessed

before the decision is made to implement a particular settlement. And certainly the planning, implementation, and management of new settlements and the rehabilitation of old ones requires a willingness to experiment with new approaches.

A major conclusion of this evaluation has been that while planning expectations tend to be too high in regard to the rapidity with which early returns can be expected, they are too low in regard to possible long-term benefits. Part of the problem relates to the planning perspective which sees new lands settlements as rather narrowly conceived agricultural production projects based on the cash cropping of a small number of export crops rather than as mechanisms for catalyzing a process of integrated area development. Where multiplier effects are visualized, they tend to focus more on the processing of the crops grown than on the need of the settlers for production and consumption goods and services. Where the settler is stressed, the emphasis tends to be on the farmer as an individual rather than as a member of a family whose members participate in a joint decision making production unit. As for settler communities, they tend to be planned more in terms of physical housing, infrastructure, and social services rather than in terms of a community in which people will want to live and raise their children.

4. Compulsory Settlement Sponsored Primarily by Government Agencies

Compulsory settlement is rarely carried out for the good of the people concerned, aside from occasional instances of removal as

part of a disease control program (human trypanosomiasis in the Zande-speaking area of the Southern Sudan being an example; see Reining, 1966). Rather it is a by-product of larger scale events in which the future settlers find themselves embroiled. The commonest examples relate to political disputes between or within countries and to such large-scale national development projects as dam construction which requires the forced removal of thousands of people from future reservoir basins. In Africa alone, over 300,000 people were resettled in connection with five large-scale dam projects in Zambia-Zimbabwe (Kariba), Ghana (Volta), Egypt-Sudan (Aswan High Dam), Nigeria (Kainji), and the Ivory Coast (Kossou) between 1956 and the mid-1970s. Although some settlers in the long run may find themselves better off because of removal, compulsory relocation of entire communities should be considered only as a last resort. Almost invariably the majority of the people do not wish to move, so that they try to resist removal either passively or actively or both. When they are then uprooted in spite of their opposition, they are often traumatized with a period of multidimensional stress usually continuing for a number of years. Throughout, the people's opposition, which subsequently may be replaced by a dependency relationship with the relocating authority, interferes with the type of cooperation needed to increase the chances for settlement success.

Because it represents such an extreme example, settlement based on compulsory relocation throws into relief a number of problems which to a lesser extent characterize all types of new lands settlements. These have been studied in considerable detail in

connection with dam relocation in a number of tropical countries in Asia, Africa, the Middle East, and Latin America -- the most systematic analysis being Colson and Scudder's twenty-five-year study of the Kariba Dam Project (Scudder and Colson, 1979). The results of such studies have been very useful in improving our understanding of settler responses to settlement, of settlement stages, and of a wide range of issues associated with each stage. (See, for example, Hansen and Oliver-Smith, 1981).

E. THE MAGNITUDE OF CONTEMPORARY SETTLEMENT

Both spontaneous and government sponsored settlement have increased since the end of World War II. Population increase (linked to increased landlessness), large scale disease control programs (as with malarial control in the basin of the Mahaweli Ganga in Sri Lanka and Nepal's Tarai, and the onchocerciasis control program of West Africa), and national development planning have all provided a major stimulus. While the World Bank's 1978 Issues Paper notes that there are no reliable global estimates on the amount of new land settled during this time period, it also states that "there is no doubt that the extension of cropped area has been a major source of agricultural growth in large parts of Latin America and Africa and, to a lesser extent, Asia" (p. 20), with most of the increase being rainfed cultivation. Quoting several sources, the same Bank study notes that estimated current annual rates of settlement range from four to five million hectares per year for the world as a whole to five to ten million hectares for Latin America alone, although the latter figure

includes all types of agricultural land clearance. All such figures are subject to sizeable margins of error and should not be taken very seriously; nonetheless they indicate that new lands settlement is a major force.

The Bank Issues Paper also noted less government enthusiasm for new lands settlement than in the past. This conclusion is questionable, with government interest appearing to shift rather rapidly as conditions change and new leaders take over. Even the World Bank's own interest in settlement seems to wax and wane. Though the Bank is strongly pushing for the rehabilitation of certain old settlement schemes, it is also actively involved in three major, indeed massive, settlement projects, while the 1980 Agricultural Sector Review for Somalia has recommended a major settlement program there over the next twenty years. These major programs are the Accelerated Mahaweli Programme (AMP) in Sri Lanka, the Indonesian Transmigration Program, and the FELDA Program in Malaysia. Though the AMP has been scaled down within the past year, the plan is still to settle 45,000 families on 43,000 hectares of new land by 1986. In Indonesia, the government's intention during the third Five Year Plan (1979-1984) has been to settle half a million families primarily in Sumatra, Sulawesi, and Kalimantan -- with World Bank assistance being the largest single source of international finance. In Malaysia, 41,288 families have been settled on FELDA projects by 1978 with major expansion currently under way in Jahore, Jengka Triangle, and elsewhere -- again with the World Bank providing the largest single source of international funding.

In the Somali case, the Bank's Agricultural Sector Review foresees the need for settling during the next twenty years approximately one million nomads because of the inability of the rangelands to absorb the population increment during that time span. Adding on population expansion elsewhere in the country, the Bank estimates that approximately 825,000 Somali will have to be settled in rainfed schemes while tens of thousands will have to be absorbed in new fishing settlements and new irrigation schemes. Elsewhere, the Bank is heavily involved in the West African Onchocerciasis Control Program which will open up new lands for tens of thousands of settlers, while it is also a major investor in a number of Latin American settlement areas. I mention these projects not to criticize the World Bank but rather to emphasize that government sponsored and internationally financed new lands settlement are a prominent focus of development. Not only is the Bank the main source of international finance, but it is also the most innovative international agency in its approach to settlement. Hence in Colombia and Indonesia, the Bank is involved in projects assisting spontaneous settlers, in Malaysia for developing rural townships, and in the Sudan for rehabilitating existing settlements.

Looking to the future, the best general summary of the situation is contained in the previously cited World Bank 1978 Issues Paper which draws heavily on FAO data. According to those data, "cultivated land in 1970 constituted about 57 percent of the world's total potentially arable land" (pp. 20-21), with over 40 percent of the estimated reserves in Latin America (459 million hectares),

followed by tropical Africa with between 15 and 20 percent. Though Asia contains only about 5 percent of the global reserves, approximately 50 million hectares are nonetheless involved (Table 1). Most of these lands, "possibly as many as 800 million hectares, or nearly 75 percent, . . lie in the humid tropics within about 25 latitude degrees of the equator" (World Bank, 1978b:21, after National Academy of Sciences, 1972). While the above totals are impressive, there is generally a tendency to overestimate the agricultural potential of arable lands in the tropics and especially in the humid tropics. Perhaps over half of the above totals would be better kept in silviculture in the humid tropics and in pastureland in the semi-arid areas and more arid savannas, with future land use of the remainder paying close attention to ecological factors and use and occupancy rights of host populations. Nonetheless, significant areas remain for small holding farming systems.

While the distribution of the better soils is not very equitable between countries, even in places like Somalia the World Bank estimates that the soils are there, including approximately 750,000 hectares for rainfed agriculture and 85,000 hectares for irrigation expansion (though the main constraint will be the availability of water in the Juba and Shebelli rivers). In West Africa, approximately 700,000 km^2 are underutilized because of onchocerciasis, including 65,000 km^2 in Upper Volta where the most fertile river bottom lands were largely unoccupied in the early 1970s. In Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela, FAO (in its Indicative World Plan for Agricultural Development) estimates that

TABLE 1

ESTIMATES OF THE WORLD'S ARABLE LAND IN 1970
AND POTENTIAL INCREASE

	Arable Land Plus Land in Permanent[1] Crops in 1970	Ultimate Potential	Potential Increase	Ultimate Potential as % of 1970 Base	Distribution of Potential Increase
	million hectares			%	
Developed Countries[2]	660.5	854	193.5	129	18
Latin America	126.8	586	459.2	455	43
Mid-East/Africa I[3] (oil producers)	58.6	87	28.4	148	3
Mid-East/Africa II[4] (generally arid)	83.2	161	77.8	195	7
Africa (other, tropical)	92.1	282	189.9	306	17
Centrally-planned Asia[5]	130.7	201	70.3	154	7
Asia, other	278.2	330	51.8	119	5
Total	1,430.1	2,501	1,070.9	175	100

[1] Comprises a sample of 125 countries. Countries with extremely limited agricultural potential and island and city states are excluded.

[2] US, Canada, West and East Europe, USSR, Japan, South Africa, Australia and New Zealand.

[3] Iran, Iraq, Saudi Arabia, Algeria, Libya, Nigeria.

[4] Chad, Ethiopia, Mali, Mauritania, Morocco, Niger, Somalia, Sudan, Tunisia, Egypt, Upper Volta, Israel, Jordan, Lebanon, Syria.

[5] China, including Taiwan, North Korea, North Vietnam, Mongolia.

Source: World Bank, 1978b which in turn utilized data in Strout, Alan M., "World Agricultural Potential: Evidence from the Recent Past," Discussion Draft, March 1975.

some 3.4 million km^2 of underutilized arable land were present in the mid-1970s, or roughly five times the area of pastures and cultivation of those countries (Nelson, 1973:9).

The largest areas of under-utilized potentially arable lands are in the humid tropics where approximately 75 percent of settlement is spontaneous. Though government sponsored settlement frequently falls behind schedule, with comparatively small numbers of settlers established from year to year, this is not the case with spontaneous settlement where estimates of numbers of families are apt to be underestimates, especially in regard to kin who move into settlement areas to join previously established settlers. At current rates of spontaneous settlement there will be little land to settle in Nepal's Tarai (and last frontier) by 1990, while spontaneous settlement in the oncho-freed areas of West Africa is accelerating and far outstripping government sponsored settlement. Presumably, at present rates of settlement much of the remaining land in the humid tropics will be occupied during the next twenty years. The same applies for the savanna environments in Africa, which are the most extensive in the world. While slower rates of settlement can be expected in arid and semi-arid lands, where the need for major government investments is greater before large scale settlement can occur, clearly there is not much time left for government agencies to develop strategies utilizing the energies, initiative, and enterprise of spontaneous settlers in a way which will raise their living standards on the one hand and facilitate a more controlled process of integrated area development on the other.

F. CURRENT JUSTIFICATION FOR GOVERNMENT INVOLVEMENT IN NEW LANDS SETTLEMENT

I have already mentioned my initial bias against government sponsored settlement and my growing conviction that there is a greater role for government involvement than I and other critics had previously realized. The authors of the Institute for Social Studies Advisory Service (the Hague) 1981 Draft Discussion Paper, Land Settlement and Regional Development in the Tropics: Results, Prospects and Options, have reached a similar conclusion. Noting persistent inter- and intra-regional imbalances in many countries, their summary stated that, "the contribution of government-sponsored land settlement to a reduction of these imbalances could be more significant than tends to be the case at present" (van Raay and Hillhorst, 1981:ii). What they mean is that there is tremendous room for improvement provided certain lessons from the past are learned and translated into new approaches to design, implementation, management, and evaluation.

I reached a similar conclusion after realizing that a small number of government sponsored settlements over the years have been more successful than previously realized in terms of their capacity to initiate a process of area development. Closer study of one of these cases, Minneriya in Sri Lanka, suggests that this project is not a fluke but rather indicates the type of success that could be replicated in other areas with a proper combination of settler initiative and government assistance and sponsorship.

As another lesson from experience, the authors of the ISS Advisory Service report also propose that "land settlement may be an

attractive alternative to the further intensification of agricultural production in already settled area [sic], especially if low-cost solutions of land settlement can be developed" (p. v). While the development of low-cost solutions will not be easy, a logical way to go would be to place more emphasis on the incorporation of spontaneous settlers within settlement design. We have already indicated that this is necessary in order to offset the weaknesses of this mode of settlement which unassisted does not appear to have the potential to catalyze a process of integrated area development. A major conclusion of the global evaluation is that some government sponsorship is essential if such a goal is to be achieved.

CHAPTER 2

SETTLEMENT SUCCESS DEFINED

I. INTRODUCTION

The purpose of this chapter is to consider various definitions of what constitutes a "successful" new lands settlement. The first is a product of the global evaluation and defines success primarily in terms of whether or not a new lands settlement initiates a process of integrated area development within the settlement or within the region in which the settlement is contained. Though the number of settlement areas which would qualify as a success according to this definition are few, examples nonetheless exist — one of which is briefly analyzed in Chapter 5. Looking to the future, it is argued that the increasing financial costs for settling new areas are sufficiently high that sponsored settlement is hard to justify unless it leads to significant multiplier effects.

Other definitions of settlement success which are reviewed include success as defined by the settlers, governmental criteria for success, and success as defined by the international community of donors. Various models which have influenced settlement design are also discussed, including the Gezira, Moshav, state farm or cooperative, and FELDA models. Since settlement consultants and scholars are apt to be disproportionately influenced by those settlements which they best understand, a cautionary section is also included on possible bias.

II. SETTLEMENT SUCCESS AS DEFINED IN CONNECTION WITH THE GLOBAL EVALUATION

According to my definition, successful settlements are those that stimulate an ongoing process of integrated area development. Essential to this definition are linkages between rural and urban sectors, with agricultural development stimulating the emergence of a hierarchy of service centers as well as manufacturing and industrial development within the region. The word "ongoing" means that the development process must be sustained at least into the second generation. While the definition presumes that settlers must be numbered in the thousands of families, rather than the hundreds, this does not mean that there is no place for small-scale settlements provided planners are aware of their limitations in terms of spread effects and area development. Indeed, small-scale settlements can be useful mechanisms for coping with disasters and other special circumstances involving relatively small groups of people. And they are indispensable under certain circumstances for developing settlement prototypes and for experimenting and demonstrating with new developmental approaches. In the latter case, however, one would hope that prototypic, experimental, and demonstration settlements would in time be incorporated as a component within a larger settlement framework.

While this is an ideal definition of success which seldom has been realized, it would appear to have been attained in a small number of cases. Furthermore, the evidence is suggestive that it could have

been attained in a still larger number if more attention had been pai to certain basic issues associated with the settlement and developmen process. The apparent success stories with which I am most familiar are only two, plus a possible third. These are the settlement and development program undertaken by the private sector CMNP in Northern Parana, Brazil and the government sponsored Minneriya Project in Sri Lanka. The third possibility is the Metro area in lampung, Sumatra i Indonesia.

Other projects that could have accomplished as much, or may still have that potential, include the Gezira, Rahad, and New Halfa projects in the Sudan and the FELDA projects in Johore and the Jenka Triangle areas of Malaysia. In the Sudanese cases, area development has yet to be realized because all three projects were planned and implemented as relatively narrowly conceived agricultural production schemes focusing on a small number of crops for export and domestic consumption. Nonetheless, urban centers have prospered in the vicinity of each project, and in recent years the Sudan government has paid more attention to urban planning in connection with settlement design. Hence the existing township of Managil received some attention when the Managil extension to the Gezira area was developed, while in the 1960s and the 1970s new townships were incorporated within the plans of the New Halfa and Rahad schemes, respectively. But in each case virtually no attention has been paid to regional development per se, and especially to the generation of nonfarm employment. That opportunity still exists, however, since the government of the Sudan with World Bank financing is seriously

considering the rehabilitation of both the Gezira and New Halfa schemes, while the Rahad scheme is currently undergoing development, with half of the household plots in new communities set aside for nonsettlers (though these are primarily for agricultural labor, those with nonfarm occupations are also included). Since all three projects are located around the margins of the Butana Plain, and are relatively close to Khartoum and Wad Medani, it would be a great pity if each was allowed to develop along separate lines without considering ways in which, taken together, they could stimulate a broader process of regional development.

In the FELDA cases the design of clusters of settlements in relationship to rural towns and service centers is still evolving, so that the opportunity for using the FELDA approach to catalyze a process of regional development continues to be a real one, provided more emphasis is placed on the development of regional towns at the top of the urban hierarchy. Nonetheless, to date the intra-regional multiplier effects of FELDA have been disappointingly few, the policy focus on the development of new towns as opposed to the stimulation of existing commercial centers being a doubtful one.

Elsewhere, ongoing settlement under Indonesia's transmigration program presents a new approach to area development -- while in Sri Lanka the rehabilitation of the Gal Oya Project, the ongoing development of the Uda Walawe project, and the Accelerated Mahaweli Programme all have considerable regional potential. In Indonesia, the first integrated area development project in the country is the Luwu Project in Sulawesi which contains a settlement component (both

rehabilitation and ongoing settlement). Furthermore, in recent evaluations the World Bank is stressing more and more the importance of multiplier effects in connection with ongoing and forthcoming transmigration projects. In Sri Lanka, recent governments have been willing to experiment with new approaches to settlement, with a cautious trend toward a more integrated approach to development through settlement. This is especially the case in the dry zone where new lands settlement has continued to be the major development intervention. Over the years, more attention has been paid to farming system diversification, to incorporating host populations along with spontaneous settlers, and to the development of nonfarm employment and urban centers, although a regional planning capability has yet to be institutionalized within the key agencies — with the result that planning still tends to be primarily restricted to individual irrigation systems.

It is significant, I think, that none of the instances of relative success includes areas which have been spontaneously settled. There appears to be an important lesson here. While spontaneous settlers tend to be more enterprising than government sponsored settlers, and while they usually make better farmers in less time and at lower cost, nonetheless spontaneous settlement tends to perpetuate systems of extensive agriculture and to realize relatively low net incomes to the settler families. It does not catalyze a process of integrated area development. To do so presumably requires major governmental assistance along lines which will be systematically elaborated elsewhere in this report.

To sum up, the conclusion appears inescapable that major governmental assistance is needed if future new lands settlement is to be successful. Since the financial costs per settler family are high (Table 2), major government funding is unlikely to be cost effective unless settlement is associated with major multiplier effects. Malaysia's FELDA projects are hardly replicable elsewhere in part because current costs per settler family exceed $18,000, a figure which only a few countries can afford. Indeed, future critics may well conclude that the opportunity costs for Malaysia were also too high if nearly 50 percent of funding allocated to agricultural development continues to reach less than 5 percent of the total rural population. Though the incorporation of spontaneous settlers and hosts can lower the costs per settler family, financial costs are still high -- as Table 2 indicates -- again emphasizing the need for using future new lands settlement as a mechanism for achieving integrated area development through regional planning.

Other recent evaluations have emphasized the same point. Though the 1978 World Bank Issues Paper on Agricultural Land Settlements is project-bound and tends to emphasize agricultural production and agro-related industries at the expense of a wider range of potential indirect benefits, nonetheless, "future settlement activities should be viewed within a comprehensive development framework which recognizes the need for careful use of all resources in the project area" (p. 8), while a wide range of considerations "lead to the conclusion that settlement must be planned within an integrated regional framework which includes development of related

TABLE 2

THE FINANCIAL COSTS OF GOVERNMENT SPONSORED SETTLEMENT PER SETTLER FAMILY IN SELECTED PROJECTS ASSISTED BY THE WORLD BANK[1]

Name of Settlement	Country	Fiscal Year Bank Loan Approved	Costs (1975 U.S. $)
Keratong	Malaysia	1975	23,400
Jahore Land Settlement	Malaysia	1974	19,700
Jengka I	Malaysia	1968	18,900
Crown Lands Settlement	Trinidad & Tabago	1967	18,530
Agricultural Development II	Papua-New Guinea	1970	16,650
Rahad	Sudan	1973	16,200
San Lorenzo (Irrigation[2] and Settlement)	Peru	1965	14,620
Terres Neuves I	Senegal		7,700
Development and Settlement in Scheduled Areas	Kenya	1962	7,280
Caqueta I	Colombia	1971	4,470
Alto Turi	Brazil	1973	3,730
Tarai Land Settlement	Nepal	1974	1,210

[1] All the information in this table is taken from the World Bank's Agricultural Land Settlement (1978b), and especially from Annex 1 - Table 1:1 and 1:2. As the Bank report notes: "A comparison of costs among projects is difficult because loans are made in different years, because of the presence of nonsettlement components in some projects, the existence of both monetary and nonmonetary costs, differences between costs at appraisal and realized costs, and because of definitional problems as to which components might legitimately be classified as settlement costs. All costs for providing health, education and housing in the project area and for access roads are included. . . . The analysis is based on information in the Bank's appraisal reports" (pp. 42-43, footnote 3).

[2] Though there are exceptions like the Malaysian FELDA projects, settlement projects with irrigation components are significantly more expensive than rainfed settlements. Hence among Bank-assisted projects between fiscal years 1962-75, the former averaged out at $14,000 per settlement family ($2,000 per hectare) versus $6,460 for rainfed settlements ($539 per hectare). All settlements averaged out at $8,650 per settler family ($830 per hectare). SR: World Bank, 1978b:44 Table 4.

agro-industrial and service sectors. In many cases, the infrastructure required for the development of new areas cannot be economically justified on the basis of agricultural production alone" (p. 40).

In their ILO Working Paper, Employment and Income Generation in New Settlement Projects, Weitz et al (1978) assume that optimal employment generation requires certain basic conditions as necessary but insufficient. At the very least there must be a critical mass of settler families numbering in the thousands rather than the hundreds, farming systems must be sufficiently diversified to provide sufficient foodstuffs for nonfarm employers and employees and produce for local processing; and settler net incomes must be high enough to enable settler families to purchase a wide range of locally made and available consumption and production goods and services. For all this to be achieved, projects must be multisectoral. "The full capacity of employment generation in new settlement projects beyond a certain size cannot be realized unless there is a simultaneous growth of agriculture and industry. The term `simultaneous' implies an intrinsic link between the two sectors. . . . In other words, even though a project is based mainly on agriculture, it should include as an integral part of its plan, the establishment of industries. . . . The plants and their workers should be located within the project area itself, in proximity to the farm communities" (p. 5). And finally, "from the evidence brought so far it seems clear that integrated planning will bring about the best results from new settlement activities," while "the main factor . . . which determines whether a

new settlement project may be planned in an integrated approach is the scope of the project" (p. 65).

Van Raay and Hilhorst reach similar conclusions when they state that without explicit linkages "between land settlement and area development, there is the real danger that minimal conditions for attaining a measure of viability cannot be met" (1981:55). And:

> We have repeatedly stressed the importance of integrated action in terms of urban development, port development, road construction and land settlement, the main aim being to establish effective linkages with urban centers that are capable of serving the population of their hinterlands. In this capacity to interact, roads and the like are clearly no more than contributing factors. Just as necessary are efficient commercial and administrative organizational structures as well as a range of lower-order centres through which flows of information, inputs and outputs are organized and channeled [p. 50].

In the final paragraph of his comparative study of five Asian countries, Perera (1979) also stresses the need for integrated area development so that settlement areas can absorb the second generation of settlers. Quoting from Bahrin et al (p. 411), he concludes that "In this connection `a long-term strategy to make all the existing agriculturally suitable land support a greater number of people by providing employment opportunities within the area and its environs is essential. This aspect should not be considered in isolation but as an integrated programme of structural changes in the agricultural

sector conceived within a balanced economy where agriculture and industry are geared to absorb the younger generation of working age appears to be a fitting suggestion."

III. OTHER DEFINITIONS OF SUCCESS

There are of course many other definitions of "success." While I have found none of these provide adequate guidelines for planning major settlements, some still have a restricted utility for settlement planning and implementation.

A. SUCCESS AS DEFINED BY THE SETTLERS

In their technical and economic feasibility study of new lands productivity in Egypt, Pacific Consultants (1980) reported that the financial returns for the operation of individual farm units were "generally positive," although the economic returns to the government for most types of land settlement were negative. The point is an important one, for in stating that government sponsored settlements tend to fail and that spontaneous settlements achieve low productivity often at the expense of the environment, the perspective taken is that of the "outsider" as opposed to that of the first generation settler.

Regardless of economic feasibility, the data suggests that a significant proportion (and perhaps even a majority) of established first generation settlers on most new lands settlements consider themselves "better off" than in their village of origin. Perera (1979) in his comparative study notes, for example, that generally speaking settlers are better off than in their communities of origin

in Nepal, Thailand and Malaysia, while in Indonesia a "fair proportion" are quite successful. In the fifth country -- the Philippines -- settler incomes are below those for the average rural Filipino family on six out of eight settlements, although it is not clear from the date how those incomes compare with their presettlement ones (pp. 307-312).

Better off is usually defined in terms of land use or ownership and living standards as measured by such criteria as ownership of livestock and other productive assets; quality of housing; household furnishing; clothing and other consumer goods; and quality and quantity of diet. In government sponsored settlements it is not uncommon for "better off" also to include more accessible and improved schools, medical facilities, and other social services -- although this is less often the case in spontaneous settlements. On the other hand, all types of settlers are apt to complain about the "lack" of recreational facilities and of social and cultural life in settlements in comparison to their villages or communities of origin. In other words, while they may see the settlements as economically viable for themselves, they are less apt to appraise the settlement as socially viable in terms of being a desirable place in which to live and to bring up a family. Furthermore, economic viability may be relatively short-lived, with yields dropping because of soil exhaustion and environmental degradation and with subdivision, indebtedness, land sales, and lack of off-farm opportunities lowering the living standard of the second generation.

B. GOVERNMENTAL CRITERIA OF SUCCESS

These cover a very wide range of single or multiple economic, social, humanitarian, and political goals which may vary within a single settlement at different points in time or from one settlement or country to another. While economic criteria may include area development, as well as acceptable internal rates of return as defined by conventional appraisal techniques they can also include such goals as generation of foreign exchange (the Gezira Project in the Sudan being a good example); the reduction of food imports (for example, rice in the case of Sri Lanka and Indonesia); construction of large scale national development projects like dams (the achievement of which requires a compulsory resettlement component); and demonstrating the profitability of agricultural settlement (as with the settlement of religious orders and the Japanese in Latin America).

Social (or socioeconomic) criteria frequently include alleviation of population pressure through the redistribution of people from one area to another as is common, for example, in Sri Lanka (highland to lowland); Indonesia (Java and Sunda Islands to the Outer Islands); Malaysia (densely populated lowland areas to sparsely populated areas); and many African countries. Population redistribution frequently is linked to such socioeconomic or sociopolitical goals as raising living standards and reducing within the settlement area the type of social disequities and class structures which characterized the old lands. As for humanitarian goals, they frequently include the settlement of international refugees or local people devastated by such natural disasters as

droughts, floods (both riverine and estuary), earthquakes, and volcanic eruptions.

Political criteria also vary immensely although settlement is frequently used as a mechanism to establish borders or to fill up vacant areas to which other countries lay claim (as in the case of Bolivia, Peru, and Colombia in regard to the Amazon Basin and Nepal in regard to the Tarai). Another common political goal is to avoid political opposition to land reform in heavily populated areas dominated by powerful land-owning elites by using new lands settlement as a mechanism to draw off surplus population. While this is a common response in a number of Latin American countries, in Africa political goals are more likely to include attempts to avoid political unrest in urban areas by "encouraging" unemployed and underemployed primary and secondary school graduates to join rural settlement schemes as in Nigeria during the 1960s and more recently in Zambia and Tanzania. Still other political goals include rewarding retired members of the national security forces through the allocation of settlement plots, a goal which may be fused with securing borders (as in Nepal) or other "sensitive" areas as in the Outer Islands of Indonesia. Or settlement may be used as a mechanism to correct inequities fostered by previous colonial regimes as with the million-acre settlement scheme following Kenyan independence and the current settlement effort under way in Zimbabwe -- or to alter class and power relationships between ethnic groups within a country (Malaysia, for example, in regard to Malay and Chinese-speakers).

Commonly a single government sponsored settlement will be characterized by a number of quite different criteria (some of which may be inconsistent), with no attempt to establish priorities. Goals and policies are also apt to shift through time owing to changes in government, often with negative implications for settlement development (Perera, 1979:196). If some goals are met, and often they are, then the settlement may well be considered a success regardless of its economic profitability either for the settlers, the region, or the nation, or its cost effectiveness in comparison to other development interventions. Frequently, however, goals are totally unrealistic, with little attention paid to attempts made elsewhere (including within the same country at a different time) to achieve similar goals. For example, time and again attempts to settle educated and uneducated urban youth on rural settlement schemes have failed, while often new lands settlement projects designed to avoid skewed systems of land distribution in the old lands have in fact only replicated that system in the new lands settlements (as Roberts, 1975, has shown for Caqueta in Colombia).

Of greater significance, governments exaggerate the capacity of new lands settlements to absorb population surpluses. According to the World Bank's Agricultural Land Settlement, massive government sponsored settlement in Indonesia over a twenty-year period has absorbed only about 5 percent of the population increase in Java during the same time period, while Kenya's major settlement program over a ten-year period has only absorbed approximately 10 percent of the population increase (1978b:17). In Latin America, Nelson reports

that new lands settlement has absorbed only 2 percent of the rural population increase (1973:198). This is the general situation. Though individual exceptions exist such as Malaysia's FELDA settlements and possibly Sri Lanka's Accelerated Mahaweli Programme, even there settlement provides at best a temporary solution to increasing population densities.

While a major conclusion of this evaluation is that the global experience with new lands settlement is relevant to the planning, implementation, and management of new settlements, this experience refers mainly to our improved understanding of the dynamics of the settlement process and to the nature of key issues and problem areas which tend to be associated with the different stages which characterize that process. While this knowledge enables issues and problems to be anticipated, it does not mean that settlement "models" which have proved successful in one country can literally be transferred to another. On the contrary, plans need to be based on a very careful assessment of local human, land and water resources and on feasible ways to utilize these resources through relevant production systems, institutional capacities, and especially capacities and interests of the settler population.

1. Settlement Models

In the past, many governments have attempted literally to import models from other countries without realizing that they have evolved in response to a wide range of factors which may be inapplicable, and often undesirable, in the area to which they are to be transferred. In particular, efforts have been made to replicate

four quite distinct models. These are the "Gezira model", the "Moshav model", the "USSR-East European state farm or state cooperative model" and the "FELDA model." All have evolved in response to certain ideological, political, socioeconomic, and other situational factors which make their replication as total approaches to settlement virtually impossible -- although, of course, certain major features may well be applicable to goals and conditions elsewhere.

As Barnett (1977) has pointed out for the Gezira scheme and Palmer for other schemes based on the Gezira model, such schemes are designed to "contribute to national development by producing a cash crop for which there is demand on the international market or a food crop which will reduce national food imports and reduce indebtedness to other nations" (Palmer, 1977:175). Such a model, if literally transferred to another setting, does not facilitate area development unless major adaptations occur (as in the case of CMNP sponsored development in Northern Parana where the original company entrepreneurs were influenced by the Gezira model). Though he underestimated the extent to which the families of Gezira settlers were to profit from the scheme, Barnett correctly emphasized that a major purpose of this scheme was to meet the needs of the British Cotton Growers Association and the spinning mills of England — and on terms of trade which were hardly favorable to the Sudan, to the Sudanese settlers, or, for that matter, to increased production of long staple cotton.

The Moshav model is very obviously country-specific. While again there is much to be learned from the Israeli experience,

attempts literally to transfer the Moshav to Nigeria (Roider, 1971); Tanzania (de Wilde, 1967); and other African countries have not been judged successes. The same applies to government-run state farms and cooperatives which have not only failed in such countries as Egypt (Pacific Consultants, 1980) and Somalia (National Planning Commission, 1979 and Whitefish Authority, 1980), but have diverted large sources of scarce capital from other development interventions with lower opportunity costs.

Even the FELDA model, which continues to attract planners and settlement administrators from other countries (Sri Lanka, for example, in the case of the Accelerated Mahaweli Programme), is characterized by features which cannot be replicated — and even if some could be, they have high opportunity costs for both Malaysia and other countries. Influenced by the Gezira model, FELDA projects are based on two export commodities (rubber and oil palm). In spite of a cost-per-settler which few other countries in the tropics and subtropics could afford (over $18,000 per settler family), FELDA has yet to stimulate a process of integrated area development but rather has channeled nearly 50 percent of public resources for rural development to less than 5 percent of the population creating a new rural middle class in the process.

Some of the success that FELDA has achieved is based on factors which are either particularly Malaysian or have been developed over an extended time period. Particularly Malaysian are the Chinese-speaking lumber and building contractors who clear the land, build the communities, and care for the rubber and oil palm seedlings

until they are handed over to settlers during the second or third year, while Malaysia's excellent tree crop research capacity has developed over an extended time period. In making these points, however, it is important to emphasize that there is also much to be learned from the FELDA experience which is replicable in part — including, for example, selection criteria based on interviewing both spouses of prospective settlement families.

C. SUCCESS AS DEFINED BY BILATERAL AND MULTILATERAL DONORS

Donor agencies tend to define success in terms of a range of conventional economic appraisal techniques of which social cost benefit analysis (SCBA) is the most important. Though their practitioners claim that such techniques are applicable to integrated area development projects, I suspect that their limitations create a bias toward projects that involve a relatively small number of components. They also give more weight to costs and benefits during the initial years of project implementation. Furthermore, multiplier effects or indirect benefits time and again are de-emphasized.

All of these characteristics of SCBA tend to favor relatively simple projects with favorable internal rates of return within a relatively short time period. They constitute a built-in bias against integrated area development projects or lead to their being restricted to a small number of components which can be relatively easily quantified. Not only are integrated area development projects based on regional planning complicated, but it takes years -- sometimes a generation — for their major benefits to be realized and many of

these benefits are indirect, relating to value added through production and employment outside the agricultural sector.

Though the issue is a complicated one, I would suspect that another variable here relates to the nature of development agencies rather than to the nature of the development process. As Tendler has pointed out (1973), development agencies must "push" money. Relatively simple projects are an effective way for moving funds and SCBA is more easily used for project appraisal than for the assessment of more diffuse area development programs. Even if this argument has little validity, the fact of the matter is that development economists who use such appraisal techniques are apt to overestimate the magnitude of early returns and to underestimate later returns. According to the World Bank's Agricultural Land Settlement (1978b:16), "Typically, evaluation of settlement projects three to five years after the start of implementation shows economic rates of return at least 50 percent below those in project appraisal documents." (van Raay and Hilhorst, 1981:7, make the same general point.) Unfortunately few evaluations are carried out over longer time intervals so that planners tend to be unaware of those cases in which major multiplier effects have occurred and, of course, they also tend to be unaware of the nature of those effects.

If it is true that the nature of current economic appraisal techniques does contain a bias against integrated area development projects or programs with delayed major benefits, then obviously a better form of project appraisal is needed. In terms of assessing success, a range of major impacts need to be kept in mind. I have

broken these down into eight components which have proved useful in my own assessment. These are microeconomic, sociological, public health, agronomic, infrastructural/service, managerial, macroeconomic, and ecological. The first three pertain primarily to the settlers and other individuals and families living in the settlement area. The microeconomic component includes net incomes and living standards, while the sociological refers to the quality of family and community life within the settlement and to the existence of such social institutions as self-help and cooperative organizations and religious institutions.

The public health component is concerned not just with community health status on the settlement, but also with the health impacts of the settlement on the encompassing region (through, for example, the availability of improved health services, or conversely the spread of schistosomiasis associated with irrigation). As for the agronomic component, this is concerned with appropriate farming systems — including the interrelationship between crops, livestock, forestry, fisheries, and off-farm employment. The infrastructural/ service component is concerned with the nature of physical infrastructure (including roads, irrigation structures, potable water facilities, etc); social infrastructure (schools, medical facilities, etc); and such production related services as extension, credit, supply of inputs, and marketing.

Managerial refers to the organization and effectiveness of governmental and other agencies with settlement responsibilities. It also includes such local organizations as water user associations and

rural and urban councils, and to their capacity not only to take over certain managerial responsibilities but also to compete for resources at the local and regional levels. As for the macroeconomic component that includes, on the one hand, terms of trade as they relate to the settlers and to the settlement area and, on the other hand, the nature of the local, regional, and national impacts of the settlement in terms of both direct and indirect benefits and costs. Finally, the ecological component relates to both the short- and long-term environmental impacts of the settlement area and associated development.

Each one of these eight components can be subdivided into as many categories as the analyst finds useful. While the result is little more than a checklist, it still indicates the range of variables which need to be considered in trying to develop a calculus for quantifying success. As currently used, SCBA and other appraisal techniques for assessing internal rates of return and economic feasibility deal primarily with only the microeconomic and macroeconomic components.

IV. CONSULTANT AND SCHOLARLY BIASES

One reason why particular settlement models have been replicated time and again throughout the tropics and subtropics irrespective of their local suitability is the tendency of international consultants to push particular approaches with which they have been associated as administrators and evaluators. Similarly the assumptions, hypotheses, and interests of scholars are apt to be

disproportionately influenced by their more detailed knowledge of, and experience with, particular settlement areas and settlement types.

Since 1956, my own research has dealt more with government sponsored new lands settlement based on compulsory relocation than with any other settlement type; with special emphasis on settlement of approximately 55,000 people relocated from the Middle Zambezi Valley in connection with the construction of the Kariba Dam. Furthermore it has dealt more with homogeneous than heterogeneous settler populations, and with Africa and the Middle East as opposed to Asia and Latin America. As for my conceptualization of settlement stages, initially that dealt primarily with the transition stage because of the multidimensional stress that weighed so heavily upon many compulsorily relocated settlers during the years immediately following removal from their homelands. Only during the past five years, have I begun to think more broadly about other types of settlement, developing during that time, the four stage framework that is described in Chapter 4.

Having spent over three years researching Kariba during eight visits over a twenty-five year period, I have become very much aware of the danger of trying to interpret events elsewhere too exclusively in terms of my Kariba experience, or of the temptation to recommend for other settlement areas Kariba approaches to planning and implementation without first carefully thinking them through in terms of their applicability under different conditions. In spite of approximately two years of additional consultancy and research work in other settlement areas, I still catch myself thinking too much in

Kariba terms, and in terms of how a relatively homogeneous population of compulsory relocatees react to settlement as opposed to how other settler populations and types react. And time and time again I have observed other consultants and scholars showing similar biases, especially where they have had little comparative experience.

I have run into two types of consultants who tend to propagate around the world their previous experience with a particular settlement model in a particular national or colonial setting. The first are consultants with long familiarity with new lands settlement in Israel. They tend to be very knowledgeable Israeli settlement administrators and scholars whose bias is toward moshav type settlements with communal control of land. The second are usually administrators with a long period of association with the Gezira, Muda (Malaysia), FELDA or similarly managed schemes. They tend to be former British colonial civil servants whose bias is towards agricultural production schemes run by a highly centralized special or national parastadal organization.

I have singled out these two types, not to caricature them, for most are immensely knowledgeable and capable individuals with much to contribute to settlement planning, implementation, management and evaluation, but to alert them, other consultants, and national planners that even the most knowledgeable consultants bring with them experiences which may not be as appropriate in new settings as they think. The best solution to this problem is for consultants to be aware of possible biases and to carefully think through their suggestions and recommendations in terms of their suitability for the

setting being examined. As for national planners, they need pay special attention to the suitability of suggestions and recommendations to local conditions.

CHAPTER 3

METHODOLOGY

I. HISTORICAL BACKGROUND

The genesis of this global evaluation goes back many years. In 1956 Elizabeth Colson (now at the University of California, Berkeley) and I began a long term study of the 55,000 people who were soon to be relocated in connection with the Kariba Dam Project in what was then the Central African Federation. The people were largely resettled between 1957 and 1959, with our first intensive follow-up study in 1962-1963. Subsequent restudies occurred at several year intervals — with the most recent in 1978, although a ten-month restudy is planned for late 1981 and much of 1982.

In 1961-62, I spent a year at the Social Research Center of the American University at Cairo during which I participated in a research project among the Egyptian Nubian population soon to be resettled in connection with the construction of the Aswan High Dam. Subsequently I was able to expand my familiarity with dam resettlement through consultancies to the Volta, Kainji, and Kossou projects in Ghana, Nigeria and the Ivory Coast. As a result of these experiences, I formulated a number of hypotheses as to how relocatees respond to compulsory relocation (see especially Scudder, 1973, 1976; and Scudder and Colson, 1981).

As I also gained familiarity with a number of voluntary settlement areas populated by both spontaneous and government sponsored settlers, I began to see major similarities between different types of settlement. These related to settler responses to their new habitat and to a wide range of developmental issues. Though settlement involving compulsory relocation was obviously an extreme form, nonetheless I was of the impression that all types of settlement were sufficiently similar as to warrant detailed comparative analysis. That assumption led directly to the study on which this monograph is based.

II. METHODOLOGICAL OVERVIEW

The evaluation which forms the basis for this report was both comparative and longitudinal. The intention was to compare the settlement process in a wide range of locales through time. This intention has been successfully carried out. Not only were source materials on nearly one hundred settlement areas analyzed and compared, but a special effort was made to study settlements which have been in existence for over a generation so that questions dealing with continuity and handing over to a second generation could be analyzed. A listing of settlement areas with date of arrival of the first settlers is contained in Appendix 1.

A special effort also was made to include settlements, especially sponsored settlements, which have been labeled as success stories by administrators, consultants, and researchers. The conventional wisdom to date has been that generally speaking sponsored

settlements in the tropics and subtropics, especially government-sponsored settlements, have not been cost effective as development interventions. Though I also leaned toward this view I wanted to examine critically the global evidence by concentrating more on settlements which were considered to be "successful" than on those considered to be "failures." I wished to know according to what criteria success was measured, at what point in time a settlement was considered to have become a "success," and whether or not "success" was a transitory phenomenon or continued through time. In seeking answers to these questions, special attention was paid to the twenty-five settlements listed in Table 3 — with site visits made during or prior to the global evaluation in eleven of the fifteen countries listed.

III. METHODOLOGICAL DESIGN

As a comparative and longitudinal evaluation of new lands settlements, the research on which this report is based consisted of three major components. These were (1) a global evaluation of the literature on specific sponsored and spontaneous settlement areas and, to a lesser extent, on countrywide programs and analyses of settlement areas in one or more countries; (2) field studies by grantees funded through the global evaluation of specific settlements which have been in existence for a minimum of ten years; and (3) site visits by myself, with and without consultants, to a number of settlement areas in Indonesia, Jordan, Malaysia, Nepal, the Philippines, Somalia, Sri Lanka, and the Sudan.

TABLE 3

NEW LANDS SETTLEMENTS TO WHICH SPECIAL ATTENTION HAS BEEN PAID THROUGHOUT THE GLOBAL EVALUATION

	Country	Name of Settlement	Type of Settlement	Date of First Settlers
TROPICAL AFRICA	Ghana	Settlement associated with the Volta River Project*	Compulsory	1963
	Kenya	Small holder settlement in the former White Highlands*	Government sponsored	1962
		Mwea*	Government sponsored	1954
	Sudan	Gezira*	Government sponsored	1925
		New Halfa*	Government sponsored and compulsory	1964
		Rahad*	Government sponsored	1977
	Upper Volta	Settlement in connection with Onchocerciasis control*	Government sponsored and spontaneous	1974
	Zambia	Settlement in connection with Kariba Dam Scheme*	Compulsory	1956
MIDDLE EAST	Egypt	Kom Ombo*	Compulsory	1964
SOUTH ASIA	Nepal	Eastern Tarai*	Government sponsored and spontaneous	1940s and 1966
	Sri Lanka	Mahaweli*	Government sponsored	Mid 1970s
		Minneriya*	Government sponsored	1933
		Minipe*	Government sponsored	1939
		Rajangana*	Government sponsored	1965
SOUTHEAST ASIA	Indonesia	Parigi (Sulawesi)*	Government sponsored and spontaneous	1906
		Belitang (Sumatra)*	Government sponsored and spontaneous	1937
		Way Abung (Sumatra)*	Government sponsored and spontaneous	1965
		Luwu (Sulawesi)	Government sponsored and spontaneous	1938
	Malaysia	FELDA settlements*	Government sponsored	1956
	Philippines	Palawan settlements*	Spontaneous	1931
CENTRAL AMERICA	Mexico	Papaloapan settlements**	Compulsory	1952
		Santo Domingo**	Government sponsored	1949
SOUTH AMERICA	Boliva	San Julian**	Government sponsored	1972
	Brazil	Northern Parana**	Government sponsored	1928
	Colombia	Caqueta**	Government sponsored and spontaneous	Late 1950s

* Settlements which I have visited either during or prior to global evaluation.
** In these five cases, written reports were supplemented by conversations and correspondence with knowledgeable experts who have studied the settlements in question.

For evaluation of the literature, field studies, and site visits, procedures — in the form of detailed abstract forms, questionnaires, and a wealth index — were used to facilitate the comparison of different settlement areas and of settler families within the same and different settlements.

A. LITERATURE SEARCH

There is a very extensive literature on new lands settlements in the tropics and subtropics which has been significantly augmented during the past ten years with Ph.D. dissertations that contain relatively up-to-date information. Written primarily by social scientists, these tend to focus on specific settlement areas. They have proved to be an invaluable source of information.

The literature on new lands settlements in the tropics and subtropics is so vast that it is unlikely that any single researcher can assess it. With the assistance of Dr. Bernard Riley, we tried unsuccessfully to make a number of computer citation searches using such data base sources as AGRICOLA (U.S. National Agricultural Library), CAB Abstracts (U.K. Commonwealth Agricultural Bureaux), CRIS (U.S. Department of Agriculture Cooperative State Research Service), and PAIS International (Public Affairs Information Service of PAIS, Inc., N.Y.). The basic problem, as Dr. Riley found out, was the sheer volume of citations and the ambiguity of the terms used. One search specifying new lands settlements came up with 739 citations. A small sampling of these included such articles as one dealing with animal bones in European archaeological sites! The terms "settlement"

and "colonization" obviously mean different things to different people, making them virtually useless for computer searches unless they are restricted to specific geographical areas through the use of country and settlement names. But in that event we found that it made more sense to contact experts on the areas involved for advice concerning the most relevant sources.

Granted this problem, a more selective search of the literature was made by relying on a relatively small number of bibliographies and journals, as well as on colleagues with settlement expertise. Bibliographies and journals included FAO sources (especially Land Reform: Land Settlement and Cooperatives); the Land Tenure Center of the University of Wisconsin's 1969 Colonization and Settlement: A Bibliography, with updating supplements; the Comprehensive Dissertation Query Service of University Microfilms International; MacAndrew's Land Settlement in South East Asia: A Preliminary Bibliography (1978); Meyer and MacAndrew's Transmigration in Indonesia: An Annotated Bibliography (1978); and the extensive bibliographies of recent Ph.D. dissertations which include both general and specific sources.

Though the bulk of the source material deals with specific settlements, there are a number of more general sources which deserve special mention. Of these the most important are the World Bank's Agricultural Land Settlement (1978b) which deals with the Bank's experience with new lands settlements and with the policy implications of that experience for future Bank lending; Nelson's The Development of Tropical Lands: Policy Issues in Latin America (1973); Chamber's

Settlement Schemes in Tropical Africa (1969) which deals only with Anglophone Africa; Pelzer's Pioneer Settlement in the Asiatic Tropics (1948) which deals primarily with the Philippines and Indonesia; Weitz, Pelly, and Applebaum's Employment and Income Generation in New Settlement Projects (1978); and van Raay and Hilhort s "Land Settlement and Regional Development in the Tropics: Results, Prospects and Options" (1981).

At the country level, important sources include the recent IDRC funded series of settlement evaluations in five southeast Asian countries (Indonesia, Malaysia, Nepal, the Philippines, and Thailand), with a summary volume by P.D.A. Perera (1979); B.F. Farmer s two volumes on India (1974) and Sri Lanka (1957); and J. Hardjono's Transmigration in Indonesia (1977).

Not only does this extensive literature vary tremendously in quality and in the authors approach to settlement but it also varies in coverage -- some sources dealing only with a single aspect of the settlement process (like the relative benefits of a nucleated settlement pattern over a dispersed or lineal one) while others are more general evaluations. To facilitate comparison, two major abstract forms were developed. The first is for studies of specific settlement areas or, within a settlement area, of a subarea or community, or of a cluster of settlers who arrived at approximately the same time. The second is for reviews of a number of projects within a particular country or geographical region. Abstracting was done by three research assistants (Miriam Chaiken, Thomas Conelly, and Sethu Palanniapan) and myself. Though August 1, 1981 ninety-seven

Form One abstracts were completed along with eighteen Form Two s. Information was also utilized more selectively on another eighteen settlements which were not abstracted, including sixteen with which I was personally familiar. These are marked with an asterisk in Appendix One. It is surprising how much information of relevance to the eight check list components listed in Chapter 2 is omitted from even the most comprehensive sources.

To facilitate analysis we coded information from seventy-seven of the Form One abstracts which had more complete information. Even these were insufficiently complete to allow meaningful correlational analysis, although the computer printouts have provided the frequency data that appears in this report. They have also proved especially useful in pinpointing where new data are needed. In this sense the seventy-seven cases present an initial data base which we hope to upgrade during the 1980s for more technical analysis.

For the analysis of new lands settlement areas, I have developed a four-stage framework which is presented in Chapter 4. Stage One deals with planning, initial infrastructural development, and settler recruitment; Stage Two with the transitional or pioneering period; Stage Three with subsequent economic and social development; and Stage Four with handing over and incorporation. A surprising and very serious weakness of the literature is the paucity of sources on the last two stages, which are the critical ones in terms of economic and social viability. When Weitz and his colleagues (1978) initiated their study of employment generation in connection with new lands settlement, they intended to use postimplementation data available in

the libraries of international organizations, including those of FAO and the World Bank. During their search they accumulated data on sixty-three projects of which thirty-three were in Latin America, twenty in Africa, and ten in Asia. On assessing that information they found very little data on my Stages Two, Three, and Four; indeed, "even the data on the planning phase itself was not always complete" (p. 16). Though the authors then tried to elicit further information directly from the project authorities, again the results were disappointing. As a result, they had to reduce their scope to the planning stage of a smaller number of projects. As the authors acknowledge, this weakness is a major one since many planning assumptions are suspect, while results often differ widely from intentions.

Though I have been able to find considerably more data dealing with the later stages through the use of more recent materials (especially Ph.D. dissertations and U.S. AID and World Bank evaluations which have been completed in the past five years), nonetheless the emphasis of too many studies and evaluations continues to be on the first five years of settlement implementation, a time period which in the majority of cases is too short for a settlement to enter a stage of major development. In our literature review we made a major effort to find studies and evaluations dealing with the later stages. Of our seventy-seven computerized cases, seven were in tropical Africa, five in the Middle East, twenty-four in South and South-East Asia, eleven in Australasia and the Pacific, and thirty in Latin America (Latin America was stressed in the literature review to

make up for the absence of site visits and project funded research in that region). Of our seventy-seven cases, fifteen (20 percent) were in Stage Two, twenty-five (33 percent) fell between Stages Two and Three, ten (13 percent) were in Stage Three, ten (13 percent) fell between Stages Three and Four, and seventeen (22 percent) had reached Stage Four.

B. FIELD STUDIES

1. Methodology

To correct for the paucity of evaluations of settlements which have been in existence for ten or more years, we followed two procedures. The first was to search out more rigorously both longitudinal studies of specific settlements and studies which dealt with the last two developmental stages. The second was to grant awards, preferably to candidates for higher degrees, to carry out research in a number of carefully selected settlement areas. Our original hope was to include the Mwea scheme in Kenya, New Halfa in the Sudan, Kom Ombo and Abis in Egypt, Minneriya in Sri Lanka, a number of settlements in Nepal's Tarai, older FELDA projects in Malaysia, Dutch initiated colonization projects in Indonesia, and older areas of spontaneous settlement in Palawan in the Philippines. In fact, seven grants were awarded — dealing with New Halfa in the Sudan (three awards); Kom Ombo in Egypt (two awards); Minneriya in Sri Lanka (one award); and Nepal's Tarai (one award). In the other cases, it was either not possible to find suitable candidates who were available to initiate research during 1980 or to obtain in time the

necessary research clearances. While this was unfortunate, the FELDA, Indonesian, and Palawan deficiencies were partially corrected through site visits (see below). Furthermore, in the Palawan case, the study profited from the current fieldwork of former research assistants Miriam Chaiken and Tom Conelly on spontaneous settlement on the West Coast of Palawan, as well as from the ongoing field research of James Eder on the east coast (which includes earlier research, documented in a 1974 Ph.D. dissertation, in a highly successful community of spontaneous settlers). Though only scanty recent information was obtained on Mwea (Kenya) or Abis (Egypt), I had visited both during the mid-1960s and was able to obtain published materials dealing with the late 1960s and the early 1970s (Mwea) and the mid-1970s (Abis).

Two other field studies were also utilized, though neither was funded through the global evaluation. The first was on ongoing long-term study by W. L. Partridge and A. B. Brown of Las Margaritas and other communities which were relocated in Mexico's Papaloapan Valley in the mid-1950s in connection with the Aleman Dam. The second was Elizabeth Colson's and my own long-term study of the Kariba relocatees who were resettled on the Zambian side of the Zambezi during the late 1950s. Not only have Partridge and I discussed his own research in great detail, but he also incorporated my comparative questionnaire for new lands settlement studies (see below) into his 1980-81 research design. In the Kariba case, together Colson and I have spent over six years in the field, researching the Kariba relocatees and the development of the Kariba Lake basin, with Colson s last visit in 1978 and mine in 1976. This ongoing research has enabled me to develop and

test out a wide range of hypotheses of relevance to this global evaluation. (Our studies and those of Partridge and Brown deal with settlements which have reached the fourth stage, though in neither case has development been successful as defined in this monograph.)

2. The Comparative Questionnaire and Wealth Index

To facilitate the field research described below, I developed a specially designed questionnaire (Appendix 2) which would enable us to compare settler families both in regard to their histories as settlers and in regard to their current living standards and problems. The historical questions were designed to test the utility of the four stage development framework for new lands settlements, while current living standards were assessed by using a 25-point "wealth index" designed not only to compare settler families within the same settlement area but also on different settlements throughout the tropics and subtropics. A rather novel feature of the global evaluation, the "wealth index" warrants further explanation.

A major weakness of practically all settlement studies is the lack of systematic information on settler income and expenditures. Where such information is included, frequently it is based on a once-only interview during which settlers are asked, in a series of questions lasting over one or more hours, to provide information on their incomes and expenses throughout the most recent annual cycle or calendar year. Though Sukhary (1980) exaggerates when she states that it is impossible to obtain accurate income data, for example, on Egyptian settlers, the task certainly is a most difficult one — with

data collected on only one occasion apt to be inaccurate either because the settler cannot sum up the family's current economic situation in a single sitting or because he/she intentionally misrepresents the facts (perhaps because he/she just does not wish to release such information or because he/she is fearful that the data may be used for taxation or other potentially harmful purposes).

Two quite different ways for trying to obtain more accurate information on family living standards are to collect daily or weekly records on income and expenditures or to develop a fairly simple index which can be used during a single interview to obtain nonquantitative (but nonetheless comparative) information on family living standards. Obviously the most accurate, the first requires a full year's research during which the investigator and/or assistants regularly visit a carefully selected number of settlers to record income and expenditures as they occur, or the latter are trained to keep such records themselves. Such an approach greatly increases accuracy of reporting since the settler is less apt to forget specific items. He/she is also less likely to under- and over-report, both because the settler family is more likely to understand the reasons for keeping accurate records (and more likely to benefit in addition from the existence of such records), and because of the researcher's greater familiarity with the farming system of the family and the general context in which that system operates.

This type of research is very time consuming, however, and rarely is such data collected over a several year period (one exception, in which the quality of the data is exceptional but the

number of settlers small, is four Kariba families that have been collecting daily records for Colson and myself since the mid-1970s). On the other hand, a relatively simple "wealth index" can be filled out within a ten-minute period on the basis of the observations of the recorder and a relatively small number of simple questions. Our twenty-five point index (which is attached to the last page of the comparative questionnaire) is divided into five components which appear to have general validity for settlements throughout the tropics and subtropics. On each component the settler can receive a high ranking of five point or a low ranking of one, with twenty-five points being the highest rating possible.

The first category deals with housing, with special emphasis on quality and number of rooms. It enables the observer to distinguish between temporary and permanent housing, and the sophistication of the latter. The second component deals with potable water and waste disposal facilities, with the former ranging from an open to a "protected" water supply (though of course the possibility exists that the former, if a freely flowing stream, may be less polluted than the latter), while the latter ranges from using the "bush" to having a water sealed privy or even a flush toilet and septic tank. As for the third component, that deals with farm and transport equipment, with the former ranging from hand tools through animal traction to two-wheeled tractors, irrigation pumps, and other forms of mechanization and the latter from bicycles to motor vehicles. The fourth component deals with certain categories of home furnishings, while the fifth deals with home illumination, cooking

facilities, and appliances. With the fifth component, a different set of indicators is used according to whether or not the home is electrified.

Though such an index has its limitations, nonetheless we found that it provided a useful mechanism not only for dividing the settlers on a particular settlement into different living standard or "economic" categories, but also for comparing settlers around the world — since the five components and the different categories under each in fact proved applicable in Asia, the Middle East, Africa, and Latin America. (Over 50 forms were filled out for each of the following settlement areas: New Halfa, Kom Ombo, Minneriya, three settlements in Nepal, and one in Mexico.) The main limitation, of course, is that the index is qualitative, providing no quantitative information which can be used to calculate net income.

The comparative questionnaire was conceived on the basis of my own previous research in Africa, the Middle East, and Asia, supplemented by discussion of its adequacies and inadequacies with colleagues. With both the wealth index and the series of core questions dealing with contemporary and historical aspects of the settlement history of individual families, the questionnaire was pretested in Nepal, Sri Lanka, and the Sudan. To date over 400 questionnaires dealing with seven settlement areas in five countries on three continents have been completed in connection with the global evaluation. While their analysis will be more the responsibility of the individual researchers, and hence will not provide detailed data for this report, preliminary analysis shows that the data is indeed

comparable, and hence has important scientific and policy implications for the transnational study and the planning, implementation, management, and evaluation of new lands settlements.

3. Introduction to the Individual Field Studies

All grants from the global evaluation budget for carrying out field research were given to researchers and administrators from the country in which the research was carried out with one exception, and in that case the researcher was from a neighboring country. In all cases, grantees spoke the national language as their native tongue. Four of the grantees were candidates for higher degrees who were encouraged to use the data collected in their own dissertations and for their own publication purposes. Their obligations to the global evaluations were either to include the comparative questionnaire in their methodology or to carry out specific assignments, with reports on their findings (and, where specified, research data) forwarded to the Institute for Development Anthropology. Though academically speaking it may be desirable for candidates for degrees in the social sciences to do fieldwork outside of their country of origin, it was our hope that the grants would not only help the researchers undertake dissertation research which would not otherwise be possible (and this was indeed the situation in several cases) but would also give them the opportunity to complete studies with important policy implications for their own countries.

Closer supervision was given than is usually the case when research is carried out in a country different from that of the

sponsoring agency. In all cases, the purposes of the global evaluation (and of the specific research as it related to the global evaluation) were explained to the grantees by supervising personnel in the field. Institute for Development Anthropology global evaluation consultant Hussein Fahim and I met with two of the New Halfa researchers in the field just prior to the initiation of their work while IDA Director Michael Horowitz met with the third researcher on several occasions during the fieldwork period. Fahim and I also met in Cairo with the two Egyptian researchers before they began their work, while Fahim continued to provide supervision during several subsequent visits to Egypt. In the Sri Lankan and Nepalese cases, I spent at least a week in the field with the grantees during the course of their work.

4. The Minneriya Study

This study has proved to be especially valuable. During a brief consultancy to Sri Lanka for the U.S. Agency for International Development in January 1979 I accompanied Kapila P[illegible] Wimaladharma on a field trip to a number of Sri Lanka's larger settlement schemes, including Minneriya in Polonnaruwa, Accelerated Mahaweli Programme areas, Gal Oya, and Uda Walawe. With a lifetime's experience with land settlement and development, Wimaladharma at that time was Director of the National Agricultural Diversification Agency (NADSA) which was rehabilitating old tea estates in the highlands as small-holder settlement schemes (subsequently he became Additional General Manager in charge of settlement operations of the Mahaweli Development

Board, and currently he is head of the Land Settlement Department of the Ministry of Lands and Land Development). In his opinion, and that of a number of other Sri Lankan authorities with settlement experience, Minneriya was not only the most successful settlement project in Sri Lanka but also had stimulated the development of a thriving township. This was Hingurakgoda, which was certainly one of the more dynamic rural townships in the country — with a range of goods including irrigation pumps, electrical appliances, and toys which rivaled the inventory of much larger and older Sri Lankan urban centers.

Already registered for a higher degree in agricultural economics at the University of Sri Lanka, Peredeniya, it was agreed that Wimaladharma (whose first degree was in sociology) would do his fieldwork at Minneriya over at least a twelve-month period. The study began in September 1979 at approximately the time of my second visit to Sri Lanka. Two research assistants were recruited to carry out the fieldwork under Wimaladharma's supervision, with both taking up residence in Minneriya in December 1979. They were M. S. Sivisena and Bandula Hewahetawat.

The research methodology included three major components in addition to an analysis of the history of the project from its initiation in 1933. The first was to track down and re-interview members of a random, stratified sample of 128 households interviewed during 1968 as part of the Jogaratnam and Schickele socioeconomic survey of nine Sri Lankan projects (1969). By December 1980 — when the study was drawing to a close -- adult members of 115 of these households had been identified and interviewed. This achievement not

only shows continuity of settlers over a twelve-year period, but it also provided an excellent opportunity to complete "a before-and-after analysis."

The second component of the study was to make a more intensive study of a single community within the Minneriya area, while the third was to census the number and type of nonfarm occupations and adult personnel as well as the number of seasonal and permanent farm laborers of both sexes employed by Minneriya settlers. A preliminary analysis of this data was presented by Wimaladharma (1981) at the April 1981 Seminar on Land Settlement Experiences in Sri Lanka; it will be referred to later in this report, along with similar data collected at New Halfa in the Sudan on nonfarm employment, with both studies showing more employment generation than had hitherto been assumed.

5. The Nepal Study

When the global evaluation was first formulated, I decided to include Nepal in order to compare the post World War II movement of spontaneous and government sponsored settlers from the foothills of the Himalaya down into the Tarai with movement from the Andes of Latin America down into the Amazon and Orinoco Basins. The Tarai was a belt of relatively unoccupied forestland running the length of Nepal between the base of the Himalayas and the Indian border. Settlement from the overpopulated and degraded Himalayan foothills began in the late 1940s and accelerated after the initiation of a malarial control program in the 1950s. Today less than 20 percent of the Tarai remains

forested, with over 75 percent of the settlers spontaneous.

To carry out dissertation research in Nepal, a grant was given to Tulsi P. Uprety, a Ph.D. candidate in Development Studies at the University of California, Berkeley. He spent nearly a year in Nepal, starting in June 1979. During that time he evaluated the government sponsored program throughout the Tarai and carried out comparative field research in three new lands settlement areas in the Eastern Tarai. Two were spontaneous settlements, of which one was pioneered over thirty years ago by some of Uprety's relatives along with other settlers. The other spontaneous settlement dated from the mid-1960s and was selected for comparison with a nearby government sponsored settlement established at approximately the same time.

I visited Uprety in the field during October 1979, during which time we retraced the footsteps of the settlers from the hill country to the lowlands and pretested Uprety's elaborate questionnaire in both types of settlement. Working with a research assistant (Sudarshan Adhikari) who was recruited just after completing his master's thesis in Economics at Tribhuvan University, Uprety subsequently interviewed adult members (who were usually household heads) of seventy-one spontaneous settlement families and seventy government sponsored ones. He also completed less formal interviews among government officials, shopkeepers, and laborers within all three settlements. Since his return to Berkeley to analyze and write up his data, he has completed his dissertation and transcribed data from his 141 interviews to the comparative wealth index form. These are especially interesting since they indicate not only the expected

difference in living standards between the earlier spontaneous settlement and the two later ones but also the higher living standards of the mid-1960s spontaneous settlers in comparison to the mid-1960s government sponsored settlers -- even though in this case the settlers did not differ significantly in background. The implications of this data will be examined in more detail later.

6. The New Halfa Study (Sudan)

Three grants have been given to young scholars for further research on New Halfa (Khashm el Girba). This irrigated settlement project was initiated in 1964 for the majority of the Halfaween (Nubian) population who were forced to relocate in connection with the Aswan High Dam Project. Subsequently, the project was opened to the Shukriyah and other host populations so that today approximately two-thirds of the settler families are hosts. New Halfa had previously been studied by a number of scholars and administrators including Dafalla, Sørbø, Fahim, and Agouba.

At the time of Fahim's and my visit to New Halfa in April 1980, grants were given to Agouba and to Mohammed El Hassan El Tayeb. Agouba had just completed his Ph.D. dissertation on New Halfa, the purpose of his grant being to interview approximately equal numbers of Halfaween and Shukriyah settlers through the use of the comparative questionnaire (seventy-six interviews were subsequently completed). El Tayeb had been employed as a research assistant on the recently completed World Bank financed evaluation of New Halfa which was carried out by the West German firm Agrar-Und Hydrotechnik and

subcontractors to access rehabilitation feasibility. His assignment for the global evaluation was to carry out a census of nonfarm employment on the New Halfa scheme.

During the summer of 1980 another award was given to Muneera Salem-Murdock, a graduate student in anthropology at the State University of New York, Binghamton, to help finance her dissertation research at New Halfa — with special emphasis on the Shukriyah and especially on project impacts on Shukriyah women. Still in the field, Salem-Murdock has also been able to collect additional information on New Halfa as requested.

7. Kom Ombo (Egypt)

Aside from Salem-Murdock's, the most recent grants have been given to Zeinab Gamal Hassan and Mohamed Fikri Abdel Wahab (both research assistants associated with the Social Research Center at the American University in Cairo) to reinterview members of approximately 100 Egyptian Nubian families who originally had been interviewed by research assistants under my direction in 1961-1962 just prior to their relocation in connection with the Aswan High Dam Project.

As part of the Social Research Center s Nubian Research Project, the original sample had been carefully selected to cover the range of economic activities performed by Nubians immediately prior to their relocation, so that reinterviewing would not only update data on the same people almost twenty years later but would also provide the opportunity to compare the responses of both Sudanese and Egyptian Nubians who had been dislocated in the mid-1960s by the construction

of the Aswan High Dam.

During our April 1980 visit to Cairo, Fahim and I met with Gamal and Fikri to work out the restudy methodology. Since then both researchers have been working closely with Fahim, whose own long-term study of the Kom Ombo and other Nubian dam settlements dates back to 1964. He was able to meet with them during November 1980 and was also in contact during visits to Cairo during the spring of 1981. Though I have received a number of completed wealth index forms, interviewing still continues, with the possibility that Gamal will use the data for a dissertation in anthropology/sociology.

8. Other Research Studies

Mention has already been made of how the global evaluation has been linked to research undertaken during 1980 by Chaiken and Conelly among spontaneous settlers in Palawan, the Philippines, and by Partridge and Brown among dam relocatees in Mexico's Papaloapan Basin. The evaluation has also been linked to Colson's and my own work in the Kariba Lake Basin of Zambia-Zimbabwe.

C. SITE VISITS

Before the global evaluation got under way, I made one 1979 visit to Sri Lanka (January-February) and one to the Middle East (April). My Sri Lankan trip was sponsored by the U.S. AID Mission, Colombo and included visits to the following settlement areas: System H (part of the Mahaweli Program), Minneriya, Gal Oya, and Uda Walawe. In the Middle East, visits were made to the Rahad (Sudan) and the

Jordan Valley (Jordan) settlement projects during a consultancy for the Ford Foundation. Between May 15, 1979 and the present, further site visits were made to Indonesia, Malaysia, Nepal, the Philippines, Somalia, Sri Lanka, and the Sudan -- all funded through the global evaluation except for the Philippine and Somalia visits.

1. Indonesia (August 28 - September 20, 1980)

During this time period, visits were made to Dutch and Indonesian government sponsored settlements in South Sumatra and Southern Sulawesi, and to spontaneous and government sponsored settlement areas in Central Sulawesi. Most of the time I traveled with global evaluation consultant Sediono M.P. Tjondronegoro. Chairman of the Social Economics Department of Bogor Agricultural University, Professor Tjondronegoro organized both the South Sumatran and Central Sulawesi visits. In Sumatra, visits were made to Metro and Belitang (both Dutch-initiated irrigation schemes going back to the 1930s) and to Way Abung and Baturaja (more recent Indonesian government transmigration projects which are also World Bank assisted). We were especially interested in comparing Metro (which was booming) with Belitang (which was not) — not just because of their age but also because Belitang was included in Karl Pelzer's 1940 fieldwork, with more recent analyses by Hardjono and by research personnel from Gadjah Mada University under MacAndrew's supervision. (We found no comparable analysis of Metro, which is unfortunate since it was one of the most dynamic areas visited during the global evaluation; however, the importance of settlement per se as an

explanatory factor is unknown.)

The Southern Sulawesi visit focused on Luwu District and was organized by Dr. Frederick E. Machmer, Jr., the U.S. AID Luwu Project Office and the Luwu Project Office under the Director General of Transmigration. Throughout I was accompanied by Arie W. Supit of AID's Luwu Project Office. Three days were spent in the District Headquarters of Palopo and another two days visiting colonization (with special emphasis on Lamasi and Sidomukti) and transmigration (especially Sidobinangun) settlements between Palopo and Bone Bone. All three of the named projects are irrigation based. Currently their irrigation systems are being extended and rehabilitated with financial assistance from either the Dutch or U.S. AID.

For the trip to Central Sulawezi, Tjondronegoro and I were joined by U.S. AID Chief of Rural Development, Douglas Tinsler. Our destination was Parigi, the site of one of the most successful spontaneous settlement areas in southeast and south Asia -- the history of which has been recorded in detail by Gloria Davis of the World Bank in her unpublished Ph.D. dissertation. At the time of our visit, handing over to the second generation of spontaneous settlers had successfully occurred and the settlers (mainly Balinese) appeared adequately integrated within the overall political economy of the area. Both first and second generation settlers were also actively involved in an ongoing process of economic and sociocultural development. The latter was manifested through a major and recent increase in the construction of new family and community shrines by the Hindu Balinese and of churches by the Christian Balinese; the

former facilitated by improved government sponsored road construction across the hills to the provincial capital and along the east coast.

2. Malaysia (August 19-26, 1980)

During this period my wife and I visited a number of the older FELDA oil palm and rubber settlement projects. Visits were made to Taib Andak, Gh. Chahaya Baharu, and Endau in Jahore; Ulu Jempol and the Jengka Triangle area (with associated new town Bandar Pusat and old town Sungai Jerik) in Pahang; and Kemendore in Malaka. Taib Andak, Gh. Chahaya Baharu, and Kemendore were all started in the 1950s, while the Jenka Triangle area is being developed with World Bank assistance as a series of settlements with an associated new town.

3. Nepal (October 13-31, 1979)

This visit was organized by Tulsi Uprety, with five days spent in Katmandu and thirteen in the field. On arrival in the Eastern Tarai we first visited Durgapur, which was the older of the two spontaneous settlements studied. From there we traveled by jeep and foot up to about 9,000 feet to the upper fringe of the cultivated area in the hill country from which most of the settlers came. Then we trekked approximately 50 miles back into the Tarai by the most direct footpaths so that I could get a feel for the different agroecological zones and the different farming systems in the hills, in the inner Tarai, and in the Tarai itself. On the third day, we reached Prithibinager -- the government sponsored settlement near the Indian

frontier which Uprety had also selected for study (founded in the mid-1960s, this he subsequently compared with Juke Khadi -- a spontaneous settlement initiated about the same time, but which I did not visit). We returned to Katmandu via the Central Tarai.

4. The Philippines (September 20-28, 1980)

On my return to the United States from Indonesia, I stopped over in the Philippines to make a personal visit to my former research assistants Miriam Chaiken and Tom Conelly who were doing extended fieldwork among recent spontaneous settlers on the west coast of Palawan. This trip also gave me the opportunity to visit the older spontaneous settlement of San Juan on the east coast in the company of James Eder, who did his Ph.D. dissertation research there in the early 1970s and who was currently resident in the capital city of Puerto Princesa during a sabbatical leave from Arizona State University, Tempe. I had wanted to visit Palawan not just because Chaiken, Conelly, and Eder were there at the time, but also because that island represents the last major frontier for spontaneous settlement in the Philippines and is the location for studies of sponsored and spontaneous settlement by Fernandez and James respectively.

5. Somalia (March 22 - April 1, 1981)

This ten-day visit was made at the request of the U.S. AID Mission in Mogadishu to help them conceptualize a midterm development program for recent refugees from the Ogaden. Though I did visit several refugee camps, I was particularly interested in learning about

Somalia s previous experience with settlement in connection with drought-stricken nomads in the mid-1970s. At that time approximately 105,000 nomads were settled on three agricultural schemes while another 15,000 were settled in a number of coastal fisheries settlements. The latter were run as government cooperatives under the Coastal Development Project and the former as State Farms under the Settlement Development Agency. Visits were made to one agricultural settlement (Kurtumwarey) and two fisheries settlements (El Ahmed and Brava).

6. Sri Lanka (September 9 -- October 13, 1979 and July 3 - August 17, 1980)

The most important component of the first trip to Sri Lanka was to help Kapila P. Wimaladharma initiate the Minneriya study. Shortly before my arrival, M. S. Sivisena had been recruited as a research assistant for the study. Wimaladharma and I accompanied him to the field where Sivisena and I spent approximately two weeks working together during which time we pretested the comparative questionnaire and carried out an initial series of exceptionally interesting interviews.

During the second trip to Sri Lanka, Wimaladharma, my wife, and I made an extensive tour of settlement projects throughout the dry zone of Sri Lanka over a four-week period. These included Rajangana; System H (part of the Accelerated Mahaweli Programme in the Kala Oya Basin); Muthu-Iyan-Kaddu-Kulam; Minneriya (where we visited with Wimaladharma s research team); Minipe; Debera-Ara-Wewa; and Uda

Walawe. I was especially pleased to visit for the first time Rajangana, Muthu-Iyan-Kaddu-Kullam, Minipe, and Debera-Ara-Wewa. Started in the mid-1960s, the first two settlement projects were studied by G. M. Abayaratna in 1970, with the results presented in his 1972 Oxford Ph.D. dissertation "Economic Aspects of Some Peasant Colonizations in Ceylon." Our visit was intended to give us an impression of both schemes ten years later. Considered one of the more successful schemes in Sri Lanka, Minipe has been evaluated by a number of settlement scholars, the most recent being Rangit Wanigaratne who is currently completing his Ph.D. at the University of Wisconsin. As for Debera-Ara-Wewa, we wished to visit that project both because it was a product of private sector initiative combined with government assistance and because developments there have influenced the planning for the Accelerated Mahaweli Programme.

7. Sudan (March 18-April 16, 1979)

In my visit to New Halfa, I was accompanied by two global evaluation consultants. One was Dr. Hussein Fahim, a leading authority on settlement in the Middle East who had already visited New Halfa on two previous occasions in the 1970s. The other was Dr. Mohamed Osman El Sammani who had recently completed the survey phase of a consultancy at New Halfa for Agrar-Und Hydrotechnik and had recently been appointed as executive officer of the newly created socioeconomic unit of the Rahad Corporation. We spent ten days at New Halfa where we were joined by Dr. Muchtar Agouba. Because of our combined expertise the four of us were able to accomplish far more

than I had expected during our visit. We were especially fortunate to arrive at New Halfa just as the Agrar team was finishing up their surveys, so that we could profit from their contemporary knowledge.

After leaving New Halfa, Fahim, Sammani and I paid a brief visit to Kassala and Aroma (headquarters of the Gash scheme), and subsequently Fahim and I made a one day visit to Nueila Village on the Gezira Scheme which Barnett (1977) studied during 1970-72. Significant changes have occurred in Nueila since the early 1970s which once again points up the need to utilize a dynamic framework for the study of new lands settlements.

D. DATA ANALYSIS AND PRESENTATION

In spite of the selectivity that has characterized the three component methodology of the global evaluation, a vast amount of data has been gathered on new lands settlements throughout the tropics and subtropics. Though my original intention was to spend at most fifteen months on the project, in fact -- because of its interest, complexity and policy implications — I have worked over eighteen months on a full-time basis and another nine months on a part-time basis. This monograph can only touch on the major results and the policy implications of those results.

In presenting results, I have not only drawn heavily on the three components of the research methodology but I have also discussed particular settlement areas and global evaluation findings in considerable detail with appropriate colleagues. In trying, for example, to learn more about settlement under CMNP auspices in

Northern Parana, Brazil as well as about profitability, productivity, and ecological implications of cattle ranching in Northern Parana and the Amazon Basin, I contacted directly a number of knowledgeable scholars, with Craig L. Dozier, Robert Eidt, Robert Goodland, Maxine Margolis, Sutti Ortiz, and James Parsons all providing useful information. I developed similar networks to deal with other settlement areas (for example, New Halfa, Rahad, and Gezira in the Sudan, San Julian in Bolivia, and Caqueta in Colombia) and other topics (nonfarm employment, for example). I also presented certain findings at various meetings which were organized for that purpose, including sessions at U.S. AID; the Land Tenure Center of the University of Wisconsin; the Annual Meeting of the American Anthropological Association; the University of Malaya; the University of Sri Lanka, Colombo; the Agrarian Research and Training Institute, Colombo; and the Marga Institute, Colombo. In the last case, a formal paper was presented on new lands settlement and employment generation, while Hussein Fahim and I prepared a formal paper on land settlement in Egypt which Fahim presented at the May 1981 Cairo Symposium on Social Research for Development (sponsored by the Social Research Center of the American University in Cairo).

CHAPTER 4

THE DYNAMICS OF THE SETTLEMENT PROCESS*

I. INTRODUCTION

A major goal of the global evaluation was to develop a framework which could be used for the systematic analysis of new lands settlements and more specifically for their planning, implementation management and evaluation. Because of a focus on policy and on government involvement, the emphasis throughout is on settlement which involves at least some participation by government agencies. The analytical framework will be presented in this chapter. In Chapters 6 through 8 a carefully selected number of basic issues associated with the four developmental stages will be assessed.

Throughout the emphasis will be on the dynamics of the settlement process. This is partly because the global evaluation has convinced me that settlement areas do constitute a unique system which must evolve through a predictable sequence of stages if it is to realize its developmental potential. Partly it is because most other analytical approaches do not pay sufficient attention either to the time factor or to experiences gained elsewhere with settlement — they tend to be neither longitudinal nor comparative.

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* Parts of this chapter draw heavily on Scudder, 1981c, which in turn draws on Appendix 2 of my Third Six-Month Progress Report to U.S. AID on the global evaluation (Scudder, 1981a). The description of the four stages is repeated almost verbatim.

II. THE DISTINCTIVENESS OF SETTLEMENT AREAS

The opening up of a new area for settlement elicits distinctive responses from both settlers and sponsoring agencies, especially during the first time phase of settlement (the so-called "pioneer phase"). From the point of view of both settlers and sponsoring agencies, these responses are often quite different from the ways in which they would behave and organize their activities in old lands.

The distinctiveness of these responses reflects the fact that the settlement process is concerned with the opening up of new areas which tend to be relatively unoccupied and relatively undeveloped prior to the initiation of the settlement process. The fact that they were relatively unoccupied influences settler attitudes and behavior, as well as the nature of settler social organization. The fact that they were relatively undeveloped influences the nature of the sponsoring institutions if they are to deliver the range of inputs and services required for the effective opening up new lands. A common response here is to create special settlement authorities or special mechanisms for coordinating the activities of a number of different government and other agencies.

The first phase of pioneering settlers arrives in an area in which they seldom have relatives and friends among the hosts who not infrequently represent a different ethnic group. They also tend to be unfamiliar with the settlement area. Even if they have come from a relatively similar agro-ecological zone (and frequently this is not the case), they still have to learn their way around. Though few

studies record in any detail settler perceptions of their new habitat on arrival, those that do almost invariably emphasize settler unfamiliarity, apprehension, and even fear. Settlers from the Nile Valley told Sukkary (1980) about their awe and fright on seeing "the mountains" in the vicinity of the Tahhadi Settlement area after a lifetime associated with the flat terrain of their areas of origin. At Khashm el Girba in the Sudan, Halfaween were fearful of thunder and lightning, unprepared for a rainy season, and very concerned about the intentions of the hosts, especially toward settler women.

At Kariba, Colson (1971) describes in some detail the fear of Tonga relocatees when they were taken to unfamiliar settlement areas even though these were within a hundred miles of their pre-relocation homes. They told how they perceived the settlement area to be a howling wilderness full of elephants and predators. In the Lusitu, their fears were exacerbated by the bad reputation of the settlement area as a place to live, a reputation which was enhanced by the presence of unfamiliar cemeteries scattered throughout the bush, and a relatively small host population which tended to be concentrated on the less fertile soils away from the river system — in itself an incomprehensible situation to the relocatees.

Though the Kariba and Khashm el Girba cases refer to compulsory settlement, in the Eastern Nepal Uprety told me of the fears associated with the spontaneous settlement of the Tarai by farmers from the foothills of the Himalayas. The Tarai was initially seen as a hostile habitat very different from the cooler hill country. This reputation was well-deserved. In the past people exiled from the

foothills were sent into the Tarai where most were thought to succumb because of malaria, snake bite and tiger attacks.

To the pioneer settlers, a new land area is an unknown quantity in which new risks to health can be expected. On arrival most settlers must arduously clear land for homesite plots and for agriculture, and build temporary housing. The distribution and nature of rainfall and of standing and flowing bodies of water, of soil, and of flora and fauna -- all of critical importance for gaining a livelihood — take time to assess. Under such new conditions, old crops and production techniques may not be suitable, in which case the settlers must experiment with new farming systems.

While clearing and preparing their land for agriculture and building temporary housing, the pioneer settlers almost invariably suffer from major labor constraints owing to changes in the nature of social units and their interaction that also characterize the early years of settlement. Though settlement may involve the movement of entire communities as well as parts of villages and such kinship units as extended families and lineages, this is the exception. Whether spontaneous or government sponsored settlement, the dominant unit during the pioneering phase is the nuclear family composed of husband, wife and children. From the day of arrival that unit must depend more on its own resources than would be the case if it had remained in its village of origin. Not only are the first families to arrive physically isolated but even if they are accompanied by relatives, friends and co-ethnics the early years of settlement still tend to be characterized by insufficient labor for clearing land, building

temporary shelter, and carrying out a wide range of subsistence activities. Furthermore the communities associated with settlement areas during the early years are structurally simple with few community activities and organizations. Indeed, initially many settlement areas consist primarily of an aggregate of individual families which may or may not participate in cooperative labor groupings to undertake certain activities.

To sum up, the early years of pioneering a new settlement area are difficult and stressful. They require a period of adaptation which is rarely less than two years and usually much longer. Though timely governmental interventions can shorten the length of this difficult period of coping and transition (Stage Two), it cannot be eliminated, hence underlining the unreasonableness of sponsor expectations that settlers will intensify their production from the very start.

III. NEW LANDS SETTLEMENT STAGES

A. INTRODUCTION

In attempting to explain the relative success or failure of new lands settlements which have been in existence for at least a number of years, I developed a four-stage framework. Before outlining this, a cautionary warning is warranted about the use of stages. These are merely tools for coming to grips with a complicated and dynamic process. They amount to simplifying assumptions which attempt to break the settlement process into a series of critical time periods during each of which a range of basic issues need be addressed by

settlers and settlement planners alike. Although the stages appear to have a certain universal validity, at least in broad outline, the details and the sequence vary with locally specific conditions.

While my four-stage framework was originally developed to deal with compulsory resettlement (Scudder and Colson, 1981), I believe that it is equally useful for all types of sponsored settlement as well as for the analysis of spontaneous settlement. As previously mentioned, compulsory relocation is a drastic form of settlement which brings forth sharp responses from the settlers. This is especially true of the years immediately following removal which, for the majority, are characterized in most cases by multidimensional stress. This stress has three components which are synergistically interrelated. These are physiological stress, psychological stress, and sociocultural stress.

Though the absence of presettlement surveys of health status require that post relocation health statistics be used with caution, nonetheless available evidence suggests that compulsory relocation is characterized by increased morbidity and mortality rates especially for children and the elderly (see for example Scudder, 1975, and Fahim, n.d.). As for psychological stress, that has two components dealing, on the one hand, with loss of homeland and on the other with anxiety about the future. Socio-cultural stress includes reduction in leadership capabilities as well as simplification of the entire sociocultural system owing to the shift from a known to an unknown habitat. The combined impact of these three components is sufficiently stressful that the majority of relocatees tend to behave

conservatively during the years that immediately follow removal. They cling to the familiar, try to replicate old behavioral patterns, agricultural production techniques, and organizational forms with the result that new techniques and ideas tend to be rejected at this time regardless of whether or not they are introduced from within or without.

While this type of behavior may be an extreme response to new lands settlement, there is increasing evidence that moves of all sorts are both potentially and actually stressful for many people. For example, Weissman and Paydel reported (1972) that:

> The evidence from our clinical experience, though anecdotal, suggests that moves in modern America tend to be far more stressful than cultural expectations will permit them to be viewed. . . . But the moves are in fact laden with stress. These stresses can try the individual's adaptive abilities beyond capacity and can result in long-term feelings of powerlessness and despair. [p. 19]

Though these stresses, in the authors opinion, are more severe for women, nonetheless "we believe that moving also creates stresses for men -- and that its impact extends well beyond the narrow bounds of the depression clinic or of any social class. It is, in fact, a stress that is extremely common, though ignored or underestimated, in American society today" (p. 16). In these quotations Weissman and Paydel are basing their analysis on family moves which are voluntary and job-related and occur in a society with comparatively high levels

of education and very high rates of mobility.

Against this background it is not unreasonable to expect even spontaneous settlement in the tropics and subtropics to be characterized by a degree of stress and by the adoption of a conservative stance during the early years of adaptation to a new habitat. While it is also reasonable to expect this statement to apply to both men and women (very little is known about the impact of moving on children), women appear to be especially vulnerable since the decision to move often is the husband's (as opposed to the family s), while the move itself tends to remove the wife from the vicinity of her kin and friends.

While one purpose of this discussion of stress is to argue that responses to compulsory settlement can also be expected, though to a lesser degree, in the case of voluntary sponsored and spontaneous settlement, another purpose is to lead into a discussion of stages which are separated from each other in part on the basis of settler responses to the settlement area.

B. SETTLEMENT STAGES

Various authors have emphasized the importance of studying settlement areas and projects as "entities which change over time" (Chambers, 1969:226). In building upon their work, I have been especially influenced by the analysis of Robert Chambers. Dealing primarily with the Mwea Irrigation Scheme and with dam resettlement in connection with Ghana's Volta River Project (Akosombo), Chambers separates out three stages. The first deals with the presettlement

period; the second with settlement and organization, with an emphasis on welfare and production; and the third with withdrawal involving specialization and devolution.

Writing on Latin America, Nelson (1973:73-74) has also analyzed new lands settlements in terms of stages -- dealing with both spontaneous and sponsored settlement, whereas Chambers concentrates on the latter. Focusing on settlement areas as opposed to the sponsoring settlement organizations which Chambers analyzes, Nelson also separates out three stages. The first is labeled "pioneer" and is followed in succession by consolidation and growth stages -- with the first two lasting from five to ten years each. Reboratti also postulates a three-stage "cycle" for settlement in Argentina and Brazil (1979), while other authors (including Weitz et al, 1978) have wished to analyze the development of new lands settlement through time but have been constrained by a lack of appropriate data.

In building upon the work of these and other authors, I have had access to a wider range of sources on new lands settlements which have been in existence for ten or more years. Particularly useful is information on the following sponsored settlement areas (country and starting dates indicated in brackets): Abis and Kom Ombo (Egypt, 1956 and 1964, respectively); Belitang and Wey Abung (Sumatra, Indonesia, 1938 and 1965,respectively); FELDA project areas (Malaysia, 1956 on); Gezira and Khashm el Girba/New Halfa (Sudan, 1925 and 1964, respectively); Kariba (Zambia/Zimbabwe, 1956-58); Minneriya (Sri Lanka, 1933); Mwea (Kenya, 1954); Papaloapan (Mexico, 1952); Prithibinagar (Nepal, 1966); Northern Parana (Brazil, 1920s); and

Volta (Ghana, 1963). As for spontaneous settlement areas, studies of Caqueta (Colombia, late 1950s); Durapur (Nepal, late 1940s); Palawan (Philippines, 1931); and Parigi (Indonesia, 1906) have been equally useful. Together these studies include data on both sponsored and spontaneous settlement in thirteen countries -- three in Latin America, four in tropical Africa, two in the Middle East, and five in Asia.

Whereas most frameworks dealing with settlement dynamics are based on three stages, mine is a four-stage sequence covering at least twenty years. It differs from Chambers' framework by focusing more on new lands settlements from the point of view of the settlers (as opposed to planners, administrators and managers -- and the organizations to which they belong), by placing more emphasis on the later stages of settlement; and on dividing Chambers' second stage — settlement and organization — into two (between which there are very fundamental differences).

The four stages cover at least a generation and are as follows:

1. Planning, Initial Infrastructural Development and Settler Recruitment
2. Transition
3. Economic and Social Development
4. Handing Over and Incorporation

In order to be successful, a new lands settlement area must pass through all four stages though the order of the third and fourth may be reversed. These last two stages are "crucial if living standards and productivity are to rise and if continuity and development are to

continue" (Scudder, 1981c:13).

After handing over and incorporation occurs (Stage Four), often it is no longer possible to factor out the specific impacts of the settlement area on the ongoing development of the incorporating region. On the one hand, this may be propelled by its own internal dynamics, especially where large urban industrial centers have emerged. On the other hand, extraneous factors may intervene, which influence the course of development. Regional development in Northern Parana, Brazil, illustrates both features. During the 1950s and 1960s, the urban industrial component became increasingly important with the larger railway towns created by the private sector sponsoring agency growing into major cities. During the 1970s, however, the decline of the coffee industry had adverse economic and social impacts which continue to this day. By this time, however, the development of the Northern Parana region had evolved beyond the stage where settlement per se continues to have a catalytic impact on that development. The same is true in the Kariba resettlement areas at the current time, with the emerging mining industry coupled with the possibility of agricultural development (including fisheries) in both new and old lands being the major possibilities.

Though ideally a settlement area should pass rapidly through all four stages so as to realize its development potential at the earliest possible date, in fact a wide range of internal and exogenous factors are apt to delay the onset of Stage Three or eliminate it entirely. World War II, for example, had an adverse effect on many of the older settlement areas, including Sri Lanka's

Minneriya and a number of colonization projects in Indonesia. After Indonesia's independence, the attempted communist coup in the mid 1960s had a very detrimental effect on Way Abung. As for internal factors, unrealistic planning has postponed the arrival of Stage Three for years in connection with Ghana's Volta resettlement while implementation problems have had a similar impact on Egypt's Kom Ombo.

In noting these examples, it is important to realize that a wide range of local, regional, national and international factors can have both positive and negative impacts on the evolution of specific settlement areas, so that a steady movement through the four developmental stages tends to be the exception rather than the rule. Furthermore, many spontaneous and sponsored settlements never reach Stage Three but rather evolve directly from Stage Two to Stage Four. In still other cases Stage Three may be reached by a significant number of settlers who subsequently revert back into a subsistence mode of production for reasons beyond their control. Finally, even where settlement areas do pass through all four stages, more often than not they still do not meet the criteria for developmental success as defined in this monograph; though from the point of view of many settlers, they may be considered socially and economically viable. Examples of this range of possibilities plus reversal of Stages Three and Four will be discussed in the paragraphs that follow.

1. Omission of Stage Three

In many sponsored and spontaneous settlement areas, the third stage never occurs. Not only does the settlement fail to become

economically and socially viable but often it comes to replicate conditions in the areas of origin in terms of low production, landlessness, unemployment and underemployment, and inadequate economic opportunities (as in such older Indonesian settlement areas as Belitang; see Hardjono, n.d.), or in terms of a concentration of land and economic opportunities in the hands of a powerful rural elite (as is emerging in settlement areas in the humid tropics of the Amazon Basin; see Roberts, 1975, for Caqueta in Colombia).

Though settler living standards may be higher for a while than in their village of origin, as time goes on they tend to drop because of such factors as subdivision through the transfer of land to the second generation, land degradation, and transfer of settler holdings to a relatively small number of large land owners. Such a fate appears to characterize the majority of older government sponsored settlements throughout the tropics and subtropics. While the more stressful aspects of the transition stage (Stage Two) come to an end, with the settlers adapting to their new habitat in the sense that they "feel at home" there and have established (or reestablished) a subsistence mode of production, the settlement process has stimulated very little ongoing development with backward and forward linkages virtually nonexistent. Handing over, and incorporation into the regional economy, have occurred but low incomes and poverty among the majority of the settlers continues and can be expected to get worse if they remain within the settlement area. In effect the opportunity to increase production, raise living standards, and generate both farm and nonfarm employment through planned settlement has been lost.

2. Reversion from Stage Three

In this case, a significant number of settlers may progress into the third stage of economic and social development but then be pulled back toward a subsistence mode of production for reasons which tend to be beyond their control (they may be ecological, they may relate to changes in rural-urban terms of trade, or they may be institutional as in the example noted below). In such cases reversion to Stage Two does not occur because that comes to a permanent end once the settlers switch from a risk aversion to a risk taking stance. Because reversion is often caused by exogenous factors, there is lots of scope for timely governmental intervention to remove constraints, though obviously the situation is complicated when these are due to the inadequacies of either government policies or agencies.

The New Halfa scheme in the Sudan is one example of reversion in the case of the earliest phase of settlers. These were Halfaween who were relocated compulsorily in connection with the Aswan High Dam Scheme in 1964. By the early 1970s, research by Sørbø and others would suggest that many Halfaween had entered Stage Three, with their rising income and living standards playing a major role in the development of the commercial sector in New Halfa township -- both in regard to their own investment there and their stimulation of other investors (who were in the majority by 1979) through purchase of a wide range of production and consumption goods and services.

By 1979, however, Agouba, Fahim, Sammani and I found that major constraints in terms of the availability of irrigation water and farm tractors were having a negative impact on Halfaween farm

operations. Though other agencies were involved (like the Department of Irrigation) these constraints were largely due to inadequacies of the major settlement agency — the government parastadal Agricultural Production Corporation (APC). While unwilling to devolve increasing managerial responsibility onto the settlers, the APC was also unable to efficiently provide the necessary inputs (for example, approximately 50 percent of its tractors were inoperable at the time of our visit). As a result of such inadequacies not only were the Halfaween settlers being pulled back but commercial development in terms of new construction for new businesses and the expansion of old businesses was being slowed down. Already a number of small businessmen had switched their operations to the more recent Rahad Scheme. Should the downturn continue, new construction can be expected to dwindle still further while the outmovement of established businesses can be expected to accelerate.

3. Progression Through All Four Stages Without Area Development

Though many government sponsored settlements never pass through the third stage, spontaneous and sponsored settlement areas that do rarely catalyze a process of area development. While they may be considered socially and economically viable from the point of view of the settlers, they do not meet our criteria for success. This is true of even the most viable spontaneous settlement areas, suggesting that a minimal level of government intervention is essential. A case in point is Parigi in Sulawesi. Though of considerable viability at the time of Davis' field research in the early 1970s, the development

of the Parigi settlement area really began to boom in the late 1970s in large part because of major government investments in road construction -- both in connection with the improvement of the cross-island highway to the provincial capital of Palu and the construction of the west coast trans-Sulawesi highway. Since both spontaneous and government sponsored settlement is still on going in this area and dominates its agricultural economy, here (as elsewhere in Indonesia) appropriate government interventions can still lead to a process of area development in which settlement plays a major role.

Another example of passage through all four stages without area development is government sponsored compulsory relocation in connection with the construction of the Kariba Dam. Currently the relocatees are entering Stage Four. The transition stage (Stage Two) began in the late 1950s when approximately 50,000 Gwembe Tonga were relocated. It continued until the mid 1960s after which a significant proportion of settlers entered the third stage of economic and social development. Commercial fishing on the reservoir supported several thousand fishermen, hundreds of whom invested their savings into mixed farming based on the cash cropping of cotton, sorghum, and tobacco (and more recently sunflowers), animal traction, and sale of cattle; and into such small businesses as village stores and tea shops. Because of resettlement, roads, and educational and medical facilities were significantly improved. While less than fifty students had attended secondary schools prior to relocation, by the mid-1970s practically every village had at least one secondary school student or graduate.

On the other hand, no major attempt was made by government to develop the agricultural economy of the area during the years immediately following relocation, while after Zambian Independence in 1964 the terms of trade continued to be unfavorable for small scale rural farmers. Though standards of living improved to an extent, with villagers improving their housing and acquiring better household furnishing, what agricultural development did occur did not lead to the emergence of rural centers and townships, to agro-industry within the area, and to the generation of much nonfarm employment. Furthermore over the years land degradation increased in the most densely populated settlement areas, while the absence by the mid-1970s of further lands to settle in most areas suggests that living standards will drop as the subdivision and handing over of farm lands to the second generation of settlers continues unless nonfarm sources of income such as mining and tourism (which are unrelated to the settlement process) create new employment opportunities in the future. In contrast to the Parigi settlement area, at Kariba the opportunities for settlement to precipitate a process of area development have been lost.

4. Reversal of Stages Three and Four

This is a fairly common phenomenon, with significant (as defined by both settlers and myself) economic and social development not occurring until after the second generation of settlers begins to take over. Such may be the case in exceptionally isolated areas or where wars and other external factors interfere with settlement

development. Minneriya is a probable example. Although there is some evidence that some first generation settlers evolved into Stage Three in the late 1940s, major development at Minneriya probably did not begin until after the scheme became a Special Project in 1967. Indeed, it may have been postponed until the early and mid-1970s when crop diversification occurred in response to much improved producer prices for onions and chillies following a policy of import substitution based on the exclusion of Indian imports.

C. PROBLEMS OF ANALYSIS

1. Introduction

Because the settlement process is a dynamic one, there are a number of other settlement features which interfere with superimposing a series of stages on entire settlement areas. Those that will be considered in order are the time phasing of settlement, poorly defined boundaries between stages, and the overlapping of stages.

2. The Time Phasing of Settlement

Where large areas are in process of being settled, settlers may arrive over a period of years or even decades. Hence in the eastern Tarai of Nepal the first pioneers descended from the foothills of the Himalaya during the 1940s, while more recent arrivals continue to arrive. In a number of larger government sponsored settlements, time phasing is institutionalized within a project with first one block or sector and then another opened up and colonized. Phased settlement of this nature is especially common in the major irrigation

schemes of Sri Lanka. In Indonesia, the phased "development" of a number of settlements may be implemented within a particular settlement area (as in South and Central Sulawesi), while FELDA has gone one step further (as in the Jengka Triangle area) by phasing the establishment of different settlements around a planned new town designed to serve as a commercial center. On a still larger scale, Sri Lanka is phasing the settlement of a series of irrigation systems (for example System H followed by System C, the settlement of which will overlap with the initiation of settlement in System B), although here little regional planning has been carried out for linking one system to another or to intervening townships and urban centers.

Where time phasing occurs, one would expect different subareas of a particular settlement to be characterized by different stages (see here Reboratti's analysis of colonization in Argentina and Brazil, 1979). Because of my interest in the later stages of the settlement process, in such cases I have tried to restrict my analysis to the first phase of settlement within a particular region. The first comers I have labeled the "pioneer settlers" who accordingly are associated with the "pioneer phase." In the long run, they tend to be the best off since they have access to a wider variety of lands and since they also tend to clear larger acreages than do later arrivals. Except where otherwise noted, throughout this report the analysis is based primarily on data dealing with the first generation pioneer settlers. A major exception is where there is good data on several phases of settlement within the same area which can be used for comparative purposes, although in some such cases (Caqueta, for

example), I have divided such a settlement into two "areas" for purpose of analysis.

3. Poorly Defined Boundaries Between Stages

Boundaries between stages are often fuzzy, especially in regard to spontaneous settlement where the distinctions between Stages Two and Three are less clear. Though there are various reasons for this, many relate to measurement difficulties. Let us take the distinction between Stages Two and Three as an example. In terms of settler orientation, Stage Two is characterized by risk-adverse behavior while Stage Three is characterized by risk-taking. In spite of the sharpness of that distinction, toward the end of Stage Two, some settlers will be risk-adverse in certain activities and risk-taking in others. How they are classified depends not only on the nature of the indicators but also on how they are weighed. Furthermore, what should be the proportion of risk taking settlers required to evolve a settlement area into Stage Three?

I have not tried to resolve this issue at the level of individual settler families and aggregates of families. Rather I have used a number of relatively gross but workable criteria to measure the shift from Stage Two to Stage Three. Examples relate to the emergence of community leadership, the building of religious structures, schools and clinics on a self help basis, and the appearance of community organizations all of which are more applicable to Stage Three than to Stage Two when settlers tend to rely more on family members and on small scale self help groupings of kin, friends and neighbors who live

in close proximity. Economic indices relate, for example, to risk taking in farming systems as measured by a shift from a subsistence mode of production to production for local and more distant markets, and especially to the shift from low to higher risk crops of greater cash value. Though these and other indices referred to in the sections on the specific stages are sufficient for my purposes in regard to the global evaluation, more research is needed simply because the better we understand the process whereby settlers move from a Stage Two to a Stage Three orientation, the easier it will be for sponsoring agencies to facilitate the shift from the low productivity of Stage Two to the much higher productivity of Stage Three.

4. The Overlapping of Stages

Especially in the case of sponsored settlements, different stages and substages within them, may overlap. As Chambers points out (1969), during Stage 1, planners and politicians are often in a hurry to realize the perceived benefits of settlement so that implementation often overlaps with planning. A very common occurrence is for agricultural areas for both rain fed cultivation and irrigation to be laid out before soil surveys are completed. Subsequently, when soil conditions are found inadequate (which has frequently been the case), changes are constrained since settlements have already been laid out and access roads cleared. A major contemporary example of overlapping between the planning and implementation substages of Stage One is the Accelerated Mahaweli Programme in Sri Lanka.

5. Summary Statement

In spite of the analytical difficulties which have been outlined in the preceding sections, during the global evaluation it has proved to be relatively easy to place different settlements (or settlement subareas) within a particular stage or between two stages. Furthermore, "the very concept of stages draws attention not only to the fact that new lands settlements have histories but also that these histories are remarkably similar" (Scudder, 1981c:13). It follows from this that people and the sociocultural systems in which they are imbedded and interrelated (including settlement agencies) respond to new lands settlement in predictable ways. And these responses have major policy implications.

D. STAGE ONE: PLANNING, INITIAL INFRASTRUCTURAL DEVELOPMENT AND SETTLER RECRUITMENT

This stage lends itself to further division into two substages: the first relating to feasibility studies, planning, and design and the second to settler recruitment and the construction of such initial infrastructure as roads and irrigation facilities.

1. Feasibility Studies, Planning, and Design

Ideally, the feasibility studies which are carried out during this substage should consider a wider range of alternatives before a decision is made to proceed or not to proceed with a particular type of settlement. Should a positive decision result, then a whole range of planning and design activities follow — a number of which Chambers

has outlined (Chambers, 1969:220-221; Chambers and Moris, 1973:462). Under planning, a wide range of issues need be considered — including the scope and scale of the intended farming systems and the settlement as a whole in relationship to regional development. Weitz and his colleagues assume, for example, that multiplier effects are correlated with diversification of the farming system, farm family income, and settlement scale and scope. A more specific issue which is important in part because it tends to be deemphasized is planning the type of land tenure for the settlers and then undertaking the necessary negotiations with the host population so as to reduce the disruptive potential for subsequent land disputes and uncertainty over tenure. Even where host-settler land rights are negotiated and legalized, subsequent conflicts can be expected so the need for adjudication procedures can be assumed from the start. During the planning phase, consideration should also be given to the extent to which the hosts will be included within the settlement project on social equity, economic, and political grounds.

2. Construction of Initial Infrastructure and Settler Recruitment

The wording "initial" infrastructure suggests that infrastructural development should be phased, with planners establishing priorities for implementing in time different types of infrastructure for settler families, administrators, and other nonfarm families. A major problem with many settlement projects is the inadequacy of all infrastructure, the authorities failing in their attempt to introduce "instant" infrastructure from the start. During

the design substage, decisions need to be made as to whether or not an elementary "site and services" approach will be taken versus a more ambitious approach. In either case, implementation of infrastructure should be sequenced, with only essential items like access roads and irrigation structures constructed during Stage One.

As for settler recruitment, far too much emphasis in the past has been paid to the recruitment of individual men as opposed to settler families where attention is paid to both spouses. But settler recruitment should be still more broadly linked during the planning process to the consideration of what types of production systems, what types of communities, and what types of societies are desired so that recruitment can seek out both farm and nonfarm families with the necessary aptitude/orientation, experience, and skills. The design and implementation of a new production system and society almost from scratch is an incredibly complicated process in which planners need rely more on the initiative, the experience, the institutions, and the symbols of the settlement population (including hosts and settlers, and farm and nonfarm families) as well as on the private sector.

To date we have found that the potential through time of settler development strategies would appear to be greater than the more restricted and static strategies of the planner. Paying more attention to the main risk-takers on new lands settlements (who are the settler families as opposed to the planners and managers) would help shift the balance from an overemphasis on agricultural production as an end in itself to a greater emphasis on the type of net income needed to encourage a greater settler initiative in regard to

production and community formation and to raise settler demand for production and consumption goods and services so as to encourage development of nonfarm employment.

E. STAGE TWO: THE TRANSITION STAGE

The use of the word "transition" is used to emphasize two points. First, that this is a stage of transition for settlers who in many cases are moving from one habitat to another and, second, that this transitional period must come to an end before settler families can be expected to take risks and increase significantly their productivity. While the duration of the transition stage may be less than a year for a minority of families in settlements which subsequently reach Stage Three, for the majority it would appear to last for at least two years and more often for five to ten years. Of thirty-six settlements on which there was sufficient data to estimate the duration of the transition stage before the commencement of Stage Three, in only one case was Stage Two shorter than three years (and in that case it was estimated to be at least two years long). In nine cases (25 percent) it was between three and five years in duration; in eleven (31 percent) between five and ten years; and in fifteen cases of over ten years (42 percent).

During the transition stage many settlers are risk-adverse, which explains why few technical, organizational, and sociopolitical innovations are adopted at this time. Risk-aversion appears to be a coping response to the stress and uncertainty associated with moving into a new habitat -- where settler families need not only come to

grips with a new physical and biotic environment but also with new neighbors, an increased government presence in the case of government sponsored settlement, and frequently with a new host population. While "learning the ropes," most settlers adopt a conservative stance, their first priority being to meet their subsistence needs. They favor continuity over change; and where change is necessary, they favor incremental change over transformational change. Where possible, they cling to the familiar by moving into new settlements with relatives, former neighbors, and co-ethnics. They also try to transfer area-of-origin house types, farming practices, and other skills even though they may not be suited to the new habitat — with the result that the transference of the old to the new may increase nutritional stress while alleviating psychological and sociocultural stress by recreating "the security of an encapsulating community with familiar institutions and symbols" (Scudder and Colson, 1981:14). Stress is also increased by illness, with morbidity and mortality rates being higher during the transition stage than later on, and quite possibly also being higher than prior to settlement (although inadequate data makes such a conclusion tentative).

During the earliest days of the transition stage, settler behavior is family and neighbor oriented, while community activities (including the formation of and participation in economic, social, political, and religious groupings) are deemphasized. In this sense, the context of social behavior is simplified. Simplification also occurs because many behavioral patterns, production techniques and skills, and some institutions, are not transferred at all, partly

because they are not compatible with ecological, economic, and sociocultural conditions in the new habitat. Where community or ethnic organizations are established, those formed first tend to be benevolent associations that cater to such family crises as death.

The transition stage comes to an end when enough settler families shift from a conservative stance to a dynamic open-ended one, hence initiating the third stage of economic and social development. This shift is most apt to occur after settler security is increased through the production of sufficient food to meet family needs and the settlers begin to feel "at home" in their new habitat. Economic self-sufficiency can be measured by calculating agricultural yields and family incomes, while "feeling at home" can be assessed through the use of a wide range of indices. One set relates, for example, to increasing familiarity with the new habitat as indicated by willingness and ability to travel to off-farm locations; the use of names (local, transferred, and new) for physical land-forms, plants, and animals; and "taming" the new habitat by referring to it in songs and other narrative forms.

Another set of indices relates to the reestablishment of community organizations (especially of community supported religious structures) and the formation of new organizations (such as farmers unions, water user associations, womens groups, cooperatives, and rural and municipal councils) which can represent the interests of the settlers vis-a-vis the hosts, the government, and the outside world at large.

At this point it is worth mentioning certain policy issues associated with the transition stage. Granted the security oriented and conservative stance of the settlers at this time, it is unreasonable for governments and donors to expect rapid increases in productivity through agricultural intensification during the first five years. Yet such unrealistic expectations all too often characterize both national and international planners since project evaluations several years after project implementation often show economic rates of return well below planning estimates. There is considerable irony here. While planners tend to seriously overestimate rates of return during the early years of settlement, they also underestimate them during subsequent stages.

The logical way to improve project performance during these early years of implementation is to shorten the length of the transition stage. This can be done in a number of ways. One relates to settler recruitment. Although there are potential disadvantages as well as advantages to recruiting whole communities as settlers, the advantages of recruiting settlers from different villages within the same locale and ethnic area as opposed to different ethnic areas are overwhelming during the transition stage. There are two reasons for this. The first is that neighbors and co-ethnics are much more likely to form self-help groups for land clearing and house building during the early years of settlement which so often are characterized by serious labor shortages. The second is that the potential stress and uncertainty of having to adapt to new neighbors is lessened when those neighbors come from a similar ethnic background.

Another way for governments to shorten the length of the transition stage is to make a conceptual distinction between settlement and development stages (Butcher, 1971:6), the former corresponding to the transition stage and the latter to the subsequent stages. During the settlement stage, the emphasis should be on helping the settlers feel secure in their new habitat at the earliest possible moment. Such an approach does not mean that developmental activities should be ignored at that time; quite to the contrary. Just as land negotiation and tenural arrangements should be completed during Stage One to expedite subsequent development, so too are there a similar range of developmental activities which can be implemented during the transition stage. These include, for example, continual provision of crucial physical and social infrastructure (especially construction of feeder roads and upgrading of access roads) and construction, equipping, and staffing of schools. (Schools are especially important because one of the first investments made by settlers is in childrens' education. If schools are inadequate in number and quality, government sponsored settlers are less apt to bring their families to settlement areas, hence contributing to instability and labor bottlenecks.)

Other developmental activities which can be undertaken by sponsoring agencies include fielding of an appropriate unified (and research backed) extension service of men and women who can deal with diversified farming systems development, including development of the livestock and nonfarm components; the encouragement of appropriate private and public sector marketing services, including marketing

cooperatives and loans to private entrepreneurs; and setting the stage through extension and training for the emergence of settler-dominated participatory action organizations. All these activities, however, must be carefully formulated and implemented so they actually facilitate settler initiative and independence rather than promote a sense of dependency which can bog a settlement down in the transition stage for years to come.

Another policy issue associated with the transition stage (Stage Two) relates to that minority of settlers and other immigrants who are willing to take major risks from the start (Partridge et al, 1981). Though personality characteristics may be involved, these innovators are apt to be more experienced and better capitalized individuals who move rapidly to acquire land and business investments in the settlement area. Though they can have an important demonstration effect on the majority and provide badly needed leadership during Stage Two, there is also the not inconsiderable risk that they will accumulate a disproportionate share of land and other resources and of influence and power within the settlement area while the majority of settlers are adapting to their new habitat in a more conservative fashion. This is especially the case where their activities are sponsored by outside elites or where these elites move into settlement areas (as in the humid tropics of Latin America) from the start with the result that land and income disequities in old lands areas are rather rapidly transferred to new lands areas. The situation here is complex, and sponsoring agencies need adjust their policies from one settlement area to another. A related issue which

will be explored in more detail later relates to whether recruitment in the case of sponsored settlement is restricted to low income settler families or includes a proportion of what have been called "middle-class" (India and Sri Lanka) or "graduate settlers" (Egypt).

F. STAGE THREE: ECONOMIC AND SOCIAL DEVELOPMENT

The contrast between Stage Two and Stage Three is dramatic: the first characterized by a population of risk-adverse settlers and the second by a population of risk-taking settlers. Since the same people are involved, a dramatic change occurs during which a relatively conservative (and even closed system in the case of some compulsory settlement) evolves into a dynamic open-ended one with the potential to catalyze a process of development both within and without the settlement area. There is something of a paradox here since some of the variables creating stress during Stage Two facilitate development during Stage Three. A case in point is the simplifications of the sociocultural system immediately following settlement. While departure from an old sociocultural setting -- with extended ties of kinship, patron-client and other nonkin relationships, and a pervasive community and religious organization -- can be initially stressful, subsequently individual households and groups of neighbors may be more able to show initiative and to innovate within the settlement area than if they had stayed "at home" simply because their behavior is no longer constrained by the preceding relationships and institutions. Extending the paradox, their capacity to innovate may be more constrained in the settlement

area during the preceding transition stage than in their "home" environment because of the stress accompanying relocation to a new habitat.

While most settlers concentrated previously on a domestic mode of production involving extensive agriculture, with investments largely restricted to education for children, during Stage Three we have observed a wide range of investment strategies designed to achieve higher levels of labor productivity through diversification of the family estate. While more data analysis is necessary, it would appear that settlers follow the same sequencing of investment activities in different parts of the tropics and subtropics. Initially they invest in education for their children, indicating a willingness from the start to forego returns from the labor of those children in agriculture in exchange for possible remittances and other support ten or more years later. Subsequently additional farm land is sharecropped, leased, and/or purchased and the farming system is expanded into cash crops (including labor intensive, higher risk crops), while the crop component is expanded to cover livestock -- both on and off the settlement -- and nonfarm activities.

Nonfarm activities tend to start on the farm homestead, taking the form of small business enterprises such as crafts, baking, and tailoring which are located within the home. The home itself may be extended, with rooms rented out to laborers and officials — and in some cases a separate house built for rental income. Subsequently, investment expands to nonfarm activities off the homestead but within the settlement area, with these including small general stores and

transport for hire in the form of two- and four-wheel tractors, trucks, taxis, and mini and other buses. Still later, as observed in Egypt (Abis) and the Sudan (Gezira and New Halfa), investments are made in urban real estate (both land and housing) and businesses.

As incomes go up, many settlers prefer to hire laborers for an increasing proportion of agricultural tasks, using family labor for more remunerative activities both on and off the settlement allotment. Especially in irrigated settlements in Africa, Asia, and the Middle East, the number of seasonal and permanent laborers may exceed the number of settler families. Though often living under extreme poverty, such laborers also have been observed to pursue a sequence of development activities designed to tap into the economic growth of the settlement area. Seasonal laborers attempt to become permanent laborers by establishing a year-round relationship with one or more settlers. Working for wages initially, the more enterprising laborers seek out sharecropping and lease-hold arrangements. Both may be sought at the same time since the landlord provides the capital in the first case while the leasee is responsible in the second. Finally, the successful sharecropper or tenant attempts to purchase land, hence becoming a settler in his own right.

Farm diversification and increasing net income among settlers also facilitate the development of commercial and service centers which process the produce and serve farm and nonfarm family needs. Provided the scale of the settlement (or of a cluster of settlements) is large enough, farm production diversified, and net incomes sufficiently high, in time nonfarm employment may exceed farm

employment — with the settlement finally realizing its potential for catalyzing a broad based process of area development, an outcome which can be realized either toward the end of Stage Three or during Stage Four. Before this is possible, however, a wide range of settler organizations need to develop. These make a number of vital contributions to the emergence of economically and socially viable settlements, of which three warrant brief mention. First, they contribute to community and settlement integration, altering the atomistic nature of social organization during the transition stage and making the settlement area a more interesting place for settler families (including children) to live. Second, their existence is correlated with higher productivity since members can personally deal with matters that directly concern their economic welfare. Third, strong local organizations, especially projectwide farmer unions and water user and cooperative federations, enable settlers to influence policy and to compete at the regional and national level for scarce resources. These points are critically important for project success. They will be expanded upon later.

During Stage Three, careful government monitoring and intervention can help identify and remove bottlenecks dealing with the provision and upkeep of physical and social infrastructure; changing rural-urban terms of trade, especially pricing policies for agricultural produce and agricultural requisites as they relate to farm income; and farm services including extension, credit, and marketing. Government agencies can also anticipate increasing labor demands in order to develop appropriate policies to serve farm

laborers, while settlement agencies should actively encourage or pursue training and institution building programs for delegating increasing managerial responsibility to specialized government agencies (especially decentralized departments dealing with health, education, agriculture and so on at the local level), local rural and municipal councils, and settler organizations.

G. STAGE FOUR: HANDING OVER AND INCORPORATION

1. Handing Over

Because of the observed inefficiency of long-established national and special project settlement agencies and because of the frequently negative impact of educational systems on the willingness of settler children to continue farming, I do not consider any settlement to be a success until a degree of handing over control to settlers and other local institutions has occurred and until a second generation of settlers has taken over. Handing over activities to departmental, local government, and settler organizations is a tricky business which can proceed both too rapidly and too slowly. As Chambers has pointed out (1969), settlement agencies may try to divest themselves of responsibility for certain essential activities because of financial stringency and a desire to concentrate more on crop production. In both the Mwea and New Halfa projects, health services suffered because responsibility for schistosomiasis and malarial control was handed over too soon to local departmental and community control.

On the whole, however, the problem in the postcolonial era is that settlement agencies retain for too long a period a wide range of activities which could be more efficiently carried out under a policy of devolution to local organizations. Since it is natural for bureaucrats to endeavor to perpetuate themselves in space and time, the problem of inefficient national and special settlement agencies is a major one during the later stages of settlement projects. Indeed, it is so major in some cases as to possibly offset the undeniable advantages of such centralized and hierarchical organizations during the initial stages, hence requiring a reexamination of the relative merits of centralized versus decentralized management strategies for settlement development.

Whether or not effective mechanisms can be built into centralized agencies from the start for subsequent handing over of a range of activities is unclear. It is equally unclear whether or not a number of decentralized agencies (including technical departments of agriculture and irrigation) will ever be able to take over all the functions executed by centralized agencies, especially in regard to complex river basin development and other projects involving irrigation. More analysis and thought is required on these issues as they relate to the development (or lack of development) of new lands settlements through time.

Because of the nature of the educational system and the propensity of settler families to invest in the education of their children, a number of older settlements are having difficulty in passing on farm activities to the children of settlers as the first

generation retires. This appears to be especially a problem in the aging Gezira scheme in the Sudan, but it may also become a problem on other settlement projects, including mature FELDA schemes in Malaysia. Government planners must anticipate this problem and either establish and implement policies which will provide sufficient incentives to keep at least one married child on the farm or consider other mechanisms for recruiting a second generation of farmers. In the former case, rural-urban terms of trade are crucial. So too are nearby service centers and townships which can cater to at least some of the rising economic and social aspirations of settler families, pointing up once again the potentially self-defeating implications of planning new lands settlements as agricultural production schemes based on the export of a small number of crops.

At a different level, another crucial problem frequently ignored on many settlement schemes is the absence of a household plot large enough to allow the settler's heir to build a separate house for his/her family. Though it is seldom possible to set aside nearby farm land for the second generation (again emphasizing the need to plan for nonfarm employment so as to avoid the dangers of land subdivision), enlargement of a homesite plot in a nucleated settlement to a size large enough for two families is much more easily accomplished.

Where many children do not wish to continue farming, as in parts of the Sudan, it should be possible to develop policies to enable enterprising farm laborers to take over the farms of first generation settlers without heirs or without heirs who are willing to remain on the land.

2. Incorporation

Incorporation refers to the process whereby a new lands settlement become an integrated part (rather than a special enclave) of the region within which it is situated. To an extent, incorportion is the result of a successful process of handing over to locally based government departments, and to rural and municipal councils. But physical handing over alone is not sufficient. The incorporating agencies must have the personnel and capital resources and the will to take over essential settlement services so these services do not subsequently break down.

Resources and will both require emphasis. Where new lands settlements are in isolated areas, departments of public works, for example, may not have the resources to maintain access roads, bridges, and other essential structures even if they have the will. And because of the tensions that so often exist between specialized development authorities and the technical ministries, this will may be absent -- local officials in public works and other departments preferring to allocate resources to communities and projects which they have been serving for longer periods of time and where they are part of a network of social and political relationships. Part of the problem here is political incorporation, since settlement organizations will not be able to compete for regional resources after handing over unless they are integrated within the political economy of the region. So incorporation has a number of aspects which extend beyond the process of handing over. Furthermore, if larger and more diversified new lands settlements are to realize their potential for

catalyzing a process of regional development, incorporation must enable the settlement area to play a major role in influencing regional policies and the implementation of those policies.

CHAPTER 5

NEW LANDS SETTLEMENT AND INTEGRATED AREA DEVELOPMENT

I. INTRODUCTION

In Chapter 2, settlement success was defined in terms of subsequent integrated area development. This chapter will focus on basic features which would appear to be necessary (but not sufficient) to initiate a dynamic developmental process. Finally, the achievements of three settlements will be examined in terms of employment generation and integrated area development.

II. BASIC FEATURES

A. A MULTISECTORAL APPROACH AND REGIONAL PLANNING

The need for a multisectoral approach and regional planning to achieve integrated area development has already been discussed at some length in Chapter 2. A multisectoral approach is needed to achieve linkages between the agricultural, industrial, and service sectors which are essential in terms of increased production, employment generation, and higher living standards. Regional planning is essential to facilitate a process of multisectoral development.

Weitz, Pelley, and Applebaum (1978) place special emphasis on a multisectoral approach to settlement development. Although their arguments are specifically related to employment and income generation

in connection with new lands settlements, they are also applicable to integrated area development. One of their basic assumptions is that settlement projects

> must be multisectoral: Agriculture does not develop itself. It requires a complex institutional system to support it, market its products, and provide inputs, credit and professional advice. The rural community, which is the agent of agricultural development, needs services for its population, such as education, health, public facilities and commercial outlets. The efficiency and location of both producer and consumer services exert a strong influence on the success of agricultural development. . . .
>
> Apart from their contribution to agricultural development and hence also to the expansion of agricultural employment, the service facilities in themselves provide new employment opportunities. This aspect of the service sector assumes greater importance with the increase in the size of the project, since certain services require a larger population base for efficient operation, and may therefore be introduced only in larger projects. Hence the volume of employment generated by the service sector in large projects is relatively greater than in smaller ones. . . .
>
> The same principle applies also to the industrial sector. The full capacity of employment generation in new settlement projects beyond a certain size cannot be realized unless there is a simultaneous growth of agriculture and industry. The term

> "simultaneous" implies an intrinsic link between the two sectors, expressed in a similar technological level, in reciprocal exchange of inputs and outputs and in a connecting infrastructure network. In other words, even though a project is based mainly on agriculture, it should include, as an integral part of its plan, the establishment of industries [my underlining]. These industries could be based on agricultural raw materials produced on the project, or provide inputs, tools and services required by the agricultural sector. . . . The plants and their workers should be located within the project area itself, in proximity to the farm communities. [pp. 4-5]

In their draft discussion paper on new lands settlement, van Raay and Hilhorst (1981) emphasize time and again the need for regional planning if settlement is to stimulate area or, in their words, regional development: "In the absence of planning responses and public intervention coherent with distributive policies, land settlement is unlikely to produce more equitable distribution of wealth. Moreover, the resource frontier is likely to become an organized and dependent social periphery if the process of regional development is left to take its course" (p. iii). And:

> If there is one lesson to be learned from past failures, it is the fact that rural development is best served by a specific locational matrix of urban and rural activities and functions. The implication for land settlement are clear, and support the case made for a contiguous and moving frontier. . . . It is not

> the proximity vis-a-vis main metropolitan centres that matters most but rather the proximity in respects of urban and rural centres in the regior. . . . Such locational considerations place colonization and transmigration clearly within the realm of settlement system planning and thus within the framework of regional planning. [p. 66]

B. SCALE

For new lands settlement to stimulate a process of integrated area development — with a simultaneous evolution of agriculture, services, and industry -- settler families must number in the thousands rather than the hundreds. This is because larger settlements have more development potential because of the economies of scale associated with a wide range of services and industrial activities, as Weitz et al (1978:5) have pointed out. Agroprocessing industries need a certain volume of produce, for example, while the growth or establishment of regional and other commercial and service centers is very responsive to scale. Unfortunately many settlement planners appear to be unaware of such linkages, no doubt partly because so many new land settlements continue to be narrowly conceived as relatively small scale production schemes where the emphasis is not so much on area development as on the production of a small number of crops for export to adjacent regions or other countries. Of forty-eight of the seventy-seven settlements on which there was sufficient data, 59 percent contained more than 1,000 families at the time of the study, and only 35 percent more than 2,000 families. Few multiplier

effects can be expected from the smaller settlements in terms of nonfarm production and employment. As Weitz and his colleagues state, "Obviously, the benefits of industry cannot be gained if the project is very small; a minimum volume of agricultural raw materials is required to support a processing plant, and a minimum population is required to create a market for perishable foodstuffs" (1978:6). In terms of employment, the World Bank (1978b) refers to Malaysian studies that "suggest that a settlement of 2,500 families at full development may provide employment for nearly all of its labor force (of which more than two-thirds would be employed in nonprimary activities), while a settlement of 400 families could provide employment for only 70 percent of its much smaller work force" (pp. 39-40).

C. THE SPACIAL LAYOUT OF SETTLER COMMUNITIES AND THEIR RELATIONSHIP TO RURAL TOWNS

Much has been written on the merits of a dispersed versus a nucleated settlement pattern for settler families (see for example Hiraoka, 1974). In the case of dispersal, settlers may live on their holdings or they may be distributed in a lineal pattern along access and feeder roads. While there are obvious benefits to the settler of a homestead pattern where the family is surrounded by their fields, in terms of employment generation, the provision of services, and the facilitation of area development a nucleated settlement pattern has the advantage in most cases. Indeed, the fact that spontaneous settlers tend to be dispersed — with each family living (with or

without dependent families, laborers, sharecroppers, tenants and others) on their own land — is probably one reason why spontaneous settlement is not associated with area development. According to Weitz et al, many settlement projects in the past adopted a dispersed settlement pattern on the assumption "that it offers more economic advantages. Actually the village is much more suitable for the purpose of agricultural development, especially at the earlier stages, due to its social and organizational attributes, and its adaptability to change" (1978:68).

Summarizing various sources the World Bank concludes:

> The interests of both settlers and their children are best served in most instances by larger, nucleated settlement. . . . The benefits are of several types -- greater employment opportunities, higher service standards, reduced infrastructure costs, reduced migration to large urban centers, and more balanced regional growth. In recognition of these benefits, the Malaysian Government has steadily increased the average size of settlement in Bank-assisted projects from about 400 families in Jengka 1 to more than 1,600 in the Keratong project. [1978b:40 and footnote 11]

The ideal size of the settler community will vary from area to area depending on a wide range of sometimes conflicting economic and social considerations. As Weitz et al point out, however, in all cases it should be large enough to enable the settlers to participate actively in the development process. While this means that nucleated

communities should not be so large as to remove the settlers too far from their fields, it must be large enough to provide for adequate basic services either within the community itself or within a rural service center around which five to ten communities are clustered. Van Raay and Hilhorst believe that the minimum community size for providing such services as a primary school, a provision store, a community hall, and certain agricultural services would be 500 families (1981:53). However, where communities are articulated to rural service centers, they can be smaller while the service center can be larger, hence providing a wider range of services (Weitz et al, 1978:72).

There is overwhelming agreement that settlement projects "must be based on a hierarchy of communities" (Weitz et al, 1978:70), with settler communities linked to, in increasing order of magnitude, rural service centers and rural and regional towns. Though historically this conclusion is based in large part on the Israeli experience with new lands settlement, it is also reinforced by a number of cases in the tropics and subtropics of which the experience of the private sector CMNP in Northern Parana, Brazil is especially relevant. There the colonization company built a railway through relatively unoccupied territory, with rural service centers or market towns laid out at 15 km intervals and rural towns at 30 to 45 km intervals. According to Katzman (1977), forty years later there were six major company towns along the railroad of which two contained over 100,000 inhabitants, while other centers contained 20,000 to 50,000 and still others 10,000 to 20,000.

At this point, however, a word of caution is necessary. There are areas where settler families have a strong preference for a dispersed settlement pattern. There are also areas where viable farming systems have not been developed to support a denser nucleated population within a reasonable distance of their fields. In some areas, both factors may apply as with certain Ujaama villages in Tanzania. Since area development has occurred historically in connection with a dispersed settlement pattern in both the tropics (Northern Parana, Brazil, for example) and the temperate zone (the western portion of the United States), possible constraints to a nucleated settlement pattern should be assessed during the feasibility studies.

Rural towns are essential if settlement projects are to catalyze area development, a conclusion which Weitz et al and van Raay and Hilhorst also emphasize as a result of their own experience with new lands settlement. According to the former, rural towns are the focal point or core of any new lands settlement: "The need for such a town must be taken into account in every project whether by planning a new town or by choosing one of the existing towns within or near the project area" (1978:72). Minimal size should be between 35,000 and 50,000 people (Weitz et al, 1978:72; van Raay and Hilhorst, 1981:55).

A major failing of settlement p. nning throughout the tropics and subtropics is the lack of attention paid to rural towns of this magnitude as opposed to smaller rural service centers with their cooperatives, schools, clinics and other service facilities but with virtually no industrial capacity. In over 100 cases examined during

the global evaluation, rural towns were planned in connection with only eleven. These were the Northern Parana settlement area (Brazil); the Managil Extension of the Gezira Project, the New Halfa Project, and the Rahad Project (Sudan); Kom Ombo (Egypt); Uda Walawe and various Mahaweli systems (Sri Lanka); and FELDA projects in Jenka Triangle and Jahore (Malaysia). As for their survey of sixty-two settlement projects Weitz et al came across only three cases where planning included a rural town -- all of which were included among the eleven cases noted above.

It is not clear why rural towns time and again are ignored in connection with settlement planning. My own belief is that two reasons are especially important. One is due to the continuing emphasis paid to agricultural production as opposed to area development. The other is more organizational, pertaining to the absence of regional and urban planning capabilities in agencies responsible for initiating development in rural areas (where regional planning capabilities do exist in tropical and subtropical countries they tend to be urban oriented).

If we examine the eleven cases noted above, the majority pertain to the 1970s, suggesting that the trend is moving in the right direction. Partly this is because of an increased emphasis on area development and regional planning. Welcome as this is, the eleven examples nonetheless relate to only five countries. Furthermore, in most cases there is a tendency to emphasize new towns rather than the enhancement of existing towns, even where suitable existing towns exist. Not only is this a more expensive undertaking, but frequently

the old town will continue to out-compete the new one (here it is important to remember that it is an incredibly difficult task to design and implement from scratch a socially and economically viable new town). This is true in settlement areas in both Malaysia and Sri Lanka. Although in the latter country more attention is being paid to the enhancement of existing rural towns (as in Uda Walawe and H System, within the Accelerated Mahaweli Programme), even there the tendency continues to be to plan the settlement area as if it existed in a vacuum — a tendency which also continues in Malaysia in connection with the planning of clusters of FELDA settlements around a commercial center (Cohen and Brookfield, 1974). To reverse this tendency more knowledge is needed on the financial costs of upgrading existing rural towns as opposed to creating new ones and on the reasons why old towns tend to outperform adjacent new towns.

D. DIVERSIFYING FARMING SYSTEMS

There are three important reasons for diversifying the farming systems of settler families in terms of multiple cropping and the combination of the crop and livestock components. First, such systems tend to be more resilient and ecologically stable and productive economically. Second, they tend to make better use of family labor providing some farm income and status to various family members in the process. And third, they provide food for nonfarm labor and agricultural produce (including crops, livestock, forest products and fish) for processing.

[1] For the farm family diversification makes sense as a risk aversion strategy in both old and new lands alike. It provides resiliency which often is undercut by development projects and programs. A major characteristic of agricultural development throughout the tropics and subtropics continues to be an undue reliance on a small number of cash crops for export. Where the emphasis is on monocropping as opposed to increased productivity and rising standards of living for farm families, the latter are vulnerable. This is especially true where the dominant crop is a commodity like cotton and where yields and profits are dependent on a wide range of government allocated inputs. Where producer prices are below the world market prices, and where major delays and short falls can occur in the provision on essential requisites, the settler family becomes a captive of forces over which it has very little control. The main risk takers, their food intake and living standards suffer because of policy inadequacies and inefficient settlement agency management. Because of such problems, settlers may become entrenched in a vicious circle whereby they become indebted to local merchants and traders who provide annual credit for production expenses in return for purchasing the major crop(s) immediately after harvest at the farm gate for a relatively low price. Called the sheil system, this procedure is relatively common on the irrigated settlement projects in the Sudan (see, for example, Barnett's analysis of one village in the Gezira scheme though the situation has improved there since his field work in the early 1970s), where settlers not infrequently have to buy cereal staples at much higher prices later in

the year.

It is for such reasons as these that multiple cropping, including the cultivation of a wide range of essential food stuffs, makes sense for the farm family which can then rely on their own produce where necessary. As for ecological stability, Goodland (1980:15) ranks such customary farming systems as the Maya home garden, the Mexican chinanpas, and the Sri Lankan Kandian garden as more stable environmentally than all other forms of agriculture except for certain other types of agri-silviculture. In such customary systems, the home garden consists of a wide variety of tree crops and vegetables, often intermixed with flowers, herbs and medicinal plants, in addition to the interplanting of a variety of crops in adjacent fields. In savanna areas of Africa and seasonal rainfall areas of Mexico, for example, cereal crops often are interplanted with legumes and cucurbits. Such interplanting has a number of advantages for the farmer. It reduces land degradation, for example, by providing a complete vegetation cover which reduces the danger of splatter, sheet and gully erosion within the field during periods of rainfall. Such vegetative covers also facilitate plant growth by evening out extremes in soil temperature and by providing a degree of weed control which also reduces labor demands (in areas of seasonal rainfall, weeding often constitutes a major, if not the major, labor constraint in relationship to rainfed cultivation).

The evidence is also increasing that multiple cropping and diversification of the farming system tends to increase yields per hectare. According to Innis (1980:7), most recent experiments "show

that growing two crops is a better use of resources than growing one. Research on three-crop mixtures, which is closer to traditional methods, but more difficult to handle with machines, shows that the closer researchers come to traditional methods the higher the yields are for the same inputs." As for diversification, small customary farms tend to combine crop production with animal husbandry, with such diversification reaching a high level in Nepal, Egypt, the Sudan, Indonesia, Sri Lanka, Nigeria and many other countries in the tropics and subtropics. Summarizing data on such small farms in general, Eckholm (1980:12) notes that:

> An international farm survey relating farm size to productivity, conducted by R. Albert Berry and William R. Cline of the World Bank and the International Labor Office, found no consistent evidence that yields per cultivated hectare differ on comparable large and small farms. Yet, because farmers with small holdings tend to use their available land far more intensively — planting a greater share of it than owners of larger units do and double cropping more frequently where that is possible — their output in relation to total farm size tends to be greater.

And, "Comparisons of per hectare output on farms smaller than five hectares with those larger than 20 hectares reveal higher productivity on the smaller units in most countries."

[2] Where planners emphasize monocropping, a hierarchical and one-sided organization of labor tends to occur within the farm family -- with the head of the household allocating family labor under his

control and receiving in most cases the profits which may or may not be divided among family members. Far too often land settlement projects are planned by men for men with both wives and children left out of the production and decision making process. As de Wilde (1967) noted for settlement projects in the former white highlands of Kenya, this situation may be resented by wives, especially where the husband uses the profits from family labor for himself.

In customary systems of land use women tend to have their own gardens and their own livestock. They also tend to have at least some control over the use of their own produce. Where they lose these activities, and the income which is associated with them, their economic and social status within the family may also suffer. Summarizing data from Chambers and Moris (1973) and Singleton (1974), it is clear that many women consider the Mwea scheme an undesirable place to live. There are a variety of reasons for this. Housing and general living conditions are relatively poor. The two-room houses provided by government are crowded, with no external kitchen and no separate quarters for older children and co-wives. Potable water supplies are inadequate. Though women do most of the agricultural labor in the rice fields, they have little claim on the cash returns which are paid to their husbands. Furthermore, they do not have their own household gardens on the scheme (indeed, land shortage is considered to be one of the greatest, if not the greatest, disadvantages of the Mwea scheme) and other economic activities for women are few (they are not allowed, for example, to brew beer on the scheme). Under these circumstances their decisionmaking position

within the family in comparison to off-scheme women has deteriorated in regard to household and farm decisions. In addition, because people on the scheme are generally unrelated and families are predominately nuclear rather than extended, women are apt to find the Mwea scheme a lonely place to live. Under these circumstances it is not surprising that women feel stressed, with a fair number leaving their husbands and Mwea.

As the Mwea case illustrates, diversification has important economic and social equity advantages as it relates to the farm family as a production and social unit. It also better distributes family labor throughout the annual cycle by providing each family member with a variety of activities which tend to be better distributed throughout the year. As Weitz et al (1978) state the case for diversification:

> Only through the introduction of properly planned additional enterprises into the crop pattern is it possible to fill the gaps of underemployment in the slack season of the agricultural year. The annual work schedule then becomes more evenly distributed, the labour potential of the farm family is utilized to a much greater extent, and the overall employment generating capacity of the farm increases. [p. 4]

Though the topic has not been carefully researched, another benefit of more fully employing family labor on the farm is to reduce dependence on off-farm activities, hence leaving these more fe nonfarm job seekers. This point will be explored more fully under net income.

[3] Diversification of settler farming systems is still more directly related to area development in that it provides foodstuffs for nonfarm families and raw materials for agricultural and other industries. Both the home garden and settler fields are important here. In regard to foodstuffs, home gardens are more apt to provide vegetables, fruit, and animal protein, with eggs, milk and other dairy products, and meat (fowl, rabbits, and stall-fed swine and goats) all being examples, while the fields provide cereal staples, legumes and a wide range of subsidiary crops such as simsim, chilies, and onions. Both garden types can also produce industrial crops, with the home garden, for example, providing medicinal plants and fibers as well as fruits and vegetables for canning and dairy products for processing.

E. NET INCOME OF SETTLER FAMILIES*

If new lands settlements are to initiate a process of area development, far more attention need be paid to the net income of settler families than has been the case to date. This statement refers to desirable net income in terms of both area development goals and rural incomes in other regions. If settlements are to be successful, net incomes must, of course, increase through time relative to settler needs and expectations. I suspect that planners have failed to realize the importance of net income in large part

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* Significant parts of sections E and F have been taken from a paper on "Increasing the Employment Potential of New Lands Settlements in the Tropics and Subtropics" which I prepared at the request of the Marga Institute for the March 1981 Asian Study Seminar on Rural Unemployment, Colombo, Sri Lanka.

because of their overriding concern with agricultural production and because of policy declarations (as illustrated by Egypt s Agrarian Reform Laws) that settlement plots should be cultivated only through the use of family labor, with the result that size of holding is determined more by the average size of the family labor force than by income considerations.

Emphasis on agricultural production as opposed to integrated area development tends to underplay the importance of net income for at least three reasons. First, it downplays the need for incentives — like-adequate profit margins — to motivate the settler family to produce. Second, it ignores the dynamics of the settlement process, and especially the role that a rising net income plays in encouraging settlers to become more risk-adverse, hence facilitating the shift from the transition stage to the stage of economic and social development (Stage Three). And third it tends to misjudge where the multiplier effects of increased production fall.

In terms of the first two reasons, more attention need be paid to the producer — in this case the settler family — in order to raise production.

The settler family, not the land or the water resources, is the main resource, and the new lands settlement can only catalyze a process of area development if the settler family has the incentive and the opportunity to produce. In planning and implementing new landa settlements, governments can do much to provide that incentive and that opportunity by creating favorable price structures for agricultural produce and providing adequate physical and social

infrastructure in the form of roads, marketing infrastructure, and a wide range of institutions.

Concerning the dynamics of the settlement process, so long as settlers remain close to the subsistence level, it is reasonable to expect them to be risk adverse -- to adopt a relatively conservative stance for meeting family security needs. As net incomes go up, however, investment strategies change (as previously outlined) and consumption goes up, hence increasing demand for goods and services which in turn provide increased nonfarm employment opportunities. This point has been documented time and again. In their Agriculture and Structural Transformation: Economic Strategies in Late-Developing Countries, Johnston and Kilby (1975:301) note that "as per capita output in the economy rises a growing share of household expenditures are devoted to manufactured and processed commodities." Under manufactured goods, the authors distinguish consumer goods and producer goods. The former include textiles (identified by Mellor and Lele as the most important consumption item for lower income categories in their India survey, 1972), cosmetics, combs and brushes, plastic and leather sandals, wooden furniture, transistor radios and fans, bicycles, and bricks, whitewash and paint for home improvement. As for the latter, they include capital equipment like plows, carts, and pumps, and such intermediate inputs as fertilizers, pesticides, fuel, and cement for upgrading irrigation components at the field level.

Where planners do take into consideration the multiplier effect of increased agricultural production, the conventional wisdom

is that most employment generation will be in agro-industry. But what evidence is available (and only some of this applies to settlement projects) suggests that this is not the case. In their World Bank study of the Muda Irrigation Project in Malaysia, Bell, Hazel and Slade (1980 as quoted by Carroll, 1980) reported that for every dollar of direct benefits generated by the project, there were eighty-three cents of indirect benefits. Of that eighty-three cents, fifty cents came from increased farmer demand for consumer goods and services rather than from production linkages (with rice milling accounting for only ten cents of the total). After recounting this case, Carroll adds that agro-industry -- commonly thought to be the main nonfarm enterprise -- may not be the best way to generate rural employment. Referring to a summary of research studies (in the form of a undated manuscript entitled "An Approach to Spatial Planning for Rural Development" prepared by U.S. AID's Working Group on the Rural Poor), Carroll concluded that "small enterprises for production of local household consumption goods engaged about two-thirds of the nonagricultural labor force" (p. 15).

One of the more interesting findings of our global evaluation of new lands settlements is that as net family incomes go up, settlers around the world appear to purchase the same sorts of goods and services. Under home furnishings, for example, wooden chairs, dining room tables, stuffed couches and chairs, glassed-in cupboards (with china and other material possessions on display shelves), wall clocks, radio cassette players, and (where electrification is available) fans all tend to be purchased during the stage of economic and social

development. With some exceptions like fans and radio cassette players, most of these items as well as bricks and other materials for home improvement can be produced locally. The same applies to a wide range of agricultural equipment including implements, bullock carts, and tubewell pumps and components. A major conclusion, for example, of Child and Kaneda's study of small-scale tubewell and agricultural equipment firms is that they require "only half to two-thirds as much capital per new worker employed as does large-scale industry" (1975:247). Obviously, then, as net farmer (or settler) incomes go up, the potential for nonfarm employment generation in rural areas is considerable. Reasons why this potential is not being realized relate not just to the too narrow perspective of settlement planners but also to national industrial policies.

While clearly net income is a critical variable, planning targets need take into consideration a wide range of factors, many of which are country specific. If net incomes are too low, not only will the achievement of developmental goals be jeopardized but, at worst, settlement areas in time will replicate rural poverty levels that characterize old lands, with or without major social disequities. Such a situation is most apt to happen after the second or even third generation have taken over, with both sponsored and spontaneous settlements being at risk here (though usually land cannot be held aside for the second generation, area development greatly increases off-farm employment opportunities for both the children and grandchildren of settlers).

On the other hand, if net incomes are too high relative to those elsewhere in the country, settlement can create a new rural elite in such a way as to jeopardize development goals at both the national, regional and locals levels. This can happen in a number of ways. First, a disproportionate amount of funding may be used to benefit a relatively small number of people, with or without an opportunity for realizing area development over the longer term. Examples include new lands settlements in both Egypt and the Sudan. Second, as settler incomes go up, they may acquire a taste for more expensive goods, including television sets, automobiles, and canned produce which are not manufactured within the encompassing region (or for that matter within the country) -- hence reducing the potential for developing local industry, which among other benefits would provide jobs for the children of settlers and others. And third, wealthy settlers may co-opt a disproportionate share of local resources (including land) -- coming to dominate the political economy of the region in the process. While FELDA communities are an example of the second possibility, the trend toward wealthy cattle ranches in the humid tropics of Latin America is an example of the third. In all such cases, net incomes appear to be too high in terms of <u>both</u> integrated area development and income redistribution goals.

In the literature on new lands settlements, various authors have stressed the risks associated with net incomes which are either too low or are too high. In his five-country review, Perera (1979:139) states that, with the exception of Malaysia, the size of settlement holdings is "quite inadequate to raise the economic level

of the people concerned," while Christodoulou has warned against the danger of new lands settlements becoming depressed rural areas (1965, as quoted by Chambers and Moris, 1973:480). Higgs (1978) is more concerned with incomes which are too high, pointing out that:

> Much land settlement has done active harm to the cause of rural development as a whole by contributing to the increased marginalization of other rural people. Whether settlements arise as a result of direct political pressures or are simply part of a campaign to produce more food or for any other reason, the settlers are usually provided with a particularly favored status in relation to other groups. Settlers tend to be provided with opportunities, which . . . set them apart from their fellows. . . . In some schemes there is an almost implicit acceptance of marginalization as in the Family Farms Scheme in Zambia where it is pointed out that each settlement adviser has a motorcycle and is responsible for no more than fifty farmers.

This situation as described by Higgs is more apt to be characteristic of recent government sponsored settlements than situations in which income targets for settlers tend to be as low, if not lower, than in adjacent areas. Weitz, Pelley, and Applebaum (1978) developed a simulation model to forecast the employment potential of different settlement prototypes. Because of the absence of data, this potential was based not on actual employment but on assumptions about the relationship of such variables as target income, project size (in terms of number of settler families), and ecological

category (based on natural conditions and type of agricultural enterprise) to employment. Target income the authors defined as "the level of income for which planners of new settlement projects should aim to generate maximum employment at minimum costs" (1978:10). After considering a range of alternative income possibilities, they selected as the income target for new lands settlement families the average national income of those employed in the agricultural sector. On the basis of this definition the authors noted that the planned or implemented number of settler families was lower in twenty-three of the twenty-nine projects evaluated than in their corresponding prototype (Table 23, p. 56). Furthermore, in ten cases the planned or implemented number of settler families was less than 50 percent of the authors prototypical figure. In the rainfed category, Caqueta (Colombia) was the extreme, with the planned settler population only 7 percent of the potential population. In the irrigation category, Managil and New Halfa (both in the Sudan) were the extremes, with 23 percent of the potential. In these cases, settlement will benefit only a relatively small number of farming families whose income, by national agricultural standards, will be disproportionately high.

While Higgs and Weitz and his colleagues points are well taken, there are a number of trade-offs here which must be considered if settlement is to facilitate area development. Though they too push strongly for multisectoral development, I suspect that Weitz, Pelley, and Applebaum's target incomes are too low to facilitate area development in some countries, especially in parts of Africa, the Middle East, and Asia. Partly this is because of the nature of their

study sample and partly it is influenced by their emphasis on employment generation, especially employment of settlers as opposed to other rural families. As for their study sample, thirteen of the twenty-nine countries evaluated were in Latin America where incomes are more apt to be skewed, with relatively small rural elites dominating 50 percent or more of the arable land base. In such cases, basing the target income on the average income in the agricultural sector would significantly raise settler incomes "often from 3 to 8 times their present income depending on the particular country," as the authors note (p. 12). But such would not be the case in Old World countries where land reform programs have been carried out and/or where most land, as in Sri Lanka, has been subdivided over the years into very small parcels. Under these circumstances target incomes, both in terms of settler incentives to farm and increasing settler demand for a wide range of producer and consumer goods and services, might be better based on the "average national income" or even the "average urban income," depending on the nature of rural-urban terms of trade. Though raising target incomes in this way would reduce the number of settlers employed on the land, in the long run it would probably facilitate area development, including employment generation. Since settler incomes that are too low are a serious constraint to subsequent development, it is better to err on the higher side than on the lower side.

At this point, I think we have to admit that almost by definition a successful settlement process will create a new rural elite among both settlers and nonfarm families. As they move from the

transition to the stage of economic and social development, many successful settlers can be expected to pursue dynamic investment strategies as their incomes go up. Almost inevitably this means that throughout the tropics and subtropics they can be expected to diversify family enterprises, acquiring more land and moving into off-farm enterprises where opportunities exist. The challenge for planners is to "set the stage" in such a way that settler initiative is encouraged without being too exploitative of others. This can be done in a number of ways. Ready availability of credit for annual production needs and strong settler dominated producer and marketing organizations will help spread the benefits of settlement to a larger proportion of the settler population. Credit for nonfarm businesses can be channeled to small-scale entrepreneurs who are not settlers, while the nature of the farming system and the size of the settler allotment can be designed to more fully employ settler labor, to reduce the need for settlers to seek out and dominate nonfarm employment opportunities, and to realize predefined income levels. What these are to be must be carefully worked out in each case.

In conclusion, no globally fixed definition of desirable net income is possible. Furthermore, allowances must also be made for rising incomes and expectations within the agricultural, service, and industrial sectors so that initially favorable settler incomes do not subsequently become a disincentive to settlement because of changes in the terms of trade and other factors.

F. EMPLOYMENT GENERATION

1. Introduction

Empirical knowledge is scant for assessing the potential of different farming systems and settlement designs for generating employment. Yet the topic is a critically important one, especially in countries with rapid population growth and high rates of unemployment and underemployment. A case in point is Sri Lanka where over one million adults, mainly relatively well-educated young men and women, have no employment out of a population of approximately fifteen million. Under these circumstances, the capacity of the large-scale Accelerated Mahaweli Programme to create employment has major implications for national development. Since planning is constrained by lack of knowledge of the possibilities, further research is urgently needed. This should focus on settlements which at the very least have reached the third stage of economic and social development, and which have stimulated the development of regional service centers and rural towns. Examples include Northern Paraná (Brazil); Minneriya, and possibly Gal Oya and Uda Walawe (Sri Lanka); Gezira and New Halfa (Sudan); Abis (Egypt); Jengka Triangle (Malaysia); and Metro (Indonesia).

New lands settlement have the potential to increase three general types of employment. These are, first, employment of owner/operators and their families on farm holdings; second, the employment of permanent and seasonal farm labor; and, third, nonfarm employment. With few exceptions the planning and implementation of new lands settlements by government and donor agencies has emphasized

the first type of employment while ignoring the other two types. Furthermore, where operators are not owners, sponsoring agencies tend to establish them more often as laborers and tenants than as renters or sharecroppers.

2. Owner/Operators and Their Families

Though planners and policy makers have underestimated and underemphasized the capability of new lands settlement to generate employment, this criticism does not mean that they have overemphasized the importance of owner/operators. On the contrary, these are the key to subsequent development including increased agricultural production, rising living standards, and employment generation including nonfarm employment. In this sense new lands settlements are the polar opposite to growth pole development which is based on the assumption that rapid industrialization in urban centers is the best starting point for regional development.

In terms of employment generation, there is no alternative to emphasizing recruitment of settlers working small holdings versus those working medium and large holdings. Not only does emphasis on small holders increase the number of farm owner/operators, but as Johnston and Kilby note, "where income is more or less evenly distributed over broad segments of the population, the result is large markets for comparatively simple goods" (1974:304). Since the production of these requires little technical and managerial sophistication, such goods can be produced within settlement areas, hence increasing the scope for nonfarm employment. On the other hand,

as Mellor and Lele (1972) have documented for India, and as Johnston and Kilby have stated more generally, larger and more wealthy farmers have an increased demand for more expensive imports or more complicated manufactured goods which cannot be produced locally. They are also more apt to invest in capital intensive equipment like tractors which, on the one hand, reduce farm employment per unit of land and, on the other hand, reduce nonfarm employment since, unlike bullock-drawn equipment, such gear also cannot be produced locally. Furthermore, in terms of increased productivity, there are no major countervailing factors which would support the recruitment of medium and large scale settlers since convincing evidence has yet to be produced to show that economics of scale are associated with increased production of a wide range of crops in the tropics and subtropics. And even where economies of scale are associated with particular crops, other alternatives — still based on the small scale family farm concept -- exist, one example being the communal cultivation of oil palm sections on Malaysia's FELDA schemes, with profits then divided among those working on a particular section.

There is an upper limit, however, to the number of small holders who can profitably be settled in a particular area in regard to productivity, rising standards of living, and the generation of nonfarm employment. Unfortunately planners tend to forget this point — so that increasing the number of settlers beyond a certain level actually reduces employment generation since settler net incomes are insufficient to increase demand for locally manufactured goods and services, and since local production is not sufficiently great or

diversified to meet the demand of nonfarm workers for locally produced foodstuffs and raw materials for local processing, the farm enterprise becoming mainly a subsistence operation which perpetuates rural poverty rather than alleviating it.

3. Seasonal and Permanent Laborers

With only a few exceptions, including perhaps certain perennial tree crops with relatively low labor requirements and beef cattle, it is unrealistic to expect successful settlers to continue to employ only family labor. Yet time and again settlements are planned on the assumption, often based on ideological considerations, that settlement allotments must be cultivated with family labor — with the size of the family labor force at the time of settlement often being the determining factor as to the size of the settlement allotment. This position not only ignores the natural development cycle of the family but it also ignores the dynamic nature of settler investment strategies once Stage Three (economic and social development) begins.

Though age criteria vary, often young settlers are recruited with preschool children. As Barnett has shown for the Sudan's Gezira scheme (1977), the ratio of active family members to dependents rises and then drops as the household head ages. At the same time, source after source shows that settlers in Latin America, Africa, and Asia encourage kin to join them to reduce labor bottlenecks both seasonally and during the early years of settlement, especially where families not only must adapt to a new habitat but also must clear and plant new lands and build their homes. Subsequently, as net incomes rise,

settlers begin to substitute nonfamily labor for family labor in regard to less desirable and/or less productive agricultural activities. This recruitment of seasonal and permanent labor occurs even on relatively small holdings (4 acres of irrigated rice at Mwea in Kenya and 2.5 acres of double cropped rice lands in Sri Lanka's Accelerated Mahaweli Programme). Though I have heretofore mentioned this as a mechanism whereby family labor is reallocated to more productive activities, family labor may also be withdrawn for social rather than economic reasons -- the husband, for example, forbidding his wife to work in the fields so as to increase the family's social status. Regardless of the reasons for the reallocation of family labor, however, as net incomes rise family labor tends to be underemployed in regard to the crop component of the farming system (see especially Abayaratna, 1972).

Against this background it is unrealistic for settlement planners to assume that settlers will not hire seasonal and permanent farm labor when they can. Furthermore, it is not in the interests of either employment generation or the welfare of those laborers to pretend that they do not exist or to deemphasize their existence. In large-scale irrigation based settlement projects in the Sudan, seasonal workers during the cotton and groundnut harvesting seasons outnumber adult settlers. Furthermore, it is not uncommon for the more successful settlers in old irrigation based settlements, like Minneriya in Sri Lanka, to have one permanent wage laborer. Though hire of laborers is less significant in regard to farming systems based on rains cultivation, even there large numbers of seasonal

laborers are used during certain stages of the production cycle of both annual and perennial crops. As for large scale irrigation based settlement schemes, one permanent labor unit per settler family may not be exceptional, in which case employment generation is significant.

Where seasonal and permanent laborers are ignored, social services in terms of schools and medical facilities tend to be inadequate to service their needs. At the same time, I am aware of no programs designed to help the more enterprising laborers improve their economic position. Although there is less evidence than in the case of settlers, laborers also appear to pursue a sequence of economic activities whenever possible. Briefly, seasonal laborers who are not circulatory labor migrants try to become permanent laborers, after which they attempt to become sharecroppers and leaseholders of farm land — with a small proportion eventually acquiring land either through marriage or purchase of a settler allotment. Where the children of settlers are not interested in working the land, it might be possible to work out some sort of arrangement whereby renters, sharecroppers, or permanent laborers could purchase the land without jeopardizing the retirement years of the previous owner/operator. Certainly the current situation is undesirable, with laborers and especially female laborers often suffering from low wages and inadequate nutrition, housing and social services.

4. Nonfarm Employment

I have already discussed the importance of nonfarm employment on settlement schemes in a number of previous sections -- in which it

was emphasized that new lands settlements should be multisectoral in scope and that as net income of settlers rose so did their demand for a variety of consumption and production goods and services — most of which could be produced locally, hence generating further employment. To further discuss nonfarm employment some reference to the general literature on linkages between agriculture and industry, and more specifically between irrigation projects and industry, is necessary simply because the literature on this topic is sparce, especially in regard to new lands settlements — and often contradictory. Yet available material underlines two conclusions. First, that the potential multiplier effects of agricultural development would appear to be considerably greater than realized in terms of employment generation in rural areas and, second, that national development policies must share much of the blame for the failure of new lands settlements to realize their development potential in terms of employment generation and multiplier effects.

The inadequacy of research makes it virtually impossible to quantify the direct and indirect effects of agricultural intensification in the tropics and subtropics through irrigation and rains-based farming systems on both new and old lands. On the one hand, few members of the academic community have attempted to carry out the type of systematical long-term research which is necessary, the work of Vimal Shah and C. H. Shah in the Matar Taluka irrigation area in India s Gujarat State being an exception (Shah and Shah, 1974). On the other hand, the large majority of postimplementation evaluations carried out by both multilateral and bilateral agencies

focus exclusively on direct effects, a major exception here being research under World Bank auspices on Malaysia's Muda Irrigation Project (see, for example, Bell and Hazell, 1980). Referring more specifically to agriculture-industry interactions, Johnston and Kilby note that "the study of variable linkages between the agricultural economy and industry in the early stage of economic development is a comparatively unexplored field" (1974:299), a comment which can be generalized for other agricultural linkages as well.

Theorists writing before the 1970s were inclined to play down multiplier effects of agricultural development in spite of the absence of empirical data. Hence, Hymer and Resnick (1969) theorized that as rural incomes rise and development proceeds, demand for locally produced goods and services can be expected to decline, while Hirschman (1958) theorized weak linkages in rural areas between agriculture and nonfarm activities. More recent empirical evidence, including our own data on new lands settlements, suggests the opposite to be true in both cases (see, for example, Chuta and Liedholm, 1979; Johnston and Kilby, 1975; and Mellor and Lele, 1972) -- suggesting that there is good reason to believe that nonfarm employment can be expected to increase significantly as agricultural development proceeds.

Against this background, let us examine the current situation as it relates to rural nonfarm employment and income in the tropics and subtropics. According to the World Bank (1978a), over half of all nonfarm employment in Africa and Asia is still in rural areas — a situation which we tend to forget because of the ongoing influx of

rural peoples into urban areas (which in Africa, at least, is also less than rural to rural migration). Using relatively recent data on eighteen developing countries, Chuta and Liedholm (1979, pp. 3-4) note that in the large majority, "one-fifth or more of the rural labor force is primarily engaged in nonfarm activities," with 20 percent so engaged in India versus 24 percent in Indonesia, 28 percent in the Philippines, 32 percent in West Malaysia, and 49 percent in Taiwan (because of its unique program of industrial decentralization, excellent infrastructure, and a variety of other historical factors). These are considered minimal estimates both because of measurement problems and because the survey areas generally speaking do not include rural communities and towns with population over five thousand people. According to the World Bank's Rural Enterprise and Nonfarm Employment (1978a), nonfarm activities in rural areas provide a primary source of employment and earnings to approximately one-third of the rural labor force where rural towns are included (my underscoring), with this proportion rising to 40 percent where town population in rural settings increases to twenty to thirty thousand residents.

Where both primary and secondary nonfarm employment are considered, available evidence indicates 30 to 50 percent of the rural labor force are so employed. According to Chuta and Liedholm, "Currently, the rural nonfarm sector encompasses a wide variety of activities, although manufacturing, commerce, and services generally predominate" (p. 79). Using relatively recent data on nine countries (including six in Asia), they note that "manufacturing ranges from 22

to 46 percent, commerce ranges from 11 to 35 percent while services range from 10 to 50 percent of total rural nonfarm employment" (p. 8). Manufacturing often occurs in small firms employing five or less people -- with cloth production, wood and metal working, and food processing activities predominating. Evidence suggests that "employment in all rural manufacturing enterprises often exceeds that in large urban manufacturing firms" (p. 8). According to data cited by Lubell, in Indonesia:

> The bulk of manufacturing employment and production is in small scale enterprises, most of which are in rural areas. The quality of handicraft production, particularly of textiles, is high (e.g. batik production). In Sri Lanka, 72 percent of total employment in manufacturing in 1971 was rural. S. V. Sethuraman found a surprising degree of sophistication among rural small scale producers in Sri Lanka in 1977, one example being the ability of village soap producers to fabricate hand soaps at considerably lower prices [than identically packaged soap produced by a subsidiary of Lever Brothers]. [1980:49]

Not only do rural nonfarm activities appear to employ more people than previously expected but these activities also provide a significant proportion of the income of rural households. Though data is even more scant here, Chuta and Liedholm present data from six countries (including four in Asia) which show nonfarm earnings accounting for over 20 percent of the income of rural families. Estimates of 22 percent and 23 percent are presented for Korea and

Pakistan, respectively, versus 43 percent for Taiwan and 70 percent for Japan.

While Japan is not in the tropics or subtropics, nonetheless that figure gives an indication of the role that nonfarm earnings can play in rural areas at an advanced stage of development while the Taiwan figure is suggestive for the middle stage of development. While the Japanese and Taiwanese cases represent special features (both, after all, are island economies with excellent crisscrossing road systems and port facilities proximate to rural hinterlands, with Taiwan's development directly influenced by Japanese occupation during World War II), nonetheless it should be possible to eventually achieve similar results in carefully selected settlement areas in the tropics and subtropics with careful planning and plan implementation. Starting with new lands settlement, the integrated area development approach followed in Northern Parana, Brazil would appear to be a case in point. While not designed as integrated area development projects, the New Halfa (Sudan) and Minneriya (Sri Lanka) cases have also generated significant rural nonfarm employment and income. Such cases suggest that it is not unreasonable to expect to realize after a generation of development a ratio of one nonfarm family for every farm family.

G. NATIONAL DEVELOPMENT POLICIES

It is very difficult for new lands settlement projects to sustain themselves through time in the face of adverse national development policies and private sector policies. Where rural-urban

terms of trade are unfavorable to the rural sector (and work by Lipton, 1977, and other scholars indicates such a situation applies throughout most of the tropics and subtropics), new lands settlements face a major constraint from the start. As for the generation of nonfarm employment through the development of small-scale enterprises including manufacturing and other types of industry, new lands settlements face major constraints where national agricultural policies are unfavorable to the producer because of the close linkages between farming and nonfarm employment.

The generation of nonfarm employment in manufacturing and other activities is more directly constrained where industrialization policies favor the development of large-scale urban based industries through a range of direct and indirect subsidies. As Katzman points out, throughout most of the world growth pole advocates favor the approach that emphasizes "a set of tightly interlinked, capital-intensive, large-scale manufacturing enterprises" (1977:7) -- in spite of the fact that there is little evidence that such an approach in the tropics and subtropics catalyzes development of the rest of the economy. According to Chuta and Liedholm, "In most developing countries, interest rates, tariff rates, foreign exchange rates, and tax policies have been designed to benefit large-scale enterprises and consequently are generally biased against the small, rural non-farm enterprise" (1979:83).

Child and Kaneda are particularly critical of the situation in Pakistan where they argue that the government should reexamine policies which favor large-scale enterprises through a "variety of

subsidies, licensing procedures, tax concessions, special credit arrangements, and protection from import competition." Such policies, they argue, unintentionally have not only "inhabited the efficiency and viability of small scale enterprises," but even threatened their "survival" (1975:273). Yet such enterprises are no less efficient than large-scale ones; indeed, the "small-scale industry studied here requires only half to two-thirds as much capital per new worker employed as does large-scale industry" (1975:274). Government and private sector credit policies may be especially critical for both the agricultural and industrial components of new lands settlements, Katzman arguing that the increasing proletarianization of the agricultural labor force in the Northern Parana settlement area of Brazil is due in part to adverse government and private sector credit policies.

In sum, the design and implementation of successful new lands settlements in terms of increased production, rising living standards, and employment generation must not only be multisectoral in scope but must also be nurtured by favorable long-term development policies at the national level.

III. CASE STUDIES

A. INTRODUCTION

As previously mentioned there is very little empirical data on the multiplier effects of agricultural development in the tropics and subtropics. Most of what information is available does not apply specifically to settlement areas. There is also scant empirical

information on the extent to which either rural development or new lands settlements have initiated a process of integrated area development. For these reasons, the three case histories which follow are intended to be suggestive only. Only one -- the Northern Parana case — was actually planned and implemented with the intention of achieving integrated area development. There the results were dramatic — with Dozier noting that "colonization was all-important in the development of urban centers along the railway in the 1940s and 1950s," with development thereafter proceeding to the point that colonization as such "no longer plays an important role" (Dozier, 1981 written communication).

While the other two cases -- New Halfa in the Sudan and Minneriya in Sri Lanka — were planned and implemented as agricultural production schemes which were initially based on one or two crops (cotton and wheat at New Halfa and rice at Minneriya), both have generated a significant amount of nonfarm employment. In each case, the projects are relatively large (with over 5,000 settlers), production was subsequently diversified to an extent on settler initiative, net incomes were high by international standards, and the settlements were associated with a dynamic rural town.

It should be noted that agriculture is rain fed in the Northern Parana case and irrigation based in the New Halfa and Minneriya cases. While Weitz, Pelley, and Applebaum concluded on the basis of their simulation modeling that large rainfed projects could not create "a balanced employment structure" in terms of agricultural and industrial development in contrast to similarly scaled irrigation projects

(1978:48), the empirical data does not support this view. Though double cropping based on irrigation may facilitate diversification and industrial development to a greater extent than rainfed agriculture, settlement at Northern Parana was initially based on small holder coffee. This points up the importance of the crop mix, with perennial tree crops mixed with annuals and livestock having, for example, a much higher potential than cattle ranching mixed with annual crops.

B. THE NORTHERN PARANA CASE

New lands settlement in Northern Parana, according to Nelson, "is in all probability the most extensive and economically successful in the humid tropics of Latin America" (1973:121). Katzman echoes the same theme when he categorizes Northern Parana as "perhaps the most successful example of regional development planning in Latin America" (1977:53). Since the project was planned and implemented from the start with a view to integrated area development, such opinions justify examining the Northern Parana case in some detail.

In Northern Parana the planning and executing agency was a private development company which was capitalized in the United Kingdom as a profit-making venture. Eager for hinterland development, the Brazilian government agreed to the selection of Northern Parana. This region was a thinly populated one which at the time was beyond the coffee frontier so that no major opposition was expressed by the coffee growers to the north or by other private sector interests.

The initial land development company was the Parana Land Company which subsequently was taken over during World War II by the

Companhia Melhoramentos Norte do Parana. The Company started its operations in the mid 1920s by purchasing approximately 2.5 million acres at fifty cents each. During the next few years no settlement was allowed while very careful soil and other surveys were carried out and utilized for planning the layout of farms (including small 1 to 5 hectare farms close to future urban centers), roads, and a railroad with associated towns. At the same time, title to future farmlands was carefully cleared so that settlers would not have to worry about the type of stressful and financially costly land disputes which so often characterize relationships between settlers and hosts and absentee owners within settlement areas.

Settlement began in 1928 and was phased to coincide with the development of roads, the railroad, and rural towns. Land was primarily sold to relatively poor Brazilians who had previously been small holders or laborers on large coffee estates. The purchase price was initially about $3 per acre, with a 50 percent down payment and the remainder payable over a two to four-year period after which the settlers received clear title. Land was sold in 12 hectare blocks, with typical farm sizes of 24 to 48 hectares. Though relatively large by African and Asian standards, these were relatively small in comparison to later government sponsored settlements elsewhere in South America. Coffee was stressed as a cash crop from the very beginning, along with a range of subsistence crops.

The settlement pattern was dispersed. Each farm was laid out so as to have access to a feeder road, while the railroad was built through the settlement area not as a capital intensive up-front

investment "but at the same pace as land sales, one period's sales financing the next period's development" (Katzman, 1977: 59). The 150 kilometer railroad was completed in 1932. Throughout its length market towns were planned at 15 kilometer intervals while farms were located so that none were more than 15 kilometers from the nearest rural center. Londrina, founded in 1932, was designed to be the area s first major rural town.

During the 1930s development proceeded slowly. Partly because of the the depression, the Company had sold only 11 percent of its holdings by 1939. Thereafter land sales boomed, with 23 percent of potential farm land sold from 1940 through 1944 and 39 percent from 1945 through 1950, with most of the remainder sold during the next ten years. As for development, that too accelerated during the 1940s as coffee trees matured and as demand for coffee increased, along with demand for food crops in the rapidly developing cities along the coast (Dozier, 1956). Population also increased significantly.

During the 1920s when the Company was founded, the settlement area was essentially uninhabited according to Katzman. Estimated at 100,000 in 1940, by 1950 the population had reached 400,000, continuing to climb to approximately one million in 1965 -- with noncompany lands outside the settlement area growing at a slower rate. As for the railway towns, two had populations of over 100,000 in the 1960s while the other centers ranged from 10,000 to 50,000 inhabitants. "The main urban centers were located 100 km apart on the trunk road west from Londrina. Londrina was planned at the outset for a population of 20,000; in thirty-five years it had reached 120,000.

Maringa was founded in 1947 for 150,000 inhabitants; by 1955 all urban lots were sold, and the population in 1968 was estimated at over 100,000" (Nelson,1973: 121). Though I have seen no figures on the ratio of primary nonfarm to farm jobs, by "1968 the population was estimated at about 1.7 million, of which 40-50 percent was urban" (p. 123). Since the number of farm holdings created was 39,000, it would appear that more than one nonfarm job had been created for every farm job.

In terms of the four settlement stages, it would appear that Stage Four (handing-over/incorporation) had occurred by the 1960s — at which time a major demographic shift was occurring from a majority of rural residents to a majority of urban residents. On the basis of evidence available to me, it would appear that this shift occurred primarily because of increasing job opportunities in the urban areas and rural towns. Subsequently, however, development in the rural areas was seriously set back during the late 1960s and 1970s. While this was partly due to ecological factors (Margolis, 1979), which impacted on the area after the new lands settlement cycle had run its course through all four stages, changing modes of production which had begun at an earlier date were also involved. Since these had major employment implications in both rural and urban areas alike, they warrant some analysis, especially since similar trends — which have adverse implications for integrated area development as described in Chapter 6 — are at work throughout new lands settlement areas in Latin America.

According to Katzman, the proportion of small-scale farm operators decreased between 1940 and 1960 in good part because of insufficient credit to meet production costs, especially in connection with the application of fertilizers to soils exhausted under coffee cultivation. Others began to buy up and consolidate their holdings, which were then converted to the mechanized cultivation of soybeans and wheat, or to pasture for cattle ranching. Both forms of land use are less labor intensive than coffee production so that large numbers of former owner/operators and their employees found themselves without work. While, for example, a 486 hectare coffee farm would provide employment for approximately 300 workers, a mechanized soybean or wheat farm of similar size would provide employment for only eight workers and a cattle ranch for two workers (Margolis, 1980:232).

The trend toward large-scale capital-intensive forms of land use was accelerated by a series of frosts in the late 1960s, reaching a climax with the catastrophic coffee-killing frost of 1975. Located in the southernmost zone of Brazil's coffee region, Northern Parana has always been susceptible to cold air masses sweeping north from Antarctica. But the 1975 frost was exceptionally severe. According to Margolis, "Close to 100% of the 915 million coffee trees in Parana were affected" (1980:231), of which approximately one-third were killed. After this disaster many more small-scale coffee farmers sold out to wheat and soybean operations and to cattle ranchers, hence accelerating the consolidation of land holdings and the movement of unemployed rural residents to the cities (Margolis, written communication to the author). The situation was especially dramatic

in the county that contained Margolis' study community. "In 1966, even after land consolidation was well underway, close to 60 percent of the country's agricultural establishments were less than sixty acres, while only 19 percent could be classified as extensive -- 180 acres or more. By 1971, the small farm of ten to twenty acres virtually had disappeared in the low-lying, more frost-prone sections of the county, and it was becoming increasingly rare in other areas as well" (Margolis, 1979: 138). The resulting depopulation also negatively impacted on nonfarm employment by causing a major drop off in the volume of sales in rural service centers.

Though currently the Brazilian government is encouraging small holder replanting of coffee in parts of Northern Parana, clearly the region has undergone a major set back. According to Margolis the major reason for this set back was the fact that climactically Northern Parana was unsuitable for coffee production (1979:136). This was the basis of the previously successful small holder economy, once again pointing up the risks inherent in mono cropping. Though soil and other surveys by the Parana Land Company were exemplary relative to other new lands settlement areas, they clearly were insufficient since they left out crucial climatic variables relating to the proposed farming system based on coffee. Simply because they are unoccupied, there usually is a dearth of climatic, hydrological, and soil quality information on new lands settlement areas. Under such circumstances, extensive feasibility surveys and intensive planning studies are absolutely essential for selecting appropriate farming systems. Though coffee is a particularly suitable crop for small

holders and employment generation, presumably there were other farming systems which could have facilitated a similar development process.

C. THE NEW HALFA CASE

Formerly called Khashm el Girba, New Halfa is a complicated multi-ethnic scheme involving government sponsored compulsorily relocated settlers and voluntary settlers. Established in 1964, it has been well studied at different points in time, especially by Dafalla, Blanckenburg and Hubert, Fahim, Sørbø, Shalabi, Agouba, and currently Salem-Murdock — with Sørbø, Agouba and Salem-Murdock carrying out extended fieldwork.

Though planned and implemented as an irrigation based agricultural production scheme, Agouba is probably correct when he states that New Halfa has contributed to the diversification of the agricultural economy, "with a consequent favorable effect on the industrial development and employment in the Khashm el Girba region" (1979:42). On the other hand, the project is beset with problems, of which the most serious are management and ecologically related. As currently constituted and financed, the parastadal settlement agency — the Agricultural Production Corporation (APC) -- not only is unable to provide essential services but is actually pulling the first phase of settlers back toward a subsistence mode of production. Though the current insufficiency of irrigation water is primarily due to the inability of the APC, the Ministry of Agriculture, and the Department of Irrigation to cooperate in the interests of the settlers, the associated reservoir is filling with silt at an alarming rate. In the

long run the only solution to this ecological bottleneck would appear to be the construction of another dam further up the Atbara River.

Located in the Eastern Sudan in Kassala Province, New Halfa lies immediately west of the Atbara River, constituting a rectangle approximately 96 kilometers long and 30 to 35 kilometers wide. In 1978 the scheme included approximately 193,000 irrigable hectares, making it one of the largest irrigation projects in the world under single management. Excluding seasonal workers and Eritrean refugees, the total population within the scheme probably exceeded 300,000 at that time.

The New Halfa site was selected for the Nubian-speaking Sudanese (Halfaween) population which would be flooded out after the completion of the Aswan High Dam in Egypt. Though Halfaween representatives favored other areas, the government preferred New Halfa and proceeded with settlement when the host population (the Shukriyah) agreed to the project on the condition that subsequent settlement phases would involve not just Shukriyah but also other local Arabic-speaking tribes.

Halfaween settlement began in 1964, with approximately 7,000 tenancies allocated to dam relocatees (who also included a small number of Arabic-speaking minorities). Settlement of selected host households began in 1965 and continued through the end of the 1960s, at which time another 12,343 tenancies had been distributed (including 6,966 to Shukriyah, 2,398 to Beja, 2,358 to Lahawyin, 1,061 to Ahamda, and the rest to members of other tribes -- for a total of 19,309 tenancies).

Though the size of each tenancy was approximately 6.3 hectares of irrigated land, as compensation for being flooded out of their homeland, the Halfaween were also given as freehold double the acreage that they had previously controlled. Though usually less than 1.5 hectares were involved, and many years went by before this land became irrigable, it nonetheless is one factor explaining the higher income of Halfaween tenants in comparison to Arabic-speaking ones.

By the end of the 1970s, approximately 169,300 hectares were irrigable — including 138,600 hectares of tenancies, 10,500 hectares of Halfaween freehold, 18,900 hectares allocated to the government sugar estate, and somewhat less than 2,000 hectares for agricultural research and afforestation projects. In 1978 total population included 216,537 settlers, 49,993 farm laborers (of whom not all lived in New Halfa throughout the year), and 70,000 seasonal laborers. Some of these laborers lived in twenty labor camps; others lived in New Halfa, with an estimated population of approximately 35,000. The unplanned settlement associated with the sugar estate numbered at least several thousand residents.

Even though they comprise only one-third of the tenants, the Halfaween settlers have been the dominant element in the agricultural development of the area to date -- for reasons which will be explained below. Settled in most cases during 1964-65, the transition stage (Stage Two) for most lasted at least six years with Stage Three (economic and social development) getting under way in the early to mid-1970s (Sørbø, communication to the author). The critical factor here has been the initiative of the Halfaween settlers to diversify

their farming system rather than the nature of the project. Indeed, according to convincing data presented by Sørbø (n.d. and 1977) for both Nubian-speaking and Arabic-speaking tenants, individual tenancies cannot support the settler family according to the farm plan of the Agricultural Production Corporation.

The Agricultural Production Corporation (APC) was formed in 1967 to run the scheme. Highly centralized, hierarchical and autocratic, the APC wishes tenants to concentrate on cotton production in spite of the fact that prices to the producer have been low throughout, while costs of production have increased relative to cotton prices over the years. For such reasons as these, Halfaween tenants have favored wheat production over cotton and have paid increasing attention to the development of their freehold land since the mid-1970s. Freehold gardens tend to be near Halfaween villages, so that after the arrival of irrigation water both men and women began to cooperate in the cultivation of fruits and vegetables for both local consumption and cash sales. In recent years increasing attention has been given to dairy cattle, with 60 percent of Nubian tenants said to have cattle by the end of the 1970s which are fed on fodder grown on freehold land and on field crop residuals. Well educated by Sudanese standards, Halfaween have also actively sought off-farm employment on the scheme, in the major cities of the Sudan, and in Saudi Arabia and other oil rich Arab states. On the scheme, for example, a significant number of higher staff positions within the APC are held by Halfaween who also are employed or self-employed in a wide range of other off-farm occupations. According to a 1981 survey

carried out by Salem-Murdock in Village 18 (an all Halfaween community), of 189 male household heads only twenty-five considered farming to be their main occupation (and in two cases the farm was an off-scheme one). Of the other 164, four were retired, perhaps twenty were self-employed (as merchants, shop and cafe owners, and artisans) and the rest were employed (with teaching the most frequent white-collar job).

In such ways as these the Halfaween have been able to improve their presettlement living standards, stimulating the development of the nonfarm sector in the process. While the importance of off-farm income for the household head is extreme in comparison to most other settlement areas, this does not mean that the crop and livestock components are ignored. As already mentioned, both men and women work the smaller freehold plots. As for the tenancies, while some wage earners and self-employed household heads also work the land, the majority either manage it themselves (with cultivation done by hired labor), or enter into managerial, leasehold, or sharecropping arrangements with other individuals.

Though their net incomes are substantially lower, many Shukriyah tenants have also been able to improve their living standards although for them off-scheme interests in the form of livestock (Sørbø, n.d.) are the crucial component. Predominantly a pastoral people, the Shukriyah were not allowed to incorporate their herds within the New Halfa scheme. The goals of the planners were transformational; they expected the Shukriyah to become irrigation farmers, deemphasizing herding in the process. They also expected the

Shukriyah and other Arabic-speaking tenants to build their houses on twenty-two fixed sites on which no provision was made for corralling livestock. Such plans were totally unacceptable to the future settlers, for whom, as Sørbø documents, livestock have continued to be the most important type of investment and source of income. Indeed, herd size probably has increased, with livestock watering at irrigation canals and grazing the stubble on irrigated land after the harvest. At that time, which coincides with the dry season when both water and food were previously scarce, some 100,000 cattle, 275,000 small stock and 20,000 camels graze crop residues in cotton, wheat, and groundnut fields.

According to recent estimates (oral communication to the author from the AGRAR team), gross income of Halfaween tenants from irrigation and livestock alone is nearly double that of pastoral tenants. Though the income of the latter from livestock is probably underestimated, this differential would be still greater if off-farm income was added. There are a number of reasons for this difference. While the Halfaween have high educational levels, those of the Arab speaking tenants are low, so that few have been able to obtain the type of well paid off-farm employment that is relatively common among Halfaween tenants. The Halfaween also have a century's old tradition of labor migration to the major urban centers of Egypt and the Sudan, while the younger generation of Shukriyah are only just beginning to seek off-farm sources of income.

As compensation for their forced relocation in connection with the Aswan High Dam, the Halfaween also received a significantly higher

level of economic and social benefits on the New Halfa project than did host settlers. In addition to freehold land on which they could keep as many livestock as they wished (in contrast, hosts were only allowed to keep one livestock unit on their tenancies), the Halfaween also were relocated in New Halfa Town and twenty-five planned communities in which schools and other social services were provided. In contrast, the hosts have received a much lower level of social services, partly because of their more dispersed settlement pattern (currently they are aggregated in fifty-seven "emergent" villages) and partly because of increasing fiscal constraints on the ability of the APC to provide social services.

Better educated and more knowledgeable about irrigated farming (which was the basis of their on-farm economy in Old Nubia), the Halfaween have been much more successful in organizing viable cooperatives than the host population. In planning for their relocation, Halfaween representatives insisted that the relocatees be allowed to develop cooperatives from the start in their new home. Though initially the function of these was more social than economic (they were seen as a mechanism to maintain the distinctiveness of Halfaween culture in a strange land which initially was seen as hostile), increasingly during the 1970s they became a mechanism for at least partially offsetting the increasing deficiencies of the APC. Two examples are especially significant, the first relating to tractor mechanization and the second to wheat marketing and processing.

APC policy has been to combine mechanization with hand labor (no animal traction is used on the scheme), with APC equipment used

for mechanized operations. Over the years, however, the 250 tractors as well as other equipment in the Corporation's equipment pool have run down. While this has had an adverse effect on scheme efficiency, it has been partially offset by the purchase and rental of tractors, combines, and other equipment by the Halfaween cooperatives. At the same time, these cooperatives have formed a union to handle wheat marketing which had previously been dominated by private traders. By offering higher prices the union was able to purchase almost the entire Halfaween production of wheat on the scheme, and in 1979 they were encouraging the host tenants to also sell through the union. A profitable operation,, this has recently built its own storage and milling facilities in New Halfa town.

While the development strategies of the Halfaween tenants clearly have been more dynamic and successful than those of the scheme planners and of the APC managers, nonetheless New Halfa was designed to include a major rural town and agro-industries with special emphasis on a sugar refinery and several cotton ginneries. Both industries have been established along with agro-industry associated with wheat milling, groundnut husking, and soap and oil making. This agro-industrial base, along with a wide range of businesses catering to the settler population, especially the Halfaween settlers, has generated a significant amount of nonfarm employment, the magnitude of has been seriously underestimated by both planners and researchers.

When Agouba, Fahim, Sammani, and I visited New Halfa in April 1980, we were impressed by the size and vitality of the commercial center -- even though development had recently slowed down because of

the decreasing capacity of the APC to provide irrigation water, agricultural machinery and other essential services. At that time government and World Bank sponsored research was under way to assess strategies for rehabilitating the APC and the scheme. Concentrating their efforts on agricultural production, especially on the organization of the APC, no one on the research team could give us figures on nonfarm employment either on the scheme or in New Halfa Town. When we asked them to guess at the number of businesses within the town alone, one consulting economist mentioned 300 to 400 versus our own estimate (based on a very crude spot survey) of at least 1000.

To obtain more accurate information, an Institute for Development Anthropology grant was given to Mohammed El Hassan El Tayeb to complete a survey of nonfarm employment on the scheme during May and June, 1980. Given below, his results included an estimated 1,408 businesses, including 500 tailors (probably an overestimate according to Salem-Murdock, though I am less certain of this granted the importance of textiles among rural industries the world over), 335 retailers, 91 cart owners, 60 wholesalers, 40 restaurant/coffee shop owners, 38 butchers, 30 milksellers, 28 buffets, 25 tea shops, 26 vegetable sellers, 24 shoe repairers, 20 porters, 18 cigarette sellers, 13 flour mills, 11 water cart owners, 11 cloth washers, 10 bakers, 10 radio repairers, 10 tinsmiths and smaller numbers of other businesses including drug stores, barbers, photo studios/shops, fish sellers and watch repairers. Even this is an underestimate since, for example, my own rapid survey the previous month suggests a larger number of vegetable and fruit sellers -- an observation which has been

more recently confirmed by Salem-Murdock (written communication to the author). Furthermore, a number of the taxi, bus, and truck owners who El Tayeb listed under the scheme as a whole are based in New Halfa Town. In sum, even we seriously underestimated the number of businesses based in New Halfa Town as well as in the area surrounding the sugar estate where El Tayeb listed 408 businesses.

Table 4 shows El Tayeb s breakdown of nonfarm employment, as opposed to number of businesses, in the New Halfa Scheme. The total number of permanent jobs comes to 14,268 while seasonal jobs come to 16,528 -- many of which provide three to seven months of employment. Of the former, probably about 2,000 should be omitted, along with 6,000 of the latter, since I suspect that they refer mainly to farm labor on the sugar estate. Since the total number of tenancies is approximately 19,300, there is approximately .64 permanent nonfarm jobs for every tenancy and .50 seasonal jobs. The majority of these do not involve members of tenant families. While Halfaween may fill a disproportionate number of upper level positions in the APC, local government, and other departments, proportionately they occupy a smaller percentage of lower level positions. They also occupy a minority of positions in New Halfa Town, though such may not have been the case in the mid-1960s. When New Halfa was first settled, a significant number of Halfaween either transferred their Old Halfa businesses to New Halfa or established new ones there. Over the years, however, most of them have sold out to local and Nile Valley Arabic-speaking businessmen, possibly because the latter had a comparative advantage in the new habitat.

TABLE 4

NONFARM EMPLOYMENT ON THE NEW HALFA SCHEME
NUMBER OF EMPLOYEES*
May-June 1981

PRIVATE SECTOR	PERMANENT EMPLOYEES	SEASONAL EMPLOYEES
Businesses (excluding Agro-Industry)		
New Halfa Town	2463	?
Sugar Factory Township	817	?
Rural Hinterland	1014	?
Agro-Industry		
Cotton Ginneries	264	2212 [7]**
Sugar Factory	2387	6440 [4]
Soap and Oil Factory	134	50 [3]
Peanut Decorticators	-	416 [3]
Other	9	4
Government Departments		
APC	2817	5731
Education	644	6
Irrigation	431	1000
Health	945	-
Water & Electricity Corpor	355	-
Public Works	315	22
Post & Telephone	108	-
Veterinary	97	-
Forestry	92	626
Mechanical Transport	60	-
Other	121	5
Transportation		
Taxi, Buses, Trucks	1177	-
Cinemas	18	20

*Not included are employeees of the cooperatives, (except under one cooperative cinema) and the Tenants Union. Also omitted are the police as well as the various illegal and legal businesses that have grown up in the refugee encampments within the scheme boundaries. Data collected by Mohamed El Hassan El Tayeb.

**Figures within brackets refer tc number of months employed.

In summary, in spite of the inefficiency of the APC, a disproportionate emphasis placed on the cultivation of cotton at unfavorable producer prices, and the inability of the APC and the Department of Irrigation to maintain irrigation structures and provide the settlers with a regular supply of water in the right amounts at the right time, agricultural development at New Halfa is associated with major multiplier effects in terms of both off-farm employment for the settlers and nonfarm employment. It has also provided major employment for both permanent and seasonal farm laborers -- with the former numbering 50,000 and the latter over 50,000, with both figures probably including working families (since husbands, wives and children all pick cotton). Many of these laborers come from Kordofan and Darfur which have been devastated since the late 1960s by both natural and man-induced desertification. Under present circumstances, these Westerners badly need the income they make as laborers. Not only do many seasonable workers try to become permanent laborers but the latter often try to enter into sharecropping and lease-hold arrangements with tenants -- especially the considerable number of Halfaween who prefer not to work their own land.

Providing employment for farm laborers is an important function of new land settlement in countries like the Sudan where many rural residents cannot support themselves in their area of origin. While many countries completely ignore permanent and seasonal farm laborers (often pretending that family farms are only cultivated with family labor), the Sudan is well aware of its importance. This is both in terms of its importance for agricultural production and for the

laborers themselves. Government policy tends to be ambivalent in terms of the relative importance of these two emphases. This ambivalence is especially visible within the administration of the new irrigation based Rahad project which lies south of the Butana between New Halfa and the Gezira scheme. Within the Rahad scheme approximately 50 percent of household plots are allocated to nontenants in the expectation that they will provide both farm labor and a range of services. On the other hand, scheme managers are also attempting to mechanize the scheme as fully as possible because of a perceived labor constraint -- mechanization being pushed to the extent that the U.S. Agency for International Development will be providing fifty cotton pickers during FY 1982.

Research by Olsson at Rahad (1978) suggests that the labor constraint is due more to low wages (which themselves are based on the low producer price of cotton) than on the nonavailability of labor in the country. The ILO report on Growth, Equity and Development in the Sudan (1976) makes the same general point for irrigated agriculture as a whole. Brief visits of my own to Rahad in 1979 and New Halfa and Gezira in 1980 gave me the same impression. At Rahad, for example, I found that rural wages for those working in construction on the roads around the scheme were two to three times the wages available to individual farm laborers (though cotton picking families would be able to put all family members to work, some laborers come to the schemes alone). Furthermore, the availablity of labor appeared to be increasing, what with the entrance of the Nilotic peoples into the labor market. Along with the Western Sudanese, these Nilotic labor

migrants from the Southern Region are attempting to better themselves through wage labor. Properly planned and implemented, new lands settlements could play a major role in providing employment as well as capital for reinvesting in the migrants' areas of origin.

D. THE MINNERIYA CASE

In comparison to Northern Parana and New Halfa, Minneriya is a smaller settlement area of approximately 50,000 people. While this is still a large-scale project in terms of settlement elsewhere in the tropics and subtropics, it has not generated much agro-industry, manufacturing, or other industry. I suspect that there are a number of reasons for this, of which three are of major importance. First, in spite of some diversification in the 1970s, Minneriya continues to be primarily a rice production scheme with relatively small multiplier effects in terms of industry. Second, though settler families number over 5,000, the project would appear to be too small in regard to facilitating an integrated area development process. If so, as in the FELDA case, the lesson for Mahaweli planners is that irrigation systems must be planned in relationship to each other and to intervening commercial centers if major multiplier effects are to be achieved. And third, for reasons which are not really clear, consumption patterns of Minneriya settlers appear to be increasingly oriented to goods which are not only manufactured outside of the project but are even imported from without the country. In spite of these "constraints," Minneriya has generated significant nonfarm employment, especially in comparison to other small, medium, and

large-scale settlement areas within Sri Lanka. For that reason alone the Minneriya case warrants some analysis.

Established in 1933, Minneriya has been carefully studied on two occasions: in 1968 by Jogaratnam and his colleagues (Jogaratnam and Schickele, 1969) and in 1979-80 by Wimaladharma (1981). In addition to tracking down and reinterviewing 115 members of the 128 settler households interviewed by the Jogaratnam team, Wimaladharma also attempted to assess employment within the settlement area.

According to Sri Lankan scholars and administrators with settlement experience, Minneriya is the most successful settlement scheme in the country. An irrigation based settlement, it is located in the Mahaweli basin of the dry zone and is situated in Polonnuruwa District where government sponsored irrigated settlement schemes constitute the major farming system. The scheme includes 18,200 irrigated acres and consists of 5,639 allotments which average five acres for the potentially irrigable lowland allotment and three for the "highland" allotment, part of which may also be converted to irrigation use. Two crops are grown annually. Total households within the project area number 8,481, of which an unknown percentage are encroachers -- separate households of spontaneous settlers from without the project and married children of settlers from within who attempt to farm illegally roadside and irrigation canal fringes and other settlement project lands.

According to Wimaladharma's data, Minnerya has clearly generated a significant amount of nonfarm employment. Of the total number employed, approximately 41 percent are listed as farm

owner/operators, 37 percent as nonfarm employees and employers, and 22 percent as laborers who combine farm with nonfarm labor. Leaving aside laborers, there is nearly one person employed in the nonfarm sector for very person employed in farming. When laborers are added, the ratio is nearly 1.5 to 1, which would be even higher during periods of peak labor demand since the casual laborers who seasonally migrate into the area are not included.

Of the 4,859 nonfarm employees and employers listed, 3,183 (66 percent) are employed in the government sector (including parastadals and cooperatives), with 40 percent of that number employed by the government textile mill. This must be considered a footloose industry since no cotton is grown on the Minneriya scheme and very little is grown in adjacent areas. Sited in the area for largely political reasons, it cannot be considered a multiplier effect of the scheme, although it could be so considered if cotton was a major part of the crop rotation during the dry season.

On the other hand, judging from the thriving nature of Hingurakgoda, the well-situated rural town associated with the Minneriya Project, it is probable that the number of people employed in connection with private sector business and trade both in Hingurakgoda and in outlying areas has been underestimated — especially in regard to itinerant merchants who attend the weekly market day or travel by cart through the settlement area selling pottery and other goods, and in regard to local hawkers... Even those employed in Hingurakgoda's fixed businesses may be underestimated since the census was based in part on the Rice Ration Book

Revalidation Survey of 1978 rather than on an actual inventory of the number of businesses and their employees. Since the purpose of the survey of 1978 was to determine the number of people whose incomes were sufficiently low to warrant revalidation, it may underrepresent those nonfarm employees whose incomes would tend to exceed the minimum. It also underrepresents employed women since the focus is on the household head.

Over the years the proportion of settler income generated from off-farm activities has also risen — from approximately 12 percent in 1967/68 to an estimated 20 percent in 1979. As for the 2,895 laborers, no data is presented on how their labor is split between nonfarm and farm employment. While some of the more successful farmers employ one permanent farm laborer, variations in settler income would suggest that many laborers combine farm with nonfarm work.

Even if employment generation in connection with the textile factory is removed along with nonfarm activities that exist primarily to serve that labor force, Minneriya has still generated significantly more nonfarm labor than have three other major dry zone irrigation based settlement schemes examined by Wimaladharma. These are Minipe, Rajangana, and Uda Walawe, where nonfarm employment averages 52 percent of farm employment, or approximately half the nonfarm employment at Minneriya if textile workers are deleted (but Wimaladharma s laborer category included). In attempting to explain this difference, the main reason appears to be the significantly higher income of Minneriya farmers which allows them to purchase

locally a wide range of producer and consumer goods and services. For this reason the shops of Hingurakgoda are some of the best stocked in Sri Lanka in terms of agricultural equipment (including two-wheeled tractors and irrigation pumps) and requisites, electrical appliances, toys, and canned goods. Since many of these are imports, linkages between agriculture and local manufacturing are not as strong as they could be — a factor which may be as explicable in terms of new government import and private sector policies as in terms of income levels as such.

In comparison to the other three settlements, Wimaladharma attributes the higher Minneriya incomes to larger allotments, more reliable water supplies, better service and support facilities, and the more diversified economic activities of settler families. The latter include not just more off-farm income but also greater crop diversification — with Minneriya settlers pioneering the cultivation of chillies, onions, and tobacco during the dry season in the 1970s when price incentives were high (in contrast, Minipe continues to be almost exclusively a rice production scheme during both cultivation seasons).

While scale is not a factor since all four schemes have over 5,000 allotments (5,639 for Minneriya versus 5,134 to approximately 8,000 for the others), the date of initiation probably is a factor. Initiated in the 1960s, Uda Walawe is still being settled. Destined to be a larger project than the other three, it is being developed as a more diversified project in association with three existing towns in which agro-industries (including a sugar refinery) are to be based.

By Sri Lanka standards, these towns are already thriving and Uda Walewe (as a more regionally planned scheme) can be expected to surpass both Rajangana (which suffered for years from insufficient supplies of irrigation water) and Minipe during the 1980s. It may even surpass Minneriya since that project continues to be overwhelmingly a rice production scheme. Though a highly successful one in terms of settler incomes and the multiplier effects associated with increased settler purchasing power, virtually no agro-industry except rice milling is associated with Minneriya. Furthermore, with 5,000 to 6,000 residents, Hingurakgoda is a relatively small town while a significant amount of the nonfarm employment appears to be in the form of off-farm employment for the children of settlers. Not only are settler households approximately two-thirds of all households, but Wimaladharma estimates that at least 40 percent of the employees at the textile factory are children of settlers. On the other hand, though settlers may own such businesses as small shops in outlying areas close to their homes, most businesses in Hingurakgoda are not owned by settlers nor does Wimaladharma believe that settler households provide much of the town labor force.

In summary, while Minneriya has generated more nonfarm employment than had previously been realized, in terms of employment generation it suffers from insufficient agricultural diversification. Holding sizes may also be too large, not only lowering the number of settler households but also leading to income levels which are very high by Sri Lankan standards — and which may encourage settlers to purchase certain imported goods at the expense of local manufacturers.

CHAPTER 6

BASIC ISSUES ASSOCIATED WITH STAGE ONE (PLANNING, INITIAL INFRASTRUCTURAL DEVELOPMENT, AND RECRUITMENT)

I. INTRODUCTION

Each settlement stage is associated with a wide range of basic issues which must be addressed by planners, administrators, and settlers. Though their proportional importance may shift through time, certain issues characterize all stages; others are primarily associated with a single stage. Their relative importance may also vary from one settlement area to another, with some issues relatively unimportant in most cases but of crucial importance in the remainder. This is one reason why monitoring should be built into major new lands settlement projects. It is not possible in a general review such as the present monograph to identify the entire range of possibly critical issues. Because the emphasis is on those which have occurred time and time again, there is a danger that other issues, distinctive to a particular settlement area, may not be identified until after they become a serious threat. In such cases, monitoring remains the best defense.

In the next three chapters a carefully selected number of basic issues which can have a major impact on settlement success, regardless of how defined, will be examined in connection with Stages One through Four. To avoid repetition, certain major issues (like

settler net incomes, employment generation and multiplier effects) which have been assessed in previous chapters are not dealt with again except in passing. Other important issues — which have already received considerable attention elsewhere in the literature (examples being the need for strong accountancy sections and training programs within settlement agencies) -- are also not emphasized.

What I have tried to do is to introduce each issue during that stage in which it is most apt to have crucial significance in terms of an orderly progression from one stage to another. Where issues have major implications throughout, there is a degree of arbitrariness as to when they are discussed. Management, for example, I have chosen to discuss under Stages Three and Four in the last chapter. Though it would have been equally appropriate to discuss management in this chapter, I placed it in Chapter 8 to point up the importance of the transfer process whereby certain management responsibilities are passed from government to settler run and other agencies.

II. PLANNING

A. KEEPING THE PLAN AS SIMPLE AS POSSIBLE

Where goals are broad, as is the case with integrated area development, there is a major risk that planners will attempt to do everything at once — with the predictable result that little is done well. In connection with new lands settlements, for example, planners often try to create upfront "instant infrastructure" for settlers and administrators alike, with results that seldom please either constituency. Evaluation after evaluation has emphasized the need to

carefully prioritize interventions, stressing a relatively small number of "projects" at a given time in order to realize more complicated program goals. Where development proceeds through a series of stages as is the case with new lands settlements, priorities will change, hence making phasing possible whereby certain inputs are delayed until a later time.

B. KEEPING FINANCIAL COSTS PER SETTLER FAMILY WITHIN REASONABLE LIMITS

Even where settlement stimulates a process of integrated area development, few countries can afford the type of financial costs per settler family which are noted in Table 2, especially where settler families number into the thousands and tens of thousands. Financial costs are broken down into capital and recurrent expenditures, both of which can be significantly reduced by following courses of action which should actually enhance possibilities for success rather than reduce them. They tend to be ignored, however, by planners and managers since, on the one hand, they reduce the opportunity for the planner to start "with a clean slate" and, on the other hand, they require settlement agencies to share responsibility with the settlers, other local residents, and with the private sector.

Capital expenditures I have broken down into a number of categories including project planning, administration, and overhead; land acquisition; such settlement and production costs as land preparation, moving settlers, and agricultural requisites and services; physical infrastructure in the forms of roads, irrigation, and other structures; and such social infrastructure as schools,

medical services, and community facilities. With careful planning, savings can be made in most of these categories -- or at least the magnitude of upfront costs can be reduced through such devices as phasing infrastructure. The paragraphs that follow are not meant to be inclusive; rather their purpose is to illustrate a range of policy options which could reduce costs without jeopardizing the chances for project success. They are not intended to be prescriptive.

1. Settlement Type

Financial costs go up as the proportion of sponsored settlers increase relative to hosts and spontaneous settlers. Though other reasons have been given for incorporating hosts and spontaneous settlers into project design, cost reduction is a major one. Financial costs are lower because hosts are already present while spontaneous settlers usually do not require transport (exceptions include government assisted transport between Java or the Sunda Islands and the Outer Islands for some spontaneous settlers bound for Indonesian transmigration projects). According to Judith Tendler (oral communication to the author), the incorporation of spontaneous settlers within a portion of Brazil's Alto Turi project nearly halved costs per settler family by increasing the number of beneficiaries, on the one hand, and by decreasing the costs of land allocation and settlement per beneficiary, on the other. (This was facilitated by an effective devolution of responsibility to settler organizations which is described briefly in Chapter 8.)

2. Location of Settlement

In discussing lessons learned, van Raay and Hilhorst (1981) emphasize that "market proximity is the major determinant of the economic viability of a land settlement scheme, the general rule being that the highest net income per ha can be realized nearest the market centre" (p. iv). A major reason for the relative success of Abis in Egypt is its proximity to Alexandria, while Mwea in Kenya and Gezira in the Sudan have profited from their nearness to Nairobi, and to Wad Medani and Khartoum, respectively.

In all of these cases, investments in major access roads (which often are the major financial cost in connection with settlement areas where rainfed agriculture is practiced) were less necessary.

Where settlement areas are planned for isolated areas as in the humid tropics of Latin America or the arid and semi-arid lands of Egypt and Somalia, then the settlements should be planned to include the market centers of the future. Regional planning is needed in both cases, however, for in the former the nature of the linkages between existing market centers and new lands settlements are crucial for the ongoing development of both.

3. Involvement of the Private Sector

Because of the complexity of integrated area development and its financial costs (and because of the handing over problems associated with highly centralized settlement agencies), it makes sense to involve nongovernmental organizations in the development

process from the very start. These include not just settler organizations, but also private voluntary organizations (PVOs) and national and international private sector organizations. It is becoming increasingly clear that settlement success is correlated with the active involvement, for example, of organizations of settlers in the operation and maintenance of irrigation systems. As for PVOs, organizations like OXFAM have the flexibility and personnel to cooperate with settlers and settlement agencies to carry out imaginative orientation, training, and other types of programs. To date, private sector contributions have been largely ignored. As in Malaysia, private lumber and building contractors can play a major role in clearing settlement areas of timber and in constructing major infrastructure. As Judith Tendler has suggested (oral communication), such private companies might be willing to shoulder more of the financial costs of settlement if assured of some of the benefits with lumbering companies, for example, contributing to access and feeder road construction in return for lumbering rights.

Joint ventures between government settlement agencies and commercial companies are another way for organizing a type of cooperation between the public and private sectors that would facilitate land settlement. Such ventures could involve forest product and mining companies as well as agribusinesses. Here I am not referring so much to the provision of infrastructure as to the actual settlement of people around the margins of a forest product, mining, or agribusiness enclave — with the settlers providing produce to the enclave both as food and, in the case of forest product companies and

agribusiness, as products for processing. Though I am unaware of any settlement schemes which include as a major crop timber species which could be sold to a forest products company for a wide variety of uses (including plywood, veneer and particle board processing, furniture making, and other timber uses), such a joint venture presumably could be made attractive.

The opportunities are more obvious in connection with mining companies and agribusiness since the former tend to have relatively large labor forces which need food while the latter could realize economies of scale with their processing facilities if these were served by a population of settlers as well as by the agribusinesses own plantation. Hence in the Luwu District of Indonesia's Sulawesi, settlers could provide food for a labor force of over 3,000 at the local nickel mines which apparently import by air from Malaysia (via Singapore) a variety of crops which in fact can be and are grown locally. As for agribusinesses, oil palm, rubber and other tree crops are appropriate for government-private sector joint ventures involving settlers, as is sugar cane and various other annual and semi-annual crops.

There are also other ways in which the services of the private sector can be used both to reduce financial costs to the government and to provide a range of management and other services. Current government policy in the Mahaweli Basin of Sri Lanka in connection with the Accelerated Mahaweli Programme is of special interest here since the Mahaweli Authority of Sri Lanka is experimenting with a number of mechanisms for involving the private sector. The prototype

here was a small scale settlement scheme of less than 200 settlers called Debera-Awa-Wewa which was developed during the mid-1970s through government-private sector cooperation. As a result of certain experience there, the MASL through its Mahaweli Economic Agency (MEA) has arranged for Hatton National Bank Limited (Private) to have exclusive lending rights to settlers in part of System H. Credit is given for both rice and other food crops. In the latter case, Hatton National Bank was concerned about the risks involved because of a shortage of irrigation water during the 1979 yala season. Accordingly they arranged for crop insurance to be extended to pulses, with the premiums deducted upfront from settler loans.

Because of the crucial importance of credit during the early years of settlement for covering seasonal production costs of settlers, and because Hatton's provided timely short term loans to settlers at Debera-Awa-Wewa, this experiment is an important one which should be carefully monitored and evaluated.

Though details remain unclear, the MEA is also interested in joint ventures with private sector and other corporations to manage certain Mahaweli blocks with their settler populations. A government parastadal, the Ceylon Tobacco Company Limited, has recently begun to manage H-9 (where credit is supplied by the government Bank of Ceylon), and the possibility exists in the future for bringing in such international agencies as the Commonwealth Development Corporation. Similar types of joint ventures are also under consideration for large scale irrigation projects in Egypt (Eastern Desert-Sinai) and the Sudan (especially along the White Nile) —

though it remains to be seen whether or not these will actually include settlers and if they do whether corporations (both governmental and nongovernmental) with experience in managing plantations can effectively apply that expertise to settlements of small holders.

4. Worker/Settlers

Periodically, attempts have been made to recruit worker/settlers who will clear and prepare their own lands for cultivation, build their own temporary housing, and, in connection with certain irrigation schemes in Sri Lanka, construct the irrigation works at the turn out level. Other examples include Bolivia (San Julian); Brazil (Northern Parana); and Indonesia (colonization and transmigration in Sumatra, for example). Though the concept of worker/settlers is an important one not just because it reduces costs but also because it actively involves the settler population in the settlement process, in practice it may not work out to the benefit of either the settlers or of settlement development. There are two major reasons for this disappointing result -- both of which reflect more negatively on the settlement agency than on the settlers. The first, by far the most common, is due to the failure of the settlement agency to meet its responsibilities to the settlers, especially in terms of the provision of physical infrastructure but also in terms of a wide range of other inputs, including food aid. The second reason occurs when the settler agency fails to hand land over to the settlers but rather continues to exploit them as low paid laborers on what are

essentially state farms or state cooperatives. Fortunately, this situation rarely occurs in the tropics and subtropics -- although a case in point was Tahhadi in Egypt where worker/settlers were promised land within two years though, in fact, the first allocations were delayed for a decade. Because of its relative rarity, this situation will not be considered further.

Worker/settlers often arrive without their families (exceptions being Indonesia, as well as Japanese settlers in Amazonia) simply because living conditions tend to be extremely difficult. Because of these difficulties and because worker/settlers so often come alone, every effort should be made to ready the land for cultivation and family occupancy during the first year; otherwise the hardship and suffering of worker/settlers is apt to be reflected in low morale, increased illness, suspicion of government intentions, and high "drop-out" rates -- all factors that can be expected to prolong the length of the transition stage.

The most successful use of worker/settlers tends to be in rainfed areas -- with worker/settler programs contributing to settlement development in both Northern Parana and San Julian. The worst situation tends to occur in irrigation projects where settlement agencies are unable to provide, as promised, irrigation water in the right amounts at the right times. This may be because of delays in completing various components of the irrigation system or shortfalls in water supplies owing to faulty hydrological surveys, low irrigation efficiencies, drought, and other factors. Sri Lanka, in particular, has experimented with worker/settlers over the years. Called Advanced

Alienation in the past, most settlement authorities (including Farmer, 1957) consider these experiments to be failures. In some cases, like Rajangana, the provision of water by government agencies was delayed in certain parts of the settlement for over five years.

The Sri Lanka government once again is attempting to use worker/settlers in connection with the settlement of System C of the Accelerated Mahaweli Programme. Recruited from the host population, the first worker/settlers began building irrigation structures at the turn out level in March 1980. In the meanwhile the Mahaweli authorities began the construction of dormitories, and potable water and other facilities in order to receive the first groups of worker/settlers from without the settlement area.

Though members of the global evaluation interviewed only the first host group of worker/settlers, its activities during the first few months were impressive. The group consisted of forty-two men, some of whom had settled relatively recently in the area as spontaneous settlers. Before commencing the excavation of a 1,500 foot long distributary channel, they had institutionalized a committee of four, one of whom was group leader. A retired government employee, this man impressed us with his leadership ability and experience.

Knowing that they are preparing the irrigation system and land which they will eventually use and farm, this group wanted even more responsibility. Indeed, within their area they told us that they would like to obtain a contract to construct all the distributary channels and to do all the land preparation. In support of their request, the group leader told us that within the group's membership

was all the expertise they needed, including masons, carpenters, other skilled artisans and drivers.

Within the context of the Accelerated Mahaweli Programme this experiment is of tremendous importance and should be given every opportunity to succeed so that it can be extended to other Mahaweli irrigation systems. Though increased use of worker/settlers will require the Mahaweli Development Board to provide more supervisory staff, worker/settlers have the capacity to improve the quality of channel layout and land preparation (and at lower cost) simply because they know that they are readying the irrigation system and land that they will eventually be farming. Already the group had brought to the attention of supervisory staff what they thought was a defective alignment, and a resurvey had shown them to be correct.

It is important to remember, however, that this first group is not living in hot, sheet metal dormitories but rather are returning every night to their homes and families. Also, it is easier to provide a small number of such groups with proper supervision and food aid than will be the case when the number of worker/settler groups increases significantly. It must also be remembered that the current worker/settler program is a variant of advanced alienation which has not proved previously successful in Sri Lanka. Now, as in the past, the idea is a good one: allow future settlers to prepare the land and the irrigation facilities they know they will be using in the future. But now, as in the past, the success of this program will depend on the work continuing on schedule so that the period of dormitory residence and of nonsettler status is kept to the minimum. If it

extends beyond one year, the risks of failure increase significantly. Fortunately, government officials within the relevant government ministries and agencies are aware of these risks and are prepared to slow down the recruitment of new settlers if delays occur in the provision of irrigation infrastructure. While such a course of action in fact may not prove politically acceptable, nonetheless Sri Lankan officials have learned from experience and will be monitoring the situation carefully.

5. Housing

Roads and government built permanent housing tend to be the two largest single costs associated with settlement based on rainfed agriculture. While the former are necessary, the latter are not. Even where relatively low cost materials are used, along with settler labor, the costs of housing are high. Lewis (1964) generalized that cheap rural housing just cannot be built by government agencies. Costs, for example, exceed $4,000 per settler in connection with U.S. AID financed housing which is being currently constructed in Kurtunwarey -- a mid-1970 drought settlement for nomads in Somalia. Such sums would be better spent on economic development. Though there may be less of a trade-off where housing is provided by donors, in some settlements costly housing is provided at the expense of critically needed developmental inputs.

Permanent housing is of course highly visible, prominently showing to all comers what specific national leaders and donors have done for the settlers. Both usually believe that they have done the

settlers a major favor without realizing that often there are also major disadvantages associated with the type of housing which is so often provided on settlement projects. In addition to high financial cost, government provided housing often is both culturally and sociologically inappropriate. It may constrain family activities and the normal developmental cycle of the family because of regulations as to how the housing and the house plots are to be used. Where houses are built closely together, there may be insufficient space for adding rooms for additional wives, children, and other dependents. Even if room exists, settlers may not be able to afford the quality of construction required by government regulations, such being the case in most Volta Dam resettlement villages.

Permanent housing also tends to be associated with relatively small house plots on which is is not possible for the settler's heir to build his/her own housing so as to be near aging parents. In effect, government provided housing locks the social organization of the settler family into "concrete," so to speak, while the size of the household plot more often than not is inadequate for the keeping of animals and the planting of household gardens.

For all of these reasons, it makes sense for settlers to build their own housing wherever possible. Initially this tends to be temporary, with settlers building in permanent materials after they have become economically self-sufficient. Rather than allocating scarce funds to nonproductive housing, a better policy would be to use that money in ways which would reduce the length of the transition stage (Stage Two) by helping settler families and settlement

communities become economically and socially self-sufficient at the earliest possible moment. Once cash cropping begins and net incomes rise, the experience with settlement the world over is that settlers then are quite capable of bearing the cost of permanent housing on their own. Since construction tends to be staggered over a longer time period, settler financed housing also allows more scope for such local craftsmen as masons and carpenters. Furthermore, where settlers design and build their own housing, it tends to better meet their own needs than is the case of government built housing.

This critique of government provided housing does not mean that the sponsoring agencies should provide no assistance for housing. In hot arid and semi-arid lands a stronger argument can be made for the provision of government housing than in forested savanna and humid tropical areas where there is no scarcity of building materials which can be relatively easily acquired and transformed into temporary housing. Even in arid and semi-arid lands, it may make more sense to bulk appropriate building materials which the settlers then use for constructing their own housing — with government funds saved being used in a more productive fashion.

6. Roads

Time and again roads are the major capital expenditure associated with new lands settlement. In Latin America, for example, they accounted for 38 percent of public expenditure in connection with fourteen settlement projects assessed by Nelson (1973:199 and Table 24). As for U.S. AID's involvement in financing the development of

the San Julian Settlement area, road construction was the number one project component, accounting for 57 percent of project expenditures. Furthermore cost overruns are more the rule than the exception, being almost double appraisal estimates in the case of World Bank involvement in Colombia's Caqueta Project.

All new lands settlements require major investments in physical infrastructure, including roads — and in arid and semi-arid lands and areas of seasonal and irregular rainfall, irrigation structures. It is best to recognize this from the start before asking in what ways it may be possible to reduce costs. When cost reductions are then considered, a number of possibilities come to mind. These include location of settlement areas as close as possible to settled areas and major market centers and involvement of the private sector.

a. Location of Settlement Areas

Obviously the location of new lands settlements in isolated areas which are distant from old lands and market centers will greatly increase the costs for road construction. Since such isolation also increases transportation costs - indeed, threatens the very viability of a new settlement -- it is better to open up new areas sequentially, starting with the closest to major market centers (van Raay and Hilhorst, 1981, in particular, stress this point).

b. Involvement of the Private Sector

The private sector can be involved in a number of ways in the planning, implementation, and management of settlement areas not only

as a mechanism to reduce financial costs but also as a possible means to avoid some of the inefficiencies all too often associated with government sponsored settlement.

Judith Tendler (oral communication) has suggested that private sector lumber companies probably could be persuaded to bear some of the costs of access road construction in exchange for contracts to remove commercially valuable trees. While such companies have received contracts in the past to extract timber, as in the Mahaweli Basin of Sri Lanka, I am aware of no cases where they have been encouraged to assist in the provision of infrastructure as a part of the settlement design. Yet in Palawan, in the Philippines, for example, lumber companies have played a major role in opening up new lands for spontaneous migrants both through the provision of major access roads and of feeder roads. Elsewhere, I would suspect that mining companies have played a similar role, so that they too could be brought into the settlement process.

7. The Phasing of Infrastructure

The phasing of infrastructure will only be briefly introduced here as a means for reducing upfront costs. As a basic issue it is sufficiently important to be dealt with separately later in this chapter. Actually, the phasing of infrastructure has two major implications in regard to financing of new lands settlement. On the one hand, it can postpone certain major capital expenditures until a later time phase of the settlement process; on the other hand, it may provide a source of income for partially financing subsequent

infrastructural investments. This latter option exists primarily in regard to large scale settlements in which there is a phased opening of different subareas. An excellent example is the policy of the private sector CMNP in Northern Parana which used income generated from land sales to finance the extension of the railroad. While this procedure is not applicable to most government sponsored settlements simply because land sales, if they occur at all, are postponed to a later stage of settlement, there are other options including the allocation of a portion of water rates and/or land development rates and settler loan repayment to finance subsequent infrastructural development. This option of course implies that such rates or repayments accurately reflect the costs of capital development. Usually this is not the case, even where settler net incomes are high enough to cover both recurrent costs and a portion of the capital costs.

8. Facilitating the Development of Existing Rural Towns

We have already noted the propensity of planners to create new rural towns from scratch, often with unsatisfactory results. Granted the undeveloped state of the art in the planning of new townships, it makes far more sense to stimulate the development of existing rural towns if such exist. Though no comparative data exists, I presume such an approach would also be significantly cheaper financially.

I would like to illustrate this mechanism for cutting costs by referring to the current development of System C of the Accelerated Mahaweli Programme, part of which is in Stage One and part of which is

in early Stage Two. Currently the Mahaweli authorities are developing from scratch a new town, at considerable financial cost, within the middle of System C. Called Girandukotte, this is being built as the System C headquarters, with a research and training station, housing and facilities for administrators, and commercial and social services for settlers. No more than twelve miles away, practically on the border of System C, is the existing rural town of Mahiyangana, in the development of which the Mahaweli authorities are investing no capital.

On the right bank of the Mahaweli, Mahiyangana is the most important commercial and service center in its area. This is reflected by plans currently under consideration to make Mahiyangana the headquarters of a new district by the same name. In addition to System C, it is adjacent to two older government sponsored settlement schemes. These are Soraboya and Minipe (which is one of the more successful larger new lands settlements in Sri Lanka).

In 1960, the Town and Country Department drew up a redevelopment plan for Mahiyangana. Redevelopment started in 1965 when the old town was shifted in order to enlarge the sacred areas surrounding the nationally significant Buddhist temple and monastary. A district hospital was established along with other government supplied services, but in recent years the redevelopment program has slowed down, partly because of fiscal constraints.

Mahiyangana is an ancient Sri Lanka center well situated on the Mahaweli (unlike Girandukotte) which could become a major commercial, industrial, and service center for both System C and the

older settlement areas. Rather than develop an entirely new center as if Mahiyangana did not even exist, surely it would make more sense to use Mahaweli financing to reinvigorate the redevelopment process within Mahiyangana. In that way the Mahaweli authorities could have the best of two worlds — since, on the one hand, they could have saved costs and time by deemphasizing the construction of costly infrastructure within a new town and, on the other, they could have increased the growth potential of the surrounding area.

Two examples follow on how relatively small capital inputs would presumably facilitate the development of Mahiyangana as a more attractive and productive place to live for administrators, businessmen, and other nonfarm employers and employees, and for settlers and agricultural laborers. These examples are suggestive only since they are based on a very brief examination of Mahiyangana by Wimaladharma and myself.

When we asked a small number of government officials at Girandukotte what would make the System C area more attractive for them, and increase the probability that they would bring their families to join them, they answered a first-rate school system along with an efficient bus service to transport the children to and from school. Good medical facilities were also mentioned. While Mahiyangana has an "A" Level secondary school, the curriculum is said to be adequate only in commerce and arts. Yet, with special financial incentives (paid by the Manaweli authorities) it should be possible to attract to this school first-rate teachers in commerce, science, mathematics, and English language medium --- turning the school into

one of the better schools in Sri Lanka at a relatively small cost in personnel, equipment, and infrastructural expansion. To accomplish this goal, an experimental, flexible, and imaginative approach would be necessary. At the Mahiyangana district hospital there is already a doctor in residence from the Philippines. If it was hard initially to attract first-rate Sri Lankan teachers to this rural area, overseas volunteers in the relevant disciplines could be recruited with the AMP topping up their salaries. Again, this precedent already exists since a least one overseas volunteer is teaching in a training institute in the present district capital. As the school's reputation grew, and as the planned residential area within the township began to grow, it should become progressively easier to recruit Sri Lankan teachers.

The other example needs only a brief mention, in part because it is more speculative and liable to error. Anyone driving through Minipe soon notices that parts of the settlement area contain a local brickmaking industry. Furthermore, next to Mahiyangana is a tilemaking factory which we were told was producing under capacity. It would appear that the construction boom at Girandukotte has not greatly benefited this local industry, probably because it has underutilized it. Hence at Girandukotte we noticed the installation of prefabricated housing imported from Indonesia, when presumably more employment could have been created within the region at lower costs by making better use of and expanding the local construction materials industry.

The Mahiyangana-Girandukotte case is not an exceptional one. Not only do other cases exist elsewhere in Sri Lanka, but a similar

situation exists in Malaysia where FELDA is attempting to develop a costly new town in the Jengka Triangle area (which is Bandar Pusat) fairly near to the thriving regional town of Temerloh-Mentekab. As in Sri Lanka, no FELDA funding is going into the old town which presumably would be cheaper to develop (see Cohen and Brookfield, 1974:123). It certainly would be easier, Pandar Pusat having grown as a commercial and industrial center virtually not at all up until 1980.

C. FEASIBILITY AND PLANNING STUDIES FOR SITING NEW LANDS SETTLEMENTS

In the previously quoted DAI report (1975) on Strategies for Small Farmer Development, the authors reported that project success was associated with first "acquiring a knowledge of the local area" (p. 3). Such studies are especially important for new lands settlements for at least two reasons. First, often they are relatively unoccupied by host populations for reasons such as lack of water, poor drainage, and poor soils. Second, they tend to be relatively unknown regions for the future settlers, the planners, and the academic community. In spite of this situation, adequate planning data on land, water, and human resources is rarely acquired -- Perera noting in his five Asian countries that all "are hampered by insufficiency of accurate data" (p. 391). Unlike old lands, seldom do new lands contain river gauging or meteorological stations, let alone agricultural research stations or experimental plots. Where such stations do exist, usually their establishment is recent, so that time series data over more than ten years are unavailable. Under such circumstances there is no substitute for feasibility studies for

considering possible development options and for planning studies to explore particular options in more detail. Such studies can be divided into two broad types, the first dealing with the physical and biotic environment and the second with the host and prospective settler populations. They will be considered in turn.

1. Studies of the Physical and Biotic Environment

Simply because of the lack of knowledge about most new lands areas, such studies should not only provide information for planning, but they also should be ongoing — with metereological and river gauging stations as well as agricultural research stations, and experimental and demonstration stations established at the earliest possible moment. In this section, climatic, hydrological, and soil surveys will be considered with agricultural research stations dealt with in connection with planning farming systems.

Time and again settlements are planned and implemented without adequate information on the physical and biotic environment. Time and again a major reason for their subsequent failure or inability to realize their development potential is due to the failure to carry out appropriate climatic, hydrological, and soil surveys or to utilize available data. Like river basins, remaining new lands with perceived agricultural potential should be viewed as national treasures to be developed with great care. An essential first step is to allocate enough time to collect and analyze basic data on the environment as it relates to settlement planning and implementation.

a. Climatological Data Pertaining to Rainfall and Temperature

All too often there are few or no metereological stations in new lands settlement areas. Rainfall data are especially crucial in areas of irregular and seasonal rainfall (as in savanna environments) where both distribution and quantity of rainfall are of critical importance along with data on evapo-transpiration. Temperature data is also crucial, both in relationship to frost and freezing temperatures and to maxima. In the Northern Parana case an inappropriate farming system was picked primarily because of a lack of knowledge about the frequency and intensity of freezing temperatures, with the result that the crop (coffee) that had initially stimulated the agricultural development of the area proved unsatisfactory in the 1960s and 1970s.

b. Hydrological Surveys

While riverflow monitoring throughout the annual cycle (along with monitoring of silt loads) and groundwater surveys are essential in connection with irrigation based settlement projects, they also provide essential data for planning domestic water supplies. New lands settlement areas tend to be relatively unoccupied for a variety of reasons, a relatively frequent one being water scarcity. For this reason, time and again settlers in arid, semi-arid, and savanna environments suffer because of insufficient potable water for themselves and their stock. A case in point are the large settlement areas associated with reservoir relocatees in connection with the Kariba and Volta dam projects. In both cases, settlers have periodically suffered from inadequate domestic water supplies (in

terms of both quality and quantity) in villages that are within five to ten miles of two of the largest artificial reservoirs in the world. Their problem relates both to inadequate water supplies and to breakdown of pumping and other installations.

Time and again water for irrigation is insufficient in part because riverine and ground water supplies have been inadequately estimated. Today this is a major danger along the Shebelli River in Somalia where there is insufficient water to serve the agricultural development projects (including two settlements for drought-striken nomads) which are currently in operation or in the planning stages. Indeed, current irrigation water shortages are sufficiently severe that the authors of the World Bank's 1980 Agricultural Sector Review recommended that major expansion of irrigation schemes be terminated immediately. Meanwhile donors continue to consider further expansion of irrigation along the Shebelli in connection with the possible settlement of political refugees from the Ogaden.

At the same time information on water quality within the Shebelli is also inadequate, with the result that irrigation regimes and drainage systems are not thought through in connection with problems associated with salinity and water logging. Similar problems of inadequate water quantity and quality have plagued irrigation based settlement areas throughout the world.

c. Soil Surveys

One of the major inadequacies of new lands settlements throughout the tropics and subtropics relates to the absence or poor quality of timely soil surveys. Of thirty-five sponsored settlements

on which we have data, thorough soil surveys were carried out in only four instances (11 percent). Where surveys are carried out, timeliness is crucial for adequate planning since it is hardly possible to resite infrastructure if subsequent soil surveys indicate that mistakes have been made in choosing agricultural areas. Hence at Kainji it was discovered too late that the runways for air traffic at New Bussa had been built on top of the largest block of higher quality arable land in the vicinity. In Somalia, soil surveys were neglected in connection with both the Kurtunwarey and Sabaale settlements, in both of which salinity currently is a problem. At Dujuma (which was planned for 50,000 drought striken refugees) on the Juba River, the soils proved so inadequate that the settlement had to be shifted to another locale. Subsequently it was closed down altogether, with the settlers employed as laborers on Juba Valley banana plantations. Similar "horror stories" can be told about many other new lands settlements, with the most common failing being the tendency to overestimate the extent of arable land. In sum, there is simply no substitute for adequate soils surveys.

2. Socioeconomic Surveys of the Host Population and Prospective Settlers

a. The Hosts

Socioeconomic surveys of the hosts should provide data on their numbers, their systems of land tenure and land use, their water rights, and, to an extent, their socioeconomic systems. Though new lands areas are underutilized as seen by planners and prospective settlers, rarely are they vacant. Surveys of the numbers and lifeways

of the host population are needed to establish the total population that will be impacted upon by a possible settlement project and to assess their attitudes toward being incorporated should settlement proceed. Studies of land tenure and water rights are needed to define host concepts of tenure according to customary law. Should the hosts prefer not to be incorporated within a settlement, such studies could provide the basis for setting aside substitute lands and for compensating the hosts for lands that are lost. It is fair neither to the hosts nor to the settlers to ignore customary tenure, since future land disputes can jeopardize the entire settlement process (such disputes are an especially serious problem in the Outer Islands of Indonesia). As for the study of host systems of land (and water) use, these can yield invaluable information on the resources of the area and how to utilize them. Not only may such information be directly pertinent to the development of farming systems for the settlers, but it can also be of use for facilitating the incorporation of the host population.

b. Prospective Settlers

Such studies should relate both to the socioeconomic activities and institutions of the settlers and to the communities from which significant numbers of settlers will be recruited. Information obtained has two major uses. First, it can provide data of use in planning and implementing the settlement itself. Second, it can provide information of how the emigration of a significant number of people from a particular locale can be used to facilitate the

development of that locale. In the first case, settlement planners should be on the lookout for special agricultural and other skills which can be built into settlement production systems, while information on women's economic activities can be used to help provide them with a source of income within the settlement area. Information on occupational diversity and local organizations can be used to plan settler communities as more attractive places to live and bring up children. As for using the recruitment of settlers as a mechanism to develop the home communities, a number of possibilities exist including, for example, land consolidation where an attempt is made to use the holdings of settler recruits to create a greater proportion of economic holdings among those who remain -- with prospective settlers required, for example, as a condition of recruitment to redistribute or sell their land to relatives or neighbours with subeconomic holdings.

III. PLANNING FARMING SYSTEMS

A. INTRODUCTION

Throughout this report it has been argued that it will be increasingly difficult to justify large scale settlement projects unless they initiate a process of integrated area development, with agriculture defined as including not just crops and livestock management but also fisheries and silviculture. While these components may be developed separately and/or included within settler farming systems, their interrelationship within the settlement area as a whole must be carefully thought through. The same applies to the

interrelationships between the crop, livestock, and off-farm components of particular farming systems.

Agricultural diversification in terms of the integrated planning of farming systems, fisheries, and silviculture is a rare feature of settlement projects. The same applies even to farming systems diversification, both in connection with diversification within a particular farming system and between farming systems. Throughout the tropics and subtropics, new lands settlements have been planned and implemented as agricultural production schemes based on a relatively small number of crops for export and domestic consumption in that order of priority. Of fifty-one sponsored settlements on which we have specific information, fourteen (27 percent) were based on the cultivation of one export nonfood crop and ten (20 percent) on the cultivation of one food crop for both export and domestic consumption. Practically all of the more "famous" sponsored settlements are based on a relatively small number of crops. The Gezira scheme is a cotton scheme on which tenants are allowed to grow sorghum for domestic consumption. Mwea in Kenya, the majority of colonization and transmigration schemes in Indonesia, and the majority of dry zone schemes in Sri Lanka are primarily rice production schemes. FELDA schemes (until relatively recently) emphasized a single tree crop, while the present depressed state of Northern Parana is related to an initial emphasis on the monocropping of coffee. In the humid tropics of South America the trend is increasingly toward cattle ranching.

We have argued throughout this report that diversifying agricultural systems and, more specifically, farming systems increases the development potential of new lands settlements This is for both socioeconomic and ecological reasons. In the face of fluctuations within the political economy of the world and of environmental uncertainties, diversification is a very effective risk aversion strategy to protect settler families. It also makes better use of family labor, provides tasks and status to all family members, and reduces periods of underemployment during the annual cycle. Economically, it tends to raise net family income -- which is desirable both because increased purchasing power stimulates nonfarm employment and because it reduces the need (though not necessarily the desire) for farm family members to seek off-farm employment. Diversification also produces the necessary range of foodstuffs for nonfarm workers and it provides produce for agro-processing. The arguments for diversification are overwhelming not only within a particular farm system but also in terms of developing several distinct farming systems for most settlement areas.

In the discussion that follows, the need for diversification must continually be kept in mind. Fortunately, there is a discernible trend in this direction both in regard to diversification within specific farming systems and to the implementation of several farming systems within the same settlement area. Such a trend is especially observable within the large scale irrigation settlement schemes in the Sudan. When Gezira was established in the 1920s, the emphasis for all farmers was placed on a single farming system based on an eight year

rotation involving cotton, lubia (later replaced by groundnuts), and sorghum interspersed with fallow years. Livestock management was excluded. Though the New Halfa project was developed along somewhat similar lines in the 1960s (with a government sugar plantation added to the typical settler rotation of cotton-groundnuts-wheat), the Halfaween also had small freehold irrigated plots on which they grew fruit trees and vegetables and kept cattle and other stock without major restrictions. More recently the Shukriyah have been allowed to substitute sorghum for wheat (the latter being the preferred cereal of the Halfaween). Perhaps influenced by the success of the Halfaween freehold gardens and dairying operation, the cotton-groundnut-sorghum rotation at the more recently developed Rahad Scheme (1970s) has been supplemented by two additional farming systems — one based on fruit trees and vegetables and the other on irrigated dairying.

Though the Sudanese schemes still have ways to go in terms of incorporating livestock management within the settlement area, especially in regard to beef production, several French-speaking West African countries have gone a step further here. In the late 1960s and early 1970s, the Ivorien Authorite pour L'Amenagement de la Vallee du Bandama (AVV) was experimenting with a five-crop rotation which included a legume (Stylosantes) as both a soil conditioner and as a fodder crop for cattle. This was to be introduced among relocatees from the Kossou Dam reservoir basin who were to be relocated in the savanna zone. More recently planners in the Senegal River Basin are at least considering integrating crop and livestock production on the new middle (500 to 1,000 ha) and large-sized (1,000+ ha) irrigated

perimeters to be developed in connection with the construction of the Diama and Manantali dams. Even FELDA in Malaysia is now encouraging settlers to acquire on-scheme domestic animals (and to plant vegetables and fruit trees). Though kept around their house lots, at present there is considerable potential for developing in FELDA areas mixed farming systems combining, for example, rubber and dairying, with the cattle grazing the cover beneath mature trees.

B. THE NEED FOR RESEARCH

There is no substitute for research for agricultural development. Simply because so little is known about new lands settlement areas, this must start at the earliest possible moment. We have already emphasized the need for feasibility and planning surveys and studies of the natural environment, and of existing land and water use systems, to provide essential background information for choosing between alternative modes of production. As for research stations, they should be established at the earliest possible moment, ideally with one for each major agro-ecological zone. While these would be established initially as agricultural research stations, their scope of work should include farming systems research. Ideally they should also have the outlook and the facilities to encourage a broadening of the research design in response to earlier findings. If, for example, it is found that particular crops and farming systems are not economic for the settlers even though technically and ecologically they are sound, hopefully the research station would encourage that further research be undertaken to establish why rates of return to the settler

family are poor. Such studies might entail more detailed research relating to labor inputs, for example, in comparison to other settler options, or to credit, marketing or other specific bottlenecks, or to unfavorable producer prices or terms of trade. While I am not suggesting that research stations necessarily have resident staff capable of carrying out such studies, I am suggesting that they both realize their importance and have linkages to universities and/or national institutes of rural development which do have the necessary staff.

Because most new lands settlement areas will be colonized by small holders, and because of the strong arguments for diversified production on their holdings, agricultural research should be oriented toward the creation of more productive farming systems. This has rarely been the case with existing research stations within new lands settlement areas, the emphasis being on whatever crops have been selected for export purposes. While I am not suggesting that conventional crop research be deemphasized, I am suggesting that every research station should include an area which simulates in size and other conditions the different kinds of settler holdings. Research should be systematically undertaken on such holdings to develop farming systems which are economically and ecologically appropriate for small holders. As they are developed, such systems could be replicated on experimental plots elsewhere within the settlement area, which in time could become demonstration plots. Indeed, one of the advantages of the farming systems approach is the greater ease of linking it to extension. Various types of linkages can occur. On the

research station, the actual field work on experimental small holdings might be carried out by residential settler families, or short courses for settlers could make use of demonstration plots on the research station, these being used for training as opposed to research purposes. Off the research station, demonstration plots could also be used for training purposes. Where extension personnel are allowed to have their own holding, these too might be used as experimental and demonstration plots. Or the holdings of carefully selected settlers might be used as well as the more conventional plots which fall directly under the control of the research station.

During the global evaluation, I came across only one case where farming systems research of relevance to new lands settlement was actually built into the research program of an existing research station. This was in Sri Lanka. Though the research itself was discontinued later in the 1970s, there is the possibility that similar research will be sponsored in connection with the Accelerated Mahaweli Programme. The World Bank is also pushing farming systems research for certain Indonesian transmigration areas.

Regardless of focus, all research programs both on the research station and in the field should be both comparative and longitudinal. Researchers should also be on the lookout for "breakthrough" possibilities which could significantly alter or even revolutionize small holder farming in existing settlement areas, and which could open up new agro-ecological zones for settlement. Research need be comparative and dynamic because settlement areas that develop are dynamic. As they evolve, new opportunities and new

constraints continually arise. If not identified, the former may remain unutilized while the latter may unnecessarily slow down development. Concerning constraints, a case in point is Minneriya which is considered to be the most successful settlement area in Sri Lanka. Rightly or wrongly a significant portion of settlers in 1980 considered that their economic position had deteriorated in recent years. Some believed that growth rates had slowed in terms of their purchasing ability while others believed that growth had in fact stopped. Reasons given included severe brown hopper infestation of rice, high mortality in buffalos because of disease, the 1978 cyclone, rising costs of inputs, and deteriorating terms of trade. While all of these concerns warrant careful assessment, only the first relates to the conventional capacity of an agricultural research station.

As for research "breakthroughs," there are many possibilities which might be effectively pursued on settlement based research stations. Rainfed farming systems for savanna environments with unimodal or bimodal seasonal rainfall are a case in point. Another example relates to the development of farming systems for tidal lands, while a third relates to utilization of Imperata cylindrica grasslands. Savanna environments are the major ecological zone in Africa, in which sizeable areas continue to be underutilized because of tsetse fly infestation. Though they have considerable potential for settlement, further research on appropriate farming systems is critically needed. In this case a logical starting point is the production systems of local farmers. In the Middle Zambezi Valley, for example, the Gwembe Tonga have evolved a settlement pattern and

system of cultivation which effectively excludes tsetse fly from riverine bush once population densities reach a certain level. No other system has proven so effective through time. With tsetse fly controlled, the Gwembe Tonga have integrated ox traction into their farming system, doubling yields per unit of labor in the process. While their farming system has other desirable features, it also has major constraints. Yields per hectare are relatively low, while increasing population densities have reduced the length of periods of fallow at the expense of soil fertility. Appropriate research is badly needed to work out new short fallow cropping systems which are technically feasible, economically productive, and ecologically stable. A similar need exists throughout the savanna environments of Africa.

In Indonesia, tidal lands constitute the major untapped area for new lands settlement. They also are a research frontier, with little work done to date on appropriate farming systems. Also in Indonesia, extensive areas have been invaded by Imperata cylindrica grasslands. While local farmers have not developed effective ways for reclaiming and maintaining such lands, agricultural researchers in Sumatra may have. They have learned that certain species of Stylosantes are able to colonize Imperata grasslands under certain man-induced circumstances, hence opening up a whole range of possible mixed farming systems such as French researchers first pioneered in the savanna zone of the Ivory Coast in West Africa.

To sum up, I am suggesting that agricultural research stations in new lands settlement areas not only place more emphasis on

appropriate farming systems research, but also that they serve as the institutional base for carrying out a broader range of research relating to the development of agricultural systems. New lands settlement areas have a special need for an ongoing program of monitoring and evaluation simply because they are new and underutilized and hence often the site of previously untested production systems. Because they are research oriented, and because they tend to be the only research stations available, serious consideration should be given to basing monitoring and evaluation activities at agricultural research stations, with the necessary facilities attached. Since effective extension must be research based, it also makes sense to place training facilities for both settlers and extension staff close to research stations.

C. APPROPRIATE FARMING SYSTEMS

1. Introduction

The phrase "appropriate farming systems" has been continually used in the preceding sections. Within a particular settlement area, presumably there are a range of farming systems which could bring a reasonable standard of living to the settlers involved. Under these circumstances, appropriate farming systems are those that are better able to initiate a process of integrated area development in terms of their biological productivity, economic rates of return to the settler, social impacts in connection with social equity and social stratification, employment generation in the nonfarm sector, and resiliency and ecological stability.

2. Large Scale Cattle Ranching as an Inappropriate Farming System for New Lands Settlements

Unfortunately the farming system which happens to "take" in a particular settlement area may be one of the least appropriate available in terms of the above criteria. A case in point which will be analyzed in some detail is cattle ranching (primarily for beef production) in the humid tropics of Latin America. Both new and old lands are involved, although expansion into new lands through both spontaneous and sponsored settlement, as well as through land development, is occurring at a rapid rate. Cattle ranching is a particularly interesting case since this farming system is more extensive in the humid tropics of Latin American settlement areas than any other while it is comparatively rare in the humid tropics of Africa and Asia.

According to Parsons, in Central America and Panama more than two thirds "of the agriculturally productive land is devoted to livestock, and the share is increasing. . . . In Panama the area in planted pasture increased 43 percent between the 1960 and 1970 agricultural censuses, to 965,000 ha; in Nicaragua it increased by 48 percent, to 1.7 million ha. between 1963 and 1971; in Costa Rica a startling 62 percent to 1.5 million ha. in the 10 years 1963-1973" (p. 124). As result of this expansion total numbers of cattle increased from 7.4 million to 10.3 million during the 1961-1973 time period.

While I have not seen similar figures for the humid tropics of South America, the same general trend is prevalent in many areas. In the Colombian Caqueta settlement area, for example, ranching is the

desired farming system for both small and large holders alike. The same is true in the newer settlement area of Guiviare (Ortiz, written communication to the author). Here, as in pioneer settlement areas throughout Central and South America, the same general strategy is followed. After clearing the land, the settlers crop maize and other food crops for several years. When yields drop off because of declining fertility and increasing weed growth, the lands are converted to pasture and cattle are acquired. Grasses are primarily introduced African species, which either invade the cleared lands with little human assistance or are planted by the settlers or by ranchers who buy (or force) them out.

The trend to cattle ranching is especially prominent in the Amazon Basin of Brazil and in the semi-evergreen forest land to the south, including Northern Parana. According to Goodland, "As soon as yields of rain-watered rice and other crops officially promoted along the length of the trans-amazonian highway system began to plummet, land use policy switched to large-scale livestock ranching" (1980:18). In the older settlement area of Northern Parana, cattle ranching is also expanding in the northwestern portion following the coffee destroying frosts of the 1960s and especially the major frost of 1975. According to Margolis, for example, between 1975 and 1978, hundreds of medium sized coffee holdings have "given way to extensive cattle ranches in the three year period" (1980:232).

Bearing in mind the absence of a similar trend in Africa and Asia, the rapid and recent expansion of cattle ranching in Latin America appears to be correlated with a number of special factors.

According to Parsons, major reasons are the proximity to the United States, with its very high demand for beef, coupled with unfavorable producer prices for such food crops as maize, rice, and beans, and market uncertainties associated with such traditional export crops as coffee and bananas (1976). "With beef, it is another matter, especially since the opening of the U.S. market some twenty years ago. Profits have been good and risks low. Moreover, grass is the easiest of crops to grow" (p. 116). As a result, small and large holders alike are attracted to beef production, with the trend being encouraged by active government support, especially in the form of credit. Hence in Costa Rica, nearly half of all agricultural credit in recent years has been to the livestock industry" (Parsons, 1976:126), while in the remaining tropical forests of Chiapas, Mexico, the government facilitates ranching "by allotting generous loans to cattle producing ejidos but neglecting purely agricultural ejidos" (Nations and Nigh, 1978:3).

In Caqueta, Colombia, medium term term credit is also primarily for livestock purchases, while in Brazil Superintendencia do Desenvolvimento da Amazonia (SUDAM) not only financed 70 percent of livestock project costs until recently but also invested more in 337 livestock projects in the 1965-1979 period than in any other sector (Goodland, pp. 18 and 22).

Parsons also believes that cattle ranching is "an activity congenial to the Latin value system . . . it carried prestige, and it implies an attractive way of life that is relatively easily entered" (1976:126). Vast areas only sparsely occupied by relatively powerless

and unprotected Indians no doubt also beckoned prospective ranchers into the area although that inducement would have applied to settlers regardless of their farming system.

Clearly cattle ranching has expanded over very large areas during the past twenty-five years. But is it an appropriate farming system for the area? Certainly there is no a priori reason to assume so, with Margolis, in respect to coffee in Northern Parana, suggesting that the availability of unoccupied land in settlement areas can encourage the use of inappropriate farming systems (1979:136-7). As for cattle ranching, the evidence is overwhelming that it is an inappropriate system for initiating a process of integrated area development. As currently practiced, the reasons can be broken down into socioeconomic, biological, and ecological components.

a. Socioeconomic Factors

In analyzing data from their sixty-three cases, Weitz, Palley, and Applebaum conclude that "the extensive beef cattle and plantation types of farms require the highest level of investment ranging from $2,500 to $8,000 per employment unit" (1978:21), which exceeds that for irrigated agriculture. Referring more specifically to cattle ranches, they note that "farms based on cattle grazing show a low employment density and a surprisingly high cost per unit of employment." In the cases of Alto Turi (Brazil), Caqueta (Colombia), and Rigoberto Cabeza (Nicaraqua), "the employment cost was as high as $3,140, $4,350 and $5,190 respectively, while the employment density was very low (0.04-0.05 employment units per hectare)" (p. 60). Not

surprisingly, the authors conclude that livestock ranching is an inefficient use of resources in terms of employment generation. On the basis of unpublished data collected by Skillings and Tcheyan (in press), Goodland reaches a similar conclusion in regard to the Amazon Basin; indeed, he states that ranching "probably creates the lowest level of employment and does this at about the highest cost per job created . . . of all types of development projects. Since the profits are repatriated almost entirely to southern Brazil, the cattle ranching emphasis has brought no lasting benefits to the people of Amazonia" (p. 10).

While the above conclusions may overstate the case (with Goodland's data referring to large-scale cattle ranching rather than to small scale ranchers as continue to exist in Caqueta), Margolis has documented dramatically the socioeconomic impacts of the conversion of Northern Parana from small holder coffee production to large scale cattle ranching and soybean and wheat production. Though accelerated by the coffee killing frosts of the 1960s and the 1970s, this trend was not entirely due to this factor. Regardless of causality, however, it illustrates dramatically what happens in a settlement area when one farming system is replaced by two others. In the process, thousands of small farms were absorbed into large-scale consolidated estates. Following the major frost of 1975, in the coffee zone between the cities of Londrina and Maringa, 600,000 workers "involved in the cultivation and processing of coffee . . . were left jobless" (1980:232). Few can expect to be reemployed on the soybean and wheat estates or on the ranches, since a 486 hectare estate or ranch will

only employ eight or two workers, respectively, versus 300 on a coffee estate of the same size.

The impact of this shift in farming systems has not only greatly increased social stratification, creating a rural proletariat in the process, but it has also devastated rural towns in the vicinity. Margolis outlines such effects in the Paranavai subregion. In the hinterland around Nova Alianca, there were 340 holdings in the late 1960s. By 1978, "these had been converted into 96 extensive cattle estates. The owner of one 1,500 acre estate, which had employed twenty-seven families when it was planted in coffee prior to 1975, purchased an additional 2,100 acres adjacent to it, converted most of it to pasture, and now employs only five families" (p. 232). As a result of these developments, the population of Nova Alianca has dropped from 6,000 to somewhat under 2,000. "Businesses have been devastated; only four remain in operation, and local tax collections, based on the value of the county's exports, have fallen by 90 percent" (p. 232). In the same subregion the population of the town of Amapora has dropped from a 1960 peak of 20,000 to 7,000 inhabitants in 1978.

In more recent settlement areas which are being converted to cattle ranching, the replacement of large numbers of spontaneous settlers by a relatively small number of ranchers and workers is apt to occur within a much shorter time period, with the ranchers taking over from the settlers when food crop yields drop after the first few seasons, the settlers then moving on to repeat the process further in the forest. After a couple of years in Panama and Central America, "invasive weeds and noxious insects combine to force the <u>colono</u> to

sell out to a second wave of settlers or speculators who follow behind, consolidating small holdings into larger ones for the exclusive purpose of raising beef cattle. . . . In the wake of the advancing frontier come serious social consequences, including unemployment and a declining rural population. Stock-raising provides few jobs and no seasonal or part-time employment" (Parsons, 1976:122-123).

b. Biological and Ecological Factors

In terms of biological productivity, extensive cattle ranching is a low output farming system especially in comparison to diversified cropping systems in which annual and tree crops are combined. Though cattle may be relatively efficient converters of grass to animal protein, ironically Parsons (1976) maintains that the per capita consumption of beef has actually declined in a number of Central American countries where national herds of beef cattle have nearly doubled. This is because, "virtually the entire increase in output has been channeled to the profitable export market" (p. 124).

Under prevailing low management techniques, "conversion of tropical rain-forest ecosystems into pastures for cattle rates the worse, environmentally, of all the conceivable alternatives," according to Goodland (1980:18). Furthermore, "the carcass leaving the ecosystem is eutrophic — rich in nutrients that tend to be in short supply and, consequently, tightly recycled in the intact ecosystem involved. . . . Overgrazing, trampling, and compaction of the soils, their oxidation and induration by the unattenuated force of

the sun, and their leaching and erosion by the untrammelled force of ca three metres annually of warm solvent rain, soon leads to degradation. Highly tolerant weeds, many of them poisonous to cattle, are much better adapted to these new edaphic conditions, and shortly outcompete the pasture grasses" (p. 19), resulting in at least some ranches going out of business or with their owners moving on to new frontiers because it is less costly to clear new pastures than to reclaim old ones.

Though less drastic, Nations and Nigh describe a somewhat similar process in Chiapas, Mexico, where ranchers "utilize the forest's organic storehouse to produce three or four good years of range grass, then move on to new primary forest that can be cut, burned, and planted in grasses for four more years of cattle and profit. Existing pastureland is maintained, but grass and cattle yields decline as sun and rain leach the soil of nutrients" (1978:3).

c. Summary

In attempting to summarize the discussion up to this point, it is important to bear in mind that most of the authors quoted are discussing extensive and relatively large-scale cattle ranching in the humid tropics and semi-evergreen forests of Latin America rather than small holder ranching in settlement areas. Clearly such large-scale operations are inappropriate farming systems in terms of initiating a process of integrated area development, a realization which may slowly be influencing policy (SUDAM, for example, recently "has ceased promoting financial incentives for cattle pasture development,"

according to Goodland, 1980: p. 22). They may also be environmentally degrading, since more intensive management through use of fertilizers, and labor intensive weed control, may not be an economic proposition (see Parsons, 1976:126-29, for a discussion of this point). And like all farming systems based on mono cropping, they are vulnerable to disease if not to market forces; hence outbreaks of hoof and mouth disease, for example, could close off the US market for extended periods of time.

But what about settlement schemes like Caqueta where the majority of small holdings do not exceed 100 hectares and where small holders continue to be the large majority of farmer-ranchers? The evidence is unclear simply because most such projects are still in the transition stage so that it is too early to assess the viability of the cattle component (according to Nelson, 1973:131, no evaluations had been made of any cattle development programs in Latin America). On small holdings at Caqueta, however, environmental degradation has not become a problem even though some pasture has been in use for ten to fifteen years without a drop in production. Indeed, according to Jarvis (written communication to the author), production around the regional town of Florencia is intensifying, with a shift from beef to dairy production.

Small holders would appear to have too major advantages over large-scale ranchers when it comes to cattle production. The first is their capacity to intensify production through higher labor inputs; the second is their propensity to diversify their farming system by maintaining vegetable gardens, fruit trees, and a mix of livestock

around their homes, and to also cultivate food staples. With intensive management, carrying capacities for cattle can also be increased, a development which better utilizes grasses like Hyparrhenia rufa which become rank unless they are cropped relatively close to the ground. Where research can play a major role is in improving upon the type of farming system that spontaneous settlers at Caqueta and Guaviare in Colombia and at San Julian in Bolivia tend to evolve on their own initiative. Though not research-tested, Stearman has tried to conceptualize such a system in her paper "Ecodevelopment in Bolivia: An Alternative Land Use Plan for the San Julian Colonization Colony" (no date). This is based on the diversified utilization of the standard 50 hectare plot, with 25 hectares combining cereals, legumes and high secondary growth in a rotational cultivation system, 15 hectares in improved pasture (with a carrying capacity of up to one cow per hectare) which would form part of a 600 ha communal pasture in which cattle would be rotated between sections, 8-hectares of green belt, and a two hectare household plot for fruit trees, vegetables and small animals (Figure 1).

There is, however, one major constraint associated with small holder cattle ranching as part of a more diversified farming system. This is poor access to credit. As Ortiz has emphasized, credit is crucial if small holders are to resist the consolidation of their land by larger scale ranchers seeking to buy them out. It is needed not just to build up their herds, and to purchase a range of agricultural requisites, but also to use for dealing with family emergencies and a wide range of other costs. Even at Caqueta which is a World Bank

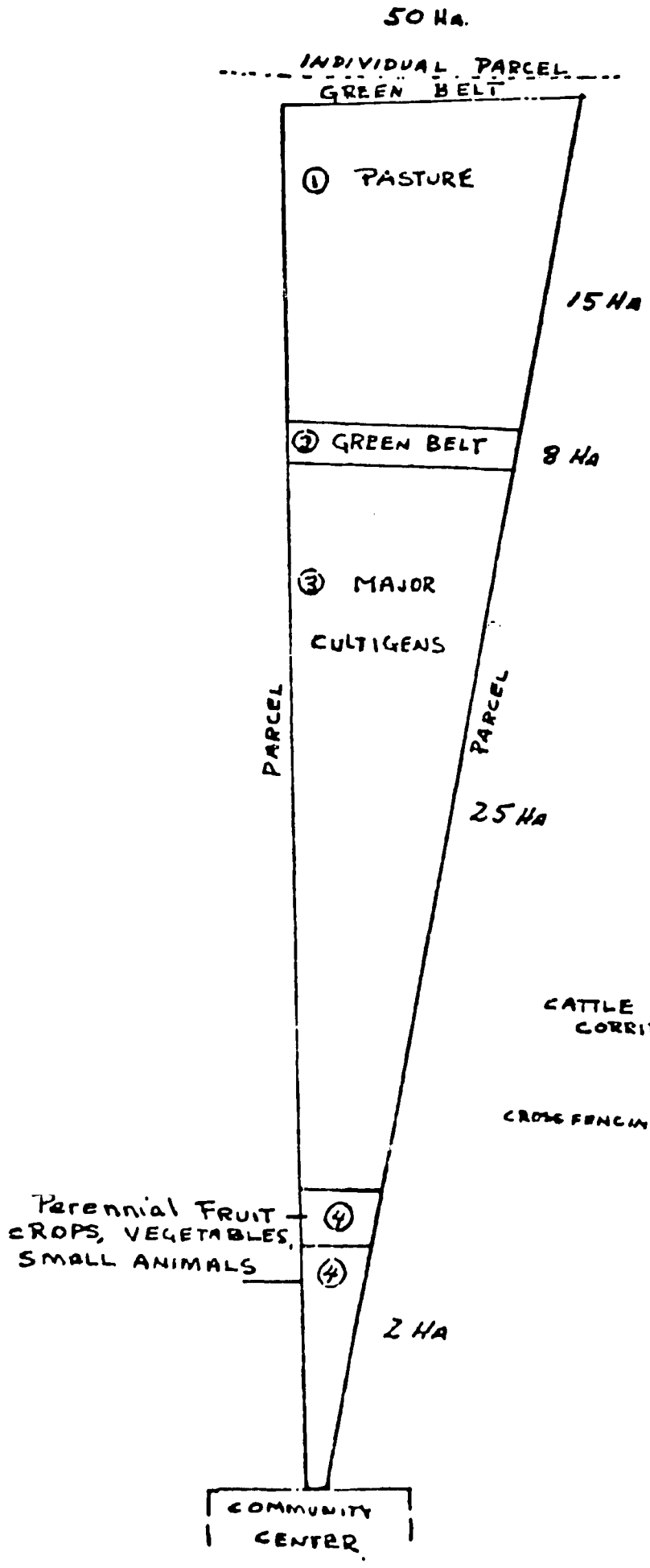


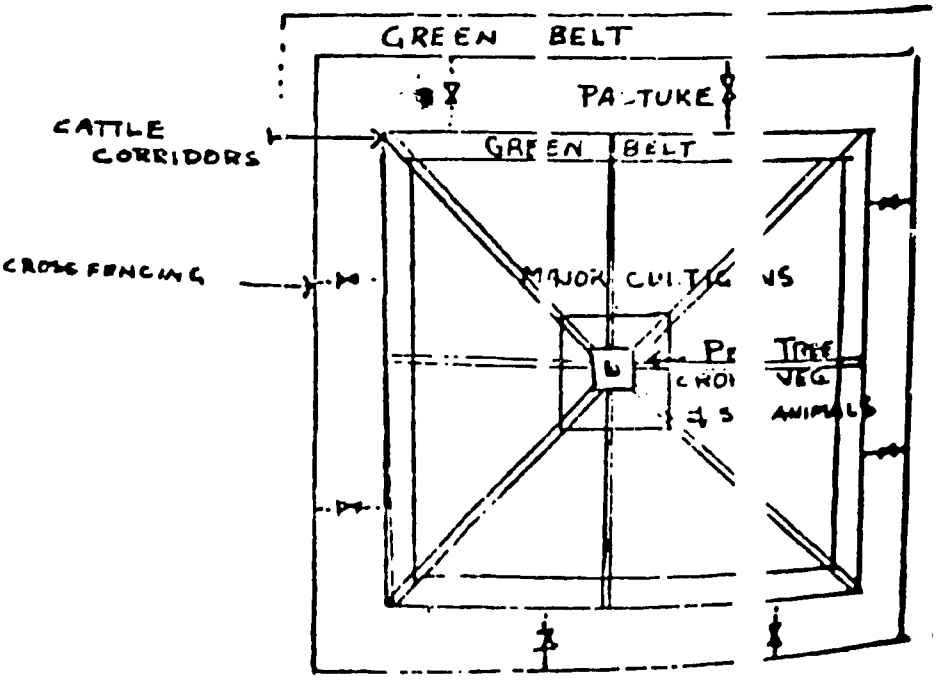
FIGURE 1

LAND USE PLAN FOR SAN JULIAN

(not to scale)

2,000 Ha. Nucleated Settlement

40 Families @ 50 Ha. Each



Source: Stearman n.d.

assisted project with a major emphasis on credit for small-holders, this reaches only 10 to 15 percent of the small holders (Ortiz, 1980, written communication). Even if it reaches the 30 percent target level, Ortiz estimates that the failure rate among the 50 percent who do not yet qualify because they have cleared insufficient land, may be as high as 65 percent (the importance of credit will be dealt with in detail in the next chapter).

IV. PHASING INFRASTRUCTURE

The phasing of infrastructural development has already been introduced in this chapter as a mechanism for reducing upfront financial costs and, in some cases, for providing capital for financing subsequent infrastructural development. In this section the concept will be further developed, with emphasis placed on the sequencing of infrastructure as it relates to the development of a particular settlement area.

A common characteristic of settlement agencies is their attempt to provide instant infrastructure from scratch. Not only is this a very expensive procedure, but also it seldom works, with the result that quality often suffers while lengthy delays prolong the duration of the stressful transition period (Stage Two) for the settlers. Since a variety of infrastructural items are not essential during the initial years, phasing of infrastructure is also an effective mechanism for improving quality and reducing delays.

Though the actual sequencing of infrastructure should vary from one settlement to another in response to different policies and

priorities (indeed, it should vary within a settlement area as policies change), a few generalizations can be made about prioritization. These do not apply equally to all participants within the settlement process, but rather vary between settlers, administrators, and other nonfarm personnel.

For the majority of settlers, the first few years tend to be the most difficult. At that time the critical items of infrastructure would appear to include potable water and certain disease control programs, access roads, primary schools, and in the case of irrigation projects the timely completion of the irrigation infrastructure and of land preparation so to ensure the timely delivery of water in the right amounts to the settlers. Since settler health tends to suffer during the initial years, a clean supply of potable water is a major need which, in fact, is rarely supplied. As previously noted, one of the ironic aspects of dam relocation in connection with the Volta and Kariba Dam project is the inadequate domestic water supply in a number of relocated communities that are located within five to ten kilometers of two of the largest man-made lakes in the world. This situation is not an exception. Of twenty-four sponsored settlements on which we have data, potable water supplies were adequate at the time of settlement in only one-fourth of the cases, while in another one-fourth, they were still inadequate five years after settlement. As for disease control programs, these are especially crucial in malarial areas such as Nepal's Tarai and the Mahaweli Basin of Sri Lanka.

All weather access roads service a variety of needs. First, they provide access not just for the settlers but also for a wide range of essential goods and services. If access roads are adequate, private sector entrepreneurs are more apt to move into the area to provide transportation facilities, and to built general stores and other retail outlets. At the same time, extension and other government personnel will be more able to reach the settlers as will essential agricultural requisites. Second, access roads provide exit routes. Their very existence reduces the degree of isolation for the settlers and increases the likelihood of entire families shifting to the settlement area at a relatively early date. Though production during the initial years tends to be consumed locally, access roads obviously also facilitate the export of crop surpluses and other exports.

Like access roads, the early provision of primary schools also encourages settlers to bring their families and to remain in settlement areas during those initial years of hardship. Throughout the tropics and subtropics, governments have been especially effective in providing upgraded social infrastructure and services within settlement areas. Granted the fact that one of the first investments settlers tend to make is in education for their children, primary schools are an effective and relatively easy way to make settlement areas more attractive during the transition stage. As for the timely provision of water in irrigation based settlements, that is a crucial input which time and again has been delayed with very detrimental impacts on settler morale, departures rates, and relationships with

the settlement and other government agencies. Where rainfed cultivation is possible, settlers can feed themselves. But where cultivation is dependent on irrigation, the government's failure to provide timely water on properly prepared land will either increase the departure rate or the period of dependency on food aid, neither of which is in the interests of development.

From the settler point of view, the need is much less urgent to provide secondary schools, a hospital, postal and banking services, and other types of infrastructure during the first five years of the transition stage. Such items are far more important from the point of view of administrative staff and other government and private-sector nonfarm personnel. For them, however, it is both cheaper financially and quicker to upgrade existing facilities in established rural towns than to build new towns. In both Malaysia and Sri Lanka, for example, it has proved very difficult to persuade settlement staff to bring their families to new towns; the same is even true in Egypt where distances between settlement schemes and the major urban centers are much less. When Wimaladharma and I asked government officials in the Mahaweli Development Board's new town of Girandukotte what facilities would increase the probability that they would bring their families to join them, they replied a first rate school system, including secondary school, which would be served by adequate bus service. Not only could this be provided more easily in the adjacent old town of Mahiyangana, but investments there by the settlement authorities would also facilitate the emergence of Mahiyangana as an important regional town which would increase its attractiveness to government personnel

not just as a service and shopping center but also as a cultural and recreational center.

V. SETTLER RECRUITMENT AND POLICY

A. INTRODUCTION

The emphasis throughout this section is on the pioneer phase of settlers — that is, those who are the first to arrive in a new lands settlement area. It is critically important, however, for policy-makers to bear in mind that the characteristics which they may favor among the pioneering families will not only change through time within those families but will certainly vary among settlers arriving at a later date. Pioneer families tend to be relatively young, often with only one or two small children. Over the years family size can be expected to increase significantly, usually exceeding the national average in terms of the number of children. The planned size of the household plot should take into consideration the needs of this growing family unit, including the probability that in their old age the first generation of settlers will wish their heir to build on the same plot during the period of handing over. The needs of the other children must also be kept in mind, since few settlement areas have the capacity of absorbing a second generation as settlers. Furthermore, since one of the characteristics of sponsored settlements is improved educational facilities, the children of pioneer settlers can be expected to have a higher education and higher expectations than their parents, hence pointing up the need to create nonfarm employment opportunities for the second generation.

Through time, the proportion of sponsored to spontaneous settlers can also be expected to change, with the latter increasing within a given locale as they arrive looking for land and other opportunities. They may be actively recruited by settlers, as in many older Indonesian colonization areas and newer transmigration areas, to help eliminate labor bottlenecks during the initial years of settlement, or they may come on their own initiative. But regardless, they can be expected to come, so that planning decisions need be based on this realization. To date few planners are sufficiently aware of the extent and implications of this influx, especially in terms of land for residential sites and in terms of employment opportunities and social services.

B. SETTLER MIX

We have already discussed in some detail various differences which may distinguish spontaneous and sponsored settlers both in regard to their background and to their response to settlement. Though major exceptions exist, spontaneous settlers tend to have more initiative and more resources, with the result that they are apt to respond more rapidly to settlement opportunities than do sponsored settlers. But both types are important if settlement is to be used as a mechanism to help low income populations since sponsored settlers are more apt to be landless laborers, sharecroppers and tenants than are spontaneous settlers. Furthermore, in sponsored settlements around the world the major constraints are rarely associated with characteristics of the settler populations but rather with policy,

planning, and implementation deficiencies on the part of national planners and settlement administrators. The global experience is that there are more than enough good candidates for sponsored settlement. The challenge is for settlement planners to first decide the mix between the two types of settlers, and then to orient them through relevant training and extension.

The desired nature of the mix will vary between countries and from one agro-ecological zone to another. Generally speaking, in countries with large areas of underutilized humid rain forests and with heavily populated old lands with a significant proportion of landless farmers, spontaneous settlers tend to outnumber sponsored settlers by three or four to one. Examples include the humid forests of Latin America, Nepal's Tarai, the Philippines, and even Indonesia where spontaneous settlers must travel from Java and the Sunda Islands to the Outer Islands on their own initiative. In such areas the construction of government and private sector roads into new lands can be expected to increase greatly the flow of spontaneous settlers (as well as landgrabbers who create special problems in Latin America), so that the use of road construction can be an important mechanism for directing spontaneous settlers to particular locales.

The proportion of spontaneous settlers tends to be significantly less in areas with rainfall deficiencies during the main cultivation season since settlement without major infrastructural development is more difficult and since governments that make such investments tend to restrict access to settlement plots to sponsored settlers. Even in government-irrigated areas, however, spontaneous

settlers appear even during the early years. They seek out small areas of unallocated land along roads and irrigation canals (as in Sri Lanka), or they cultivate more extensive seepage areas along major canals or in areas of irrigation drainage (as in Egypt). In such areas we have not been able to find much information on the proportion of spontaneous to sponsored settlers. While they are in the minority during the pioneering phase, over the years their proportion can be expected to increase.

If planners are aware of the history of spontaneous settlement within the different agro-ecological zones of a particular nation, obviously they are in a better position to forecast the possible response of spontaneous settlers to the opening up of new areas and, based on such estimates, to work out the settler mix. What the mix should be will also depend on other factors. Since financial costs per spontaneous settler family tend to be lower, this factor alone may be significant -- although a site and service approach to sponsored settlement can also reduce settlement costs. Another factor relates to whether or not sponsored settlers come from without the settlement area or are hosts. In the latter case, the global evaluation suggests that the best strategy is to incorporate them within the settlement area if they are willing. Such a strategy has evolved in Sri Lanka. Though there host populations tended to be ignored prior to the Accelerated Mahaweli Programme, today the host population is given preferential treatment. A similar strategy has been quite effective in the Sudan in connection with the Gezira, New Halfa, and Rahad schemes where future land disputes and host-outsider conflicts have

been greatly reduced by giving the host population the majority of holdings (conflicts have not been entirely eliminated since some hosts have been excluded by the local rural elites who were responsible for selection).

In sum, while it is not possible to generalize about the settler mix, planners should carefully consider for each major settlement area the proportional representation desired for both spontaneous and sponsored settlers, and among the latter, for hosts versus outsiders. At the same time planners should think through approaches for articulating spontaneous settlers to and within communities of sponsored settlers, with the former eventually apt to be in the majority in many areas of rainfed agriculture. Surrounding sponsored communities, the majority of spontaneous settlers would be farmers; within sponsored communities, they would more likely be farm laborers and nonfarm employees and employers. A major conclusion of the global evaluation is that far more emphasis should be placed on facilitating spontaneous settlement and combining it with sponsored settlement as a mechanism to tap into the initiative of spontaneous settlers, to diversify settlement areas in terms of occupational specialization, and to cut the financial costs of the settlement process.

C. RECRUITMENT AND ORIENTATION

1. Recruitment

While recruitment refers only to government sponsored settlers, orientation refers to all settlers regardless of type.

Where new lands settlements are a major development intervention, serious thought should be given to formulating a national set of recruitment criteria. While desirable criteria will vary from country to country, and perhaps even at different points in time within the same country, some generalizations appear valid. Of these perhaps the most important is to recruit settlers as families rather than as individuals. Another is to use a formal point system whereby both spouses are evaluated according to desirable criteria with recruits being those families with the highest number of points.

Time and again settlers are interviewed by sponsoring agencies or local leaders as if they did not have wives or families, and with little effort made to learn if wives wish to move -- and if they do, as to whether they have appropriate skills. Though more research is needed, the experience of Lund in Sri Lanka (1978), Sørbø in the Sudan (oral communication to the author) and Gissou (oral communication) in Upper Volta suggest that the social and economic position of women may deteriorate following sponsored settlement, with adverse effects on both family life and productivity. Removed from kin in the "home village," women are apt to be more isolated in the settlement area and more dependent on their spouses. Though they often must work longer hours than before, they have less economic power (and hence more often than not less social status) since former sources of income for women tend not to be replicated by settlement planners, while income from cash crops is more apt to be paid through marketing organizations directly to the male head of household.

Special planning is needed to correct this situation. As a starting point, it makes sense to recruit only families in which both spouses wish to become settlers. Otherwise, too many families will be chosen in which only the husband wishes to settle new land, with the wife accompanying him as a "reluctant pioneer" against her own preferences. As for establishing a point system, not only does that require more careful thought about the relative merits of different criteria, but it also reduces the possibility of favoritism within the selection process.

In assessing nearly 100 settlement areas and programs, a point system was used in only a small minority of cases, while family selection and points were combined in only two cases. These were the Mahaweli and FELDA programs. In the case of the Accelerated Mahaweli Programme, the Mahaweli Development Board was probably influenced by the FELDA experience when it introduced a point system in the early 1970s. Only one criterion relates to women, however, and that concerns membership in womens' organizations rather than agricultural and other productive skills. In contrast, FELDA has evolved an impressive selection process which is described in detail in Bahrin et al (1979). While only the presence of the husband was required at former interviews, "presently both husband and wife are required to be present. The maximum number of points allotted to a candidate husband is 27 while the point allocation to his wife is 13" (p. 120). Since questions on family size are asked of the husband even though they are equally applicable to the wife, the difference in emphasis between husband and wife is actually less that the two-thirds to one-third

ratio. Once points are totaled up, families receiving less than twenty-five of a possible forty are not recruited.

Though it is far more difficult to generalize about the desirability of specific criteria, and very difficult to weigh them in relationship to each other, even here the global evaluation has led to some tentative conclusions. These will be discussed in relationship to FELDA's current point system which is included in Table 5. This allocates points under five general headings: health, education, skills, backgroumd, and number of children. Granted the hardship associated with the initial years of settlement (which last throughout the transition stage), good health is clearly important. On the other hand, the correlation between education and becoming a productive settler is not clear in spite of a good bit of attention to this factor in the research literature. Ideally, sufficient education to be able to read simple instructions (as contained in extension handouts or as supplied with such agricultural requisites as pesticides) and to keep simple accounts makes sense. Other than that, what appears to be more important than the number of years of education is the type of education and the expectations associated with being educated. Though FELDA allocates the maximum number of points for a secondary school education, in many tropical countries secondary school leavers do not wish to be settlers -- and where they do have allotments, they are apt to seek off-farm employment for themselves with their land worked by hired labor or contracted out through leasing or share-cropping arrangements.

TABLE 5

FELDA POINT SYSTEM FOR BOTH SPOUSES
(1974 to Present)

Eligibility Factor	Husband	Total Points	Wife	Total Points
Health factor	Excellent health	6	Excellent health	6
	Moderate health	5	Moderate health	5
	Poor health	2	Poor health	2
	Physically disabled (application will be rejected)	0	Physically disabled	
	(Full Points 6)	6	(Full Points 6)	6
Education	Secondary school (Form 1 and above)	4	Secondary school (Form 1 and above)	4
	Primary school (Std. 4 to 6)	2	Primary school (Std. 4 to 6)	2
	Other schooling standards with ability to read and write	1	Other schooling standards with ability to read and write	1
	(Full Points 4)	4	(Full Points 4)	4
Skill	Business skill	2	Business skill	1
	Barbering skill	2	Tailoring skill	1
	Tailoring skill	2	Embroidery/knitting skill	1
	Skill in handicraft	2	Weaving skill	1
	Carpentary skill	2	Skill in handicraft	1
	Mechanical trades skill	2		
	Working skill in rubber estates	2		
	Working skill in oil palm estates	2		
	(Full Points 6)	6	(Full Points 3)	3
Background	Farmers, Fishermen, Ex-servicemen	8		
	Mining workers, Lumbermen	5	No points	
	Labourers, drivers, Office workers and others	3		
	(Full Points 8)	8		
Number of Children	3 children & above	3		
	2 children	2	No points	
	1 child	1		
	(Full Points 3)	3		
	Total for Husband	**27**	**Total for Wife**	**13**

Source: Bahrin et al, 1979:122

The third FELDA eligibility criterion relates to both agricultural and non-agricultural skills, a change from the past when only agricultural skills were sought. This change in emphasis is strongly supported by the global evaluation. If new lands settlement is to initiate a process of integrated area development, obviously people must be recruited with both farm and nonfarm skills. This applies at all community levels, since even small settler communities need barbers, carpenters, masons, blacksmiths, curers, midwives, religious leaders, and other skilled personnel. Though FELDA is looking for at least three separate skills in each person interviewed, another option is to diversify the settler population in regard to a variety of skills. Hence the Mahaweli Development Board is planning to set aside a proportion of household plots for families with nonfarm skills while the Rahad Corporation (Sudan) is allocating approximately one half of the plots in new communities to farm laborers and (to a lesser extent) nonfarm families. The MDB-Rahad option makes more sense in terms of both employment and social equity goals since the FELDA approach restricts on-settlement opportunities to the settlers. Such an approach is more apt to create a new privileged class of rural residents who are able to monopolize governmental inputs for themselves In the FELDA case it has also increased net incomes to the extent that settlers increasingly are consuming goods which are not manufactured in the region, or even in Malaysia, for that matter, hence reducing the potential multiplier effects of the settlement process.

Of the five FELDA criteria, background relates more to occupational and class background, with maximum points given to poor

rural farmers and fishermen as well as to servicemen. Fewer points go to miners and lumbermen and fewer still to laborers, drivers, office workers, and others. Throughout the tropics and subtropics, we found that sponsored settlers were overwhelmingly low income rural residents (see also Perera, 1979:303), though not necessarily from the lowest income categories (for example, Uprety, 1981, argues that application procedures are sufficiently complex in Nepal that the poorest rural residents are effectively excluded from being settlers simply because they do not have the skills to apply or to get others to apply for them). In this sense, sponsored settlement is an effective mechanism for assisting low income populations. Major exceptions occur where a conscious attempt is made to recruit a proportion of what have been called middle class settlers. Rarely more than 20 percent of the total, these often include retired members of the national security forces including police and soldiers. They also may include graduates of agricultural high schools and universities (as in Egypt) as well as middle income families regardless of occupation as has been the case in the past in India and Sri Lanka. Such middle class farmers will be dealt with in the next section. The other major exception includes favoritism whereby local, regional and national elites allocate settlement plots to their relatives and clients. While such favoritism definitely occurs, it appears to be more a factor in choosing between applicants who are poor than in excluding the poor.

While the majority of settlers tend to have an agricultural background in most settlement areas around the world, it makes sense to select a portion of settlers who have special and relevant

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1979:123). Two additional factors which were considered in making these changes were the length of the period of loan repayment and the need to replace perennial tree crops after their period of highest yields. In both cases, FELDA was concerned that older settlers might not have the strength to sustain their activities over the twenty-one year loan repayment period and to replant their holdings.

As the FELDA example illustrates, a number of factors particular to a settlement area should be taken into consideration -- including not just age and size of labor force at time of entry, but also the length of the loan repayment period and labor and management inputs that vary according to the nature of the farming system. Another factor that tends to be ignored are the sociological implications of a settlement population which initially contains very few three-generational families and, in comparison to old lands, a very small proportion of older people. Since little research has been carried out on the implications of this situation, no recommendations are possible. Assuming, however, that a broader mix of people of different ages is desirable, planning consideration could be given to actively recruiting older couples to provide the necessary nonfarm occupational skills. Older women, for example, could be recruited as midwives and older men as carpenters, masons, and blacksmiths. Older couples could also be recruited as health practitioners and religious leaders.

2. Orientation

While both spontaneous and sponsored settlers need orientation, only rarely has this been given, the major exception being the San Julian Project in Bolivia. Orientation is crucial to introduce settlers to their new habitat — including the natural environment and the settlement context including new neighbors, new farming systems, and the settlement agency along with other participating organizations. The topic is of sufficient importance that it will be dealt with separately (under the heading Orientation) in the next chapter, which deals with Stages Two and Three.

D. MIDDLE-CLASS SETTLERS

Periodically governments and settlement agencies have experimented with the recruitment of middle-class settlers, usually as a minority within a settlement dominated by lower-class settlers but occasionally within their own settlement (an example being Sri Lanka's Kopakulama). One or two reasons tend to be used to justify a policy incorporating middle-class settlers. The first is that they will make more successful farmers both because they are more knowledgeable and educated (and hence better able to obtain agricultural credit and requisites) and because they have more capital for investment in farming. The second is that they will provide leadership within the settlement.

There is no evidence that middle-class settlers make better farmers in spite of the fact that they have better access to extension personnel and credit, and tend to have larger allotments. On the

contrary, what evidence is available suggests that yields per hectare generally speaking are lower on middle-class allotments than on peasant holdings within the same settlement. According to Pacific Consultants (1980), even net incomes among middle-class settlers (called graduates owing to their completion of a curriculum in agriculture at either the high school or university level) are claimed to be lower. The experience with middle-class settlers has been even less satisfactory in Sri Lanka (Farmer, 1957:307).

The major reason why yields per hectare of middle-class settlers tend to be lower than those of others is because a lower proportion work the land themselves. As managers, they prefer to hire labor -- and in some cases to contract leasehold and sharecropping arrangements.... Absenteeism is also higher than is the case with smaller scale settlers. In Egypt's Tahhadi, graduates farm approximately 75 percent of their larger holdings while small holders farm 100 percent. While practically all of the latter live in the settlement, only 83 percent of the high school graduates live on scheme and only 58 percent of the university graduates. Even among residents, a significant number concentrate on off-farm employment in the form of government service (teaching, for example) or business operations (including taxi and other transport activities). In Sri Lanka, "as early as 1937, land allotted to middle-class colonists at Minneriya had to be reallocated because of the failure of earlier allottees to cultivate their land, and absentee landlordism soon became rife. When the author was working in Kopakulama Colony in 1951, 32 out of the 36 `colonists' were not in residence and the

standard of cultivation was generally very low" (Farmer, 1957:307).

As for providing leadership, the issue is more complex. Though Farmer notes that middle-class settlers in Sri Lanka "have on the whole done little or nothing to provide any form of leadership for nearby peasant colonists," small holders at Tahaddi told members of the Pacific Consultants team that graduates were useful in pressuring the settlement authorities to live up to their responsibilities in terms of operating the irrigation system and providing inputs. At Way Abung, an Indonesian transmigration settlement in Sumatra, Tjondronegoro and I were told that middle-class settlers who were retired members of the security forces had been instrumental in establishing a senior secondary school and other social services which were then available to all settlers. On the negative side, however, is the tendency for middle-class settlers to dominate positions of leadership not just on school boards but also within cooperatives and other production and marketing oriented settler organizations, becoming a new rural elite in the process which impedes the subsequent development of more broadly based settler organizations. While this process has not been specifically documented in settlement areas with which I am familiar, it has been documented in connection with rural development in old lands, with rural elites actually opposing the development of more representative participatory action organizations which are seen as a threat to their own political and economic interests (see, especially, van Heck, 1979).

Against this background, there appears to be little justification for combining middle- and lower-class settlers in the

same settlement. Rather settlements of small holders should produce their own leaders, a conclusion which Farmer reached in the 1950s after his analysis of settlement in Sri Lanka. The same conclusion, he adds, had been reached fifty years earlier in the Punjab Canal Colonies of India where "the Colonies Committee reported in 1907-8 that `the colonies would probably do better to rely for their future leaders amongst the agricultural community on men raised from the peasant class'" (p. 307).

In closing this discussion of middle-class settlers, it is important to emphasize that we have been discussing only the recruitment of middle-class settlers and not the emergence of a new middle-class at a later date among previously low income recruits. The latter situation is a very different and complicated issue, the economic, social and political implications of which are poorly understood in terms of ongoing and broadly spread development. I have argued throughout that a necessary but not sufficient condition for integrated area development is settler net incomes high enough to allow farm households to buy a wide range of goods and services. Where this has occurred, as in Northern Parana (Brazil), Abis (Egypt), Gezira (Sudan), Minneriya (Sri Lanka), and FELDA settlement projects, a significant proportion of settlers have in fact become a new middle-class. In some cases -- Minneriya and FELDA, for example -- settler preferences have shifted toward goods which are not produced within the region, hence reducing local multiplier effects. At the same time, the children of such middle-class settlers often have been reluctant to take over their parents' holdings (Gezira being a case in

point), preferring to find a different type of employment. It is difficult to sort out the implications of these examples. Are, for example, net incomes too high on FELDA schemes and at Gezira and Minneriya, as no doubt Higgs and Weitz et al would state? If yes, how much lower could they be without jeopardizing major multiplier effects in terms of increased purchasing activities? Much more research is needed on this poorly understood topic.

E. EXCLUSIONS

Though the evidence is overwhelming that new lands settlements benefit the poor, nonetheless exclusions occur on sociopolitical grounds which discriminate against the recruitment of certain populations. Most frequently such exclusions pertain to host populations, although they may also be more specifically ethnic. Only recently have the Indonesian authorities agreed, for example, to incorporate the host population into transmigration projects. Even now the proportion of hosts is kept to only 10 percent, with the overwhelming majority of sponsored and government-assisted settlers continuing to be Javanese and Sundanese. In the Sudan, fellata (West Africans who have immigrated into the Sudan over the generations) are underrepresented among Rahad settlers who otherwise are composed almost exclusively of hosts, while it would appear that clan leaders among the Shukriyah passed over certain poorer lineages in selecting recruits for tenancies on the New Halfa scheme. In South America, indigenous Indian populations almost invariably are excluded from settlement areas in the humid tropics. The same appears to be the

case with the indigenous inhabitants of Nepal's Tarai.

While the exclusions noted above relate primarily to the very poor and/or to disadvantaged minorities among the host population, other exclusions may relate to entire ethnic groups, especially where they are seen as a threatening minority by the ruling majority. Hence in Malaysia, over 95 percent of FELDA settlers are Malays, with few settlers of Chinese background included.

As the above examples illustrate, exclusions in settler recruitment are not uncommon. Though they may be justified in some cases, these would appear to be the minority. Furthermore, where the hosts are excluded, future conflicts can be expected to threaten the viability of the settlement process. Though the international community of donors has the opportunity to at least question (if not influence) exclusionary policies, rarely have they done so.

F. SETTLER HOMOGENEITY

Though governments continue to see new lands settlement as a mechanism for integrating and nationalizing a heterogeneous population, the evidence appears overwhelming that settlers prefer to live and work with co-ethnics and that ethnically homogeneous settler populations facilitate cooperation, reduce potentially disruptive conflict, and are a contributary factor to a shorter transition stage (Stage Two).

Cooperation is especially crucial during the early years of the settlement process when settler families often have to clear and prepare their land, build temporary homes, and plant and care for

their farms under unfamiliar conditions. Regardless of the tasks to be carried out, almost invariably the settlers must face a major labor constraint. In addition to attempting to recruit kin and neighbors from the "home" community (as in Indonesia), settler families within the same neighbourhood may form loose cooperative self-help groups that work together. These have major advantages. Not only do they speed up the work pace but they also breakdown family isolation and facilitate community formation, including the construction of schools and the formation of cooperatives which time and again have been shown to play a major role in settlement development. On settlements throughout the tropics and subtropics, such self-help groups are formed more often among co-ethnics than among settlers from different ethnic groups.

The key word in the above sentence is "co-ethnics." This does not mean that people should necessarily be recruited from the same village community; indeed, there is some evidence to suggest that co-ethnics transferred as a community develop economically at a slower rate than do co-ethnics from different locales within the same neighborhood. Stearman (1978) has suggested this to be the case in Bolivia, while Sri Lankan administrators often comment on the lower receptivity to change (including the use of new production techniques) of host villages which are settled as units. These two cases are different since Stearman is referring to the settlement of outsider communities as units, and the Sri Lankans to the settlement of host communities. In both cases, however, similar factors may be at work.

Most settlers move as individual families, hence removing themselves from both the security and the customary constraints of established community life. Constraints here might include patron-client and other types of class and caste relationships which constrain family behavior — along with customary beliefs, backed up with religious sanctions, that are prejudiced against certain types of people, innovations and behavior. While the evidence is insufficient, once the transition stage comes to an end, the innovative and entrepreneurial potential of settler families may be released in part because they are no longer so constrained by community mores as in their former homes. The evidence is suggestive only; further research is needed. Furthermore, in the case of compulsory relocation, no attempt should be made to break up existing communities if the relocatees wish to move as a unit since such actions can be expected to increase the heavy stress load associated with forced removal. Not only does this apply to communities which must move because of such national development projects as dams but it also applies to host communities who must move to make way for settlement infrastructure (such being quite common where irrigation systems are involved).

Just as there is evidence to suggest that co-ethnics should not be recruited as an entire community (or perhaps even community ward), so too is there evidence to suggest that co-ethnics from different states should not be merged within a single community because of the danger that subcultural variations will retard cooperation during the early years of settlement. A case in point is Malaysia, where the aggregation of Malay speakers from different

states within a single community has created more factionalism and slowed down the process of community formation than in situations where settlers are recruited from the same state and hence are more familiar with each other's life styles.

While there is very good evidence to back up the recommendation that co-ethnics from the same locale be settled within the same community, one advantage of large-scale settlement is that there is room for a range of ethnic groups within the settlement as a whole. In terms of spatial arrangements, it makes sense for co-ethnics to be clustered around their own rural service centers in which they manage their own cooperative and send their children to their "own" primary school. Mixing between adult members of different ethnic groups would then occur at the next level in the urban hierarchy -- that of the rural town where their children, for example, would mix in junior and senior secondary schools.

G. WORKERS/SETTLERS

Recruiting settlers initially as laborers who work together clearing and preparing land which they know will become their own holdings is a very attractive strategy (see, for example Perera, 1979:399). Proponents note that not only does it reduce the costs of mechanical land preparation, but it also directly involves the settlers in the settlement process. Not only do they come to know each other and begin to build settler organizations and communities, but they also develop an identity with the settlement which reduces the risks of future relationships of dependency developing between the

settlers and the administrators. These are powerful arguments. They only make sense, however, if the duration of the worker/settler period is kept relatively short.

The use of worker/settlers has been best studied in Sri Lanka where formerly it was referred to as advanced alienation. The worker/settlers are recruited without their families and housed in makeshift dormitories where they live under arduous conditions until the land is prepared and the irrigation facilities completed. According to experienced settlement administrators, if the duration of this initial phase of settlement continues beyond one year to eighteen months, morale drops and worker/settlers begin to drop out (Mahinda Silva, oral communication to the author). Even if they do not, they become increasingly dependent upon the settlement authorities for providing them with food aid — and antagonistic toward them for not providing irrigation water in time. Both characteristics are inimical to development, the implication being that worker/settlers should only be involved where there is an excellent likelihood that they will be able to harvest a subsistence crop during the second year.

In this regard the Sri Lankan record is not encouraging. According to Silva, advanced alienation began in 1957. The first worker/settlers were brought in on the assumption that they would prepare their future lands and carry out irrigation related construction work for no more than two years prior to the arrival of irrigation water. Since the government authorities were not able to meet that timetable, advance alienation was terminated as a policy in 1971 -- after considerable settler suffering. More recently it has

been institutionalized again by the Mahaweli authorities in System C, the first group of worker/settlers having been recruited during 1980.

More difficult in connection with irrigation based settlement, worker/settler programs have been more successful in connection with rain-fed systems of agriculture. At San Julian (Bolivia), for example, worker/settlers have been able to prepare and plant their subsistence fields within the first four months.

H. LAND ACQUISITION, LAND TENURE, AND LAND USE

1. Land Acquisition

In terms of fairness to both hosts and settlers alike, land acquisition must be carefully undertaken before the first settlers arrive so as to reduce the incidence of subsequent land disputes which can undermine the development process. Even then, some disputes are almost inevitable so that land adjudication procedures should also exist. The need for a formal land acquisition and adjudication policy tends to be neglected by settlement planners until after conflicts occur, and even then policies tend to be ignored. Such disputes are especially common in Indonesia where host-settler, and settlement agency-local government relationships suffer as a result in Sumatra, Sulawesi, and Kalimantan. In this and other cases a variety of factors are involved, including the political weakness of host populations in the central government and national claims to land ownership which are more apt to be pressed where lands are considered to be unutilized and unoccupied. It probably is not accidental that the best land acquisition program noted during the global evaluation

was pursued by the private sector CMNP in Northern Parana -- where the first two years during the settlement process were spent in clearing title, with the CMNP (or rather its predecessor) sometimes buying out several claimants to the same piece of land.

2. Land Tenure and Land Use

No generalizations are possible as to the relative merits of individual versus communal control and cultivation of land. Rather the key factor is working out a form of tenure which provides sufficient security to the settler family to encourage members not only to maintain their allotment but also to make permanent improvements, and to develop a form of cultivation which the settlers support. Within these limits many possibilities exist -- including family cultivation and control of land, family cultivation and settlement agency control of land, family cultivation and communal control of land, and communal cultivation and control of land. There is little doubt that the majority of settlers in the tropics and subtropics prefer family cultivation and control of land. So do the majority of settlement scholars who expressed themselves on this matter. Settlement agencies, on the other hand, tend to shy away from granting titles to settlers (even where promised), preferring tenancy type arrangements based on annual or longer term leases which theoretically can be terminated at the discretion of the settlement agency. This preference for tenancy arrangements and for long term purchase options (which may be prolonged as in the FELDA case) can be largely explained in terms of two government concerns. The first is a

concern for maintaining certain agricultural production goals -- goals which the settlement agency fears will not be met if settlers have full title to their land. The second is concern that settlers will sell their land to speculators, hence interfering with social equity goals — or they will subdivide it among heirs, hence interfering with production goals. Both of these concerns appear exaggerated when compared with the problems associated with lack of settler security over land tenure. Productivity, for example, is more apt to suffer where the settler has a disincentive to produce and to make permanent improvements because of tenural insecurities, while subdivision may occur because of inability to obtain credit — many institutional donors requiring land title for collateral. Furthermore, illegal sales, leasing, and other land negotiations are relatively common on government sponsored settlements regardless of government policy. Finally, on a disproportionate number of the more successful settlements, settler families own their land (examples being Northern Parana, Brazil; Japanese settlers in South America; and, in connection with their more productive freehold plots, Halfaween settlers at New Halfa, Sudan).

For such reasons as the above, settlement scholars tend to favor granting land titles to settlers. While they also suggest that safeguards be institutionalized to reduce land sales and subdivision, I suspect that the best measures are ready availability of credit (so that settlers do not have to sell out in the face of adversity and misfortune) and the development of nonfarm employment for absorbing the second generation (hence cutting down on the need to subdivide between heirs).

Family cultivation and communal control, and communal cultivation and communal control should not be rejected without some consideration, however. The former has worked quite successfully in Israel and is seen by Weitz et al as an effective mechanism for reducing the risks associated with family control. As for the latter many experiments exist -- including the ujamaa movement in Tanzania and a wide variety of Asian cases (see especially, Wong, 1979).

While many of these efforts have failed, it is not clear that communal control of land and cultivation as such were primarily to blame. The ujamaa movement is a case in point. In terms of communal cultivation clearly it has failed, being replaced by the block mechanization system whereby individual families cultivate, harvest, and profit from their own plots within blocks where certain mechanized operations are carried out on a cooperative basis. On the other hand, while "virtually all studies of ujamaa production conclude that productivity on the communal farm was considerably below that on private farms" (Hyden, 1980:119), it would be a mistake to blame this result on communal land use as such. As von Freyhold points out, Chinese peasants were "able to communalize their activities successfully within only a decade" (1979:116). In the Tanzania case, however, "communal villages made little progress and finally failed because the ruling party that had called for communalization did not support poor and middle peasants against kulaks, democratic structures of the villages against the authoritarian bureaucracy, and did not force the technical staff to serve the villages loyally and intelligently" (p. 117).

Whether or not one accepts von Freyhold's interpretation as opposed to one which emphasizes the preference of settlers for family plots, it is a fact that after superimposing communalism on the settlers not only did the government not follow through in terms of policy execution but it soon reversed itself by recommending the division of blocks into family plots. In its execution, government policy was unclear to the settlers — some of whom are said to have found communal cultivation a useful system during the few years in the early 1970s that it was practiced. This brings me back to the initial point that the important thing is that systems of land tenure and land use provide security to the settler and that they be acceptable to the settler. While settlers may prefer communal systems in some cases, simply because they pre-date settlement as part of the settlers' heritage, land tenure and land use systems must also be consistent with national ideologies and give the relevant government agencies the authority during the initial years to evict unsatisfactory settlers under clearly prescribed conditions. Eviction rights under certain circumstances is a tricky issue, especially if it increases settler insecurities, hence emphasizing not only the need for clarifying minimal cultivation requirements but also for involving settler representatives in the decision making process as it relates to eviction.

I. TARGET INCOME AND SETTLEMENT PATTERN

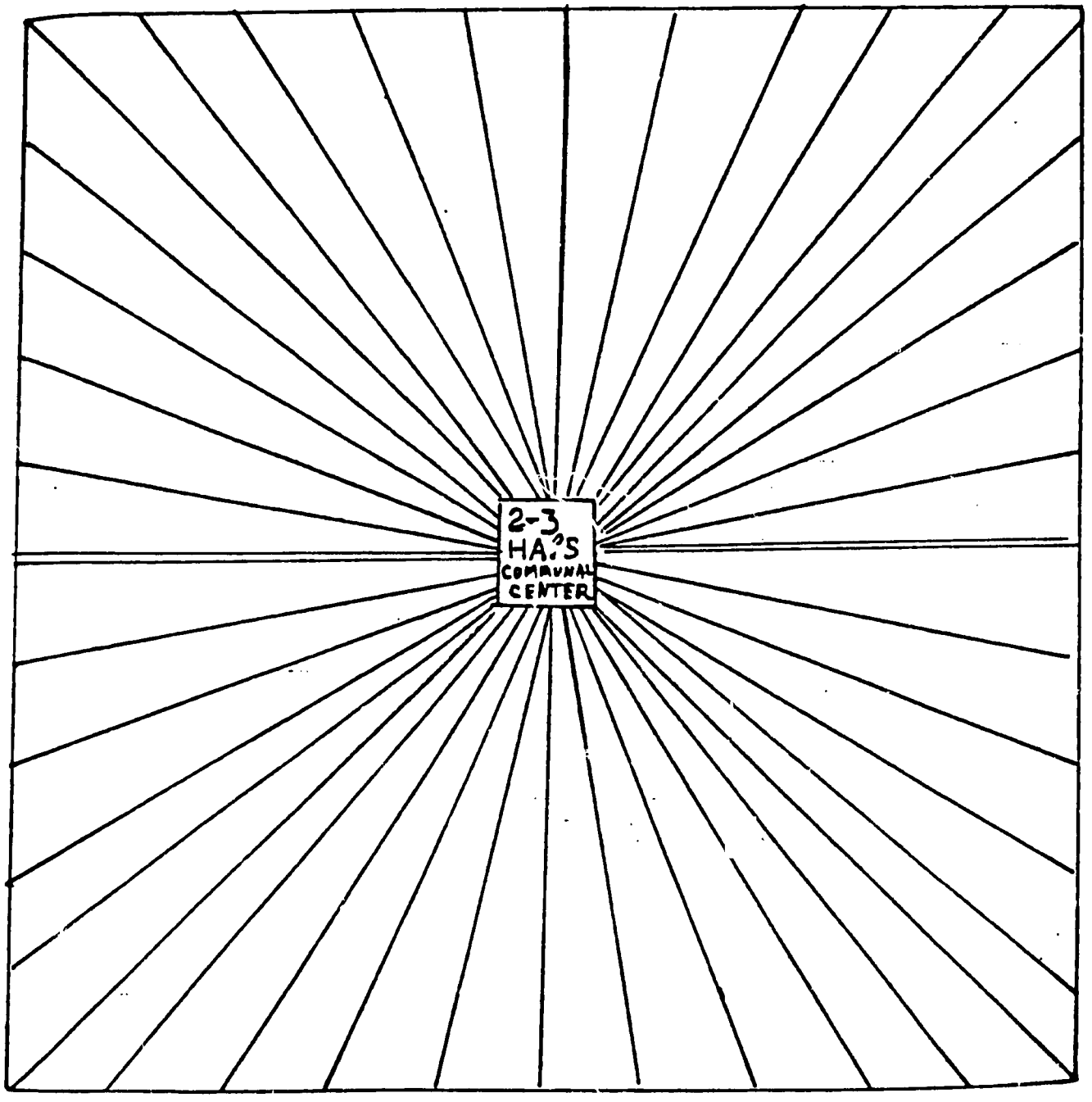
These two topics are lumped together since they have already been considered in some detail. Focusing on net income to the settler

family from crop, livestock, and off-farm activities, target incomes need be high enough to stimulate settler demand for locally supplied goods and services but not so high as to favor purchase of imports over locally produced goods (as would appear to be the case with FELDA settlers). Though target incomes need be carefully thought out in each case, a starting point for consideration is either the average national income per employed person or the average income per person employed in the rural sector. As already mentioned, the target income used by Weitz et al for employment generation, which is the average income per agricultural employee (1978:11), is probably too low in terms of its multiplier effects — especially in Asia and Africa.

As for settlement pattern, the general consensus favors a nucleated settlement for reasons already explained. Although a dispersed pattern does not preclude integrated area development, as shown by the Northern Parana case, it does make it more difficult to provide a wide range of production oriented services as well as social services. Clearly it is easier to nucleate settlers within communities where allotments are 5 hectares or less. On the other hand, highly original nucleated settlement patterns have been worked out for settlements in which family holdings are as large as 50 hectares. An especially interesting case is San Julian in Bolivia as described by Hess (1980) and Stearman (1979); see also Figure 2. Here forty wedge shaped holdings allow the settlers to build their houses close to the communal center while also giving them easy access to the rest of their holding, contrary to the situation in many nucleated settlements where settlers may live several kilometers from their

FIGURE 2

NUCLEO SETTLEMENT PATTERN



Total Area = 2,000 ha.

Each Parcela = approximatel 50 ha.

Source: Hess, 1979 (Figure 2)

fields. This is almost inevitable in large nucleated settlements and is the major disadvantage associated with nucleation.

J. SIZE OF THE HOUSEHOLD PLOT

We have already argued why housing should be built by the settlers rather than by the sponsoring agency or agencies. Another important policy issue relates to the size of the household plot, especially in settlements where the settler family is expected to live in a nucleated community at a distance from their field or fields. While the size of the settlement allotment will vary tremendously between settlement areas owing to different agro-ecological conditions, farming systems, target incomes, and pricing structures, it is easier to generalize about the size of the household plot since it relates to social as well as economic factors. For this reason, a strong argument can be made for not reducing the household plot below a size which can support various economic activities for various family members (especially the wife), which can accommodate some family livestock, and which will allow extra rooms to be added as new family members appear.

Contrary to the above needs, the usual situation is for the settlement authority to allocate household plots which are smaller than settlers would prefer. There is no simple solution to this problem. The planners must aggregate a minimum number of families into a community before they can justify providing a primary school and other social services. Wishing to reduce as much as possible the distance between the settlers' homes and their fields, and to use as

little arable land as possible for nonproductive uses, they tend to allot a household plot which is only large enough for a relatively small house. Community planners also tend to have fixed ideas as to how settlers should use and maintain their plots, so that frequently the keeping of livestock on the plot is either discouraged or prohibited.

Settler preferences tend to be very different, especially those of the settler wife. More often than not she will want a large enough plot to plant fruit trees and vegetables, and to keep rabbits, poultry, a few swine or small ruminants, a milch cow or two, and/or the family buffalo -- not only to provide a more diversified diet to the family but also to provide economic activities and a source of income for herself. Since she is apt to spend much of her time on the household plot, she would also prefer it to be large enough to provide some privacy. As for the husband, he too would prefer to keep valuable work animals close to the house so as to reduce the danger of theft -- while both spouses want the plot to be large enough to make further additions to the house to accommodate new family members. They may also wish to build a second house on their plot which can be used as a rental unit in the short run and then be handed over to their heir.

Such settler preferences are not only reasonable but they make sense both economically and sociologically. While there must be an upper limit to the size of the household plot in terms of meeting other settlement goals, in my experience settlement authorities allocate smaller plots than their own planning needs would require,

usually because they are unaware of settler preferences and of the economic and social logic that underlies them. In Sri Lanka, the Mahaweli authorities have recently agreed to increase the size of the household plot from one-half to two-thirds or to one acre so as to enable more room for fruit trees, some domestic animals, and the wife's home garden -- this being done without jeopardizing community planning. In Somalia, the size of the household plot varies in two otherwise similar agricultural settlements for drought-striken nomads simply because of different donor recommendations. At Sablaale, the Dutch were instrumental in getting the Somali authorities to provide a large enough household plot for planting fruit trees and vegetables, and for keeping poultry and perhaps a couple of goats. At Kurtunwarey, where permanent housing was designed by U.S. AID contractors, the smaller household plot is not large enough for such activities although there was more than enough land available.

VI. SETTLEMENT MANAGEMENT

While this topic will be analyzed in Chapter 8, obviously part of the Stage One planning process is to develop a management plan for each new settlement area which will clarify the roles to be played by the various organizations involved, including not just the lead settlement agency but also other government organizations as well as private sector, private voluntary, local government and settler organizations. Since the relationships between all these organizations can be expected to change as the settlement evolves, planning must include mechanisms to upgrade settler and local

government organizations, and to gradually decentralize and devolve at least some of the management responsibilities of the lead settlement agency. These issues will be dealt with in detail in Chapter 8.

CHAPTER 7

BASIC ISSUES ASSOCIATED WITH STAGE TWO: THE TRANSITION STAGE

I. INTRODUCTION

The focus of this chapter will be on the settlers, especially on mechanisms to reduce the drop out rate of settlers during the initial years of settlement and to hasten the arrival of Stage Three (economic and social development) by assisting the settlers to shift from a risk-adverse to a risk-taking stance. There are a number of ways in which the settlement authorities can attempt to reduce the dropout rate. One is through more effective recruitment, which has already been considered under Chapter 6. Another is through orientation courses -- possibly before but certainly after the settlers arrive, and through an effective research backed extension service. Since settlers are more apt to drop out if they get sick and fall into debt, potable water supplies and credit are also important factors, as are settler organizations if they can guarantee the credit-worthiness of their members. Effective orientation and extension -- and credit and settler organizations, including cooperatives -- are also important development mechanisms. While these factors will be emphasized in this chapter, a wide range of other factors and issues are also relevant during Stage Two, although in this report they are dealt with elsewhere.

II. THE LENGTH OF STAGE TWO

Of forty-eight settlement areas on which there was sufficient data and which had passed beyond the second stage (or were at least between Stages Two and Three), in no cases did any of the four abstractors estimate the duration of Stage Two as less than two years, and in only one case as less than three years (but more than two). Duration in ten cases (21 percent) was three to five years, while in one-third of the cases Stage Two lasted for ten years or more. Its duration tended to be longer in the case of spontaneous settlement, suggesting again that external inputs can play a critically important role in helping settlers move from a stage two to a stage three orientation.

The fact that the transition stage is less than five years duration in only a minority of cases (27 percent for sponsored settlement) points up the unreasonable expectations of governments and donors who expect significant financial returns during the first five years. To achieve development through new lands settlement takes time.

III. THE DROPOUT PROBLEM: ILLNESS AND INDEBTEDNESS

A. ILLNESS

During the early years of settlement, it is not unusual for relatively large numbers of both spontaneous and government sponsored settlers to drop out. This is true for both those settlements which subsequently initiate at least some area development and those which do not. Though there is no quantitative data as to why settlers leave

their new homes, case studies indicate a variety of reasons. Of these, misfortune appears to be a more common explanation than deficiencies on the part of the settler family. Two types of misfortune are mentioned time and again. These are illness and indebtedness, with the first not infrequently leading to the second.

On theoretical grounds, one would expect morbidity and mortality rates to rise immediately following settlement, though no controlled studies have been carried out to test such an assumption. Especially where settlers come from a dissimilar habitat, they are apt to encounter new diseases within the settlement area to which they have neither natural immunity nor knowledge. Malaria, in particular, has devastated settlement areas again and again, examples including the pioneer phase of La Colmena (sponsored Japanese settlement in Paraguay); Minneriya (government sponsored settlement in Sri Lanka); Eastern Tarai (spontaneous settlement in Nepal); and Parigi (spontaneous settlement in Sulawesi, Indonesia).

According to Davis, mortality rates among both adults and children were high at Parigi during the initial years, with almost one person out of ten dying within one community. While the situation improved worldwide with the increased use of insecticides (especially DDT) after World War II, the recent resurgence of malaria in the tropics emphasizes the continued need for malarial control programs in connection with new lands settlements of all sorts.

Dysenteries and other illnesses associated with unprotected domestic water supplies are also frequently reported -- while poor diets in regard to both quality and quantity can be expected to weaken settlers, hence making them more susceptible to illnesses of various

sorts. While stress is more a factor in regard to settlement involving compulsory relocation, nonetheless it can be expected to characterize the pioneering phase of all types of settlement since the first settlers almost invariably must cope with adverse conditions during at least the first few years. Regardless of cause, if serious illness occurs during those years, it may be the major reason why some settler families drop out.

B. INDEBTEDNESS

Indebtedness can occur for a variety of reasons, including illness and death, crop failure, such social events as weddings, and fiscal mismanagement. Medical expenses for the living and funeral expenses for the deceased are frequently mentioned as a cause of indebtedness. Where crops fail because of the illness of one or more active members of the family labor force; because of lack of knowledge about how to farm the new habitat; because of inadequate land preparation (and irrigation structures); or because of weed infestation and crop destruction by insect pests, rats, monkeys, bush pigs, and such other animals as are frequently encountered in new lands settlement areas, settlers are also apt to become indebted. As for indebtedness arising from weddings and fiscal mismanagement, that is more apt to occur during the later years of settlement simply because children tend to be young during the initial years of Stage Two, while farming is subsistence oriented and hence generates little cash to mismanage.

Because of the general absence of other forms of credit, indebtedness is usually to local moneylenders. Though their credit is

better than none, it is usually provided at very high interest rates (frequently over 50 percent per annum) — so that debtors may find it virtually impossible to meet their debt servicing responsibilities, with the result that they either sell out or have their land taken over by their creditors. As both Katzman (1977) and Ortiz (1981 written communication) have emphasized, lack of appropriate sources of credit in new lands settlement areas almost inevitably is correlated with a process whereby moneylenders, ranchers and other large land owners, and businessmen consolidate land into increasingly larger holdings by buying out small owner/operators. While improved recruitment procedures can reduce the proportion of unsuitable settlers, a viable credit program is an absolute necessity for suitable settlers, especially for those dealt misfortunes during the initial years of settlement.

IV. DEPENDENCY AND SUBSIDIZATION VERSUS PAYING FOR DEVELOPMENT

A. DEPENDENCY

While spontaneous settlers frequently suffer because of inadequate government assistance, the amount of assistance and the way in which it is delivered to sponsored settlers may cause them to become dependent on the settlement agency. While this problem is especially serious in the case of compulsory settlement (Butcher, 1971, and Scudder, 1973), it is apt to characterize all types of settlement where a centralized settlement agency not only is responsible for carrying out many farming operations (or closely supervising settlers carrying out such operations under a rigid time

schedule), but also retains most decisionmaking and management responsibilities. Examples include FELDA (Bahrin et al, 1979) and Mwea (Chambers and Moris, 1973). In the FELDA case, dependency apparently continued into the 1970s even in settlements which were established twenty years ago. Though the first settlements were begun in the late 1950s, it was not until the late 1960s that FELDA realized the importance of both agricultural development and community development. At that time Scheme Development Committees were established, which Bahrin et al claim have played an important role in fostering "leadership and participation among settlers" (p. 333). It is not clear how effective these are, however, since Bahrin et al discuss settler participation and leadership on only one page of a 456-page report — while the World Bank in the early 1970s (1973 and 1974) reported that most FELDA problems were of a social nature, of which dependency presumably was a major factor, along with a lack of community structure and dynamic leadership. At Mwea, Chambers and Moris (1973) note that the scheme's structure "made adoption of dependent attitudes by the tenants . . . all but inevitable," a generalization that is equally applicable in the Sudan to the Gezira, New Halfa, and Rahad schemes in the Sudan.

Such dependency is undesirable for a number of reasons. First, it delays the arrival of Stage Three and reduces the development potential of new lands settlement by curtailing settler initiative. This is because dependent settlers are apt to expect the settlement agency to meet their needs rather than to rely on family initiative and the activities (including lobbying) of settler organizations. Second, where settler organizations do form, there is

the danger that their activities will be disproportionately concerned with settlement agency-settler organization relationships, with settler leaders spending much of their time attempting to obtain more managerial responsibilities or fighting particular settlement agency initiatives, as in the Gezira case where they successfully fought off the introduction of water rates during the late 1970s. Third, settler dependency increases the financial cost of settlement since the settlement agency must retain a large staff and continue carrying out a range of activities which could otherwise have been handed over to local management. The best way to avoid these disadvantages is to attempt to involve the settlers in settlement decisionmaking and management at the very start, using orientation and extension activities, for example, not just as a mechanism to increase production but also to foster settler initiative and the early formation of responsible settler organizations.

B. SUBSIDIZATION, FOOD AID, AND PAYING FOR DEVELOPMENT

While subsidization of settlers should be kept to the absolute minimum at all times -- both to reduce the risk of dependency and to cut financial costs -- during the initial years of settlement special assistance may be necessary. This is especially the case in regard to worker/settler programs where the settlers need shelter, water, and food while preparing the settlement area. It also applies to cases, of which there are many, where it is unlikely that settlers will be able to meet their food needs during the initial months or years of settlement. In the humid tropics, sponsored settlers seldom have the resources to meet their food needs until they have harvested their

first rainfed crops. In irrigation based settlements, often more than a year may elapse before the settlers can feed themselves since settlement agencies are apt to fall behind schedule in completing irrigation structures and providing irrigation water. A several year delay may also occur (as in the FELDA case) where the farming system is based on tree crops which take several years to come into production.

In all such cases planners should carefully assess ways to help the settlers become self-sufficient at the earliest possible moment with the least danger of a settler-settlement agency dependency relationship developing. Special attention should be given to procedures which enable the settlers to plant customary food crops while the official farming system is being developed. For example, where irrigation systems are being developed in areas of seasonal rainfall, it makes sense for settlers to arrive in time to prepare the land for planting rainy season food crops. In the humid tropics, where the official system will be based on such tree crops as coffee, oil palm and rubber, serious consideration should be given to the planting of subsistence crops between the newly planted trees as practiced by the Ivorien AVV in connection with Kossou Dam resettlement. In such ways the period of dependency on the settlement authority can be reduced.

More often than not governmental aid will be necessary for settlers until the first adequate harvest occurs. A number of options are available here including food aid (both national and World Food Programme), wage labor on the scheme, and subsistence allowances until settlers are self-supporting. Regardless of the option selected, it

must be carefully thought out and implemented so that settlers actually receive timely food of sufficient quality and quantity. Where there is a choice, in my experience (and there is not enough data to generalize this from the seventy-seven cases), government provided food for work produces the best results, provided it is distributed in a timely fashion. This is especially the case where settlers know that they are obtaining food assistance in return for preparing land which they, or members of their community, will eventually be cultivating. The trouble with a food allowance is that family health may suffer if there is insufficient food for local purchase prior to the first harvest, if food prices are seriously inflated, or if the allowance is spent for other purposes. As for wages, the risk there is that the settlers may come to see themselves as laborers on a government farm rather than as owner/operators preparing their future holdings. Different circumstances, however, will require different approaches.

While some form of food aid/wages/allowances usually are necessary for a while on sponsored settlements, their duration should be kept to the minimum time period consistent with settler well-being (conversely there should also be the flexibility to prolong assistance under special circumstances). Other types of subsidization should be avoided wherever possible, although again some subsidies may be needed to introduce the use of certain essential requisites such as pesticides. In such cases, however, it is important to explain to the settlers and settler organizations from the start that the subsidy is for a limited time period only. Where short and medium term credit is given, there is good evidence that interest rates should not be

subsidized (see Section E below). As a general proposition, settlers should be taxed to the extent that at the very minimum they pay for recurrent project costs. Whether or not they can be expected to eventually repay the government for capital investment will depend on the nature of that investment. Generally speaking, irrigation based settlements which are undertaken as a part of large scale river basin development projects cannot be expected to pay for the costs of their development, the Gezira Scheme being the major exception in Africa (Stryker et al, 1978:62 and 95). On the other hand, net incomes are sufficiently high on FELDA projects that settler families are expected to pay for many developmental costs.

Regardless of the circumstances, how the settlers are to be "billed" should be carefully planned, with the settlers informed of their obligations at the time of recruitment. Various options exist. Where settlers are to eventually own their plots, a careful repayment schedule should be worked out and explained to the settlers. Though usually an initial grace period for five to ten years makes sense, this too will depend on the circumstances with graduated payments tied to production being one possibility (though here it is important to make sure "paying for development" does not become a disincentive to the settler family to produce). In Northern Parana, where settlement was financially lucrative for the private colonization company, settlers were required to pay for their land over two to four years (with no grace period but some flexibility in cases of crop failure) at an annual interest rate of 8 percent (Margolis, 1973). In the case of FELDA, settlers are expected to pay off most development costs over a fifteen year period (with an annual interest rate of 6 1/4 percent)

following a grace period which coincides with the time it takes the official perennial tree crops to come into production. FELDA has also worked out a sliding scale for payments, "whereby the amount increases and decreases according to the price of the commodity" (Talib, 1978:29).

As for recurrent costs, these should be covered by land development and/or water taxes which are carefully explained to the settlers from the start. While here again a grace period will usually be necessary during all or part of Stage Two, if payment is delayed too long, or if the settlement agency attempts, for example, to introduce a water tax at a later date which had not been previously agreed upon, settler resistence can be expected as occurred in the Gezira case during the late 1970s.

V. ORIENTATION

Whether in the form of orientation or extension, settler training is one of the weakest aspects of government sponsored settlement programs. Orientation virtually never occurs; in fact, among our cases I am aware of only one where a carefully thought out orientation program has been executed which is separate from extension. This is the San Julian (Bolivia) settlement orientation program. Heads of newly recruited settler families are brought together to the settlement area where they work communally to prepare the land that subsequently they will cultivate as individual families, and to build family housing. Throughout the four-month period they receive orientation and special training.

San Julian is a middle sized settlement which included 1097 settler households in 1978. Perhaps its most unique feature is a four month long orientation program which has been carefully designed and tested not by government agencies but by a private voluntary organization. This is the United Churches Committee which several Protestant churches established in 1968 to work with flood refugees in the Bolivian department of Santa Cruz. These were experienced farmers who were shifted to a refugee camp on the edge of a small urban center. While living there, these people "evolved their own strong and effective decision-making structures" (Hess, 1979:105) which impressed the UCC personnel working with them. With their self-generated community organization they built dormitory sheds and a communal kitchen and dining hall for preparing and serving food relief, designed an innovative privy for their water logged camp, and maintained discipline among their members. Subsequently, with UCC and OXFAM assistance, they obtained a settlement site within the same agro-ecological zone on which communal labor was also used to built family housing and prepare land for cultivation. "After the first year, the settlement appeared to be successfully established" (p. 108), with a good rice harvest, and a functioning school and health program.

The UCC was sufficiently impressed by these organized self-help activities that when they began to work with the government settlement agency in another area, they selected some of the former refugees to act as advisers within the UCC designed orientation program. This was for the first forty families to arrive and lasted three months. Prior to arrival, a two hectare community site was

cleared (the predecessor to the nucleo settlement pattern implemented at San Julian), communal shelters constructed, and a potable water supply and rough access road provided. On arrival, the orientation program began, with classes and communal activities resembling those developed by the flood refugees, and including communal food preparation, land preparation for rice cultivation, and construction of family housing.

It was this program that the government settlement agency asked the UCC to implement at San Julian in 1972. After further experimentation, the UCC developed a four month orientation program (OP) which was used for the 1977 intake of settlers. According to Stearman (1978), this program has three goals. These are (1) help the settlers adapt to their new habitat; (2) promote community solidarity; and (3) facilitate the socioeconomic integration of the settlers. Activities resemble those already described. The course is repeated for each community (nucleo) of forty families. On arrival, these are met by a social promoter who is present throughout the four month course. Though he takes the initiative during the first week, otherwise the focus is on settler organized self-sufficiency, with a major effort made to avoid settler dependency on OP and other staff. At the end of the first week, the forty families elect their first community leader. He serves one month and is followed in turn by three more leaders, each elected for a month, after which a single leader and a five to six member board is elected for a twelve month period to deal with nucleo affairs and relationships with other nucleos.

In terms of land preparation, community organization, and communal construction of family housing, the first four months are seen as especially important. During the first six weeks of land preparation, for example, an "orientator" works with the social promoter, providing agricultural advice on farm technology, while floating UCC staff spend two days per week with the settlers. During their visits, they help the settlers establish their own consumers cooperative. This is disbanded at the end of the orientation program, being reestablished only if the community wants it -- which would appear to be in most cases since Hess (1979) reports that one to two years after the OP, 76 percent of the settlers are still members.

In late 1978, U.S. AID sent an experienced evaluation team to assess the San Julian project. Under the leadership of Ronald Curtis, this included Michael Nelson and Allyn Stearman. According to Curtis (1979) all team members were impressed by the orientation program. In Stearman's opinion the OP "appears to have resolved in most instances some of the more pressing problems of colonization while not falling into the trap of excessive paternalism" (1978:5). She sees it as playing the role of a "rite de passage" which helps settlers adjust psychologically and physically to a new habitat, while Nelson (1978) believes that the OP is correlated with a higher rate of development during the next three to four years. Furthermore, he believes that it has been instrumental in alleviating suffering; "nutrition, education, child mortality and morbidity are much better than in dispersed spontaneous zones" where services are harder to provide and less satisfactory. Costs per settler come to $220 for the four month period, a cost which Nelson considers to be well spent.

The San Julian orientation program is a very important attempt during the initial months of settlement to help new lands settlers not only adjust to their new habitat but also to participate in its preparation. This program, however, is not sufficient unto itself, nor should attempts be made to physically transfer it to different contexts since it has been designed for a particular setting. Quite new, it should be carefully monitored and evaluated, both to assist with its improvement and to identify features which may be applied elsewhere. Furthermore, the OP is not without difficulties. For example, it deals exclusively with the male head of household, worker/settlers leaving their spouses and families behind throughout the orientation period. It remains to be seen how this affects family adaptation after the other members arrive. It also remains to be seen whether or not the initial concentration on the male head of household is subsequently complemented by a shorter orientation program for women, or in the absence of that, a strong extension program for developing both economic and social activities for the women which go beyond the usual emphasis on home economics.

A final question concerns the sustainability of orientation programs, especially where developed by nongovernmental organizations. In Stearman's opinion, if the UCC turned the orientation program over to the settlement agency "it would cease to function at its present level of competency, if at all. The orientation program is highly effective but has the serious drawback that it is dependent almost totally on the input of a foreign staff" (1978:5). Though Stearman may be overstating the case here, Nelson notes that the OP has such characteristics as flexibility and staff continuity which are seldom

associated with government operations. Staff continuity is especially important; indeed, often a key individual -- not infrequently an expatriate — is involved. Curtis notes this to be the case with the San Julian OP (in Sri Lanka the ambitious training program for establishing water user associations is also associated with a single expatriate).

VI. EXTENSION

Though there are exceptions in the case of individual settlement areas, throughout the tropics and subtropics the large majority of settlers are unfamiliar with their new habitat as an agro-ecological zone at the time of their arrival. Because of their lack of knowledge and because of the tendency of people moving to a new area to cling to the familiar, settlers can be expected to replicate their old production techniques in their new home irrespective of suitability or, as more often is the case, lack of suitability. Clearly if settlers are to avoid costly mistakes and a lengthy period of adaptation, both orientation and extension are crucial. We have already seen that orientation programs are virtually nonexistent in regard to new lands settlements. As for extension, of the thirty-six government sponsored settlements on which we have sufficient information, in nineteen cases (53 percent) extension services were either nonexistent or minimal, and in only four cases (11 percent) were they good to excellent in quality (and in one of those cases they were inadequate in regard to availability). In regard to ten spontaneous settlements on which we have adequate data, on nine (90 percent) extension services were either nonexistent or

mihimal.

In spite of the fact that most government sponsored settlement areas are planned and implemented as agricultural production schemes, data from the global evaluation show that most of the necessary early inputs into the implementation of viable farming systems are absent most of the time. These include soil surveys and research based extension services (also inadequate most of the time are credit and favorable producer prices). In the case of extension both the research backed advice and the trained personnel are apt to be inadequate.

Though there is no easy solution to the extension problem, some guidelines can be given. First, the advice extended must make sense economically as well as technically in the context of the settlers farming system or systems. That requires not just appropriate agronomic research but farming systems research. Second, advice must be presented to the settler family in a consistent fashion and in the right way. All too often farm families are presented with different advice by a range of government agencies, each with its own scope of work and recommendations relating to that scope. In francophone Africa, for example, different parastadal agencies are apt to push different crops, while elsewhere livestock and crop agriculture frequently fall under totally different ministries (as in the Southern Sudan and Sri Lanka) which seldom coordinate their activities.

The logical solution to this problem is a unified extension service with one field agent responsible for advising settlers in regard to the entire farming system (with back up advice provided by specialized technical officers at the district, section, or irrigation

system level). One advantage of a specialized agency being responsible for settlement planning, implementation, management, and evaluation is that it can more easily provide a unified extension service than where management is decentralized with one agency attempting to coordinate the efforts of several extension oriented ministries. In spite of this advantage, frequently the extension service of settlement agencies is not unified but rather is directed at specific crops such as rubber and oil palm in the case of FELDA schemes, and cotton at Gezira. Even where the extension service is unified, as with the Mahaweli Authority of Sri Lanka, there is still the problem of handing over to existing departments — although by then settlers are in a better position to evaluate different options as presented by different types of extension personnel.

Presenting extension advice in the right way refers not just to how the extension agent approaches the settlers but also to the sex of the agent. A frequent planning weakness of new lands settlements is that planners are apt to put more stress on the farmer rather than on the farm family. Not only is the agricultural role of women apt to be ignored, including providing economic activities for women, but agricultural extension personnel often are exclusively male. Though times are changing here, with more women being trained as extension agents in fields other than home economics, more women extension agents are needed, granted the critically important role of women in agriculture.

A third guideline relates to terms of service for extension personnel -- whose morale is frequently low because of inadequate salaries, inadequate opportunities for advancement, inadequate

housing, and inadequate local transport (whether in the form of bicycles, mobilettes, motorcycles or other transport). It is for reasons such as these that agricultural extension often ranks relatively low in the preferences of secondary school leavers, especially in Africa and the Middle East. One advantage of a unified extension service is its cost effectiveness. With less money Hused than is the case for multiple extension agents carrying multiple messages, it should be possible to improve the terms of service for settlement areas, hence attracting and retaining a higher quality of extension personnel.

It is not possible to generalize about ratios dealing with the desired number of settler families per extension agent since these vary between farming systems. Furthermore, they may also vary through time with higher ratios needed during Stages Two and Three, for example, than during Stage Four. In the Senegal Valley, SAED — the parastadal organization responsible for developing irrigated perimeters on the Senegalese side -- is considering a two phase extension approach (though these perimeters are primarily for adjacent villagers, some are apt to include a settlement component in the future). Initially extension services will be intensive. "Once farming practices and management have become routine" (OMVS, 1980a:E.III.13-14), numbers of extension personnel will be reduced, with the others moved on to the next perimeter being brought under cultivation. While this is an interesting approach to a situation where a single agency has its own extension service and is responsible for bringing on line a succession of specific projects (as is also the case with FELDA and the Mahaweli Authority), there is always the risk

that the initial phase of extension is brought to an end at too early a date. In the Senegalese case, SAED hopes to hand over managerial responsibility for specific irrigated sections to associations of village farmers at the end of two to three years. I suspect that time table is too short, being influenced more by SAED's needs to keep to a rigid time table for starting up new irrigated perimeters than to capability of the villagers to assume managerial responsibilities at that time.

VII. COURSES FOR SETTLERS AND TRAINING COMMUNITY EXTENSION AGENTS FROM AMONG SETTLER FAMILIES

The British introduced farmers' training centers in their former colonies, while the French paid special attention to training unpaid village volunteers who were selected by their fellow village farmers. Both types of training are applicable to new lands settlements though the actual mix will depend on the nature of the settlement as well as on the nature of any orientation and extension programs. Short courses at farmers' training centers close to agricultural research stations are a particularly attractive option, especially if the latter specializes in farming systems research. However, granted the labor constraints associated with the initial years of settlement, even short courses of ten to fourteen days duration may pose a problem for settlers. Though the longer period of training for a community extension agent would be virtually impossible, such training would be appropriate for a few worker/settlers during the construction and land preparation period. SAED, for example, is requesting villagers to select "pilot peasants"

for a one year training program which corresponds in time with the construction phase of new irrigated perimeters. While the "pilot peasant" is being trained, his fellow villagers prepare his plot within the irrigation section. On his return he provides leadership and technical advice while farming his own plot, a procedure which might also be applicable to Mahaweli worker/settlers. Similar training might also be given at a later date (that is, during Stages Three and Four) to the children of settlers.

VIII. LOCAL PARTICIPATION AND SETTLER ORGANIZATIONS

A major conclusion of the global evaluation is that local participation in the form of strong settler dominated organizations should increase the chances for the agricultural success of the settlement. Included would be village farming associations, water user associations, cooperatives and credit unions, village councils and development committees, and women's organizations both at the community and project or settlement area level, the latter relating to unions and federations of local level associations. The purpose of this section is to provide an introduction to the justification for local participation and settler organizations. More detail on the role that specific organizations can play in project implementation and management is included in other sections dealing with such topics as credit, marketing, and cooperatives.

The need for more local participation and stronger settler organizations is based more on the general literature dealing with rural development than with settlement schemes as such where strong local organizations tend to be less common or are slow to develop.

There are at least two major reasons for their absence. One relates to the general paucity of community organizations within new lands settlement areas. The other relates to the ambivalence at best of centralized settlement agencies toward local participation. As previously analyzed, new lands settlements are composed of aggregates of families that frequently come from different geographical locales. During the initial years settlement families tend to live relatively isolated lives, with community organizations restricted largely to small self-help groups of neighbors and benevolent associations.

As for government settlement agencies, only recently have they begun to place more emphasis on organized settler participation (and in part one suspects this is more because of financial and managerial inadequacies than a commitment to participation as such). Even where officially encouraged, as in the Gezira case, devolution tends to be resisted by settlement staff members who see it as a threat not just to their authority but to their very jobs. Where settler organizations do arise under such circumstances, their relationship with the settlement agency all too often becomes an adversary one -- as in the case of the Gezira Tenants Union. A federation of tenants at the project level, this association is especially strong and is able to lobby at the national level, indeed into the Office of the President, for the interests of its members.

Settlement agencies modeled on the Gezira or other highly centralized prototypes tend to be especially ambivalent toward such federations, which may be one reason why the Mahaweli Authority of Sri Lanka has been slow to encourage, as a matter of policy, the federation of water user associations. Centralized agencies are also

apt to resist such local organizations as rural and municipal councils and other agencies of local government which are composed of both settlers and nonfarm residents. This is unfortunate since the more powerful such local agencies become, the more effective they are in lobbying for resources at the local, regional and national levels and for helping the settlement area to stimulate a process of integrated area development.

Though the initial stimulus may need to come from government or other agencies, throughout this section the emphasis will be on organizations which are actually run by the settlers rather than by outsiders. Such organizations, for example, as government run marketing agencies which are are called local cooperatives would not qualify as settler run. Furthermore, the emphasis will be on organizations which represent the interests of a significant number of settlers. In the past, a problem associated with local organizations like cooperatives is that they are coopted by local elites whose interests they serve sometimes at the expense of the majority of settlers (see Ralston et al, 1981, for a general review of this problem in rural development).

It is becoming increasingly clear that project success is associated with active local participation. In their Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects (which dealt with thirty-six projects in eleven countries of Africa and Latin America), Development Alternatives (1975) stated as their primary findings that "to maximize the chances for project success, the small farmer should be involved in the decisionmaking process and should also be persuaded to make a resource commitment to

the project" (Executive Summary:1). Local action to complement outside management and resources they found to be especially important during the implementation phase, with effective two-way communication and "functioning local organizations or groups" also being important (as for resource commitment, that referred to both labor and cash). Furthermore, "the small farmer's involvement should complement (and ultimately replace) the work of the project's outside staff" (p. 2).

Generalizing for irrigation projects, Radosevich states that "at the local level, countries with the most successful irrigated agriculture have adopted some form of Water User Association" (1979), the effectiveness of which appears to increase where federated up to the irrigation systems level or within a river basin. Montgomery (1979) also stresses the relationship between project success and local participation and decisionmaking in regard to such local level irrigation activities as allocating water and maintaining canals. One of the most impressive recent cases, which is not documented by either of the above authors, relates to small scale irrigation perimeters in the Senegal Valley of Mauritania and Senegal which are run by village associations. Yields are 4-5 tons of rice per hectare versus 2.5 on large scale government run perimeters where farmer participation is very low (OMVS, 1980). Dealing more specifically with settlement, we have already documented the impressive accomplishments of the San Juan flood refugees in Bolivia, whose local action greatly facilitated their settlement and served as a model for the San Julian orientation program.

Granted the lack of social integration which so often characterizes new lands settlements, settlement agencies should be

prepared to facilitate the development of settler participatory organizations; indeed, the importance of these in terms of stimulating development and avoiding dependency is such that their creation should be built into the enabling legislation establishing settlement authorities.

This is especially important in connection with irrigation projects where time and again government agencies are responsible for poor land preparation, faulty tertiary channel alignments, and defective irrigation structures at the turnout and field level -- defects which not only create serious problems for the settlers from the start but which could be better avoided if settlers were more actively involved not just in operation and maintenance activities but also in the preparation of lands and the construction of structures which they will eventually be using.

Especially important are a wide variety of training programs for training leaders and staff of community farming associations, water user associations, and cooperatives. Here a word of warning is needed since there is a danger that such training programs may separate the trainee from his or her peers who subsequently view the trainee not as representing their interests but rather the government's. This is especially a problem where a single trainee is involved. A case in point is the current training program for water user associations in connection with the Accelerated Mahaweli Programme. The government of Sri Lanka through the Mahaweli authorities is committed to active ongoing settler participation in the development process, at least at the turnout level. In System H, two leaders selected by each turnout unit of approximately fifteen

households were trained in a classroom situation at fortnightly intervals over a one year period. More recently, in System C, one such leader per turnout unit will be trained. Under the supervision of an experienced UN expert living in the field, this training has been high quality, involving officials from different divisions of the Mahaweli Development Board and the Mahaweli Economic Agency who have worked together not only learning about each others' perspectives, but also about the settlers' perspectives and problems as mentioned by their turnout leaders.

There are, however, major risks with this approach which is now concentrating on the training of a single settler representative at the turnout level. Even if his peers see him as their own, the Mahaweli emphasis on a single leader as opposed to the internal organization of the turnout unit may lead to disputes and conflicts over water allocation, especially where the trainee is a top-ender. Suggested amendments to the Sri Lankan irrigation ordinance recommend a minimum of three leaders per turnout unit so as to represent the needs of bottom-enders and middle-enders as well as top-enders. Focusing more on the internal organization of each turnout unit, this approach makes more sense in terms of developing local organizations, as distinct from just developing local leaders. It may well be that more training should also occur in the field as opposed to within the classroom.

As for the scope of settler organizations which are encouraged by government and other agencies, it is especially important to not overload them with too many functions. In the Mahaweli case, hundreds of settlers are being currently trained to play the lead role in

organizing a similar number of water user associations at the turnout level. During the initial years a strong case can be made for restricting each association's functions to water management and conflict resolution, the latter being tied in with water courts in the suggested amendments to the Irrigation Ordinance. Once these tasks are managed, subsequently other functions might be added on a phased basis, such as guaranteeing loans issued to members.

IX. SHORT AND MEDIUM TERM CREDIT

The issue of credit is one of the most difficult policy issues associated with new lands settlement areas. Though there may be no correlation, nonetheless on settlement projects where credit is easily available through government channels, there is also apt to be a degree of settler dependency which may retard fiscal responsibility and initiative within the settler family. On the other hand, case after case shows that inadequate institutional credit can cause settlers to lose their land, especially following a wide range of misfortunes. In other words, there are special circumstances where credit is needed if otherwise satisfactory settlers are going to survive as settlers.

In the sections that follow, special attention will be paid to the need for credit and the timing of its availability, the type of credit, sources of credit, interest rates, and repayment.

A. THE NEED FOR CREDIT AND THE TIMING OF ITS AVAILABILITY

In their Strategies for Small Farmer Development, Development Alternatives (1975) concluded that "not all successful projects

required institutional credit as a part of development assistance" (Executive Summary:21). This is an important point, since it emphasizes that even small farmers often have sufficient capital resources to purchase necessary inputs. In regard to new lands settlement, this generalization is most applicable to spontaneous settlers who are more apt to have resources than the majority of government sponsored settlers. On the other hand, pioneering a new lands settlement area is a riskier proposition than participating in a program of rural development within old lands. During the initial years, accidents, sickness and other personal misfortunes are more apt to occur as are insufficient harvests (however, credit should not be a substitute for food aid in situations where settlers need assistance prior to their first harvest). At such times the need for credit, on a family by family basis may be crucial and if it is not available on reasonable terms, dropout rates are apt to go up and indebtedness to moneylenders and rural elites increase, with both results encouraging the consolidation of land into fewer and fewer hands.

A case in point is the Terrenos government sponsored settlement in Mato Grosso, Brazil which was initiated in 1924 and studied by Bein in 1972. According to his analysis (1974), credit was difficult to obtain except from local moneylenders whose interest rates ranged up to 48 percent. To repay debts, Bein's data suggests that some settlers sold portions of their holdings. Katzman's analysis (1977) of the gradual decrease of the proportion of small holders in Northern Parana also suggests inadequate credit as being partially responsible for increasing consolidation. This was especially the case when formerly virgin soils became exhausted under

coffee cultivation, with small holders (as opposed to large scale land owners) unable to acquire sufficient credit to purchase fertilizers (1977). If such situations are to be avoided, and many other examples could be given, credit must be available from the time of initial recruitment along with a mechanism for identifying those with special credit needs.

Up until this point, the sole emphasis has been on credit for farm families. An important way to breakdown the isolation of new lands settlement areas is to encourage local entrepreneurs to invest in such transport facilities as taxis, minibuses and buses, and trucks and to build provisioning stores, cafes, and coffee houses. A program of small business loans in the early years of settlement can greatly facilitate this process, and commence the development of the nonfarm sector from the very beginning although it must be kept in mind that settler demand for goods and services will be relatively low during at least the initial years of Stage Two.

B. THE TYPE OF CREDIT

For settlers, the primary need is for short term credit during the first few years, although medium term credit may be equally important where farming systems are based on animal traction (being used for the purchase of both plows and animals). With most farming systems, however, the need for medium term credit increases as the focus of the settler family shifts increasingly from production for consumption to production for the market. It also increases in those Latin American settlement areas where crop land is converted to pasture land after the first few years, medium term credit being

needed for the purchase of beef and dairy cattle. This trend should not conceal the probability of an ongoing need for short term credit not just to deal with shortfalls in production and family misfortunes but also to deal with such seasonal activities as purchasing fertilizers and pesticides and recruiting labor for weeding, harvesting, and other activities.

In spite of government regulations and preferences, as farming systems evolve (and especially as they intensify) settler families hire labor. Irrespective of whether the primary motive is to reallocate family labor to other economic activities as part of the normal process of diversifying the family estate, or to remove them from the fields for social reasons, the global evaluation shows that throughout the tropics and subtropics the trend through time is for settler families to hire more labor if they can. Examples include hiring labor for harvesting coffee in Brazil (Northern Parana); cotton in Zambia (Kariba) and the Sudan (Gezira, New Halfa, and Rahad); and rice in Sri Lanka (practically all major irrigation schemes). Whether through mismanagement (as Wanigaratne describes for Minipe in Sri Lanka) or inadequate cash flow, many settlers are apt to need seasonal credit before the harvest can be sold. If it is not readily available through government channels or private banks, settlers will borrow from moneylenders, local shopkeepers, and other members of the rural elite (including wealthy settlers).

As for small and medium scale entrepreneurs, their need is more apt to be for medium credit to start up businesses, although small provisioners may need credit for replenishing inventories.

Type of credit also refers to whether credit is supplied in cash or in kind. While the decision here will depend on the need, if the settler wishes to abuse the system it is often as easy for him to sell fertilizer received in kind as it is to abuse the use of cash received for purchase of fertilizer. Cases where this is less applicable relate to plows and plow animals or to beef and dairy cattle — which often are supplied in kind both as a quality control mechanism and as a means to ensure that the credit is used for the purpose intended.

C. INDIVIDUALS AS SOURCES OF CREDIT

A major function of local elites is to provide credit. Though they provide an important service here in the absence of alternate sources of credit, it is usually provided in a patron-client relationship which often enables the patron to profit at the expense of the client. "Interest rates" vary immensely. In some cases, local shopkeepers give credit without interest on the condition that the debtor makes all purchases at his store. In other cases, as in the sheil system on irrigation based settlements in the Sudan and in rice production areas of South Asia, the settler agrees to sell his crop to the moneylender at a fixed (and relatively low) price. The creditor tends to collect the crop at the farmgate immediately following the harvest, after which, in the case of cereal crops, he stores it for sale at a higher price at a later date. Under such circumstances, some settlers are apt to fall increasingly in debt over the years, with the result that in time the moneylender or another land purchaser acquires some or all of their holding. In still other cases, credit

is given on interest rates which may reach 100 percent over a twelve-month period, again leading to loss of land in cases where the settler is unable to repay.

While stressing institutional sources of credit in the next section, I do not mean to imply that individuals such as moneylenders, shopkeepers, more well-to-do settlers, and other members of the rural elite are unimportant sources of credit. For short term credit, their assistance is crucial in many settlement areas simply because they are virtually the only source. Individual creditors do not require complicated forms to be completed, with the result that they handle requests for loans almost immediately. For short term loans, a major purpose of institutional credit is to provide a degree of competition which may keep the interest rates of individual moneylenders within a more reasonable range.

Another noninstitutional source of funds, and one which should be encouraged since it helps develop fiscal responsibility, is the informal rotating savings association or tontine. While this takes many forms, typically a small group of, say, twelve settlers will each contribute a fixed sum of cash each month, with one member taking the entire sum that month for his own use.

D. INSTITUTIONAL SOURCES OF CREDIT

There are many possible institutional sources of credit, which can be divided into four general types. These are settlement agency sources, other government agencies (such as agricultural banks and agricultural finance corporations), private banks, and settler organizations. In settlement planning, sole reliance on a single type

should be avoided since policies are apt to change within each type of organization through time. While national and specific settlement agencies may have sufficient funds for credit during their early years, as time goes on their funds may be cut back -- while increasing bureaucratization and inefficiency may interfere with the timely provision of credit along with other agricultural requisites (the Agricultural Production Corporation of New Halfa in the Sudan being an example of both problems).

Not only is it desirable for there to be several sources of available credit, but ideally through time settler organizations should play an increasingly important role in meeting the credit needs of their members.

1. Settlement Agencies

Both national and special settlement agencies are apt to supply credit to settlers although policies vary widely concerning the type of credit, the activities for which the credit is given, and mechanisms for repayment. Though one of the more reliable sources, especially in the case of U.S. AID and World Bank assisted projects, settlement agency credit is not without its problems. First, it tends to be tied to a limited number of cash crops in which the settlement agency has a major interest. Often these are export crops like cotton, rubber, oil palm, and cattle -- with the ready availability of such limited credit interfering with farming system diversification. Second, even for those crops, the credit may only be available for a limited range of activities. Third, restrictions on availability, or on funds, often curtain the credit to a relatively small proportion of

settlers even in project areas with a major credit component. In Caqueta, Ortiz estimates (1981 written communication) that the national settlement agency (with World Bank funding) provides credit to no more than 10 to 15 percent of the settlers. This medium term credit is restricted to the purchase of cattle and to spontaneous settlers who have prepared a certain proportion of pasture. In the H System of the Accelerated Mahaweli Programme, "institutional credit is only accessible to 16 percent of the farmers and the percentage is progressively going down every year" (Kahn, 1980:iii). Fourth, the ready availability of credit through centralized or even decentralized settlement agencies can increase settler dependency at the expense of settler initiative, hence becoming a factor in prolonging the length of the transition stage (Stage Two).

In spite of such limitations, settlement agencies are a crucial source of credit during the start-up period of new lands settlements, when other types of credit institutions are either hesitant to become involved or, in the case of settler institutions, are not yet sufficiently organized. Here is a case where linkages are important, since not only are settlement agencies a good source of initial funds but they also can play an important role in helping appropriate settler organizations increase their capacity to take over a range of responsibilities including provision of credit.

2. Other Government Agencies and Private Institutions

Throughout the world a variety of national government agencies make available credit to small farmers. In Zambia, Kariba settlers can obtain credit from the Agricultural Finance Corporation while in

Mexico settlers at Santo Domingo can use the agricultural land bank. The main limitations associated with such credit are the lengthy bureaucratic procedures which the settlers must follow and the limited funds available, since national institutions must serve farmers throughout the nation. At Kariba, rarely do more than several farmers in a community of twenty-five households receive credit during any one year. Furthermore, whether in the form of cash or kind (fertilizers, for example), the credit may be received after the deadline for its use (a classic example being the arrival of credit for plow oxen after the plowing season is over). Such examples are not uncommon and are due to the elaborate bureaucratic procedures involved. Kariba settlers must fill out application forms, usually with the help of extension personnel who then forward the forms on Ho the AFC with their recommendations.

The possibilities for involving private banks in credit programs for new lands settlements are greater than usually realized, with the result that they are an underutilized source of funds. Private banks tend to hesitate to become involved with small holder agriculture for a variety of reasons, including lack of collateral to secure a loan (particularly a new lands settlement problem where the majority of settlers do not have land titles of any sort, especially during Stage Two), the administrative costs of processing many small loans as opposed to a smaller number of larger ones, and low repayment rates. There are imaginative approaches, however, which can be used to solve these problems such as providing loans only to settler organizations rather than to individuals. In Sri Lanka, another approach is being pioneered in H-5 of the Mahaweli system by the

Mahaweli Authorities and a private bank (Hatton National Bank, Ltd.). In this case, Hatton's has been given a monopoly on supplying credit to small holders in H-5 on the basis of an earlier experiment during the 1970s whereby they provided credit to farmers on the small scale settlement of Debera-Ara-Wewa. Though it is too early to evaluate the larger scale H-5 experiment, already Hatton has expanded the previous availability of credit for rice to certain dry season crops. In this case, Hatton's has attempted to protect itself by persuading the national crop insurance agency to extend coverage to those crops. The fee for individual settlers is then withdrawn from the loan before the remainder is handed over.

The Hatton's experiment is an important one which warrants careful monitoring. Even if it does not succeed, it represents the type of innovative approach for involving the private sector in new lands settlement areas which is badly needed.

3. Settler Organizations

The global evaluation suggests that one component that not infrequently is associated with more successful settlement areas (as defined by both the settlers themselves and government organizations) is settler organizations which provide credit for their members. Possibilities include savings and thrift associations, cooperatives, water user associations, and community farm associations. Where they exist, they are usually associated with sponsored settlements -- with sponsors playing a role in their development. An excellent example is the Mwea Co-operative Savings and Credit Society (Chambers and Moris, 1974:289-93). One of three cooperatives formed by Mwea tenants, this

was established in 1964 — in good part because of the suggestions, lobbying (before both tenants and relevant government officials), and encouragement of the expatriate manager who saw the society as a means for eventually funding a rice mill on the scheme (though his role was certainly crucial, a tenant who subsequently became the Society's manager also played an important role).

During its first year, 60 percent of the tenants joined with membership up to 87 percent by 1968. Deposits were required for loans which were restricted to seasonal loans (up to 75 percent of member deposits) for transplanting rice. Repayment rates were excellent, with defaults of only 2 percent during 1968. A major reason was that repayment was deducted by management from rice deliveries -- with both the Society and management having a common interest in both high yields and scheme marketing, the Society's position being a factor in reducing black market sales. So successful was the Society that a rice mill was built, commencing operations in 1968 with tenants' shares nearly 40 percent of the total (since the Society was prohibited by its constitution from holding shares in the mill, a new society was formed for that purpose with the same committee and members). Up until this time, members were willing to forego dividends (though one was given in 1968) because of their expectation of receiving increased dividends through the rice mill.

In their summary statement. Chambers and Moris note that "the Society is one of the few Savings and Credit Societies in Kenya, and probably the largest. It has even been able to lend its money back to the Government, as in its more recent participation in the financing of cotton cooperatives in the country. A major factor in its success

has been the active support of the scheme management and especially management's willingness to deduct Society repayments through the scheme's accounting system for marketing rice and deducting settler payments for scheme provided operations" (1973:293).

A second example deals with settlement sponsored by the Mennonites in Paraguay (Fretz, 1953). Initially settlers received financial assistance from the church and private financiers. But after the 1930s they developed their own cooperatives which in time took over the role of banks in extending credit to particular settlements and to individuals within those settlements.

E. INTEREST RATES

These must be attractive enough to secure the participation of private banks and ensure the fiscal viability of other institutions allocating credit. What evidence is available suggests that settlers are willing and able to pay such rates, especially if we bear in mind their willingness to receive (though occasionally with disastrous results) credit from individual moneylenders at much higher interest rates. In summing up the data on their thirty-six small farmer development projects, for example, Development Alternatives (1975) concluded that "high interest rates do not appear to affect small farmers' willingness to borrow or ability to repay borrowed funds. Seven of the most successful projects deliberately encouraged local savings by the use of high interest rates paid local lenders. This was accompanied by still higher interest rates charged to small farmer borrowers, adding further weight to the conclusion that high

unsubsidized rates are a feature of good credit program design" (pp 22-23).

Just as there is a tendency for planners to underestimate the ability of small holders to manage their own farms and affairs (and to underestimate their ability to save), so too would it appear that they have underestimated the ability of small holders, including settlers, to repay loans at interests rates which are financially attractive for the lender. A word of caution, however, is needed here which once again emphasizes the initially poor information base dealing with new lands settlement areas and the high exposure to risks from crop failure during the first few years. Such risks need be more carefully calculated by planners. Where they are especially high, the need may be more for a food aid program during the first few years than a major credit program, although again some settlers will need credit to cope with such special circumstances as the severe illness of the family head.

F. REPAYMENT

Repayment rates tend to be better where settlers are required to market their crops through the project and where incentives to do so are high enough to forestall the development of too large a black market. Mwea is an example of such a situation, where paddy must be marketed through the National Irrigation Board (which runs the scheme) and where the majority of settlers (as shareholders in the scheme rice mill through their own cooperative, the other major share-holder being the NIB) utilize scheme marketing facilities. Under such circumstances settlement agencies often are willing to make available

credit for a wide range of activities, although as previously noted these may be restricted to the crop or crops in which the settlement agency has a special interest. At New Halfa, for example, the Agricultural Production Corporation provides seasonal credit both in kind and cash for a wide range of activities relating to cotton cultivation, with all charges debited to a single tenant's farm account.

Though there are few cases, repayment also would appear to be better where loans are given through a settler organization which vouches for loans to members. Hence at New Halfa, repayment rates were apparently good when the agricultural bank gave loans to groups of fifteen to forty Halfaween tenants (Allam, 1971).

In sum, data from the global evaluation supports the Development Alternatives conclusion that factors associated with a good repayment rate include "group rather than individual credit liability; and compulsory marketing through an organization established by the project" (1975:24). Under such circumstances, however, it is important that credit be available for farming systems diversification rather than just for one or two crops.

X. EVICTION OF SETTLERS

Even where careful recruitment procedures are followed, inevitably some settler families will prove to be unsatisfactory farmers. This should be anticipated ahead of time (with minimum standards of adequacy carefully worked out) and explained to settler families as they are recruited. Although there are not many cases to refer to, on theoretical grounds it makes sense to involve settler

organizations in the decisionmaking process as it relates to eviction. At the same time, as at Mwea, it makes sense to follow a formal set of procedures -- starting with oral warnings which are followed by written warnings and finally by eviction.

CHAPTER 8

BASIC ISSUES ASSOCIATED WITH STAGES THREE (ECONOMIC AND SOCIAL DEVELOPMENT) AND FOUR (HANDING OVER AND INCORPORATION)

I. INTRODUCTION

The shift from Stage Two to Stage Three occurs as an increasing proportion of settlers begin to experiment with new economic opportunities and to participate in settler and other organizations. The nature of this shift is nicely illustrated on the Mwea Scheme in Kenya (Chambers and Moris, 1973, and Singleton, 1974). There the first settlers arrived in 1954, with Stage Three getting under way during the 1963-1968 period. According to Geddes (in Chambers and Moris, p. 294), there was an upswing in tenant initiative during 1963-64 which was "flowering" by 1968. Particularly impressive was the development of education and the Mwea Cooperative Savings and Credit Society. Financed largely through school committee contributions of parents, primary education expanded dramatically after 1966, with old schools rebuilt during 1967-68. Parents also contributed to the construction of a secondary school for boys (opened in 1965) and another for girls (which opened later in the 1960s), with school fees being the settlers' largest single expense. Settlers also contributed to a small hospital which was constructed by the Catholic Mission.

Described in the previous chapter, the Credit Society was founded in 1964, with 60 percent of the settlers joining that year. When the Mwea rice mill started production in 1968, settler savings were such that they were able to acquire from the start nearly 40 percent of the shares. In addition to investing in rice processing, settlers also began to invest in a variety of business enterprises both on and off the scheme, although unfortunately there are no figures on the proportion of settlers involved or the magnitude of their investments. On the scheme, a group of settlers formed a bus company, while individual settlers started stores as well as their own transport businesses. Off the scheme, settlers purchased additional farms, with some investing cooperatively in large farms in the former White Highlands. They also invested in other off-scheme businesses, including some in the capitol city of Nairobi.

In spite of the paucity of information in the sources on off-farm investment, the concensus is that average settler net incomes are not only higher than those of surrounding rural populations (with the exception of the relatively small number of progressive farmers), but that a majority of settlers cluster around the mean (Singleton, 1974:234) with the growth of settler demand stimulating the emergence of 164 local businesses by 1971. By global standards, most of the settlers would appear to be reasonably well off. For example, of Singleton's 1973 sample of 250 settler families, 75 percent had bicycles, 70 percent had galvanized iron roofs on their homes, 20 percent had radios and 5 percent had sewing machines.

In spite of its limitations in terms of settler participation and integrated area development, clearly the Mwea Irrigation Scheme has enabled a majority of settlers to enter Stage Three in terms of economic development, although socially the evidence indicates that Mwea remains rather a waste land for settler wives and the educated children of settlers. If so, the shift from Stage Three to Stage Four can be expected to be a difficult one, Moris believing that stresses on the scheme "will become intense once tenant families include two generations of adults" (p. 308). Such stress will relate not just to lack of land and employment on the scheme, but also to the inability of the National Irrigation Board to actively involve the settlers in its management.

II. MANAGEMENT

A. INTRODUCTION

Though management in Chapter Three was defined as including local organizations along with the entire range of settlement sponsoring agencies, in this section the emphasis will be upon government agencies including national, specialized, departmental and other agencies involved in the planning, implementation, management and evaluation of new lands settlements. A major conclusion of the global evaluation is that new lands settlements cannot stimulate a process of integrated area development without major external assistance -- the lack of such assistance being perhaps the major reason why spontaneous settlement has been so unsuccessful as a development intervention. The primary source of such assistance is

government agencies.

Having emphasized the need for government assistance, it is also important to emphasize that inadequate government assistance and management capabilities may also become the major constraint facing settlement development. Partly for this reason it is important to stress the need for combining government initiative with local participation, and with private sector and private voluntary organization cooperation.

According to the World Bank's Agricultural Land Settlement (1978b), "The deficiencies of numerous settlement projects, and often the most direct causes of failure, are in their organization and staffing. The problems relate to the organizational structure for effective implementation and operation as well as to the performance of managerial and technical staff within that structure. The most common organizational problems are due to inadequate interagency coordination and cooperation. . . ." (p. 36). This general statement is fully supported by the global evaluation which found that settlement problems were more apt to reflect government policy and management inadequacies than settler inadequacies.

Creating viable new lands settlements is a complicated ongoing task, with case after case indicating that where government agencies attempt to go it alone, they are apt to become a constraint on the very development that they are supposed to foster while reliance on settler and other assistance can facilitate development. This point is sufficiently important to warrant a number of examples, several of which have been previously mentioned.

In the Sudan, the inadequacies of the Agricultural Production Corporation are currently a major reason for the slowing of development at New Halfa. It is unlikely that rehabilitation will solve the problems involved unless it includes a major effort to more actively involve in managing the settlement settler organizations, local government bodies and such decentralized government agencies as the departments of agriculture and irrigation. In regard to other government agencies, more emphasis need be placed on improving coordination and cooperation. As for local government bodies, current APC policy is to keep them at arm's length, in effect ignoring their potential cooperation. While the APC has encouraged settler cooperatives and the Tenants' Union, the latter are still restricted primarily to the Halfaween, while no attempt has been made to actively involve settler organizations in the operation and maintenance of the irrigation system. Essentially the management of the New Halfa scheme continues to be based on the Gezira model where decentralization and devolution of managerial responsibilities is supposed to occur but where in fact control is maintained within the central office.

While the APC has yet to learn how to work toward common goals by devolving managerial responsibilities to settler and other organizations, other settlement agencies have learned, through an often bitter process of trial and error, to work with other types of organizations. In the Senegal Valley, SAED is now experimenting with an ambitious program to hand over responsibility for new irrigation sections within larger projects to management by associations of village farmers within a two to three year period. While this change

in policy was partly based on the realization by SAED personnel that otherwise SAED would be unable to maintain existing projects while bringing on line an ambitious series of new ones, it was also based on the realization that crop yields were higher on small-scale farmer run irrigation projects than on larger SAED managed ones where farmers were given virtually no responsibilities.

In Brazil, Tendler has recounted to me (oral communication) a fascinating case where Companhia de Colonizacao do Nordeste (COLONE), the government settlement agency on the Alto Turi project, was able to settle more families at a lower cost per family by devolving power to settler organizations during one phase of development. In this case, the settlers were spontaneous ones who pressured COLONE to incorporate them within the settlement at a faster pace than originally budgeted for. Once organized, COLONE allowed settler communities to allocate land to members -- a function previously carried out by COLONE itself. Not only did responsive communities speed the settlement process (and at less cost to COLONE since the settlers bore much of the financial costs of allocation), but it also reduced land grabbing by elites which elsewhere had been a serious problem within the settlement area.

As for the involvement of the private sector, the development of the very successful Orientation Program for San Julian (Bolivia) is an example of a settlement agency relying on a PVO. Elsewhere the Mahaweli authorities of Sri Lanka are allowing a private bank to experiment with, on a sole source basis, the credit needs of settlers within a irrigation section, while FELDA relies on private lumber and construction firms to clear and prepare the land, to plant and

initially care for oil palm and rubber seedlings and to build housing and community structures on its settlements. In the case of oil palm, FELDA has also developed an imaginative communal form of land use whereby settlers work together and split the profits, though FELDA has yet to actively involve settlers in the management of its schemes.

B. CENTRALIZED AND AUTONOMOUS GOVERNMENT MANAGEMENT AGENCIES VERSUS COORDINATING AGENCIES

The conventional wisdom is that large-scale settlement projects are best carried out by autonomous specialized or national settlement agencies. This conclusion is reinforced by the fact that the majority of settlement agencies are of one type or the other, while the more famous settlements like FELDA and Gezira are associated with autonomous agencies (hereafter referred to parastadals). Examples of specialized parastadals include the Gezira Board and the Rahad Corporation in the Sudan, the Jordan Valley Authority, and the Mahaweli Authority of Sri Lanka. National parastadals include Malaysia's Federal Land Development Authority (FELDA), Nepal's Resettlement Company (Purnabas), Kenya's National Irrigation Board and Colombia's Instituto Colombiano de la Reforma Agraria (INCORA), the difference between the two types being that national agencies deal with settlements throughout the country while specialized agencies are restricted to a specific settlement or river basin (or, in the case of Mahaweli, to use of the waters from a given basin even though they may be transferred to other basin areas).

While such centralized agencies are parastadals established outside the normal departmental structure through special statute, coordinating agencies tend to be incorporated within a particular government ministry or department, examples being Indonesia's Directorate General of Transmigration (within the Ministry of Manpower and Transmigration), Sri Lanka's Office of the Land Commissioner (within the Ministry of Lands and Land Development), and the Philippine's Bureau of Settlement within the Department of Agrarian Reform.

1. Parastadal Management Agencies

a. Strengths

In theory parastadals have the flexibility to plan, implement and manage through time the complicated components associated with settlement and integrated area development whereas government departments do not. At least at the beginning they also are apt to have considerable political support which is translated into funds, personnel and influence. This is especially the case with river basin development and other parastadal agencies which are associated with major development interventions. The President of Sri Lanka, for example, takes a direct interest in the Accelerated Mahaweli Programme, while the Chairman of the Mahaweli Authority of Sri Lanka (MASL) is also the Chairman of the political party in power. As for Malaysia's FELDA, which is responsible for nearly 50 percent of the budget allocated for rural development, Perera (1979) and Palanniapan (1981) both stress the importance of the support of the Deputy Prime

Minister.

Parastadal agencies like FELDA and the MASL have indeed proved their flexibility and efficiency. During over twenty years of existence, FELDA has learned from many of its mistakes and shown an ability to experiment with new ideas, and to develop new institutional responses to deal with changing times. Though much younger the MASL has shown a impressive capacity to experiment with new ideas (such as cooperating with private banking in the provision of credit) and to establish new institutions (such as the Mahaweli Economic Agency).

Powerful autonomous agencies are also in a stronger position to lobby for additional resources and to protect settlers against outside interests. Brazil's COLONE, for example, has been able to protect settlers to an extent from powerful landgrabbing interest groups who wish to consolidate settler holdings into larger units (Tendler, oral communication). To attract staff such agencies also tend to offer higher salaries, hence achieving better staff quality and continuity. Favored by donor agencies, they also are more apt to offer opportunities for advancement both through training programs and continued expansion, and they are in a better position to train and field a unified extension service.

b. Weaknesses

Though the strengths of parastadal settlement agencies have received considerable emphasis, less attention has been paid to their weaknesses. I suspect that this is largely because the obvious strengths of such agencies are associated with the initial stages of

the settlement process, while their weaknesses are more apt to appear at a later date. Three types of weaknesses, linked to an extent, appear with relative frequency. Though hardly restricted to centralized settlement agencies, the first is an increasing inability to service the settlement area as time goes by, while the second relates to poor relationships with other government departments. The third, of special concern, relates to an inability to hand over managerial responsibilities to settler organizations, rural and municipal councils and other government agencies. We will consider these in turn.

Parastadal settlement agencies vary in their effectiveness not only at different points in time but also in comparison with each other. Some, such as the Nepal Settlement Company, may hold back settler initiative in certain settlement areas from the very beginning. A case in point is Prithibinager, a government sponsored settlement in Nepal which Uprety (1981) compared with a spontaneous settlement of approximately the same age (mid-1960s). Though Uprety found little difference in settler backgrounds, those in the spontaneous settlement were better off in 1979-80 than their neighbors in Prithibinagar. While lack of initiative and settler dependency on government efforts may be partly responsible, Prithibinagar, like other government settlements in the Tarai, is poorly sited for irrigation purposes in comparison to surrounding communities of spontaneous settlers (Perera, 1979:396). As for parastadal agencies constraining settler initiative at a later date, we have already documented this in regard to New Halfa's Agricultural Production

Corporation.

Poor relationships and coordination with other agencies is commonplace. At Prithibinagar, for example, the settlement road deteriorates badly just outside the settlement boundary. While I do not know the reason for this, several possibilities exist. One is simply because government and local agencies do not have the funds to maintain their portion of the road. Another is that they lack the will, either because of inter-agency jealousies or because of pressure from nonsettler constituents to allocate scarce resources to them. Not infrequently local government agencies and such decentralized government departments as public works resent the power and autonomy of settlement agencies. Even if this is not the case, the latter often are unwilling to cooperate closely with such agencies as the Ministry of Agriculture or local government departments.

An especially serious weakness, in my opinion, is the inability of most parastadals in the tropics and subtropics to hand over managerial responsibility to settler and other organizations during the later stages of development. This failing is especially serious in the case of settler organizations since, as we have seen, their growth is positively associated with project success. Here it is important to distinguish between policy and execution. While commonly the policy is that the settlement agency should share power, in fact agency staff at the center resist decentralization while all staff resist devolution. In the Sudan, staff of the Gezira Board have resisted an explicit devolution policy for over twenty-five years, while it remains to be seen where SAED in Senegal will in fact hand

over responsibility for irrigated sections to village associations of farmers. This tendency to resist devolution increases the risk that the settlement bureaucracy will become more inefficient as the years go by, especially if political influence wanes with time (it often does as politicians seek out and support newer projects while other supporters retire or die), so that financial resources are cut and the better staff seek more rewarding job opportunities elsewhere.

c. Solutions. While there are no easy solutions to the weaknesses outlined above, two types of approach exist — the one political and the other based on budgetary inducements and constraints. Both have the same goal — to force parastadal settlement agencies to share power not just in the interests of efficiency but also in terms of facilitating integrated area development. Unfortunately I am aware of no situations in the tropics and subtropics where settlers and/or their representatives in local and national governments are able to bring the same type of pressure to bear on parastadals to share power that local interest groups, for example, were able to bring to bear on the Tennessee Valley Authority. Unlike the situation in the United States, broadly based associations of farmers and other rural residents are neither much in evidence nor powerful where they do exist. This is especially true of settlement areas where community and political organization tend to be weak in comparison to old lands. The Tenants' Union on the Gezira Scheme is probably the strongest settler organization of those studied during the global evaluation, having at least reached the point where it has

representatives on the Sudan Gezira Board (three of fourteen). Though the Union has had some impact on policy, it has not been effective in getting the Board to honor its policy of devolution. Invariably power relationships are reversed, with settlement agencies like the Sudan Gezira Board being in the dominant position at practically all times.

While political pressure from settlers does not appear to be an effective mechanism at this point in time for pressuring parastadal settlement agencies into handing over more managerial responsibilities, budgetary inducements and constraints would appear more promising. Not only could the enabling legislation emphasize their responsibility to facilitate the development of strong local participatory organizations, but funds could be made available for establishing such organizations and training their members and leaders to increasingly take over not just the management of their own affairs but also an increasing proportion of settlement management tasks. Similar funds could be made available through the settlement agency for local government councils and for decentralized government departments. Local government councils, for example, could be given financial and other incentives by the settlement agency to improve their capabilities to deal with feeder roads, culverts and minor river crossings, as well as with potable water supplies, sanitation and community health (including, for example, malaria and schistosomiasis control measures). Such government departments as public works could be allocated funds to purchase additional equipment for maintaining settlement and other access roads.

Budgetary constraints could be built into annual reviews in such a way that certain funds would not be allocated if it appeared that insufficient effort was being made to honor timetables relating to handing over and incorporation goals. The international community of donors could apply pressures here by allocating funds to appropriate institution building and training programs for local organizations, by more carefully monitoring their use, and by justifying different approaches on the basis of experience elsewhere. The World Bank, for example, has been instrumental in encouraging FELDA to decentralize its activities through several regional bureaus although I am not aware of cases where donors have tried to use their influence in reference to devolution.

Donors might also make their interests known at the highest levels of government, a not inappropriate intervention bearing in mind the scale and scope of large-scale settlement projects. Indeed, as previously mentioned, important political leaders right up to the presidential level often have a direct interest in the success of large-scale settlement projects, hence being in an excellent position to bring pressure to bear on settlement agencies through the minister or the council of ministers most directly involved in their financing and oversight.

d. Summary. While the strengths of parastadal settlement agencies are well known, too little attention has been paid to their weaknesses during the later stages of the settlement process, especially in regard to their inability to share power and a wide

range of managerial responsibilities with settler and other local organizations, and with other government agencies. Here it is important to reiterate that the fourth stage of the settlement process involves both the handing over of an increasing proportion (if not all in the case of rainfed agriculture) of settlement responsibilities to local organizations and government departments and the incorporation of the settlement within the economic and political structure of the encompassing region. What is involved is a process of normalization whereby the settlement agency eventually relinquishes its dominant position as the settlement area becomes an old lands area in which settlement as such has ceased to be the dominant factor in development.

As we have seen, failure on the part of the settlement agency to share power and managerial responsibilities can retard settlement progress through increasing inefficiencies in regard to routine oyerations and maintenance activities and provision of essential services and requisites. At the same time such agencies may also impede the diversification of the economy of the region by continuing to focus almost exclusively on a small number of crop or agriculture related goals. Commenting on irrigation settlement schemes, Chambers and Moris sum up the risks involved in stating that once a national organization is established "it is under constant temptation to function as a special interest group in favour of the continuing expansion of irrigation <u>at any cost</u>" (1973:453, my underlining).

2. Coordinating Settlement Agencies

a. Strengths

Aside from not requiring the establishment of yet another governmental organization which inevitably will create inter-jurisdictional jealousies, the main advantages of using an existing government department to play the lead role in coordinating the settlement process relate to the later stages of the settlement process, and especially to handing over and incorporation. Both actions are less of a problem simply because the various departments being coordinated are usually the ones to which an autonomous settlement agency would hand over responsibility.

b. Weaknesses

The weaknesses of using an existing department or ministry to coordinate the development of a new lands settlement relate to problems of flexibility and of influence. As Dalton (1981) has pointed out for area development projects, the coordination of complex development efforts involving many agencies is an incredibly difficult task demanding "an enormous and steady series of efforts directed at fostering communication and understanding among policymakers, technocrats and technicians" (p. 13), not to mention politicians and leaders of local organizations. Bound by civil service regulations, rarely will the coordinating department have the flexibility required or the influence to ensure that the participating departments (whose chains of command are vertical within their respective ministries rather than horizontal between departments, let alone, ministries)

carry out their obligations.

It could also be argued that existing departments are no more likely to share responsibility with settler and other local organizations than autonomous settlement agencies. Though perhaps an extreme example, a case in point is Indonesia's Directorate General of Transmigration's work as coordinator in Sulawesi's Luwu District (the example is extreme because DGT has more resemblance to an autonomous settlement agency than most coordinating agencies). Involved in an area development project with a major settlement component, DGT is responsible for coordinating the actions of three other ministries (and four Directorate Generals). With no budgetary control over these other agencies, DGT has had to rely in good part on the effectiveness of two high level coordinating committees (drawing on personnel from the participating agencies). While interministerial coordination is said to have improved in recent years, this institutional arrangement has been a difficult one; indeed, according to AID's December 1978 evaluation, "The attempt to establish a viable overall coordinating mechanism -- the major institutional development goal of the project -- remains the most difficult and least successful of the project objectives." As for involvement of local government, interrelationships have been poor right up to the district level, while little effort has been made on the part of DGT to develop settler participatory action organizations aside from a small number of cooperatives.

c. Solutions

Two types of solutions to the above weaknesses suggest themselves, the first being institutional and the second budgetary. Clearly the nature of the interagency coordination is crucial at settlement, district, regional and national levels. At the national level, the coordinating agency's influence and political clout could be enhanced if the coordinating committee reported directly to a prominent cabinet subcommittee or even directly to the vice-president or president himself. While such an option is not available for small and medium scale settlement projects, the focus throughout this report has been on large-scale settlement designed to initiate a process of integrated area development. That is an important enough goal to directly involve decisionmakers, when necessary, at the top. As for the local level, clearly local government agencies should be involved along with the participating government departments while at the district level, the senior district political official in most cases would be the logical person to chair the coordinating committee, hence providing an institutional mechanism designed to at least reduce antagonisms between the capitol and the district headquarters.

As for budgetary solutions, here funds could be allocated to the coordinating agency to "encourage" participating agencies to carry out activities that fall within their sphere of influence but which they may have neither the motivation or the staff, equipment and finance to carry out.

C. SUMMARY

While the weaknesses of parastadal settlement agencies suggest that the relative merits of the two management approaches should be reassessed, especially as they relate to the later stages of the settlement process, the weaknesses of coordinating agencies are associated with all four settlement stages. Since I am unaware of any attempts to institutionalize, let alone evaluate, the types of solutions suggested above, no conclusions are possible except to state that parastadal settlement agencies generally speaking have been more effective in planning, implementing, and managing settlement areas. Since they have major weaknesses, however, more serious attempts should be made to address these not just in regard to the creation of new agencies, but especially during the ongoing evolution of existing settlement agencies. The type of rehabilitation program that the World Bank is currently considering in connection with the Agricultural Production Corporation (New Halfa) and the Sudan Gezira Board present exceptional opportunities to make parastadal settlement agencies more responsive to the need for a decentralization and devolution of activities.

III. MARKETING FACILITIES AND SETTLER RUN COOPERATIVES

A. INTRODUCTION

Marketing facilities include appropriate handling and storage facilities on the settlement and transport from the farm to the market either direct or via government or private sector marketing agents. While settlement planners are aware of the need for such facilities,

they were either absent or inadequate on 35 percent of the thirty-seven sponsored settlements on which we found data. Though available in another seven cases (19 percent) they were considered costly. Relatively adequate (in terms of both availability and costs) marketing services existed on the other 17 settlements (46 percent). Interestingly enough, the proportions were relatively similar for the nine spontaneous settlements on which we found information. Since cooperatives were present more often on sponsored settlements, these similarities suggest that the private sector not only has played a major role in providing marketing facilities but also could be expected to play a larger role in the future especially where loans for transport and storage facilities were made available to local entrepreneurs. On the other hand, the costs of such services to the settler tend to be considerably higher than those of well run government and settler marketing agencies, suggesting the need for several types. Since cooperatives not only are common on sponsored settlements but also tend to be more effective, spontaneous settlers are more dependent on high cost private sector marketing agents, this being one further reason why spontaneous settlements are less apt to be associated with major multiplier effects.

B. MARKETING INADEQUACIES

Sponsored or spontaneous, marketing inadequacies are associated with the majority of settlements on which we have data. Whether related to availability or cost, frequently these are associated with inadequate feeder and settlement access roads, with

the result that the settlers have to pay exorbitant prices to marketing agents to pick up their crops at the farmgate, have to hire laborers and transport to carry produce to the nearest government or cooperative depot, or have to use their own labor and transport.

Abayaratna's study (1972) of the government sponsored settlement of Ragangana (Sri Lanka) provides an excellent example of the implications of such inadequacies. According to plan, Rajangana was supposed to be provided with well run government sponsored cooperatives which would purchase paddy (the main crop) at a price higher than that of private traders. When Abayaratna undertook his research in 1970, there were ten Multi Purpose Cooperative Societies on the scheme which were offering settlers 0.67 rupees per kilo paddy versus 0.49 to 0.58 rupees offered by private traders. In spite of this differential, settlers tended to sell their paddy to the traders for three reasons. First, the cooperatives were inefficient and in at least one case mismanaged with the result that they could not compete with traders in regard to speed of payment. Second, traders purchased directly from the farmer at the farmgate, while cooperatives provided no pickup services (this was a major constraint since feeder roads throughout the scheme were completely inadequate, hence raising significantly the cost of transport to the cooperative). Third, while the coop purchased only rice, traders purchased all sorts of produce (when the government's mobile marketing unit attempted to purchase settler vegetables at a higher price, private traders were able to outcompete the mobile unit by temporarily raising their prices and then dropping them when the government unit ceased operating).

C. SOLUTIONS

In discussing possible solutions to marketing inadequacies from the settlers' viewpoint, it is important to emphasize that private traders, like money lenders, provide an invaluable service at a high price — in the absence of other alternatives. Granted the complexity of the settlement process, and the difficulty of government sponsored agencies providing, at a lower price, equally efficient services, settlement planners should seriously consider providing alternative options to settlers as opposed to a strategy which attempts to give government marketing organizations a monopoly from the start by excluding both private traders and settler organizations.

Large-scale settlements planned and implemented as agricultural production schemes for a small number of export crops tend to rely on government organizations to market those crops often on a sole procurement basis. Governments pursuing socialist goals -- Tanzania and Zambia for example -- are also apt to extend the sphere of national marketing organizations to new lands settlements to the exclusion of other marketing agents. While some of these organizations are very efficient (including FELDA marketing organizations for oil palm and rubber), the majority may well be counterproductive in terms of new lands settlements initiating a process of integrated area development. There are three reasons for this. First, concentrating on one, or a small number of crops, such organizations act as a constraint on farming systems diversification. Second, while often evening out price fluctuations, prices offered settlers tend to be low -- government marketing boards being a major

mechanism whereby farmers are "taxed" to subsidize the development of the urban-industrial sector (Bates, 1981). Third, they are often highly inefficient, with delayed pickup of crops and delayed payouts. In the Sudan, cotton is the major commercial crop on both the New Halfa and Gezira schemes, with the first two factors applying in particular to the government cotton marketing organizations. In Zambia, where the Cold Storage Board was given a monopoly during the 1970s for the purchase of village beef in both old and new lands areas, sales virtually dried up since prices offered not only favored the urban consumer at the expense of the rural producer but were also significantly lower than those previously offered by private traders. Buying schedules were also frequently changed without informing the farmers.

Effective solutions to marketing problems often must provide not just prices, marketing facilities, and pickup and payout schedules which meet settler needs, but also help remove other constraints which increase settler dependency on private traders. Credit is a case in point. In the Rajangana case traders who offer the lowest prices for settler paddy are moneylenders who are collecting settler debts in paddy at the threshing floor, their low prices reflecting what would otherwise be high interest rates on cash repayments. Where settlers receive from private traders less than 75 percent of the market value for the crops at cooperative outlets not only do their net incomes suffer but they also becoming increasingly vulnerable to further indebtedness which could lead to loss of land. Another constraint which must be addressed has already been mentioned — improved feeder

roads so that settlers can get their produce to the cooperative at a reasonable price, the cooperative itself can provide pickup services, or competition between an increased number of private traders will reduce costs (as would appear to have been the case in Northern Parana which the CMNP provided with a good road network).

Although a number of cases, including the Northern Parana one, indicate that the private sector can provide adequate marketing services without competition from government and settler run organizations, we have argued throughout that settler participation is associated with project success. The emergence of settler run cooperatives is a major way to foster that participation. Indeed, during the global evaluation we came across a number of efficient settler run cooperatives which were able to outcompete private traders by offering members a better price and a range of other services. Examples relate primarily to sponsored settlements, with religious and government sponsoring agencies playing an important role in the origins and initial development of the cooperative movement. In Paraguay, Mennonites, with assistance from Mennonite organizations, created their first cooperative in 1931 (this being a form of organization with which they had previously been unfamiliar). Initially a consumers' cooperative, this soon became a marketing agency for seven colonies with all settlers eventually becoming members. It also became a cooperative bank providing credit to both individual members and to the different colonies. Profits from the cooperative movement were then used to assist the colonies in a variety of ways including road maintenance (Fretz, 1953).

Another example relates to a Japanese settlement in Paraguay which originally had been sponsored by a private colonization agency. After the end of World War II, they received a low interest loan of $30,000 from the Japanese government to help develop a marketing cooperative (Stewart, 1967). Once established, this cooperative set production quotas, and transported produce to the market. It also maintained the settlement's major access road which had originally been built by the settlers themselves. Another small Japanese settlement in Brazil has become immensely profitable for the settlers since the end of World War II, with the cooperative to which all settlers belong playing a major role in that success. This cooperative concentrates on pepper which the settlers began to emphasize in the late 1940s. At the time of Demoor's field study in 1963, the cooperative had become a major business in the area, owning a pepper processing plant and a river boat to take produce downstream. Furthermore the cooperative had developed an international pepper marketing network with offices not just in Brazil but also in New York and London.

As for government sponsored settlements, one of the best examples of a strong cooperative movement -- which actually grew out of settler rather than government initiative -- relates to the Halfaween cooperative movement in New Halfa (Sudan). By 1978 there were over 60 Halfaween cooperatives, a majority of which were village based. These included farm machinery cooperatives, consumer cooperatives, flour mill cooperatives, and transport cooperatives. Though some have failed, and other vary greatly in their

profitability, the Cooperative Union has become very successful over the years. Growing out of the village cooperative movement, the Union was able to dominate the Halfaween wheat market by offering better prices than private traders. It has consolidated its position by constructing a large flour mill and in the late 1970s was attempting to incorporate Shukriyah and other Arab-speaking tenants by offering them favorable prices. At that time the cooperative movement was continuing to grow, with the Tenants' Union pushing for a cooperatively owned textile factory to serve all scheme tenants (cotton marketing being the prerogative of the Agricultural Production Corporation).

IV. ECOLOGICAL IMPACTS OF NEW LANDS SETTLEMENT

Throughout the tropics and subtropics new lands settlements have had a number of serious ecological impacts which not only interfere with their capacity to stimulate integrated area development but also threaten their viability for first and, especially, second generation settlers. Associated with both spontaneous and sponsored settlement, such impacts are more easily countered on sponsored settlements or on settlements which combine both spontaneous and sponsored settlement.

Since many of these impacts are similar to those observed in old lands, varying primarily in regard to the greater rapidity of their onset in new lands areas, planners should refer to the World Bank's Environmental Guidelines for Development Projects (currently under revision) and the Pan American Health Organization s forthcoming

guidelines on health improvement and environmental planning in new lands settlement areas of Latin America and the Caribbean.

Because of the availability of an increasing number of sources on the ecological impacts of development in the tropics and subtropics (see for example Dasmann et al., 1973), this evaluation will only briefly summarize some of the most serious. Of special concern is the replacement of highly diversified humid tropical rainforests with less productive cropping systems. Especially serious in Latin America because of the emphasis placed on conversion of humid forest to grassland for ranching, the elimination of primary rain forest is also occurring at a rapid rate throughout tropical Asia and in West Africa. Of concern is not just the removal of the forest cover but also the techniques being used for land preparation, with mechanical clearance more apt to remove the top soil and cause adverse compaction than hand clearing through the use of chain saws (which also increases employment and are more suitable for worker/settlers programs of land clearance).

Another problem in the humid tropics as well as in savanna environments is declining soil fertility occurring over both the short and long run. Throughout the lowland humid tropics of Latin America, rapid decreases in soil fertility occur when previously forested land is sown in maize, with depleted soils converted to pasture after two to three years. Longer term decreases in fertility have occurred in older settlement areas in the humid tropics, in semi-evergreen forest and in savanna environments. Examples in Brazil include the States of Sao Paolo (Augelli, 1956), Mato Grosso (Bein, 1974) and Northern

Parana (Margolis, 1979), with pasturage replacing either annual or perennial crops in all three cases. As for savanna environments, the Kariba Lusitu resettlement area is especially instructive. In the late 1950s approximately 6,000 dam relocatees were resettled in an area which probably could support less than half that number under the pre-settlement system of land use which continues to this day. As a result during a fifteen-year period most of the trees were removed, while perennial grasses were gradually replaced by annual grasses and weeds. By 1973 this cover had been replaced around villages by a fungal covering, while the otherwise exposed top soil had been largely removed by a combination of sheet, gully, splatter and wind erosion. Though rainfall was approximately 635 mm., on windy days the amount of dust in the area made the area resemble the Sahel. Though an extreme example, the Lusitu case points up the rapidity with which otherwise arable lands can be converted into wastelands because carrying capacities have been exceeded under a particular production system. The example is extreme not just because of the speed with which degradation occurred but also because of the excessive number of people placed in the area to start with.

In arid and semi-arid lands, adverse ecological impacts are more apt to relate to problems of salinity and water logging, coupled with declining fertility. Though coupled with too dense a settler population at Kariba, in all of these cases the major problem relates to inappropriate farming systems for each agro-ecological zone. As Goodland has pointed out for Amazonia, on environmental grounds ranching "is the worst option under prevailing low-management

practices" (1980:15-Table IV), while Margolis (1979) has commented on how coffee is an inappropriate crop for Northern Parana. To correct such deficiencies better planning studies of the existing habitat are essential as is more and better farming systems research. In the latter case, there is good evidence to suggest that a good starting point is the more diversified farming systems of host populations which are characterized by multicropping and interplanting, with both leading to a more intensive form of land use which is not carried out at the expense of soil fertility (see, for example, Goodland, 1980, Innis, 1980 and Nations and Nigh, 1978). Though Japanese settlers have pioneered relatively intensive and diversified farming systems in Brazil (as opposed to settlers of European origin), they have still suffered loss of soil fertility over the long run.

V. RESEARCH

A. INTRODUCTION

It is appropriate that we end this evaluation of settlement topics by stressing the need for research including monitoring and evaluation. Many of the conclusions in this study are based on a relatively small number of studies. They need testing against the results of further research. There is a special need for farming systems research (see Chapter 5), for research on the multiplier effects of new lands settlements, and for research dealing with the later stages of the settlement process. Such research should be both longitudinal and comparative, and it should also be topical and problem oriented. Both types of research will be discussed in the

sections that follow. A final section will deal with institutional responsibilities for research programs.

While the research topics mentioned are important, they are not inclusive, with one function of an ongoing program of monitoring and evaluation being to identify new research needs, some of which can be expected to be area or project specific. Furthermore the emphasis here is more on the settlers as opposed to other crucially important topics such as the management of tropical soils (see World Bank, 1978b:22-23). On the other hand, there are other topics which have been sufficiently well researched that further study should be given a lower priority. Examples include homogeneous versus heterogeneous backgrounds of families to be settled in the same community, settler built versus sponsor built housing, and middle class versus lower income recruits. Since study after study shows the advantages of co-ethnics from the same district (but not community) living together, of settlers building their own houses wherever feasible, and of lower class over middle class recruits, further policy oriented research on those topics is not needed at this time.

B. LONG-TERM COMPARATIVE RESEARCH

To better realize the potential of new lands settlements for integrated area development and to enhance their economic and social viability for farm and nonfarm families alike long-term comparative research is needed for at least two reasons. First, potentially successful settlement projects are dynamic. As they evolve, new opportunities and new constraints continually arise. If these are not

identified in a timely fashion all too often the opportunities remain unutilized while the constraints form bottlenecks which slow down progress or, at worse, reduce the economic and social viability of the settlement.

A second reason why an ongoing program of long-term comparative research is necessary is simply because national policies and international conditions change, hence changing the assumptions on which planning is based. And as knowledge accumulates, the justification of other planning assumptions loses its validity. Planning for Mahaweli development provides an excellent example of how assumptions may change over a ten-year period because of new knowledge, changing national priorities, and changing international conditions. Such changes have major policy implications since they affect, for example, net farmer income and hence settler satisfaction, and since they alter the comparative advantage, for example, between draft animals and tractors in regard to land preparation. New knowledge also gives rise to new assumptions and is corrective of old ones, examples being the growing realization that settlement planning in Sri Lanka and elsewhere, on the one hand, has neglected the nonfarm component of settlement development and, on the other hand, has been based on faulty assumptions about the need for and use of seasonal and permanent labor on even small settler holdings as production intensifies and diversifies, and as settler aspirations change.

All too often settlement planning is based on static thinking -- with assumptions which may or may not have been justified at one time taking on an immutable character for all time. Planning figures

relating, for example, to desirable net income, size of land holdings, and village size and layout also become fixed.

C. TOPICAL AND PROBLEM ORIENTED RESEARCH

There are a wide range of special topics which need further research of which some of the more important are briefly outlined below.

1. Further Research on Appropriate Farming Systems for Lands Settlements in the Tropics and Subtropics

Discussion: It is virtually impossible to overemphasize the need for further farming systems research as discussed in Chapter 6. In terms of cost effectiveness, it is an especially attractive investment for donor agencies. But the emphasis must not just be on the agronomic, technical, and economic implications of such systems but also on their social and ecological implications as illustrated by the discussion in Chapter 6 of large-scale ranching in the humid tropics of Latin America. Information is needed, for example, on the potential of different farming systems for more fully employing family members and for providing activities and income to different members of the farm family. Information is also needed on the potential of different farming systems to generate employment for both seasonal and permanent laborers (including men and women).

2. The Multiplier Effects of New Lands Settlements

Discussion: There is very little data available on the extent to which new lands settlements have created nonfarm employment through

time and have stimulated development in the industrial and service sectors. Though available evidence suggests that the importance of farm family net incomes has been seriously underestimated, there also is relatively little data on the relative importance of increased consumer demand on the part of settler families for a wide range of consumption and production goods and services, and of the processing of agricultural products. Little is also known about appropriate footloose industries for large-scale settlement areas.

3. The Relative Merits of Parastadal (and Autonomous) and Departmental (and Coordinating) Management Approaches to Settlement Planning, Implementation and Evaluation

Discussion: Comparative case studies are badly needed here, especially as they relate to improving the handing over capabilities of parastadal management agencies and the coordinating capabilities of departmental agencies.

4. How Better to Involve the Private Sector

Discussion: In spite of the relative success of private colonization companies in Latin America, and especially in Brazil, I am aware of no evaluations of how government settlement agencies can make better use of private sector planning and management expertise and financial resources. An evaluation of the relative success, and the policy implications of that success, of various attempts to collaborate with the private sector would be a logical starting point.

5. Rural Towns

Discussion: Research is badly needed on how best to facilitate the development of existing commercial centers and rural towns within or adjacent to new lands settlement areas so as to best enhance the development potential of new lands settlement in terms of integrated area development. Comparative research is also needed on the difference in financial costs between developing old towns and creating new towns and on the extent to which the latter actually restrict the development of both.

6. The Phasing of Infrastructure

Discussion: Here the emphasis should not just be on physical infrastructure for developmental purposes but also on social infrastructure to make settlements more attractive places to live not just for settlers and their families but also for administrators and other categories of nonfarm personnel. Phasing, of course, will vary according to settlement design, being different, for example, where worker/settlers are employed as opposed to where settler families arrive together.

7. Mechanisms for Combining Spontaneous and Sponsored Settlers

Discussion: To offset the disadvantages of spontaneous settlement and to utilize the energy and enterprise of such settlers, as well as to reduce the financial costs of sponsored settlement, it is crucial to investigate possible ways to combine both types of settlement. Very little comparative research has been carried out on

different approaches to such integration.

8. Land Tenure

Discussion: What is needed here is a careful assessment of different forms of land tenure (leasehold, share-cropping, individual tenure, communal tenure etc.), and of the length of trial periods and settler status during those trial periods, as they relate to settler productivity and participation. What are the implications, for example, of delaying the issuing of land titles to individual settler families (as on FELDA schemes as opposed to their allocation within the first five years (as in Northern Parana)?

9. Settler Production Strategies and Labor Preferences

Discussion: Little is known about the circumstances under which settlers shift from a risk adverse to a risk taking orientation, hence bringing to a close the Transition Stage (Stage Two). At the same time, more research is needed on whether or not settlers throughout the tropics and subtropics do in fact follow rather similar investment strategies once they begin to diversify their farming systems. Moreover, as income levels rise, under what circumstances are settlers more apt to pursue off-farm as opposed to on-farm investments and to purchase imported consumer goods. Such topics have important policy implications in terms, on the one hand, of shortening the duration of Stage Two and on, the other hand, relating settler initiative more toward the achievement of integrated area development goals. For example, can credit and better rural -- urban terms of

trade (in the form of more favorable producer prices, for example) stimulate more on-farm investment and less off-farm employment of farm family members, hence increasing nonfarm employment generation?

In terms of labor preferences very little is known about the willingness of settlers and especially of the second generation to continue farming at different levels of income.

10. Social Organization of New Lands Settlement

Discussion: Research is badly needed on how settlers organize themselves within new lands settlement communities, with special emphasis on voluntary organizations such as self-help and benevolent associations during Stage Two, and such other groupings as school committees, cooperatives, credit unions, women's groups, farmers associations and water user associations, so that this knowledge can be used to assist the emergence of stronger participatory action organizations for undertaking operations and maintenance work (on roads and irrigation systems), and for providing credit and marketing services.

11. Farm Laborers

Discussion: Granted the propensity of settlers to hire labor as their incomes rise, much more research is needed on the status and needs of seasonal and permanent farm laborers on new lands settlements, and on their preferences for the future, not just to improve their social and economic condition, but also to channel their initiative more effectively into the development process by enabling

them, for example, to take over control of farms without heirs or to move into nonfarm industrial and service occupations.

D. INSTITUTIONAL RESPONSIBILITIES FOR RESEARCH

There is a special need for experimental research, for topical research, and for long-term comparative research. Of these three general types, experimental research will deal in large part with appropriate farming systems. It should be based at agricultural research stations as described in Chapter 6, provided the linkages to universities and other research centers exist to ensure that such research is not restricted to agronomic and technical components alone.

As for topical and long-term comparative research, a strong argument can be made that at least part of this research should be carried out by settlement agencies themselves. This is not only because they should become more aware of the importance of monitoring and evaluating the settlement process but also because they should have an internal capacity to undertake that research. Both with and without the encouragement of donors, such settlement agencies as FELDA and the Rahad Corporation (Sudan) have developed a capacity to undertake socioeconomic research.

The Rahad case is a particularly interesting one because, with assistance from the Ford Foundation, a special effort has been made to articular the socioeconomic research unit to outside institutions. While there is the expectation that settlement agencies will pay more attention to research that is carried on by its own staff, there is

also the risk that such research will be used to justify existing policies or preconceptions rather than to objectively evaluate particular problems in terms of a range of possible options. For example, centralized, autonomous agencies may use their research capacity in a way which will centralize still further management responsibilities. The Rahad socioeconomic research unit is set up to reduce such risks by having the head of the unit responsible not just to the Rahad Corporation but also to the Minister of Agriculture and to a Steering Committee. This Committee is composed of agricultural economists and other social scientists from the universities and such research oriented governmental organizations as the Agricultural Research Corporation and the Economic and Social Research Council of the National Council for Research. Not only do committee members advise on the research program and evaluate its results, but -- in the case of university representatives in particular — they also help recruit research personnel including students for higher degrees who are encouraged to undertake dissertation research on the Rahad Scheme.

In Indonesia, the World Bank is helping the Directorate General of Transmigration develop an evaluatory capacity, while both the Bank and US AID have funded topically oriented monitoring and evaluatory research of assisted projects through Indonesian universities. While the results of such research often are not especially satisfactory, the money is well spent if its use leads to an improvement of policy oriented in-country research capabilities. This has already occurred in Sri Lanka, where university research funded by both the Mahaweli authorities and the community of donors

has contributed to such important policy decisions as the need to incorporate host communities -- on a priority basis -- within the various Mahaweli schemes. Currently the Ministry of Lands and Land Development is considering establishing a Centre for Settlement and Land Tenure Studies and Training which would carry out a wide range o policy oriented research and training activities (see Scudder and Wimaladharma for discussion of how such an Institute might perform).

While improving host country research capabilities is of crucial importance, there is also a need for comparative long-term research which might be best coordinated through an agency like the World Bank. What I have in mind here are more general studies of a small number of carefully selected settlement areas in different agro-ecological zones which would be both comparative and long term. As comparative studies th y would utilize a common methodology; as longitudinal studies they would followed the development of the sample settlements through time. Their purpose would be to learn more about the development potential of new lands settlements and about ways to realize that potential.

Initially, it would make sense to study several of the older, more successful settlements to ascertain just what their development impacts in fact have been. Obvious examples would include Northern Parana (Brazil), Abis (Egypt), Minneriya (Sri Lanka), some of the older FELDA projects (Malaysia), and Metro (Indonesia), although studies should be restricted to settlements which have been carefully studied in the past. A few smaller projects like Mwea (Kenya) and Santo Domingo (Mexico) might also be included, along with one or two

of the more successful spontaneous settlement areas (such as Parigi in Sulawesi which has already been studied by the World Bank's Davis). However, though such studies are especially timely in terms of their policy implications for the design of new settlements, the ongoing development of others and the rehabilitation of still others, I would hope that a few studies of settlements which are right now in the planning stages could be initiated and continued through time. While funded through a donor agency like the World Bank, such research could be especially effective if it was based on the collaboration of research institutions both within and without the tropics and subtropics so as to access the best research expertise in terms of theory and methodology.

VI. SUMMARY: AN IDEAL SETTLEMENT PROCESS

The global evaluation has convinced me that government sponsored settlement has a yet to be realized potential to catalyze a process of integrated area development in carefully selected portions of the tropics and subtropics. For while planners overestimate the magnitude of rates of return during the first five years, they underestimate the long-term potential. This potential relates to both irrigation-based and rainfed farming systems. In stating this I do not wish to give the impression such potential will be easy to realize. The majority of government sponsored settlements cannot be considered a success in terms of either direct or indirect benefits. Furthermore, they are fraught with problems for the settlers who are the major risk takers. For example, of forty sponsored settlements on

which we have sufficient data, the majority were characterized by three or more major problems at the time of study, major problems including such factors as settler dependency; on-farm problems due to poor soils, lack of fertilizers and credit etc.; inadequate infrastructure; and institutional problems relating to inadequacies on the part of the settlement and other government agencies.

Such problems are not easily solved especially by government organizations with annual funding and relatively short-term horizons (it probably is not coincidental that several of the more successful new lands settlements in terms of integrated area development involved private colonization companies). But they are not intractable. For that reason they should be amenable to solution through more careful planning, implementation, management and evaluation.

In the paragraphs that follow I will conclude by briefly outlining the distinctive features of an ideal settlement process. This is not presented as a new prototype or "model" to be superimposed on a particular area. Rather it represents a composite, based on features -- drawn from many settlement experiences -- which would appear to increase the possibility for success. These features have never been combined in a single case so that little can be said about how they would fit together and evolve through time. Furthermore, because of the distinctiveness of national ideologies and development policies, of the background and experiences of prospective settlers, and of the differential nature of agro-ecological zones, some features of the composite would be inappropriate. Notwithstanding these cautions, I think that we know enough now about the settlement process

that the presentation of a ideal settlement "model" can help national and international policymakers and planners, administrators, settlers and other settlement participants improve the planning, management, implementation, and evaluation process. At the very least, planners should consider the appropriateness of the "ideal" and not introduce major variations unless these are based on convincing reasons.

The major goal of an ideal settlement process is to catalyze a process of integrated area development with growing linkages between the agricultural and the industrial sectors within the settlement area. Though initially the settlement population numerically is dominated by settler families, as the settlement area evolves the proportion of farm laborers and of nonfarm workers increases until eventually nonfarm workers employed in rural service centers, rural towns, and urban areas predominate. To reduce financial costs and the type of organizational inadequacies which so often dominate sponsored settlements, careful attention should be paid from the start to the proper balance between settlers and other settlement residents, the private sector, and the public sector in the provision of inputs required for settlement success.

To realize such a goal, settler families must number in the thousands. Appropriate farming systems should be sufficiently diversified to provide economic opportunities to all family members to realize a net income high enough to stimulate demand for a wide range of production and consumption goods and services which can be locally provided, and to produce a variety of agricultural commodities for meeting the food needs of farm laborers and nonfarm workers, and for

stimulating the emergence of agro-industry. Within the farm system, special emphasis should be placed on the crop and livestock but not the off-farm components.

From the start there should be major government involvement, with very careful attention given to how government inputs can be best provided through time in terms of organizational structure. Where a special or national settlement agency is involved, mechanisms should be built into its enabling legislation or terms of reference which not only encourage the handing over at appropriate times of certain managerial and other functions to the decentralized departments of relevant ministries, rural and municipal councils, and local and participatory agencies, but also include fiscal and other mechanisms to insure that such handing over occurs. Where a decentralized form of administration is established with one agency responsible for coordinating the activities of other agencies, that agency should report to a high enough authority (a council of ministers, perhaps, or the vice president, prime minister, or even president) to ensure compliance from other cooperating agencies in the achievement of clearly stated settlement goals.

Thorough planning should precede implementation, with feasibility studies including climatic, soil and hydrological surveys of potential settlement areas, and socioeconomic surveys of the land tenure, land use, and sociocultural systems of the host population. Once specific settlement areas are selected, more detailed soil, hydrological and host-oriented studies should commence, and appropriate agricultural experiment stations, with a farming system

(as opposed to a crop specific) orientation, should be established. The settlement type should attempt to include host, spontaneous, and government sponsored "outsider" settlers not just as mechanisms to provide opportunities for all three populations and to tap into the enterprise and initiative of the spontaneous settlers, but also to cut the financial costs of the settlement process. For settler recruitment, both spouses should be interviewed and settlers with a mix of farm and nonfarm skills should be selected.

All types of settlers should be encouraged to settle in nucleated communities in which household plots are large enough for women to grow vegetables and fruits and raise some livestock and for the second generation heir to build a home next to that of his/her parents. These communities should be articulated to a carefully planned and hierarchically organized network of higher order service centers and townships which should incorporate existing commercial centers wherever possible, and which should be planned with the needs of both settler and nonfarm resident (including government officials) in mind. Orientation courses for at least a minority of settlers (with some drawn from each community) should be undertaken as soon as possible after the arrival of each phase of settlers.

The provision of infrastructure should be phased, with initial emphasis on roads; potable water (and water for irrigation where relevant); preventive medical services (malarial control, for example); appropriate research-based extension advice; and credit. Generally speaking, settlers should be responsible for building their own houses, although in certain agro-ecological zones it may be

necessary for government to stockpile local building materials. Throughout, initial government inputs should be targeted to achieve economic and social viability of settler communities at the earliest possible moment so as to facilitate the shift from the second stage of transition to the third stage of socioeconomic development.

Economic assistance should have priority over social infrastructure and housing — while the provision of such social infrastructure as schools, clinics and other community services should have priority over housing, which is best left to settler initiative. Under economic assistance I have selected out roads, research-backed extension services, and credit for special emphasis during the initial years because of their inadequacy, time and again, in settlement planning and implementation. Properly maintained access roads are crucial not only to move inputs into the settlement area and produce out of it, but also to reduce the sense of isolation from the point of view of the settlers. Appropriate research-backed extension advice is needed for both production related and ecological reasons, while credit is crucial from the start if the failure or "drop-out" of settler families and the risks of land consolidation in the hands of a few are to be reduced.

There is increasing evidence that production increases and project success in connection with rural development is closely correlated with the participation of local beneficiaries in the development process. For this reason, special emphasis need be placed on how best to involve the settlers in the preparation of the lands that subsequently they will be farming and to facilitate the emergence

of settler dominated local organizations during the early years of implementation. In the case of such organizations as water user associations, community organizations, and cooperatives, these should be encouraged to federate up to the project level so as to increase their capacity not only to organize community labor for development purposes and to express settler needs but also to enable the local population to compete more effectively for scarce resources at the district, regional, and even national level.

Though marketing facilities usually are not crucial during the initial years when many settlers are struggling to achieve self-sufficiency, they become crucial as soon as settlers begin to produce for both local, regional, and national markets. As defined here, marketing facilities include those for both storage and transportation. These can be provided by a wide range of organizations, the exact nature of which need be worked out in each instance. The need for market centers right up to the level of the regional town increases as the settlers begin to shift from a Stage Two to a Stage Three orientation. At that time implementation of a policy to develop rural service centers and rural towns should be accelerated through such mechanisms as the provision of credit for business loans. At the same time, efforts should continue to make rural towns attractive places to live not just for the owners of commercial enterprises and their employees but also for settlement agency and other government officials. This can be done through the construction of appropriate housing (in contrast to the policy for settlers) and the phased upgrading and provision of educational and

medical facilities, post and banking services, and recreational opportunities -- with the upgrading of existing commercial centers favored over the construction of new towns wherever possible.

General prescriptions become more difficult as the settlement area evolves, with the dynamics of the development process becoming more complicated. As more and more factors come into play, with ongoing shifts in their proportional importance, policy prescriptions which are not based on an ongoing process of monitoring and evaluation become more difficult. But a capability for carrying out ongoing monitoring and periodic evaluations should be present from the start since the identification and solution of one set of problems in itself can lay the basis for new problems. As the settlement area evolves, new constraints and strengths can be expected to continually arise. Rural/urban terms of trade at the national level may shift in such a way that they effect the settlement area either adversely or favorably. New health hazards (such as schistosomiasis in the case of irrigation projects) may sap settler vitality, while the proliferation of rats, wild pigs, and a wide range of insect pests, the appearance of new diseases of crops and livestock; and major environmental changes (owing to increased land degradation and riverine siltation, or to an increased incidence of frost or drought) can bring on major setbacks. Though monitoring and evaluation can not be expected to identify all problems before they reach critical proportions, properly done it can easily pay for itself in terms of what problems are identified and then acted upon in a timely fashion.

One function of monitoring and evaluation is to ascertain the appropriate time for handing over certain managerial responsibilities from the settlement agency or agencies to settlers and local government institutions. This, of course, requires monitoring and evaluating the capabilities of those institutions — with weaknesses identified so that they can be offset by appropriate training and other assistance, and strengths also identified so that they can be built upon. Though aspects of centralized management may have to continue where settlement is part of large-scale river basin development projects or major systems of irrigation, this is not necessarily the case even there. It is still less necessary during Stage Four in the case of settlement based on rainfed systems of agriculture.

APPENDIX 1

SETTLEMENT AREAS AND PROJECTS SELECTED FOR COMPARATIVE ANALYSIS LISTED BY LOCATION, TYPE OF SETTLEMENT, AND DATE OF FIRST SETTLERS

AFRICA

Ghana

*Settlement in connection with the Volta River Project
Compulsory (1963)

Ivory Coast

*Settlement in connection with the Bandama River Project
Compulsory (1969)

Kenya

Mwea Irrigation Settlement Scheme
Government sponsored (1954)

*Small-holder settlement in the former White Highlands
Government sponsored (1962)

*Shimba Hills Settlement Scheme
Government sponsored (1952)

Nigeria

*Settlement in connection with the Kainji Dam Project
Compulsory (1963)

Western Nigerian Farm Settlement
Government Sponsored (1959)

Senegal

*Terres Neuves Settlement Project
Government sponsored (1972)

Somalia

Settlement in connection with drought
Compulsory (1975)

Sudan

*Gezira Irrigation Settlement Project
Government sponsored (1925)

Khashm el Girba Irrigation Settlement Project
Compulsory and government sponsored (1964)

*Rahad Irrigation Settlement Project
Government sponsored (1977)

Tanzania

Tobacco based settlement schemes
Government sponsored (1952)

Upper Volta

Settlement in connection with Onchocerciasis control
Government sponsored (1974) and spontaneous

Zambia

*Settlement in connection with the Kariba Dam Scheme
Compulsory (1958)

MIDDLE EAST

Egypt

*Abis Settlement
Government sponsored (1967)

*Kom Ombo Settlement
Compulsory (1964)

Israel

Romema: a Moroccan Jewish Moshav[1]
Spontaneous with massive government support (1956)

Jordan

Settlement under the Jordan Valley Authority
Government sponsored (1972)

SOUTH ASIA

India

Pilibhit Colony (Uttar Pradesh)
Government sponsored (1958)

Settlement within the Indian Terrai (Uttar Pradesh)
Government sponsored (1948)

H. B. Halli settlement in Mysore in connection with the Tungabhadra River Basin Project
Compulsory (1952)

Kaki settlement in Assam
Government sponsored (1952)

SRI LANKA

*Debara-Ara-Wewa
Private sector and government sponsored (1974)

*Gal Oya
Government sponsored (1951)

*Mahaweli settlement program
Government sponsored (1973)

*Minipe irrigation settlement project
Government sponsored (1939)

*Minneriya irrigation settlement project
Government sponsored (1933)

Muthu-Iyan-Kaddu-Kulam
Government sponsored (mid-1960s)

Rajangana irrigation settlement project
Government sponsored (1965)

*Uda Walawe
Government sponsored (late 1960s)

SOUTHEAST ASIA

Indonesia

Settlement in the Parigi Area, Sulawesi
Spontaneous (1906) and government sponsored (1960s)

Belitang, Sumatra
Government sponsored (1937) and spontaneous

Way Abung Transmigration Settlement
Government sponsored (1965) and spontaneous

*Luwu District settlement at Bone-Bone, Sulawsi
Government sponsored (1938)

Spontaneous settlement in Lampung, Sumatra
Spontaneous (1951)

Gedongtataan settlement, Sumatra
Government sponsored (1905)

Malaysia

FELDA settlement projects
Government sponsored (1956)

Chinese settlement in Sabah
Spontaneous with government assistance (1905)

State settlement in Kelantan
Government sponsored settlement (1957)

Resettlement of Chinese-speaking Malaysians during the "emergency"
Compulsory (1950)

Nepal

*Settlement in the Terrai
Spontaneous (late 1940s) and government sponsored (1960s)

Philippines

New lands settlement in Mindanao[1]
Spontaneous (1919) and government sponsored (1938)

Settlement in Luzon[1]
Spontaneous (1900) and government sponsored (1953)

Narra Settlement Scheme, Palawan and adjacent areas
Government sponsored (1949) and spontaneous (1903)

San Jose Settlement, Palawan
Spontaneous (1931)

Thailand

Resettlement in connection with the Nam Pong Dam
Compulsory (1964)

Vietnam

The Agroville resettlement program
Compulsory (1959)

MELANESIA, MICRONESIA and POLYNESIA

Melanesia

Settlement on the Gazelle Peninsula, Papua-New Guinea
Government sponsored (1955)

Silanga resettlement, West New Britain
Spontaneous (1953)

Kioa settlement, Fiji
Spontaneous (1948)

New lands settlements in the Solomon Islands
Government sponsored (1938) and spontaneous (1955)

Maat resettlement to Efate Island, New Hebrides
Spontaneous with outside assistance (1952)

Micronesia

Bikinian Resettlement
Compulsory (1946)

Enewetak resettlement
Compulsory (1947)

Polynesia

Resettlement of Micronesians to Sydney Island
Phoenix Island Group[1]
Government sponsored (1938)

CENTRAL AMERICA

Belize

*Settlement of the Kleine Gemeinde Mennonites at Spanish Lookout[1]
Spontaneous (1920s)

Guatemala

Settlement in El Estor Minicipio
Spontaneous (about 1950)

Settlement in Department of Esquintla
Government sponsored (1956)

Mexico

Santo Domingo Settlement
Government sponsored (1949)

Papaloapan Settlement
Government sponsored (1952)

Nicaragua

Eastern Nicaragua
Spontaneous (1940s)

Candelaria River Settlement
Government sponsored (1964)

Mennonite colonization[1]
Spontaneous (1922)

SOUTH AMERICA

Argentina

Settlement in the Misines area, with special emphasis on the European settlement of Monte Carlo[1]
Spontaneous and company/government sponsored (1920)

Jewish settlements including Colonia Baron Hirsch[1]
Refugee settlement facilitated by the Jewish Colonization Association (1905)

Bolivia

Mennonite Settlement in Santa Cruz Department[1]
Spontaneous (1967)

San Julian settlement of Santa Cruz Department
Government sponsored (1972)

Brazil

Japanese settlement in the Amazon[1]
Sponsored — Japanese Colonization Company (1920)

North Parana Province Colonizatin
Facilitated by a British financed colonization company (1928)

Mennonite settlement in Parana[1]
Spontaneous (1930)

Transamazon Highway Settlement
Government sponsored (1971)

Mato Grosso Settlement
Government sponsored (1924)

Colombia

State of Caqueta Settlement
Spontaneous and government sponsored (late 1950s)

Guiviare Settlement
Spontaneous (1940)

Paraguay

Japanese colony of La Colmena[1]
Sponsored — Japanese colonization company (1936)

Mennonite colonization in eastern and western Paraguay[1]
Spontaneous (1927)

Peru

Settlement in the lowland tropics
Spontaneous and government sponsored (about 1940)

San Lorenzo settlement in the north coastal region
Government sponsored (1961)

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*Settlement areas with which I am personally familiar but which were not abstracted during the global evaluation are marked with asterisk.

[1]Ethnicity or religious affiliation of settlers mentioned where they originate outside the country of settlement.

APPENDIX 2

QUESTIONNAIRE FOR FIRST GENERATION SETTLERS
(and where appropriate for their children and grandchildren)

Name of interviewer_____ Date of interview_____

Name of settlement area_____ Date settlement started_____

Type of settler [government-selected, gov't-assisted, spontaneous, etc]_____

Interview number_____ Name of settler_____

Relationship to head of household [wherever possible the interviewee should be the head of the household]_____

Identification criteria [it is important to be able to re-identify the interviewee for future research; for this purpose, include such criteria as: identity card/house number, village/ward/tract number, division, and so on]_____

Nationality_____ Ethnic group_____ Religion_____

Age [or date born]_____ Number of years of education_____

Year interviewee first came to settlement area [settler may have come first as a laborer, businessman, etc]_____

Year interviewee came to present location_____

Year interviewee began to cultivate at least part of present holding_____

Present landholdings of head of household [specify unit of measurement: acres, bigha, feddan, hectares, etc]:

	Allotted	Rented in(+)/ Sharecropped	Rented out(-)/ Sharecropped out
Area of irrigated cropland			
Area of non-irrigated cropland (permanently cultivated)			
Area of non-irrigated cropland (cultivated on basis of shifting or slash-and-burn cultivation)			
Area of house/homesite plot			

Total number of landholdings [including house plot]_____

Major cash crops [including livestock]_____

Current livestock:

Type	Number	Owner/Manager [household head, spouse, son, daughter, etc]
Buffalo		
Cattle		
Sheep-goats		
Pigs		
Fowl [chickens, ducks, doves, etc]		

Size and type of landholdings in village of origin prior to settlement_____

Number and type of livestock in village of origin prior to settlement_____

Type of house [including number of rooms] in village of origin prior to settlement_____

Major occupations and skills prior to becoming a settler [it is particularly important to include those which may have helped the interviewee after becoming a settler]

Characteristics of adult family members [14 years and older] working on the family farm:

Name	Relationship to Household Head	Age	Sex	Number of Years of Education	Occupation [also note if part-time or full-time]
1					
2					
3					
4					
5					
6					

Characteristics of adult family members working off the family farm:

Name	Relationship to Household Head	Age	Sex	Number of Years of Education	Occupation [note if part-time or full-time]	Location
1						
2						
3						
4						
5						

Dependents under 14 [regardless of relationship to household head]:

	Ages 9 and Under	Ages 10-13
Number Living On the Family Farm		
Number Living Off the Family Farm		

A. History of household head's career as a settler [please ask the settler to summarize in his own words his experiences as a settler, noting the advantages and disadvantages of being a settler]. Continue history on the back of Page 2 and if necessary on back of Page 3.

Continuation of open-ended questions [please write answers to the following questions as much as possible in the settler's own words]:

What were the main problems that you had during the first year after you received your present allotment?

C What were the main problems that you had during years 2 to 5 after you received your present allotment?

D 1. When did you begin to feel "at home" in this settlement? [try to get the settler to give a date here]

2. What factors or reasons were responsible for your feeling "at home" at that time? [we want the settler to tell us in his own words why he began to feel at home at that particular time]:

E 1. As a settler in this place, what time period has been best for you? [ask the settler to give dates; if he cannot, then relate the time period to historical events which the settler can remember for the period in question]:

2. What are the reasons why that time period was best?

F 1. As a settler in this place, what time period has been worst for you?

2. What are the reasons why that time period was worse?

G In your own words, please explain how your position has improved and how it has gotten worse during the past five years?

1. Ways in which life has improved?

2. Ways in which life has gotten worse?

F 1. What are the major problems that you and your family now have?

2. Please tell us how you believe these problems can best be solved?

Interview Number___

Other Economic Activities

1. Since you became a settler in this place, have you purchased additional land in any place? _____

   If yes, write the following for each holding:

	Size	Date Purchased	Location of Holding	Price Paid	Relationship to Seller
a					
b					
c					

2. Since you became a settler in this place, have you sold, mortgaged, leased, or otherwise allowed others to cultivate any of your land?

   If yes, write the following for each transaction:

	Size	Date	Location of Holding	Nature of Transaction [sale, rental, lease, etc]	Relationship to User
a					
b					
c					

3. Sri Lanka question [omit]:

4. Current Additional Economic Activities

	Type of Activity	Date Started	Location	With Whom/ Who Manages
a	Hiring Out Buffalo/Oxen			
b	Hiring Out Ox/Bullock Cart(s)			
c	Hiring out 2/4-wheeled Tractor(s)			
d	Room Rental to Boarders			
e	House Rental to Boarders			
f	Shop, Boutique, or Other Small Business			
g	Contractor for Supplies or Services			
h	Other Activities [please specify]			

5. History of any abandoned economic activities [giving date started, date

H (continued) Other Economic Activities

6. Have you built a house in your village of origin or anywhere else outside the settlement? If yes:

When?	Where?	Who lives in it?

7. Are you now working for wages? Yes _____ No _____

If yes, what type of work do you do? _____

When did you begin this work? _____

If no, when did you last work for wages? _____

What kind of work did you do at that time and for how long? _____

I Have you educated any of your dependents outside of the settlement area? _____

If yes, how many? Where did you send each one? And why did you choose schools outside the settlement area?

J Indebtedness and Savings

1. Are you in debt to private moneylenders now? _____

If yes, why? _____

If no, when were you last in debt and why? _____

2. Are you in debt to cooperatives/banks now? _____

If yes, why? _____

If no, when were you last in debt and why? _____

3. Are you in debt to relatives/friends now? _____

If yes, why? _____

If no, when were you last in debt and why? _____

4. Do you have a savings account (bank, postal, etc) and/or own shares? _____

If yes: Type of Savings	Date Started	Location	Amount of Savings [don't push interviewee if reluctant]

5. Sri Lanka question [omit]:

K Labor Constraints

1. Did you have enough on-farm family labor for agricultural activities during the first five years that you were working this allotment? _____
2. If no, were you able to recruit additional labor through:
   a. Your village of origin [specify whether relatives or nonrelatives] _____
   b. Hiring labor from outside your village of origin _____
   c. Exchange or other self-help labor within the settlement _____
   d. Other _____
3. Do you have enough on-farm family labor for agricultural activities now? _____
4. If no, do you need permanent or seasonal help? _____
   a. If permanent, how many laborers do you need? _____
      How many laborers do you now have? _____
   b. If seasonal, for what activities do you need seasonal labor?

Activity	Number of Laborers Needed	Number of Laborers Actually Hired for That Activity During the Last Cultivation Season
1		
2		
3		
4		

L Local Organizations and Community Integration

1. Membership in local organizations [including village councils, cooperatives, funeral and other self-help associations, school boards, temple/religious organizations, etc]:

Name of Organization	Date Joined	Position Held [member, chairman, etc]
a		
b		
c		
d		
e		

2. Settler evaluation of the capacity of such local organizations to represent and protect settler interests:

3. Were you married at the time you received your present allotment? _____
   If no, date of marriage _____
4. When did you bring your wife to your present allotment? _____

L (continued) Local Organizations and Community Integration

5. If you had children when you received this allotment, when did you bring your children here? _____

6. When did you last visit your village of origin and why? _____

_____

7. When did you first carry out a religious ceremony in your present home? _____

When did you first give alms after coming to this settlement? _____

8. When did you first make a pilgrimage after coming to this place [and where] and when did you last go [and where]? _____

_____

9. When were the first collective religious activities started in this community [for example, to build a temple, a mosque, a church, or a shrine] and what proportion of the people participated? _____

10. When did you first begin to vote?

a. In local elections in this place _____

b. In national elections in this place _____

11. Community viability [here the settler should be asked to compare social life in the settlement with that in his community of origin; the purpose of this question is to get the settler's evaluation of the settlement as a place to live -- to find out if the settler sees it as a viable community sociologically speaking]:

M Extension Services

1. What new farming knowledge have you learned from extension personnel during the past five years [if answer is none probe for the reasons why]_____

_____

_____

2. When were you last visited by an extension worker? _____

3. Sri Lanka question [omit]:

4. When did you last attend a meeting at which an extension worker was present?

_____

N Land Tenure, Land Subdivision, and Land Sales

1. What type of tenure does the head of household have over this farm at the moment?

_____

If he has a certificate of ownership, when did he obtain it? _____

2. Have any of your neighbors subdivided their current holdings in any way through land exchanges: loaning, sharecropping, leasing out land, sales, etc? [the purpose of this question is to learn something about the extent to which settlers are subdividing -- either legally or illegally -- their holdings]_____

If yes, what proportion approximately have subdivided their land and in what ways?

_____

_____

_____

3. Have any of your neighbors increased their landholdings in any way through land exchanges, sharecropping or other arrangement, or land purchases? _____

If yes, what proportion have increased their landholdings and how have they done that? _____

_____

_____

O Who is your nominated successor and why did you name that person? [if the interview has no nominated successor, he should be asked, "whom do you plan to have work your land when you retire?"]_____

P If you were allowed to subdivide your land, what would you plan to do when you retire

_____

_____

Q Wealth Index [see next page]_____

R Comparison of Current Position with Other Areas

1. In what ways are you now better off [and worse off] than if you had stayed in yo village of origin rather than coming to this settlement?

a. Better off_____

_____

b. Worse off_____

_____

2. In what ways is your wife better off [and worse off] than if the two of you had stayed in your village of origin [wherever possible ask that question directly t the wife herself]

a. Better off_____

_____

b. Worse off_____

_____

R (continued) Comparison of Current Position with Other Areas

3. In what ways are your children better off [and worse off] than if your family had stayed in your village of origin?

   a. Better off_____

   _____

   b. Worse off_____

   _____

4. In what ways is your family better off [and worse off] than your neighbors who live outside the settlement? [this question is designed to get the interviewee to compare his position with that of the host population -- that is, with the indigenous residents of the area if any were present prior to the begining of the settlement activities]

   a. Better off_____

   _____

   b. Worse off_____

   _____

S Children

1. What careers [in order of preference] would you like your children to follow?

   a. Sons? _____

   _____

   b. Daughters? _____

   _____

WEALTH INDEX [25 points maximum]

[The purpose of this index is to rank interviewees in regard to other interviewees on the same settlement, on different settlements in the same country, and on different settlements in different countries. Much of the information can be obtained through observation, but where it cannot the interviewer MUST ASK WHATEVER QUESTIONS ARE NECESSARY TO OBTAIN THE INFORMATION NEEDED. After points are totalled up, insert total after Q on page 10.]

NATURE OF HOUSING	POINTS
1. Tile or other improved roofing and over five rooms	5
2. Tile, etc, roof; 4-5 rooms	4
3. Tile, etc, roof; 1-3 rooms	3
4. Thatch or cadjan roofing; over 2 rooms	2
5. Thatch, etc. roofing; 2 rooms or less	1

NATURE OF DOMESTIC WATER SUPPLIES AND SANITATION FACILITIES	
1. Improved [concrete] well/piped water supply and water-sealed/flush toilet	5
2. Improved well, etc, OR water-sealed toilet, etc	3
3. Unimproved well and unimproved sanitation facilities	1

WEALTH INDEX (continued)

	POINTS
HOME FURNISHINGS	
1. Five MAJOR items of furniture [including glassed-in cupboard, sewing machine, settee set, large dining room table-with chairs, radio-cassette player, large wall clock, large radio, spring bed-mattress, etc]	5
2. Three to four of the above	4
3. One to two of the above	3
4. None of the above but cane or simple wooden furnishings and a small radio	2
5. Small radio or cane-wooden chairs, etc, only	1
D FARM EQUIPMENT/TRANSPORTATION	
1. One or more motorized vehicles [2 and/or 4-wheeled tractors, car/lorry, etc]	5
2. No motorized vehicles but water pump plus 2 trained buffalo [or bullocks with cart] and a bicycle	4
3. No motorized vehicles or pump but 2 trained buffalo (or bullocks with cart] and a bicycle	3
4. Bicycle only [no trained buffalo/bullocks]	2
5. No bicycle; uses simple hand tools only	1
E LIGHTING	
[Here there are two possibilities depending on whether or not electricity is available to the settler.]	
IF ELECTRICITY IS AVAILABLE, use the following categories:	
1. Electric lights plus three or more electrical appliances [such as electric refrigerator, fan, stove, clock, radio, etc]	5
2. Electric lights plus two appliances	4
3. Electric lights plus one appliance	3
4. Electric lights only [no appliances]	2
5. No electrification but petromax lamp	1
IF NO ELECTRIFICATION IS AVAILABLE, use the following categories:	
1. Kerosine [parafin] or other fridge, kerosine or other stove/ cooker, plus one other major appliance [including water pump] but not counting petromax lamps	5
2. Two appliances such as the above	4
3. One appliance such as the above plus two petromax lamps [or other type of pressure lamp]	3
4. One appliance such as the above plus one petromax lamp, etc	2
5. Petromax lamp, etc, only	1

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