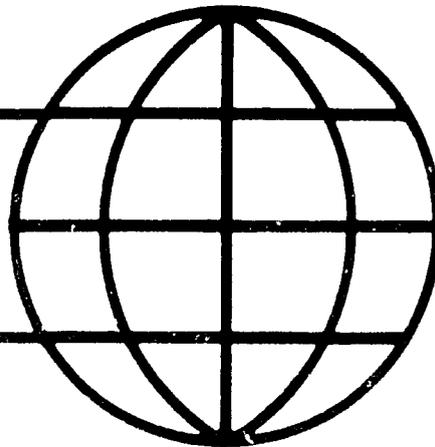
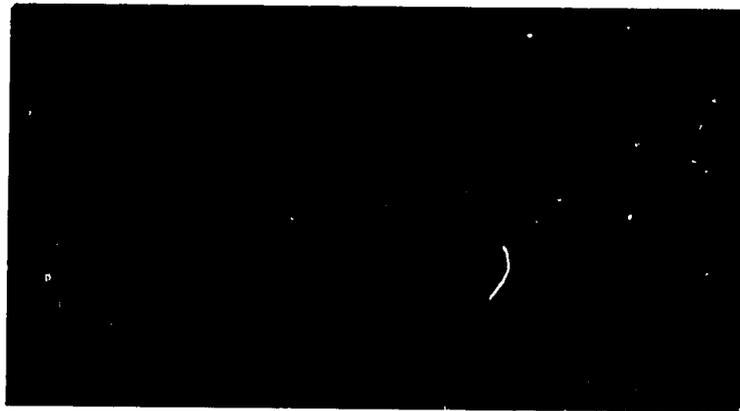


**COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS
AND NATURAL RESOURCE SYSTEMS ANALYSIS**



Clark University
International Development Program
950 Main Street
Worcester, MA 01610

Institute for Development Anthropology
Suite 302, P.O. Box 818
99 Collier Street
Binghamton, NY 13902

New-Lands Settlement and
Regional Development:
The Case of San Julian, Bolivia

by

Michael Painter

Carlos A. Perez-Crespo

Martha Llanos Albornóz

Susan Hamilton

William L. Partridge

December 1984

Cooperative Agreement on Settlements and Natural
Resource Systems Analysis

Agency for International Development, Institute for Development
Anthropology, and Clark University (NO. DAN-1135-A-00-1078-00)

Institute for Development Anthropology
99 Collier St., Suite 302, P. O. Box 818
Binghamton, New York 13902 U.S.A.

**REGIONAL DEVELOPMENT LINKAGES IN NEW-LANDS SETTLEMENT:
LESSONS FROM SAN JULIAN, BOLIVIA**

TABLE OF CONTENTS

I.	Introduction: Significance of San Julian	1
	A. San Julian Evaluation in Global Perspective	1
	B. New-Lands Settlement as a Development Strategy	2
	C. Success Criteria for New-Lands Settlement Projects	3
	D. The San Julian Success Story	4
II.	Summary of Research Findings and Recommendations	6
	A. Summary of Findings	6
	B. Summary of Recommendations	9
III.	Detailed Findings of the Research	10
	A. Profile of San Julian Settlers	10
	B. The Settler Production System	12
	C. Growth of Urban Functions	14
	D. Community-Level Social Organization	18
IV.	The Success of Settlement in San Julian	22
	A. Establishing and Maintaining Subsistence Production	22
	B. Commercial Production and Regional Development	25
	C. Implications of San Julian for Regional Development	29
V.	Appendices	34
	A. Research Design Employed	34
	B. Origins of San Julian	35
	C. The San Julian Evaluation Record	38
	D. Historical and Geographical Background	40
	E. Maps, Figures, and Tables	44
VI.	References Cited	52

**REGIONAL DEVELOPMENT LINKAGES IN NEW-LANDS SETTLEMENT:
LESSONS FROM SAN JULIAN, BOLIVIA**

**Michael Painter
Carlos A. Perez-Crespo
Martha Llanos Albornóz
Susan Hamilton
William Partridge**

I. INTRODUCTION: SIGNIFICANCE OF SAN JULIAN

A. SAN JULIAN EVALUATION IN GLOBAL PERSPECTIVE

The San Julian colonization project is widely perceived as a successful and innovative effort to settle highland Quechua and Aymara indigenous peoples into the subtropical lowlands of eastern Bolivia. This conclusion is largely based on the findings of abbreviated evaluations that were not informed by recent, state-of-the-art information regarding global experience with new-lands colonization. Moreover, evaluations to date have not encompassed the full range of data available regarding several serious, persistent constraints on the further economic growth of San Julian.

The research results presented here place the achievements of San Julian in global, comparative perspective, which demonstrates that the project was successful in its early stages; however, most significant outcomes of the San Julian experiment that have been the object of the U.S. Agency for International Development (USAID) "Consolidation Program" since 1979 have fallen somewhat short of expectations. Yet preliminary indicators of sustainable economic growth are present. The research, then, goes further to identify specific constraints on economic growth that, if successfully dealt with, can enhance the spread-effects of San Julian and its potential as a catalyst for genuine regional development.

Because of the many innovations cited by writers as contributing to the success of San Julian, the Institute for Development Anthropology (IDA) became interested in conducting field research on the project as part of its continuing study of new-lands settlement projects. The IDA research reported here has four goals:

- (1) To assess San Julian in light of the success criteria established through global, comparative evaluations of colonization projects recently completed (Scudder 1981).
- (2) To discover how the San Julian experience might be applied to new-lands settlement projects elsewhere.
- (3) To better understand the role of San Julian and other small-holder projects in the development of eastern Bolivia.
- (4) To provide recommendations based in a more comprehensive data analysis than heretofore available regarding ways in which the future growth of

San Julian might best be supported and promoted by interested agencies.

The research design employed to achieve these objectives is at once more comprehensive and less costly than any previous evaluation. It was implemented by a team of five field investigators, two Bolivian nationals and three from the United States, and encompassed four data-gathering techniques: study of the land-registry archives, an urbanization inventory of the project as well as of spontaneous settlements nearby, in-depth interviews with settlers from four sample settlements in San Julian and two spontaneous settlements, and key-informant interviews with a score of persons experienced in the area. (As used in this report, "San Julian" refers to the project area where settlers received specific orientation, not to nearby spontaneous settlements.) For detailed discussion of the research design and the qualifications of the research team, please see Appendix A (Research Design Employed).

B. NEW-LANDS SETTLEMENT AS A DEVELOPMENT STRATEGY

Third World nations, particularly in Latin America, have turned to new-lands settlement as a strategy for achieving development goals for several decades. There are four reasons why new-lands settlement remains an important strategy for development:

(1) The perception that the tropics and subtropics of these nations are sparsely populated and underexploited has been coupled with the realization that increases in food production over the past 40 years stem from increases in lands under cultivation, not from improvements in agricultural technology on already settled lands (Schuh 1975; Nelson 1973). The latter are narrowly concentrated in the thriving commodity export sector, while the bulk of increased productivity of food consumed continues to come from bringing new lands into cultivation.

(2) Another reason for the increased importance of new-lands settlement has been to resettle displaced populations as, for example, in the case of catchment and reservoir areas of hydroelectric dams, taking advantage of the forced resettlement to bring new lands into productivity (Chambers 1970; Scudder 1973; Partridge 1983). Expensive petroleum costs indicate that resettlement produced by hydroelectric and other large-scale public-works projects will continue.

(3) Relief of population pressure on the temperate zone lands, which are widely perceived as overpopulated, is another reason for new-lands settlement schemes. This is particularly prevalent where land-consolidation schemes in the already settled zones (often coupled with urban and agribusiness development) create factor market conditions that propel migration to the tropics and subtropics (Heckadon Moreno and McKay 1982).

(4) New-lands settlement is an attractive device to assert political sovereignty over remote, little known, and thinly populated tropical and subtropical regions where national borders have been in dispute. The Amazonian region is an example, with its resources contested by several countries (Painter 1983).

Because the conditions listed here will remain salient for the foreseeable

future, enthusiasm for new-lands settlement schemes today remains quite high in development circles. This is true despite the fact that failed schemes far outnumber successful ones. Scholars and development technical experts have attributed the failure rate of new-lands settlement projects to a wide range of factors: lack of soils studies and other preparatory research (Nelson 1973); excessive administrative control (Scudder 1973; Ewell and Poleman 1980); radical technological experimentation with settlers before subsistence security was achieved (Partridge and Brown 1982; Scudder 1973; Chambers 1970); lack of settler experience with constraints of the new environment (Moran 1979); failure to maintain vital infrastructure (Ballesteros, Edel and Nelson 1970); massive abandonment of new settlement zones (e.g., 60%) due to poor health, economic, and other conditions (Chambers 1970); and so forth.

Whatever factors emerge as critical in any given case, the most frequent outcome of failed settlement schemes is displacement of the settlers: cleared forests, rudimentary infrastructure, and cheap labor attract tropical cattle ranchers and other labor-displacing production systems that quickly consolidate settler parcels into larger holdings that are then only superficially exploited (Partridge 1984; Schmink 1982).

One reason why San Julian is important is that this settler displacement has not occurred. San Julian remains today, as it was designed 13 years ago, a zone of smallholder colonists. Since examples of failed settlement projects are legion and success cases few, the San Julian experiment deserves careful consideration.

C. SUCCESS CRITERIA FOR NEW-LANDS SETTLEMENT PROJECTS

Between 1979 and 1981, the Institute for Development Anthropology (IDA) conducted a global evaluation of new-lands settlement projects (Scudder 1981). The evaluation entailed literature review of over 100 projects throughout the world and field research that was restricted to 9 projects in Africa and South Asia. The objective was to determine the factors that constitute a successful settlement project, given the large financial, human, and natural-resource costs that such projects entail, and to specify the conditions that must be met for success, thus defined, to occur.

A major conclusion was that:

Successful settlements are those that stimulate an ongoing process of integrated area development. Essential to this definition are 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 (Scudder 1981:34).

The evaluation also defined conditions that are necessary, but not in and of themselves sufficient, to generate the success of settlement projects, including:

- (1) A critical mass of settler families, numbering in the thousands.
- (2) Farming systems that are sufficiently productive and diversified to provide food and employment to a nonfarm population.

(3) Settler incomes that are sufficiently high to permit them to purchase locally made or locally available goods and services.

(4) Simultaneous growth in agricultural and nonagricultural sectors (Scudder 1981:40)

The present research findings extend these criteria to the case of San Julian, Bolivia, with specific emphasis on rural-urban economic linkages.

Linkages are defined as investment-generating opportunities entailed in the production of any given commodity (which vary considerably with the kind of commodity) that can be taken by local producers or by others outside the project area. Production linkages can be either forward or backward in the production process; an example of forward linkage exists when rice production stimulates local or external investors to sell truck-transport services (or any other needed output-using services) to producers; a backward linkage is generated when beef production stimulates investors to provide pasture seed (or any other needed input) to producers. Consumption linkages occur when new local patterns of consumption generate novel demands for food items (or other commodities) that can be satisfied by local or other producers; an example might be honey introduced into a zone by merchants, the demand for which can be satisfied by local producers. Fiscal linkages are revenue-taking opportunities for local, regional, or other authorities that are then invested in infrastructure, services, and other resources that spur further development. Social structural linkages are investment-generating opportunities created when social, political, or other forces realign relationships among social groups in such a way that new investment resources are made available to people who previously were denied access to them. (For further examples and discussion of linkages as these apply to agriculturally based development processes, see Hirschman 1977 and Partridge 1979.)

These economic linkages that flow from the choice of commodity-production regimen are primary determinants of other kinds of rural-urban links, which should be considered secondary even if essential (Hackenberg and Hackenberg 1984). The secondary links include schools, shops, stores, infrastructure and its maintenance, health, clinics, and so forth--all of which depend on the capacities of colonists to purchase services and contribute taxes out of profits earned through sale of their products. Temporary provision of some of the latter by agencies or organizations external to the community (an obvious requirement at the outset) does not obviate the necessity for their continuance to be eventually based on economic linkages between rural and urban areas.

D. THE SAN JULIAN SUCCESS STORY

The origins of the San Julian colonization project have been described by Hess (1980:102-116). They are recounted here in summary form in Appendix B (Origins of San Julian). Briefly, the project grew from general efforts of the Comité de Iglesias Unidas (United Church Committee, or CIU) to alleviate the suffering of highland settlers in the eastern lowlands. With assistance from OXFAM, the Federal Republic of Germany, and later USAID/Bolivia, the

planned colonization of San Julian was begun in 1972 under CIU's direction. Following the initial success of settling 1,372 families in 41 nucleos by 1979, USAID/Bolivia embarked on a "consolidation" phase intended to develop diversified agricultural production systems and marketing strategies for high-value commodities produced, this time implemented by the Fundación Integral de Desarrollo (Integral Development Foundation, or FIDES). The goal was to reduce settler dependency on rice and corn and to raise farm incomes.

San Julian has been proclaimed a success by a series of different evaluation teams over the last decade. Because the project has been partly funded by USAID/Bolivia, it has been evaluated by USAID technical teams supplemented by outside consultants several times over the last seven years. The early years of the project were the subject of a doctoral dissertation, and several shorter research projects carried out by independent scholars have been published.

On the whole, evaluations of the San Julian Colonization Project have ranged from highly favorable to glowing in their assessments of its success. For a detailed analysis of the series of evaluations of San Julian by Hess (1978), Castro (1978), Curtis (1978), Locatelli (1978), Stearman (1978,1980), Maxwell (1980), Solem et al. (1983), and Ward (1984), please see Appendix C (The San Julian Evaluation Record). For present purposes, we note that several factors emerge repeatedly as having impressed evaluation teams:

(1) Evaluators have emphasized the importance of a three-month orientation program that new settlers received, which combined training in land clearing and tropical cultivation with the provision of rudimentary communal shelter and PL 480 food assistance for the first four months or until the initial harvest could be realized.

(2) Frequent reference is made to the núcleo settlement pattern, in which 40 settler households are clustered around a central clearing, with the 50-hectare farm parcels radiating outward. This settlement design, including further centering of intermediate administrative and urban services for a group of nine núcleos (villages) in a central settlement along the German Highway or the Brecha Casarabe (main access roads), is supposed to provide easier linkages among the dispersed nucleos and the towns and cities of the region. This design is often cited as a reason for success because it achieves equitable and cost-effective distribution of essential services such as water and schools, because it concentrates the settler population in units thought to be large enough to encourage establishment of small businesses, and because it facilitates local community organization by maximizing face-to-face interaction among settlers.

(3) The program by which the settlers were recruited is often cited as the reason many potential settlers who might have been unlikely to succeed were discouraged from moving to the San Julian area. In essence, settlers were self-selected, but a waiting period of six months to a year after initial sign-up is hypothesized to have caused the less serious and/or capable aspirants to lose interest, while the more serious and/or capable readied themselves.

While most evaluations note in passing serious problems with health-care services, land titling, exploitative transport costs, and poor road maintenance, the overall picture that emerges is quite positive. Solem et al. (1983:21-22) assert, "The confidence in prospects for growth cannot be overstated," and

"the feeling seemed to be one of inevitability--that time and energy were sure to be rewarded." San Julian is reported to be an established agricultural area capable of providing its own food needs, with excellent prospects for further economic growth.

The same evaluation attributes the perceived success of San Julian, especially in comparison with other colonization projects (such as the nearby Chané-Piray), to the timely role played initially by USAID and to additional technical support provided San Julian (through USAID's 1979 "consolidation" program) and not available at Chané-Piray (Solem et al. 1983:18). This USAID evaluation team concludes: "It seems safe to attribute critical differences in economic impacts at Chané-Piray and San Julian to the greater AID involvement in San Julian" (Solem et al. 1983:18).

Our findings call attention to certain problems not in passing, but as significant obstacles to realization of the potential benefits of the consolidation program.

II. SUMMARY OF RESEARCH FINDINGS AND RECOMMENDATIONS

A. SUMMARY OF FINDINGS

This section briefly covers the major findings of the research, while the body of the report discusses in detail the evidence and analyses on which our findings are based.

The following findings should be prefaced by the observation that whatever success can be claimed for San Julian is structured, in some measure, by historical and geographical factors in eastern Bolivia. For example, the fact that the San Julian settlers have not as yet been swept aside by the growing cattle and agribusiness interests is in part due to the barrier to large-scale commercial development represented by the shifting banks of the Rio Grande (see Stearman 1983). During the rainy season passage is hazardous if it is possible at all. Still, large tracts of land near San Julian are being machine-cleared in 1984, indicating that outward expansion of the giant cattle industry from Santa Cruz will not long be stalled at the Rio Grande. Detailed information on the historical and geographical features of the region that affect San Julian are given in Appendix D (Historical and Geographical Background).

The following is a summary listing of major findings more fully explicated later.

(1) San Julian has achieved a subsistence production system, but commercialization of production remains merely a potentiality. To the degree that success is defined as establishment of a subsistence level of production, the assertion that San Julian is successful is correct. This report concludes, however, that reproduction of a subsistence economy is not adequate justification for a new-lands settlement project, given the high financial, human, and ecological costs entailed.

(2) Moreover, research findings raise serious doubts that the current subsistence production system of San Julian can continue very much longer.

The risk that San Julian will end up as most failed colonization projects have, with settlers being displaced or exploited as day-laborers by cattle ranchers or agribusiness firms (attracted by improving infrastructure and institutional services meant originally for the settlers), is a very real threat today.

(3) Contrary to published reports, the San Julian settlers, as well as spontaneous settlers nearby, are on arrival mature men and women and their children. The project design has been flawed by the assumption that colonists were young, single males who at some later date would bring family members or marry and start families. As a result, program components, including those of the "consolidation program," have been directed exclusively at males and bypassed the majority of settlers.

(4) The most important crops today in settler production systems are staple foods vital to subsistence of the household, but of very low value in regional or national markets: rice, corn, and manioc (yuca). The predominant resource-use pattern after 10 years is forest-fallow cultivation, the extensive agricultural pattern dependent on continual forest clearing. A negligible number of settlers has experimented with high-value cash crops, although the knowledge that these would be preferable is practically universal.

(5) Low-value commodities produced in San Julian offer almost no backward production linkages; all inputs required by the producer are supplied at the individual-household level. Forward production linkages generated include a handful of individual-settler-owned rice and corn hullers and the San Julian Multipurpose Cooperative rice mill. The only other forward production linkage is transport, which has been taken over by entrepreneurs from the city of Montero.

(6) Because of these factors, no input-supplying enterprises in San Julian provide sources of off-farm employment (except inputs supplied by agencies like FIDES, such as novel cultigens from the experimental garden). Similarly, there are only a few output-using enterprises, and, setting aside the cooperative rice mill for the moment, their owners still support themselves primarily from subsistence cropping and require no employees. The cooperative rice mill employs but a handful.

(7) The consolidation program's attempts to encourage diversified production systems, including high-value crops and livestock, have been limited to demonstrating technical feasibility. Resources have not been devoted to stimulating commercialization of production of either high-value crops or livestock, such as improving credit availability for pasture creation, improving roads so that more fragile crops can reach markets, or improving transportation resources so that 50% of profits are not eaten up by truckers.

(8) Off-farm services (such as shops, stores, clinics, schools, and skilled trades), which represent vital sources of off-farm employment, are only incipient in the project. Settlers practicing these specialities remain primarily dependent on subsistence agriculture. Thus settler incomes in the project do not generate sufficient demand for even basic trades or services needed in the area and provided by the private sector.

(9) The San Julian Multipurpose Cooperative, with origins in the orientation phase, offers staple foods at costs, savings and credit services, a marketing and processing system for the rice crop, household artisan supplies, and credit for agricultural inputs. The fact that no nucleo reported having a functioning branch of the agricultural-inputs credit program is indicative of the formidable commercialization difficulties facing settlers: there is no incentive to accept debts in order to increase productivity or to experiment with high-value crops.

(10) San Julian remains dependent on distant urban centers for all but the most basic goods and services, including health services, food items, and all manufactured consumer items. Normal marketing patterns prevalent throughout the region penetrate San Julian only superficially. Just one nucleo along the brecha can be said to represent an incipient marketplace where vendors and buyers (numbering but a score at most) assemble weekly. Consumption linkages are present but limited to only a few nucleos. They consist of part-time services of barbers, mechanics, brickmakers, and the like, who support themselves mainly through farming.

(11) Community-level democratic social organization is well developed, and perhaps as much as any other factor accounts for the resiliency of the settlement under harsh conditions. FIDES personnel understand this to be a strength of the project and have initiated programs through patient collaboration with community leaders and in conformity with community opinion. Outsiders frequently demand immediate compliance with initiatives proffered and interpret democratic decision-making processes at the local level as obstacles to their programs.

(12) Community-level democratic social organization extends to control of access to land resources, such that settlers who wish to sell parcel use-rights can do so only after the buyer is presented to fellow settlers and the sale approved by them. This strong local control of access to resources in the project, supported by the National Colonization Institute (INC), accounts for the fact that settlers have not been displaced as easily here as in other colonization projects in Latin America.

(13) Because one well was dug in each nucleo, all previous evaluation teams have assumed that potable-water supply is not a factor limiting growth in San Julian. In fact, failed or polluted drinking water is strongly correlated with rates of abandonment/sales of parcels; potable water is a major determinant of whether a family remains to develop its parcel or not. This finding is significant at the .05 level for all sales and at the .01 level for multiple sales. Thus, potable water is a key constraint on sustained economic growth at San Julian.

(14) Despite the facts that some settlers have been trained in health-care delivery, have gained considerable experience, and were used widely in the past--while project funds lasted--today, settler incomes are too low to support health-care services that exist. Poor health is related to poor economic conditions and to a lack of trained female personnel. Health-care clinics are functioning in only 5 of 39 nucleos.

(15) Predatory burning of forest, while seemingly less a problem here than in other colonization projects, is still a problem at San Julian.

Too little is known of the magnitude of predatory burning of forest to estimate its impact, but in the absence of trends toward intensified and diversified production, its impact can only worsen.

(16) After scarcity of potable water, lack of road maintenance is the most serious obstacle to economic growth of San Julian. The road built for settlers is destroyed, especially during the rainy season, by heavy logging trucks that pay no road-use fees. Owners of trucks hauling agricultural produce are reluctant to damage their own vehicles by venturing onto these roads. With transport thus uncertain, no farmer can risk large investments in high-value crops requiring efficient transport to market.

(17) No fiscal linkages of any significance to either the colonization zone or to the region are currently being generated at San Julian. The colonists clearly already have the organizational strength to administer fiscal resources if such linkages are generated from their farm and off-farm activities in the future. Revenues from fiscal linkages, in fact, could be used to resolve many if not all the problems of infrastructure, health, potable water, and so forth mentioned in this report.

(18) FIDES leaders are now attempting to assist the settlers in securing legal title to their parcels, but as this involves the INC bureaucracy, progress is expected only over the long run and unevenly throughout the zone. Without legal title, colonists' efforts to secure credit are severely limited; indeed, they are restricted to dependence on government or PVO programs for investment resources.

B. SUMMARY OF RECOMMENDATIONS

San Julian has been successful in transferring a highland indigenous agricultural population to the subtropical lowlands. The settlers today can be characterized as having entered the transition phase of resettlement, characterized by successfully overcoming the stresses of pioneering and establishing new subsistence-level production systems. There is clear evidence that they are poised to enter the next phase of potential economic and social development, which is marked by an exponential rise in experimentation and innovation of novel income-generating activities both on the farm and off (Partridge and Brown 1982). Such evidence is albeit scanty but still convincing; a few settlers are experimenting with animal traction, pasture creation, tree-crop cultivation, rice-hulling machines, purchase of a tractor by the Multipurpose Cooperative, opening grocery stores, seeking training in health care, and providing services in a variety of nonagricultural enterprises including barbers, brickmakers, sandalmakers, bricklayers, carpenters, bicycle repairmen, bakers, pension operators, mechanics, and so forth. The challenge facing FIDES, other concerned agencies, and the San Julian colonists is to discover ways in which to build on the foundation created. The following recommendations address that issue.

The recommendations summarized here are based on the research results obtained and are more fully explicated in the body of the report.

(1) Potable water is the single most important limiting factor that threatens not only further growth and development but also threatens to undermine the success of San Julian to date.

- (2) Road improvement and provision of transport facilities represent a key mechanism for stimulating commercial production and regional development.
- (3) Introduction of high-value commercial crops compatible with household production regimens is needed, based on careful study of the kinds of local and regional development economic linkages these will entail, the market potential for such crops, and the compatibility of crop technical requirements with existing household production systems.
- (4) Provision of mechanisms for generating new fiscal resources and credit for agricultural and off-farm innovations for individual settlers and settler organizations is essential. These fiscal resources in the future can be used to take over the maintenance of water supply systems, transportation systems, and other program components that must initially be secured from agencies.

III. DETAILED FINDINGS OF THE RESEARCH

A. PROFILE OF SAN JULIAN SETTLERS

There is no precise accounting of the number of people residing within the confines of the San Julian settlement project or in the surrounding spontaneous settlements. Several factors have made difficult an enumeration of the population in recent years. First, the record keeping of the INC has deteriorated during the early 1980s due to several large cuts in that institution's budget. Second, a population of significant but undetermined size lives in the region, both within the project itself and in the surrounding area, which has not registered with the INC and frequently is not included in community leaders' responses about the number of people living in a particular settlement. These individuals include relatives who have come into the area after the officially recognized settlers, and who, in some cases, have established separate households on their parcels. They also include families contracted by settlers to work their parcels while they dedicate themselves to activities elsewhere. (At present, the most important of these activities is mining for gold in nearby San Ramón. Also, a few people have established homes in the region and earn a living by entering into various kinds of sharecropping and wage-labor relationships with settlers.

In 1980, FIDES estimated the population of the San Julian project area to be 5,440 people living in 1,861 families (Kraljevic 1983). Pena and Tejada (1982:8) place the San Julian population at 6,424 individuals and 2,016 family units. Our own estimate, based on our review of the INC archives and the urbanization inventories, is that there are 1,661 households containing 5,435 individuals within the 43 nucleos that comprise the portion of San Julian settled under the auspices of the orientation and/or consolidation programs. In spontaneous settlements, some of which are located in the area designed as part of San Julian, we calculate there to be approximately 2,518 households composed of some 7,730 persons. This means that in San Julian and the surrounding area there are some 13,166 people living in some 4,179 households, not including the individuals mentioned earlier who have not registered as settlers with the INC and are not accorded the status of colonists in the communities where

they live. Over 90% of the population in the project and surrounding area is from the highland and Andean valley regions of Bolivia, the majority coming from the departments of Oruro, Chuquisaca, and Potosí (see Map 1).

From the information obtained from the INC archives, it is clear that the majority of the settlers in the region are mature adults when they arrive. The archives provide complete information on the settlers in 29 San Julian nucleos. Within these, the mean age of the male settlers was 27.6 years among the original groups to arrive in each nucleo and 28.7 years among those who subsequently arrived and acquired their property from one of the original settlers. The majority of the original settlers (68%) arrived with children, spouses, and/or aged parents, although there is considerable variation from nucleo to nucleo. Of the 29 nucleos examined, the mean number of settlers who arrived with dependents varies from 35% to 92%, for a standard deviation of 15. Similarly, among settlers who arrived in San Julian after the nucleos were established, 67% brought dependents with them. Among these later arrivals there is also considerable variation from one nucleo to another, from a low of 40% who arrived with dependents to a high of 91%, creating a standard deviation of 13.

It is possible to hypothesize that whether settlers arrive with dependents or not is a factor of the situations that they left behind when they moved to San Julian. For example, in Nucleos 2 and 3, some 80% and 92%, respectively, arrived with dependents. These also are the only two nucleos in the project area predominantly occupied by people of lowland origin. Many of them were already living in the area when the project began and were simply incorporated into it. Others came from nearby areas and already possessed the skills necessary to survive, so that the move did not represent major risk for their families.

Among the highlanders in the other 27 nucleos, several factors may have influenced whether or not they arrived with dependents, including the perceived risks involved in the move and whether or not they were leaving property of any value behind. Landless or near-landless peasants had no property in the highlands that could have required attention or supported family members, so there was no reason to leave people behind. Migrants who had a bit more property may have left dependents behind to maintain land holdings and a place to return to should the settlement effort go awry (see Stearman 1973).

The mean age of the settlers, combined with the fact that 68% of them arrive with dependents, is important because it contradicts the view commonly held by officials involved in San Julian that most of the highland migrants are young, single males who marry or send for their families after becoming established in the settlement area. The myth that they were dealing predominantly with single males was cited as the reason that none of the orientation program was directed to women and that the health and nutrition component intended to address women's needs under the consolidation program was not systematically conducted throughout the project area. In fact, there are 73 women for every 100 adult males, both in San Julian settlements and in the region as a whole. While women are a minority, they are not so much so that they can be ignored by project planners. Furthermore, 47% of the surrounding region consists of children residing with their parents. Together with their mothers, these children account for 69% of the population of San Julian and 68% of the population of the surrounding area. Clearly, women cannot be ignored by project planners on the grounds that they are not an important part of the settler population.

(See Figure 1 for population composition of the project, spontaneous settlements, and total for the settlement area.)

In San Julian, only 1.8% of those who currently have settlement certificates are women, while females represent 7.4% of the current colonists in nearby spontaneous settlements (Hamilton 1985). A chi-square test of the numbers on which these percentages are based shows that the differences are significant at the .001 level of confidence. Such differences in ratios of female land ownership may well be due to discrimination against women in the recruitment process employed by CIU.

A subtle devaluation of the importance of females may also be reflected in the sex ratios of settlers' children. For the area as a whole, females predominate up to 1 year of age (106.8:100 males, a ratio within the normal range). However, for children aged 1-14 years, the ratio is reversed, with 111.3 males to 100 females. This difference is significant at the .01 confidence level. Male children may be more highly valued by settlers for their labor in land clearing and cultivation, and may therefore receive preferential treatment, such as longer periods of nursing, more or higher-quality food, and/or greater likelihood of receiving expensive medical care in case of illness (Hamilton 1985).

B. THE SETTLER PRODUCTION SYSTEM

Upon arrival in the San Julian area, settlers begin to establish a production system; its first objective is to satisfy their household food requirements and its second is production of agricultural products that may be sold for cash. Rice and corn are the most widely grown cultivars in the region. Rice was listed by 94% of the producers interviewed as the cultivar to which they dedicate the largest area of land, while 73% cited corn as being second in importance. Yuca (sweet manioc) also was frequently cited by respondents as being among the most important crops in the production system.

The advantages offered by these cultivars are several. First, they provide households with staple foodstuffs that may be stored and consumed throughout the year. Second, although rice is relatively labor-intensive, none of the three cultivars requires particularly specialized knowledge to grow successfully. Third, because they are relatively nonperishable, they are well-adapted to the geographic isolation, scarce transport facilities, and numerous shipping delays that characterize the marketing of produce from the San Julian area. Fourth, production of these cultivars entails no technical inputs not available at the household level; indeed, yields currently provided by quite elementary technology exceed the capacities of farmers to transport them out of the project area.

Unfortunately, all of these crops have decided disadvantages associated with them as well. As noted previously, Santa Cruz has suffered from chronic overproduction of rice since the early 1960s (Heath 1969). In fact, in 7 of the 10 years prior to 1984, rice production in Santa Cruz department has met or exceeded the national demand. In 1984, the Empresa Nacional de Arroz (National Rice Enterprise, or ENA) estimated rice production in Santa Cruz to be about 150,000 tons, of which Bolivia's national demand was expected to be able to absorb about 70%. Furthermore, due to the relatively low quality

of Bolivian rice, logistical problems, and a saturated international market, export prospects are poor (CORDECRUZ 1984a).

Under these conditions, small-scale farmers are hard-pressed to market rice successfully. In addition to low prices resulting from market saturation, the colonists are at a disadvantage in competing with large, more established producers who are able to deliver relatively large quantities of rice at one time. In addition, because they are attempting to sell a low-value crop from a relatively isolated area of the department, producers must pay dearly for their rice to be transported to market. Settlers report being paid prices for their rice ranging from 50,000-60,000 Bolivian pesos per fanega (1 fanega = 177 kilograms), and transport charges eat up from one third to one half of this. The frequent devaluations of the peso currently occurring in Bolivia make the cost of transport particularly devastating. In June 1984, 65,000 pesos were equivalent to US \$12.24. By August of the same year, 65,000 pesos were worth US \$4.08.

Corn suffers from serious marketing difficulties as well. For 1984, corn production in Santa Cruz is estimated to be about 150,000 metric tons, while national demand is estimated to be about 100,000 metric tons. The department's development corporation, CORDECRUZ, reports that theoretically it would be possible to export the excess production to other Andean Pact countries. However, its assessment of the practicality of this course of action is pessimistic, due to the necessity of selling the corn at the official Bolivian peso/dollar exchange rate, which is considerably below the unofficial, or "parallel," rate, and due to the lack of money for paying producers during the period between when the corn is purchased from them and when it is sold internationally. An additional difficulty with corn is that prices are subject to wild fluctuations, as producers respond to low production and high prices one year by increasing production the next, thus flooding the market and driving prices down (CORDECRUZ 1984b).

Yuca does not provide settlers with a profitable alternative either. Grown throughout Santa Cruz as well as the rest of lowland South America, it is marketed only locally and only in small quantities by producers. It plays an important role in household diet and because it can be harvested on an as-needed basis, it can be stored in fields that are sufficiently drained for almost two years. But yuca is not and has never been a cash crop in the region nor elsewhere in the lowlands.

Therefore, none of the three major crops grown by San Julian settlers offers much potential for generating the sort of cash revenues necessary to catalyze a process of investment in production and capital accumulation among settlers. [It is remarkable that previous evaluations, such as Solem et al. (1983), could have imagined otherwise.] In order to address this problem, CORDECRUZ (1984a) has suggested undertaking an agricultural diversification program focusing on cultivars with export potential, such as pineapple, nuts, coffee, and cacao. As discussed previously, FIDES undertook an agricultural diversification effort as part of the USAID/Bolivia-funded consolidation program (FIDES 1980, 1981, 1982). However, our interviews indicate that the diversification program has not had a great deal of impact on settler production systems, because it was limited to determining the technical feasibility of producing particular crops without addressing how they might be commercialized.

Settlers have also attempted to overcome the limitations imposed by reliance on low-value crops. In some San Julian nucleos, settlers have sought to grow vegetables such as tomatoes and bell peppers. But they have found that while these crops do appear to have greater profit potential when sold successfully, they do not withstand the transport conditions to urban markets--long trips over poor roads in vehicles stuffed with other items that damage the produce. And, of course, alternative transport or protective packing is not within the means of settlers. Others have tried cattle production for beef and milk. However, settlers report two factors that currently limit this option: the labor investments required to create pasture land and the cost of purchasing cattle to establish a herd. FIDES reports that settlers interested in raising cattle tend to introduce animals before there is enough pasture to support them (FIDES staff, personal communication). FIDES promotes cattle raising in a program administered jointly with the Proyecto Heifer of the Mennonite Economic Development Association. Under this program, communities are required to have five hectares of cleared pasture in order to receive an animal.

The growth of land area dedicated to pasture has been slow. In the sample of six settlements where we conducted detailed producer interviews, we found three in which some settlers were attempting to convert part of their land into pasture. Among these settlers, we found that pasture land was being created at an approximate mean annual rate of .26 hectares (n=17; standard deviation=.24).

Land is normally turned into pasture after it has been cultivated in corn and rice for two or three years. It is then allowed to go out of production as a result of declining fertility and the limited ability of household labor to maintain increasingly large extensions as new land is cleared. Additional labor is required to seed pasture grass and control weed and tree growth if a settler wishes to convert the area into pasture.

Our in-depth interviews with settlers indicate that forest is being cleared at a mean annual rate of 3.2 hectares per household (n=33; standard deviation=2.6). The figure is inflated by a small number of settlers who use land much more extensively than do the majority of their neighbors. Among the settlers who responded to our queries regarding how much land they had cleared and how much remained in forest, two clear an average of greater than 10 hectares a year and six average over 5 hectares of land cleared per year.

C. GROWTH OF URBAN FUNCTIONS

Recognizing the importance of developing social services and sources of nonagricultural employment to the ultimate success of the settlement project, the CIU planners of San Julian attempted to encourage growth in these areas through adoption of the nucleo settlement plan. We documented the growth, spatial distribution, and mean amount of time required for selected urban functions to develop as part of the urbanization inventory we conducted. Among the facilities we examined are stores, shops that produce or repair articles required by settlers, schools, churches, health posts, and branch cooperatives established to support San Julian settlers in each nucleo. Figure 2 illustrates the temporal sequence for the development of various urban services in San Julian. We also asked where the people in each nucleo go to obtain goods and services they cannot obtain in their own communities.

Of the 39 nucleos, 10 (26%) included in our urbanization inventory possess shops where skilled or semiskilled trades are conducted. The shops include eight rice-hulling businesses, six bicycle repair shops, four brickyards, four carpenters, three mechanics (two of whom specialize in chain-saw repairs while one does general mechanical work), three barbers, and one each bricklayer, wood-carver, radio repairman, and a sandal maker. In only one case, that of a rice-hulling business, was the person practicing these trades not a settler. This has both positive and negative implications for the development of San Julian. On the positive side, it indicates that outsiders have not begun wresting control of essential nonfarm activities away from the settlers. On the other hand, the settlers practicing these specialities remain primarily dependent on agriculture for their livelihood. This indicates that the settlers in San Julian do not generate sufficient demand to permit even these basic trades to function on a full-time basis and that they offer little in the way of off-farm employment opportunities.

Of the 10 nucleos that contain shops, community leaders in 7 were able to tell us the year in which the shops were established or when the people involved began to practice their trades. Based on this information, a mean period of 4.0 years ($n=7$; standard deviation=2.7) elapsed after the settlement was established before the first of the shop or trade specialties appeared. Of the 10 nucleos where these trades are located, 4 are lateral settlements not located either on the German Highway or the Brecha Casarabe.

Of the 39 nucleos inventoried, 23 (59%) contain stores that sell various goods to the settlers. We found 41 stores distributed throughout the project. These include 31 grocery stores selling sugar, soft drinks, beer, canned goods, matches, candles, and other household items; 4 kiosks belonging to the San Julian Multipurpose Cooperative; 2 corn-beer stands (*chicherias*); and 1 general store that sells groceries as well as a few hardware items.

Of the 23 nucleos in which stores are located, community leaders in 19 could specify when the first store was established. Based on this information, we found that the mean period of time between the establishment of a settlement and the founding of its first store was 4.4 years ($n=19$; standard deviation=2.1). As in the case of the shops, the stores in San Julian tend to be clustered along the German Highway and the Brecha Casarabe, although 7 lateral nucleos contain stores as well.

Of the 39 nucleos studied, 22 (56%) contain schools. One nucleo has a school only because the community has agreed to pay one of its own members privately to teach a class for first-graders. In the 21 nucleos where schools receive state support, there are 27 teachers working with 1,113 students in grades 1 through 6 (primero básico through primero intermedio). There is an average of 1.3 teachers per school, and the mean number of students for whom each teacher is responsible is 39.2 ($n=20$ classes for which information was obtained; standard deviation=17.4). The mean number of years of instruction available in each school was 3.4 years ($n=21$; standard deviation=1.2).

Based on information provided by 16 of the 23 nucleos containing schools, we found that the mean time period between establishment of the settlement and founding of the school was 3.8 years ($n=16$; standard deviation=2.48). The limiting factor was the communities' ability to secure and keep a teacher.

The process of securing an appropriation from the Ministry of Education to support a teacher is usually an arduous one, requiring several years to be completed successfully. Even when a teacher has been assigned, communities frequently find it difficult to keep him or her there, as the rustic life-style and geographic isolation of San Julian prompt many teachers to be absent and others to abandon their assignments altogether. When a teacher leaves a community, the process of securing an appropriation from the Ministry of Education must begin again in order to hire a replacement. Several settlements we visited had had schools in the past but lost them when teachers left.

We found regularly functioning churches in 23 of the 39 nucleos inventoried. The inventory recorded 28 different churches representing the Catholic, Methodist, Quaker, Seventh Day Adventist, Jehovah's Witness, Christian Union (Unión Cristiana), Free Evangelical (Evangélico Libre), and several unspecified evangelical faiths. In some cases the churches are served by ordained priests or pastors, although more frequently ritual and administrative duties are handled either by a lay leader who has received some religious instruction or by members of the congregation selected by their co-worshippers. Based on information obtained from 14 of the 23 nucleos that reported having regularly functioning churches, we calculated that the mean duration between the founding of settlements and church establishment is 3.6 years ($n=14$; standard deviation=2.47).

While indicative of the growth of urban functions in the settlements, the churches are not the only foci of religious life in San Julian. The area is also characterized by several revivalist movements, which are less formally organized than the churches and revolve around charismatic leaders who claim either to be prophets or the second incarnation of Jesus. These movements generally draw followers from a number of nucleos, sometimes competing with established congregations.

Of the 39 settlements inventoried, 24 (62%) report functioning branches of the Cooperativa Multiactiva San Julián (San Julian Multipurpose Cooperative). The cooperative had its origins in the orientation program developed for the settlers by the CIU. During the orientation of each nucleo, a branch was organized to distribute the food aid provided under the program and to help settlers secure the supplies they needed to begin producing in the area. New officers of the cooperative were elected monthly by the male settlers in the community during the three-month orientation program in order to allow as many as possible to gain administrative experience. After the orientation program ended, the cooperative would be disbanded and any assets distributed among the settlers. They then had the option of deciding if they wished to organize a permanent branch on their own.

Today the San Julian Multipurpose Cooperative receives financial support from several organizations, including the CIU, FIDES, and the Cooperativa San José Obrero (Saint Joseph the Worker Cooperative). It offers services in five areas: staples and other basic supplies at cost to members and with a small mark-up to nonmembers; the Sección de Ahorro y Crédito allows members to borrow up to four times the amount they have deposited as savings in the cooperative for purposes of investment in agricultural production, livestock, home improvements, or health; the Sección de Insumos Agrícolas sells agricultural inputs to members at cost and with a small mark-up to nonmembers and gives loans for up to four times the amount of money a member has deposited in the cooperative as savings for the purpose of purchasing agricultural inputs;

the Sección de Comercialización de Arroz purchases rice, processes it, and sells it on the behalf of settlers; and the Sección de Insumos del Hogar, which is directed at women, sells household goods and knitting and crocheting supplies at cost to members and for a small mark-up to nonmembers.

One or more of the services of the San Julian cooperative were reported by 25 nucleos. Among them, 18 branches of the Sección de Consumo, 16 of the Sección de Ahorro y Crédito, 3 of the Sección de Comercialización de Arroz, and 1 of the Sección de Insumos del Hogar were functioning at the time of our research. The mean duration between the founding of the nucleo and establishment of a branch of the cooperative was 1.26 years ($n=15$; standard deviation=1.53), with leaders in 6 of the 15 communities who knew the date of establishment reporting that the cooperative had been founded in the same year as the nucleo.

The fact that no community reported having a functioning branch of the Sección de Insumos Agrícolas is indicative of the commercialization difficulties facing settlers. As they find it very difficult to sell most of what they produce, settlers have no incentive to seek credit to obtain inputs that will help them increase production. The Sección de Comercialización de Arroz represents an effort to help settlers address this problem. However, the region already suffers from overproduction of rice, and the problem shows signs of becoming worse rather than better (CORDECRUZ 1984a). In addition, this section of the cooperative was only formed in 1982, and just began processing rice in its own mill (established with support from USAID/Bolivia) in 1984. At the time of our research, the mill was running below capacity and the cooperative was actively seeking to inform settlers about this new service and interest them in it. At the present time, the outcome remains unclear. The Sección de Insumos del Hogar, which was said to be functioning actively in only one community, is also indicative of the problems facing San Julian. It is the only program in the project or area directed at women, and it did not come into existence until 1982, during the consolidation program--fully 10 years after the first nucleo was settled. One reason for the low level of participation in this section of the cooperative may be its relative newness. However, there are other reasons as well. First, the women did not receive the training given to male settlers in leading and administering the cooperative. Therefore, efforts in several nucleos to establish and maintain branches of this section of the cooperative have floundered because of chronic administrative and bookkeeping problems. In addition, the Sección de Insumos del Hogar did not receive systematic promotion by any of the agencies working in San Julian. Some of the FIDES extension personnel charged with working with women under the nutrition-education component of the consolidation program did seek to help establish branches of this section of the cooperative in some nucleos. The branch that was reported to be functioning was established in this manner. However, because the extension personnel received neither explicit instructions nor training, little was in fact done (see Llanos Albornóz 1984a; 1984b).

Of all the urban services examined as part of our study, the health posts were the least widely dispersed. Of the 39 communities inventoried, 37 responded to our questions about whether or not they had a functioning health post. Only 5 (14%) responded affirmatively. We were told by program officials of other settlements that had health posts. Unfortunately, various factors prevented these from being available to the settlers. For example, in Nucleo 38, where FIDES had established a pharmacy and a health post, settlers reported that the post was usually closed and that they could not always find the health

extensionist when they needed him. As a settler himself, who receives no pay for his efforts since the consolidation program ended, the extensionist finds it necessary to give priority to tending his own land at the expense of working at his health post. In addition, the nurse charged with attending the pharmacy had been unable to make her regular rounds for a number of weeks, in part because of bad weather and in part because she had been working as an interviewer on a FIDES-sponsored research project. In Nucleo 2, where a well-equipped post had been built by the community and the Catholic Church, the doors remained closed due to a dispute between the community and church officials regarding jurisdiction over the facility.

The urbanization inventory also is indicative of the dependence of San Julian on the urban centers of Santa Cruz and Montero for all but the most basic goods and services, and of its isolation from those centers. We inquired where and when settlers would purchase household goods and foodstuffs not produced locally. Over 80% of the time, respondents agreed that Montero and Santa Cruz were the only places where these things could reliably be obtained. However, only along the German Highway is there regularly scheduled transportation to these cities. Settlers along the Brecha Casarabe report that the trip to Montero and back normally requires a minimum of three days. When inclement weather makes travel along the brecha difficult or causes delays in the pontoon ferries crossing the Rio Grande, the time required to make the trip can be considerably longer.

D. COMMUNITY-LEVEL SOCIAL ORGANIZATION

A visitor to San Julian familiar with the high degree of control that centralized settlement authorities exert over the lives of people in many projects around the world cannot help but be impressed by the degree to which the power to make meaningful decisions has been vested and maintained at the community level. Community-level institutions have the authority to settle disputes among neighbors, organize the labor of community members for work projects, regulate the degree and kind of contact that outsiders are allowed to have with their members, and control access to land in the community.

In both the spontaneous settlements we visited and in those formed under the San Julian project, community leaders are elected annually by the male members of the community. They are responsible for running its daily affairs. Among their duties in this regard are serving as the first arbiters in resolving disputes among community members. If they are unable to agree on resolution of a dispute, it may then be taken to the corregidor, a person appointed by the national government to render judgments on civil cases in a determined area, or to the INC. However, every effort is made to resolve issues within the community before resorting to outside authorities. Community officials also take responsibility for organizing and administering projects such as road improvements and building bridges, school buildings, and other community structures.

The strength of community-level institutions is particularly striking with regard to their ability to control the nature of their contacts with outside institutions and the control they exercise over access to land. Development agencies and other outside organizations need to seek community approval if they are to work effectively there. Normally, the procedure followed is that

used by professionally trained anthropologists when they enter a new community: to present the idea for work in a community to the community leaders--in this case, to the elected leaders. The community leaders then either agree to present the proposal themselves or to allow the outsider to present it to a meeting of the community as a whole. Discussion follows and a consensus is reached regarding whether or not to permit the idea to be followed up in the form of a project in the community. A decision may also be taken to permit or prohibit individual participation by community members. The process is frequently cumbersome from the viewpoint of the outsider responding to externally defined project timetables and other pressures. (Indeed, quite expensive research and development efforts that have been attempted in the same communities where our team worked with great ease and success encountered considerable resistance and refusal to cooperate, only because this simple procedure was not followed.)

When FIDES, for example, wished to initiate a program to develop models of diversified production systems, it had to present the project idea to three nucleos in San Julian in order to find one that was able to arrive at a consensus quickly. In the other two, internal conflicts prevented quick agreement and settlers had to turn the project down (FIDES 1981). FIDES, for its part, felt the need to move the project along quickly in order to show results to USAID/Bolivia, which was financing it under the consolidation program. Despite this kind of external pressure, FIDES has found that working through the democratic process favored by the settlers is the most productive long-run strategy.

Community control over land is manifested in several ways. Although the INC grants settlement certificates, once a community has been established, it exercises control over the buying and selling of household parcels. When a settler wishes to sell the parcel, he or she must present the prospective buyer to a meeting of the entire community. Community members then interview the prospective buyer and decide whether or not to permit the person to buy land there. If the decision is positive, community leaders then notify the INC in writing that the community has approved the sale and authorize it to issue a settlement certificate to the new community member.

Through our archival research, we learned of one case in which a settler had left the community to pursue university studies. Because his land was left uncultivated for more than a year, the INC followed its usual procedure of voiding the settlement certificate and giving the land to another person. Several years later, after completing a university program in agriculture, the original settler returned to apply his knowledge to San Julian and asked the community to allow him to buy land. Because it felt that his presence would be an asset, the community established what it considered a fair price for the parcel the young man had originally owned and instructed the new settler to sell it back to him. The community then instructed INC to assign the parcel back to the original owner and relocate the other settler to some other community in the zone. And this was done.

The ability of the community to control access to land in this way developed after several instances in which the INC approved sales between individuals without consulting the community, and the community responded by making it impossible for the new owner to live there. As a result, the INC adopted the policy of not granting settlement certificates to land purchasers without prior community approval and of respecting community desires regarding whom

it wishes to reside there.

Enthusiasts of the San Julian orientation program argue that the program has played a major role in supporting the development of community organization that permits settlers to assert their control in this way. They note with satisfaction that the characteristics of the San Julian communities described here are not unique to those that participated in the program but have been transmitted to the spontaneous settlements as well. Skeptics, however, have a different perspective. They note that strong community organization is the norm in the highland areas from which the settlers come. They view the strong community organization characteristic of San Julian and the spontaneous settlements nearby as evidence that the process that occurred in San Julian would have occurred more or less the same without the orientation program.

Orientation-program supporters respond by saying that the stresses of adapting to the lowland environment would have prevented reestablishment of the strong highland community organizations had it not been for the orientation program. They also argue that, in settlements where most of the people are from the same highland area, it was easier to reestablish community organization than it was in those cases where settlers came to the same nucleo from different highland areas. From data collected during our research, it is difficult to state conclusively what significance the orientation program had for creating the high level of social cohesion and community control over important features of the settlement effort.

Research conducted in other colonization zones of the Americas, however, raises important questions about the forces that brought about the situation described for San Julian. Partridge (1984) has noted that through the humid tropics of Latin America, small-holder settlement has paved the way for the establishment of large-scale cattle-ranching enterprises. Small-holders provide the labor necessary to clear the forest cheaply, and then, as infrastructure and other services improve and land values rise, they move on further along the colonization frontier while their former holdings are consolidated into ranches.

Schmink (1982) and Wood and Schmink (1981) have demonstrated along the Transamazonian Highway in Brazil that once small-holders have cleared an area, various legal and extralegal means have been employed to restrict their continued access to the land, forcing them to go even deeper into the forest and allowing large enterprises to move in behind them. In the case of San Julian, this pattern has not occurred. While there have been boundary disputes between settlers and the owners of neighboring cattle ranches, arrangements have been worked out that all parties apparently accept, and there has been no systematic effort to encroach on the settler landholdings.

Stearman (1983) suggests why San Julian settlers have not been subjected to the pressures on their landholdings that settlers in other areas have experienced. She noted that the Rio Grande historically has been a barrier to the expansion of large-scale agricultural enterprises in Santa Cruz. Because of its constantly shifting banks, the river has defied construction of a bridge, and producers of cotton, sugar, and other commercial agricultural products have not been anxious to establish operations to the east of it.

At the same time, Bolivia's major cattle-ranching zones have grown up

farther to the east and north of this region, prior to establishment of small-holder settlement in San Julian. Because of these factors, the area in which San Julian is located has not been particularly coveted either by those who potentially would be interested in incorporating it into the agribusiness zone of Santa Cruz or by ranchers. As a result, settlers may not have had to compete with such enterprises for access to land. We note, however, that in 1984 considerable mechanized land clearing is taking place along the German Highway, so this situation may change.

Settlers have been able to solidify their communities in relative peace and to assert their rights regarding land and control over local affairs before the INC and other state agencies. One cannot help but wonder if this would have been possible, with or without an orientation program, had the settlers been locked in competition for land with powerful ranchers and commercial farm owners. In any case, when and if infrastructure and urban services improve in the San Julian area, community-level social organization may be tested in a much more competitive factor market than has been the case to date.

However it came about, the settlers in San Julian have established a degree of local control over resources and autonomy of action that is not found in many settlement areas; once gained, this will not be given up easily. It is difficult to overemphasize the importance of these local institutions to creating the potential for future development in the region. Whether or not it is proper for those associated with planning and implementing the San Julian project to claim credit for strong community social organization, they deserve credit for not snuffing out the possibility for it through the extreme paternalism and excessive regimentation characteristic of settlement projects in many other areas.

Recognizing the importance of strong community institutions to the potential growth and development of San Julian, it also is important to recognize what their existence implies about the nature of the social formation within which they currently are operating. In the Andean highlands, conditions that gave rise to strong community organizations have also in many cases precluded their access to resources that would permit them to become a focus of economic development (Painter 1984; Platt 1982). While we praise the establishment of strong community organization in San Julian, we must also caution that throughout Latin America, strong communities with characteristics similar to those described here have been associated with the maintenance of a peasant economy rather than with economic development. Like the closed corporate communities described by Wolf (1955), the San Julian settlements are located in marginal areas that have not been the object of great interest for commercial exploitation. At the same time, they are located at the edge of one of the most rapidly growing regions of capitalist agriculture in South America. If the agencies that participated in creating those communities do not also participate in creating conditions whereby settlers achieve access to the resources necessary to produce profitably, there is the danger that they will have contributed to nothing more than the creation of yet another area in Latin America where a poor peasantry exists on the fringe of a zone of prosperity with no prospect of prospering in its own right.

IV. THE SUCCESS OF SETTLEMENT IN SAN JULIAN

A. ESTABLISHING AND MAINTAINING SUBSISTENCE PRODUCTION

Settlers in San Julian have been successful in establishing a subsistence production system in which rice, corn, and yuca play central roles. In general, settlers appear able to provide for their own food needs through what they produce as part of this system. However, the continuing viability of subsistence production is threatened by an inadequate water supply.

Project evaluators have tended to give little attention to water as a factor constraining settlement success in San Julian because deep wells were dug as part of the initial settlement effort. In spite of equipment and logistical problems, and the alleged use of pipe and other resources purchased with USAID/Bolivia funds for the construction of wells for large private landowners, a well was installed in every nucleo settled under the San Julian project. Wells have also been provided for some of the spontaneous settlements. Thus evaluators have tended to assume that, even though only 40 of the planned 200 wells were actually constructed (Solem et al. 1983:B-2), few settlers faced a serious water problem.

Nevertheless, settlers have been complaining about inadequacies in the water system for a number of years. Hess (1980) noted that settlers from several nucleos reported that the water from their wells was salty and that in some cases it caused diarrhea. As part of our urbanization inventory, we inquired about the water supply in each nucleo we visited. In 31 of the 39, or 79.5%, community leaders reported serious water problems. Of the 31 reporting problems, 14 stated that the water supply is inadequate, that the well does not supply enough to meet the needs of the people who depend on it. In some cases, this appears to be due to the volume of water that could be pumped declining as the well cavity fills with sand. In several nucleos this problem is exacerbated by swelling of the population beyond the 40 families that had originally settled. This is particularly apparent in the central nucleos located along the main roads, because people from the lateral settlements frequently maintain houses there to be nearer to schools, transportation, and health facilities. In addition, some central and lateral nucleos contain an undetermined number of additional people beyond the 40 officially recognized settler families living there.

Leaders of another 14 of the 39 nucleos inventoried report that the quality of the water is bad. They complain that the water is salty to the taste and that it causes diarrhea. One nucleo has had problems with both the quality and quantity of water from its well, and two have frequent pump failures that prevent settlers from using the well nearly half the time.

Because of frequent complaints about water, we wondered if it might be a factor in determining whether or not settlers remain on their parcels or move on seeking more favorable locations in which to live. We decided to test for a relationship between those parcels that report serious water problems and those in which settlers most frequently sell their parcels and go elsewhere. We compared the data on water in our urbanization inventory with the data on the rate of parcel sales gathered from the INC archives. We found 29 nucleos for which we have specific information on both water and the number of land sales over the years.

A chi-square test was used to determine if there is a relationship between water supply and frequency of land sales. We divided the nucleos into two groups: those that had reported serious water problems and those that had not. We then calculated the percentage of parcels that had been sold one or more times subsequent to original settlement in each of the 29 nucleos. A mean of 46.5% of the parcels had been sold one or more times overall (n=29; standard deviation=17.33). The nucleos were divided according to whether the percentage of parcels sold one or more times is above or below the mean.

The chi-square test was used to determine if there is more than a chance relationship between the report of water problems and a percentage of parcels sold that is greater than the mean. We set .05 as the level of significance that would convincingly indicate a relationship between water problems and parcel sales. The chi-square value obtained is 6.995, greatly exceeding the 3.84146 needed to indicate a significant relationship at the .05 level and leading us to conclude that water is an important factor in determining whether settlers sell their parcels.

We then reasoned that if water is an important factor in explaining all parcel sales, it might be particularly strongly related to the cases of parcels that have been sold more than once since they were originally settled. Following the procedure described earlier, we calculated the mean percentage of parcels that had been sold more than once to be 11.7% for the 29 nucleos in our sample (n=29; standard deviation=9.8). Again, we used the chi-square to test for a relationship between nucleos reporting water problems and those in which the percentage of parcels sold more than once is above the mean. This time the level of significance we required was .01. The chi-square value obtained is 7.54, exceeding the necessary value of 6.6349 and leading us to conclude that water is particularly closely related to multiple sales of parcels.

We see, therefore, that settler complaints about their water supply are not made idly and that water plays an important role in determining whether or not a family remains in a particular area and develops the parcel it has claimed. The significance of an adequate water supply for ensuring the long-term viability of subsistence production cannot overestimated. As a result of water problems, large numbers of settlers drink water from sink holes, with serious risks to their health. Alternate sources of water are in many cases located at some distance from the settlements, leading family members to occupy large blocks of time with provisioning themselves with water in the dry season. This is precisely the time of year when large amounts of labor are required for clearing and planting. The problem is compounded by concurrent use of dry-season water holes by jaguars, wild pigs, and other large and potentially dangerous animals. People have been attacked, and in communities where this has occurred, entire families go to draw water, a task that a child alone could do if the well in the nucleo worked.

The thin distribution and irregular functioning of health posts is another factor that interferes with the smooth maintenance of the subsistence system. As was discussed earlier, only 5 of the 37 San Julian nucleos that responded to our question about health posts have one that functions. Several of those maintain such irregular hours that large numbers of people report being unable to obtain assistance when they need it. Because the health post in the INC complex also tends to provide irregular services, respondents in 62% of the

nucleos report that they go directly to Montero if they are seriously in need of medical attention.

When we inquired about health-care facilities, both settlers and program officials tended to respond in terms of dramatic incidents: the emergency Caesarean section performed by the visiting doctor in a remote nucleo, with the patient lying on a wooden table in her home and chickens running beneath it; a snakebite victim carried to the doctor over flooded roads at night; or treatment for a person injured when a tree fell the wrong way. Such incidents dramatize the inaccessibility of health care for the settlers. In Nucleo 23 settlers never grow tired of pointing to the "mobile" clinic sitting up on wooden blocks, its wheelbase allegedly pirated by INC employees to haul out logs for sale; the "mobile" clinic today remains locked and rusting away.

The health problems that take the most serious toll on the settlers' ability to subsist are of a mundane sort associated with being poor and living in a tropical area. Because of the inaccessibility of health care, people often do not seek medical attention for a child suffering from diarrhea or intestinal parasites, for example. Nor do highland peoples know traditional remedies for common tropical illnesses. At least one locally available plant with medicinal uses could be named by 62.5% of the migrant women interviewed, but many complain of their lack of familiarity with local flora (Hamilton 1985). Many illnesses are easily treated by health extensionists such as those trained by FIDES under the consolidation program. Many of these paraprofessionals remain in the area as settlers. However, since the consolidation program ended, they no longer earn a salary and are faced with the same survival problems as other settlers. Thus they cannot make themselves available to their neighbors on a regular basis (see Perez-Crespo 1984a).

An additional problem is that the extensionists trained in the past are almost all men; even when they are available, women are reluctant to have them attend childbirths, preferring to have their children alone or to be attended by their husbands. Moreover, men are those most often gone from the nucleo and therefore not available to assist in delivery of babies. As a result, a high incidence of tetanus and navel infections arises from unhygienic childbirth conditions (see Llanos Albornóz 1984a; 1984b). The health situation in San Julian could be greatly improved by working with community leaders to find a way to make it economically possible for the trained extensionists already in the area to provide service on a regular basis, and to increase the number of extensionists by recruiting and training women to serve in this capacity.

A third factor that has had a negative impact on some parts of the settlement area is the predatory burning of forest land. Persons who engage in this practice have been found in nearly every settlement area in the Amazon region. There appear to be fewer in San Julian than in other areas because CIU and FIDES personnel were partially successful in barring such individuals during the recruitment phase. Still, a certain percentage of settlers burns large areas of forest every year to cultivate rice on it once or twice, and then moves on. Our in-depth settler interviews turned up 2 such persons out of the 34 we interviewed in the four San Julian nucleos sampled. The number of predatory burners in San Julian may be considerably higher than this indicates, however. It will be recalled that the INC archives show that about 46.5% of the parcels in San Julian have been sold by the original settlers, while

about 11.7% of the parcels have been sold repeatedly. It seems possible that a large portion of the parcels that are sold repeatedly suffer from some defect that make them undesirable. However, it is unlikely that the 35.7% of parcels sold only once are less attractive than the bulk of the parcels in the region. Given the strong correlation discovered between potable water and parcel sales and the paucity of our data regarding predatory burning, we can conclude only that more systematic study of the impact of predatory burning is called for.

B. COMMERCIAL PRODUCTION AND REGIONAL DEVELOPMENT

There is little doubt that the services provided under the orientation and consolidation phases of the San Julian settlement project greatly facilitated the establishment of stable communities carrying out subsistence production. However, one must ask if the expense and effort involved in conducting a settlement project are justifiable if the goal is simply to recreate a subsistence economy. Morán (1983), for example, found that 40% of the settlers in an area of Brazil who received no support at all and who were under considerably more pressure to abandon their land for consolidation by larger enterprises nevertheless managed to succeed economically by engaging in commerce, usury, and various entrepreneurial activities.

As resettlement projects go, San Julian is not expensive. The cost of the orientation program, which functioned for five years (1976 through 1980), was US \$975,182.00, or about US \$711.00 per settler family (INC/CIU 1981:Vol. 2:40). The consolidation program was budgeted for an expenditure of US \$1,481,923.00 for the period 1979 through the end of 1983 (Solem et al. 1983:B-4), for a cost of about US \$796.00 per settler family. These figures include only program support and not the costs of building the German Highway or the Brecha Casarabe, which opened up the region for settlement, nor the costs absorbed by the several private voluntary organizations and Bolivian agencies over the years. Costs per settler household are sorely underestimated at present, but no additional data are available.

The justification of even a low-cost resettlement program, or any other development effort, is that it creates conditions that would otherwise not exist to permit the producers to improve their position in a society vis-a-vis other social strata. This can happen in San Julian if conditions are created that make agricultural production profitable for the settlers and that encourage investment in nonagricultural activities that can provide sources of off-farm employment for the second generation of people to live there. At the present time, San Julian settlers are involved in the same sort of subsistence production that they practiced in the highlands. While they are able to provide their own food more successfully than before, the project has not yet given settlers the economic opportunities they need to cease being peasants and to begin participation in regional and national economies. In our opinion, work needs to be done in four major areas if San Julian is justifiably to be called a successful settlement project: (1) provision of an adequate water supply, (2) improvement of roads and transportation facilities, (3) introduction of high-value crops that are compatible with household production regimens and that provide important production and consumption linkages stimulating off-farm employment, and (4) creation of fiscal linkages and sources of agricultural and small-business credit that settlers can draw on to finance all of this both in the short run (when they require assistance from outside agencies)

and in the future when their offspring take over the enterprises created as self-maintaining.

The water problem in San Julian already has been discussed in the context of threats to the established subsistence regimen. An adequate water supply, however, also has implications for settlers' ability to make a transition from subsistence to commercial production; any effort to improve settlers' access to water should bear this in mind. An adequate water supply does not simply satisfy current household consumption requirements but can accommodate a growing population and an expanding economy. Securing safe drinking water is, of course, the first priority. Beyond that, it is necessary to consider other water requirements that settlers will have if some of their productive activities begin to prosper. For example, growing herds of cattle will make increasing demands on surface-water resources. Water also will be needed in virtually any sort of agroprocessing enterprises built in the area. Planning must accommodate too a greatly increased population if agricultural labor and off-farm employment demands materialize, as they should in a successful development process.

The transport difficulties faced by settlers are twofold. First, the road system is inadequate, particularly for the lateral nucleos; second, not enough vehicles travel on the existing roads to satisfy the needs of the settlers to move themselves and their goods. Our experience and the information provided by settlers indicate that the German Highway is well maintained throughout the year and is generally passable for most vehicles. The major problem here lies at the Rio Grande, which remains a formidable barrier between the urban centers of Santa Cruz and the rural areas to the northeast.

Parts of the Brecha Casarabe become impassable nearly every year in the rainy season, particularly due to heavy logging-truck traffic that continues until the road is entirely impossible to negotiate. This forces settlers to sell their rice and corn sooner after the harvest than would otherwise be necessary and adds to the disadvantages they face in an already unfavorable market. They do not have the option of holding their products for an extended period in the hope that prices will improve. In addition, as there is only a brief period during which they can be sure that trucks will be able to enter and haul their crop away, settlers are in a disadvantageous position for negotiating transport costs as well as the price of their crop. During the dry season, damage from the rains and trucks is not systematically repaired, as settler communities are unable to compete effectively with large landowners who can pay to have the state's heavy equipment give priority to private roads.

The lateral nucleos face the greatest difficulty with the road network. The only repairs made on the five-kilometer roads leading to these communities from the German Highway or Brecha Casarabe are those done by settlers themselves. In many cases, they lack the resources or construction skills to make the lateral roads passable to vehicular traffic, particularly when the road must pass through low areas where water stands for much of the year. In fact, the problem of standing water was compounded in some areas of the project by the construction of lateral roads. Culverts that were supposed to pass through elevated roadbeds and allow water to pass under them were left out of the construction. This caused elevated roadbeds to act as dams that prevent rain and runoff from draining and create new standing pools. The health implications of these and of borrow-pits filled with stagnant water have not been assessed.

The lack of vehicles serving the settlement area is most acute in the case of the nucleos along the Brecha Casarabe. On the German Highway, a regularly scheduled colectivo, a very overcrowded bus, makes one trip daily to and from the city of Santa Cruz, and a number of vehicles pass through the area at irregular intervals. There is no regularly scheduled transportation on the Brecha Casarabe, although a large number of vehicles do use it daily. The only vehicles that enter the lateral roads are those that have been contracted by those communities to come in and haul out the rice crop. As a result, most of what goes in or out of the lateral nucleos is on the backs or the bicycles of the settlers. Along the Brecha Casarabe, the vehicles that move with greatest frequency are the tronqueros, trucks bearing hardwood logs to the several sawmills that have set up operations in the San Julian area, and it is on these that settlers most frequently rely for transportation. Truck drivers vary in their treatment of settlers seeking rides, some going out of their way to accommodate the needs of passengers and some charging exorbitant rates. At best, the ride is uncomfortable, and it can be extremely dangerous if a weary passenger is so careless as to allow an arm or leg to slip between the shifting logs.

Establishment of a transportation service making a once-a-day round trip along the length of the Brecha Casarabe would constitute a significant improvement in the access of settlers to transportation links. If FIDES, the Cooperativa Multiactiva San Julian, and the INC could cooperatively mount sufficient resources to secure a vehicle and FIDES could agree to provide maintenance services at its mechanical shop near the entrance to the brecha, we have little doubt that charges to users would cover operating expenses.

The problems of inadequate water and transport facilities can and should be addressed immediately as a prerequisite to any effort to stimulate integrated regional development based on the San Julian project. The two remaining obstacles to further development, lack of high-value cash crops and lack of credit resources, require a serious, long-term, and region-based planning effort to overcome. Through their efforts in agricultural diversification, FIDES and CIAT have identified many agricultural activities that are technically feasible in the San Julian environment, and in some cases FIDES has calculated the costs that a settler household can expect to incur by incorporating them into its production system. However, the agricultural diversification effort ultimately did not provide settlers with any high-profit alternatives to rice and corn production for several reasons. It did not try to identify which of the technically feasible crops had a market or potential market in which it could be sold. No work was done to determine what would be needed to permit a potential cash crop to arrive at a market, such as processing and improvements in packing and shipping practices and facilities. No systematic research was conducted on household production systems and income sources to determine which of the many cultivars they experimented with were in fact practical for adoption by settler families in terms of financial costs, scheduling among other economic activities, availability of required inputs or family labor, or other labor resources and requirements.

Noting that this was not done under the agricultural diversification program is not a criticism of FIDES or CIAT. CIAT's assigned role in the region is providing technical, agronomic support for tropical agriculture, not regional marketing problems. FIDES does not have staff trained to do

this sort of research, and even if it did, the regional focus it requires would have taken it far beyond the confines of the projects funded by the consolidation program specifically for San Julian. Nonetheless, because no organization concerned itself with the integration of San Julian producers into the regional and national economy, limits have been placed on the project's significance for development of the area and on the impact it could have as a model for small-holder development in the Amazonian area.

The modest efforts made to provide San Julian settlers with access to credit have been eviscerated by the economic crisis through which Bolivia currently is passing. The Banco Agrícola de Bolivia (BAB) rarely makes loans to settlers. The Cooperativa Multiactiva San Julian provides credit up to four times the amount that a settler has saved in that institution. Yet, because settlers do not have any cash crops that generate enough income to save money in significant quantities, and because even if they could, the present inflation rate (over 1,000% annually) reduces its value before they have the opportunity to take out a loan, settlers cannot secure sufficient loans from this source to undertake significant investments in improving productive capacity or infrastructural facilities.

If settlers are to expand beyond simple subsistence production, they require improved access to credit in order to hire labor to help clear and prepare land for cultivation and to harvest crops, to acquire draft animals and/or mechanical equipment, to purchase livestock, and to invest in off-farm economic activities that would be stimulated by production, consumption, and economic linkages.

Enhancing the availability of credit also requires long-term planning that is regional in scope. Work needs to be done in several areas, including identification of settler populations large enough to support a credit program sufficient to undertake significant projects and homogenous enough to have its needs addressed by an institution with specifically designed goals and policies for making credit available. Equally important in identifying such settler groups is their capacity for corporate activity, the mobilization of member energies in timely and cohesive cooperation through a responsive leadership structure. On the other side, it is necessary to identify an institution or group of institutions that works with settlers and that can manage a credit program oriented to settler needs discussed here. In other projects, settler participation in long-term investment planning has been demonstrated to be not only workable but also productive of more sound investment priorities and procedures than is top-down planning. Once institutions are identified, a plan for establishing and administering such a credit program needs to be worked out with them. Finally, to manage limited credit resources well, administrator must help elaborate a regional development plan that spells out what the settlement area should look like after 5 years and after 10 years, if development goes as planned. This process too requires participation of settler groups.

Such a planning process would facilitate targeting loans for greatest impact and would provide both baseline data and development criteria for evaluating progress of the settlement area over time. The elaboration of such a regional development plan would be a natural application of the production and marketing data collected to permit the introduction of high-value cash crops into the settler production system, and the plan would require a comprehensive effort to link agricultural development to creation of off-farm economic linkages

by settlers.

C. IMPLICATIONS OF SAN JULIAN FOR REGIONAL DEVELOPMENT

The San Julian project has established stable subsistence communities capable of managing their own affairs with a minimum of outside assistance or interference. Success in this area appears attributable to three factors: (1) enlightened planning that combined an effective orientation program with an emphasis on encouraging settler participation and self-reliance, (2) settler backgrounds that included a long tradition of strong communities relatively experienced at managing their own affairs, and (3) a marginal location that freed settlers from exposure to intense resource competition from economically and politically more powerful interests in the region. For the moment at least, the San Julian project has succeeded in securing settler rights to land and in providing them with the basic skills needed to work it.

In spite of this success, however, San Julian settlers still lack access to the means of producing for market. Limitations include a water supply inadequate for present subsistence requirements and for any population growth and economic expansion, poor transportation facilities, and virtually no avenues for obtaining credit. Because of these limitations, settlers have been frustrated in their efforts to find high-value cash crops or to enter cattle production. They have been unable to command the expenditure of regional development resources on efforts that would be of benefit to them. Agencies working with the settlers have not provided assistance in this area, in part because of their very geographically narrow and project-specific focus and in part because they have felt themselves incapable of challenging the established political and economic interests concerned with regional planning.

Any effort to build on San Julian's success and initiate a regional development process must be planned and implemented on three levels. These include (1) settler production systems and their linkages with the regional market network, (2) revenue generation to finance improvements in the productivity and profitability of settler production, and (3) strengthening local institutions so they can design and implement a comprehensive regional development plan based on small-holder settlement.

Production-System Support. Several factors must be considered in attempting to strengthen settler production systems. The most obvious is development of high-value cash crops and livestock production, along with the market linkages necessary to make farming more profitable. Such an effort would seek to build on the work already done to diversify settler production systems by identifying new markets for settler products and making appropriate improvements in transport, bulking, shipping, and storage facilities.

Less obvious but equally important considerations in developing settler production systems are promoting growth of off-farm employment through facilitating development of production and consumption linkages and protecting settlers from encroachment by large commercial agricultural enterprises or cattle ranches. Promoting off-farm employment is an important means of providing opportunities for the offspring of settlers, and selecting cultivars with potential production and consumption linkages is a way to do this. If such opportunities are not provided within the region, settlers' offspring must

migrate to cities and join the ranks of urban poor, or else they must go deeper into the forest, beginning the cycle of environmental, economic, and social problems that arise when poor people seek a better life through settlement but lack adequate support structures. Efforts to develop off-farm employment should focus on areas such as agroprocessing, which supports both settlers' production efforts (by adding value to the products before they leave the region) and services such as repair shops for farm implements, thus reducing dependence on distant urban suppliers. As noted, a number of repair shops exist in San Julian, but their economic role remains limited.

Developing settler production systems, insofar as it involves improving transport facilities and commercial links, risks making the area a target for encroachment by large agricultural and ranching interests. As discussed earlier, San Julian's relative isolation has been important in protecting these settlers from the encroachment that has plagued settlement projects elsewhere in lowland South America. One way of protecting settlers from this pressure is by promoting household-level production innovations that do not immediately lend themselves to large-scale commercial exploitation. Also, distributing a large number of relatively small bulking, storage, and agroprocessing facilities throughout the area makes them less useful to large enterprises than major facilities in central locations. Tying improvements such as road maintenance to community-level action reduces the incentive to push settlers out, because the improvements generally sought by large-scale producers would disappear if the settlers leave or their communities are weakened.

Revenue Generation for Regional Development. While expenditures by outside agencies such as USAID/Bolivia would be appropriate and useful in specific areas, such as alleviating the lack of water, the long-term solution to problems faced by settlers involves finding ways to fund development efforts locally. The amounts of money required to promote area development are not large, but they need to be spread out in programs with a longer term commitment than most international donor agencies are able to make. In interviews with our team, FIDES officials repeatedly said that, in retrospect, the USAID/Bolivia-funded consolidation program would have yielded more results had the same, or even smaller, amount of money been made available over a longer period of time.

One plan to begin generating local funding for development activities in the settlement area would be elaboration of a tax policy that requires those who have benefited financially from the opening of San Julian for settlement to begin to pay for its continued development. For example, a half-dozen sawmills operating on the edges of the project area conduct a profitable business depleting local hardwood resources. Large piles of logs rejected as unsuitable for sawing into lumber mark the entrance to each mill and indicate that tree-cutting has been less than selective. In addition, logging trucks are the single largest group of users of roads in the area; because of their great weight, they are also most responsible for road deterioration. Yet, as sawmills employ few local people, the only contribution they make to the area economy is through taxes logging trucks are supposed to pay the Federación de Colonos (Federation of Colonists) and the Servicio Forestal (Forest Service). Although the tax is small, amounting to only a few cents per log, loggers are willing to go to considerable lengths to avoid paying. One company, for example, has constructed a private road exiting from the far end of the San Julian project to bypass the control point where taxes are collected. Settlers are very dissatisfied to see resources available for such a project while they cannot get support

to maintain existing public roads.

Ways of improving the collection efficiency of taxes should be investigated, as should ways of generating additional revenues for local development by taxing those now using resources without paying. For example, a tax based on the selling price of products from sawmills around San Julian would be a potential source of revenue.

It is not our intention here to single out the lumber industry as a special target for taxation. It is simply an example of how Bolivia's efforts to base development on a policy of small-holder settlement have sometimes benefited other interests to the detriment of settlers themselves. Another such interest group is the large landowners who had wells constructed on their properties at subsidized prices; they paid to have materials provided by USAID/Bolivia for settler wells delivered instead to them. During an occupation of INC in 1983 to force a formal audit of its affairs, settlers found documentation of these events. Yet no action has been taken by authorities to redress the situation. Recovery of part of the value of these misused materials would provide valuable resources for settlement development.

Any taxation plan or other effort to secure development resources for the settlement area needs to be based on a detailed study of the local situation. Economic growth should not be discouraged but channeled to the benefit of settlers. Conflict over resources should be avoided; settlers would have no hope of winning against established economic interests. The institutional means of using locally generated resources for small-holder settlement development should be examined carefully, as existing state agencies involved in settlement have shown very limited capacity to serve settler interests in the area.

Strengthen Local Institutions. Two private institutions, FIDES and the Cooperativa Multiactiva San Julian, have been most actively involved in supporting settlers in the San Julian area. Although both institutions grew out of CIU initiatives, they are separate organizations with independent programs. The cooperative has emphasized strengthening settler social organization as part of its efforts to organize branches in different communities and to educate settlers on cooperative management and administration. FIDES has tended to be skeptical of this "overly political" emphasis and focused its efforts in more narrowly technical areas, such as agricultural diversification and community health promotion.

Their different approaches have sometimes been the source of disagreement between the cooperative and FIDES. Nonetheless, they have maintained a working relationship over the years, with a relatively high degree of communication and coordination for their respective activities. They are by far the most knowledgeable and experienced organizations involved in resettlement in Santa Cruz and the only institutions that focus their activities on San Julian and the surrounding region.

Other organizations such as FAO, CIAT, CORDECruz, the Mennonite Central Committee, and CIPCA (Centro de Investigación y Promoción del Campesinado, or Center for Peasantry Research and Promotion) conduct activities in the San Julian area, but these are either components of larger programs not specifically directed toward settlement development or are small-scale, isolated efforts that reach only a few people. None has the knowledge of lowland settlement

that the San Julian cooperative and FIDES have accumulated.

Therefore, we feel that FIDES and the Cooperativa Multiactiva San Julián should coordinate any development initiatives undertaken in and around San Julian. To be successful, they need financial support to expand their operations to the entire settlement region between the Rio Grande and the Rio San Julian. This will allow them to work on a scale sufficient to stimulate regional development.

FIDES and the San Julian cooperative need to be supported not just to grow in size but also for training or acquiring personnel. They must have the skills and experience to plan development on a regional level, understanding the linkages between activities and the larger regional context and using them to the settlers' advantage, rather than thinking only in terms of isolated projects.

Within the context of expanding the size of the institutions' operations and improving the professional capacity of their staffs, support in specific areas can also be contemplated. The most useful would be establishment of credit programs for settlers that could make loans of sufficient size to promote commercial expansion of agricultural production and investment in off-farm activities. A long-term commitment by an outside donor to provide seed-money for a revolving loan fund available to settlers would be necessary, rather than any open-ended effort to provide credit to settlers. To protect such a fund from inflation and currency devaluation, we recommend that any agency providing funds insist that the institutions adopt a plan under which repayment of the loans will be tied to the value of commodities produced by settlers. This will protect the fund from being eaten away through repayment of loans in devalued currency.

If the San Julian cooperative and FIDES are successful in expanding the scope and quality of the services they offer, then they might seek authority to allocate development funds that accrue locally from institution of a tax plan. These revenues could be used to strengthen settler production systems within a regional development framework. Under such circumstances, FIDES and the San Julian cooperative could also coordinate the activities of other institutions working in settlement development.

Future Prospects. If these three areas of concern are addressed systematically through a regionally based research-planning effort, San Julian can successfully make the transition from subsistence to commercial production and stimulate development throughout the region. The settlement project's orientation and consolidation phases have been important in creating this possibility. The accomplishments, however, have been necessary but not sufficient to enable settlers to prosper. What is now required is a regionally based development approach that joins the San Julian project with other small-holder settlements east of the Rio Grande, defines specific obstacles to be overcome and goals to be achieved, and designs a plan to accomplish these objectives. If this can be done, San Julian has a bright future as one of the most successful resettlement projects in the world.

If it is not done, we can expect the combination of rising production costs and low revenues to force San Julian settlers to seek ways of satisfying their cash needs on their own. The only existing alternative is to become wage laborers on the large sugar and cotton estates. This would potentially

place them in competition with highlanders who continue to migrate seasonally to Santa Cruz for these jobs. In addition, over the long term it would lead to impoverishment of the small-holders, contribute to environmental destruction of the region, and result in abandonment of the project.

Collins (1984; forthcoming) has pointed out that cycles of poverty frequently lead to cycles of environmental degradation in Amazon development efforts. In the case of San Julian, such a relationship would certainly be expected. Because work for agribusiness enterprises would be seasonal, settlers would have to continue to rely on their parcels in San Julian to provide the basic elements of their food supply. However, the reason they do not participate in wage labor now is that developing their own parcels requires too much time to permit it. If their economic situation deteriorates to the point where they must leave in search of wage labor anyway, they would be forced to take "shortcuts" on their own plots--primarily using land much more extensively and reducing fallow cycles when this strategy exhausted the forests. Over time, production would decline, forcing them to seek new land elsewhere and beginning the cycle again. This scenario with its potentially grave consequences need not occur. Nor does a solution have to cost tremendous amounts of money. What is required is a willingness to do the planning necessary to incorporate San Julian and the other small-holder settlements into the region, focusing on linkages with the larger departmental and national economies, rather than continuing to view settlement in terms of isolated project elements.

APPENDIX A

RESEARCH DESIGN EMPLOYED

This is the second in a series of reports on our evaluation of settlement in San Julian. The first (Pérez Crespo and Llanos Albornoz 1984) is a general summary of the team's findings immediately following the field research and without benefit of systematic data analysis. In this report we present the formal findings generated by the research design. The research was conducted in June, July, and August of 1984.

The research team consisted of five members, three from the United States and two from Bolivia. One of the team members had worked for over a year in San Julian as an extension agent. She speaks Quechua fluently, has extensive ties with settler households, and is very familiar with the history of the region's settlement by highland people. Two team members have extensive research experience among highland populations similar to those from which the San Julian settlers have come. One had participated in research on spontaneous, seasonal migration by highland Peruvian populations to valleys in the tropical lowlands of that country. Another team member is a new-lands settlement specialist who has conducted research and participated in the design and evaluation of new-lands settlement projects in Mexico, Central America, and India. All three team members from the United States speak fluent Spanish and one speaks Aymara. In addition, the research team has considerable experience in social, economic, and ecological analysis through the individual specialities of its members.

The research was conducted over a period of eight weeks, six of them in the settlement area. The other two weeks were spent in Santa Cruz and La Paz, interviewing representatives of agencies that have worked in San Julian before entering the settlement area and debriefing them on the results of the research when fieldwork was completed. During the period of field research, four data-gathering techniques were employed. First, the archives of the Instituto Nacional de Colonización (National Colonization Institute, or INC) were reviewed. All settlers in the region must register with the INC, and the archives contain the history of every parcel that has been settled since the early 1970s. The filing system begins to break down after about 1980, as a result of budget cuts that left the INC without adequate staff to maintain the archive. However, the records are complete until 1980, and they provide a comprehensive history of settlement in the San Julian area until that year. We examined the entire archive and recorded information on the history of every parcel in the records.

Second, we conducted an urbanization inventory in 39 of the settlement communities in the San Julian project and in 11 nearby spontaneous settlements. The inventories are designed to measure the growth of nonagricultural economic activities and social services such as health care in the communities and to chart their geographic distribution throughout the area. They also elicited information that would allow the team to determine how well infrastructure provided under the San Julian project is serving settler needs.

The data collected from the INC archives and the inventories formed a basis for the selection of six communities for conducting intensive interviews

with settlers. Of the communities selected, four are settlements created under the San Julian project and two are spontaneous settlements that had not participated in the project. Additional selection criteria included community age, ethnic identity of the majority of their members (Quechua, Aymara, or members of the local Camba population), and location (along one of the two main roads passing through the region or one of the lateral, connecting roads). In each community sampled, intensive interviews were conducted with between 8 and 10 of the approximately 40 settlers living there, with a total of 48 interviews conducted. The persons interviewed were all volunteers; members of our team explained the nature of our research first to the elected community leaders and then, with their permission, to the entire community.

The interview schedules are those used in the IDA global evaluation of new-lands settlement (Scudder 1981) with minor adjustments to accommodate local conditions. The interviews elicited information on land use, labor availability, commercialization of produce, and the history of settler families. They yielded rich data on the experiences of settlers in the region. However, few women volunteered to be interviewed initially, and in some cases when they did, found it difficult to respond to some of the questions. This problem appears to stem from women's exclusion from economic and political participation in the newly settled communities (Llanos Albornóz 1984a; 1984b). Therefore, separate interviews were conducted with women who volunteered to talk with us after both parties obtained the permission of community officials. These interviews elicited information on the role of women in the settlement areas and allowed women to discuss areas of particular concern to them, such as health care, nutritional problems, and their lack of political and economic power.

Finally, interviews were conducted with 23 individuals who were not part of the sampled communities. These include settlers who became interested in the research and asked to be interviewed as well as individuals sought out because of their long experience in the area or because they were reported to be particularly knowledgeable about settlement.

APPENDIX B

ORIGINS OF SAN JULIAN

The origins of the San Julian project have been described in detail by Hess (1980:102-116) and will be recounted only in summary form here. The San Julian project took shape from the experiences of the Comité de Iglesias Unidas (United Church Committee, or CIU), an informal organization composed of representatives of Catholic, Mennonite, and Methodist churches in the region. It was formed in 1968 to try to alleviate the suffering of highland settlers in the eastern lowlands. The first settlement effort of the CIU occurred in January of the same year, when it administered relief to settlers forced to flee their homes as a result of widespread flooding. The refugees were temporarily relocated in a camp just north of the city of Montero. Deciding not to return to their homes because the areas were susceptible to future flooding, they then moved to a permanent site with the assistance of CIU. The settlement, named Colonia Hardeman, was located farther north than any previous settlement in the department of Santa Cruz.

The refugees that formed Colonia Hardeman demonstrated ability to organize themselves and work cooperatively that greatly impressed the CIU members. Out of this experience grew an interest in supporting settlers' formation of their own community structures and management of their own affairs with a minimum of outside intervention. It was hoped that such an approach would overcome some problems that plagued previous settlement efforts, including excessive paternalism by project sponsors and inadequate or inappropriate support services.

In 1971, the CIU obtained a grant from OXFAM and permission from the INC to administer the settlement of 120 families on 10,000 hectares of land between the Chané and Piray Rivers. Drawing on lessons learned from Colonia Hardeman, the CIU provided two hectares of hand-cleared land in the community center, communal shelters, a potable-water well, and a primitive access road prior to arrival of the settlers. It also conducted a three-month orientation program to teach settlers the skills needed to survive and bring the area into agricultural productivity, supported them through the initial months as they constructed houses and community buildings, and provided food until their first harvest.

In 1972, under contract to the INC to provide an orientation program for settlers there, the CIU moved its operations from Chané-Piray to San Julian. Because of limited funding, no more than two nucleos were settled in any one year. In 1975, expanded international funding greatly accelerated the pace of planned settlement in San Julian. The Federal Republic of Germany sponsored a financial and technical assistance program that included construction of an all-weather gravel road between the Rio Grande and the Rio San Julián, now known as the German Highway. Also, USAID/Bolivia and the Bolivian government reached an agreement for construction of a road that would run northeast for 100 kilometers from kilometer 42 of the German Highway. Named the Brecha Casarabe, the road opened large areas of agricultural land between the Rio Grande and Rio San Julian for settlement. USAID/Bolivia also financed construction of lateral access roads and settlement infrastructure, the most important of which were deep wells in the nucleos to be settled.

In addition, USAID/Bolivia, the INC, and the CIU agreed to coordinate the settlement of 5,000 families in San Julian through annual orientation programs between 1975 and 1980. Roads, wells, and land clearing in each community center were to be provided by USAID and the INC, while the CIU would provide guidance for the settlers according to a specified model of economic development and social change. By 1979, it was clear that the goal of settling 5,000 families in San Julian would not be met. Only 1,372 had been settled in 41 nucleos by the end of that year (INC/CIU 1981:Vol. 3). According to Hess (1980:115-116):

The most important reasons for this discrepancy include: administrative intransigence, personnel difficulties, transfers and cuts in funds, uncoordinated planning, and just plain bad luck with the weather, machinery, illnesses and communications. However, to dwell on these problems found universally in development projects, would be to overlook the unique positive and negative aspects of the project.

Apparently USAID/Bolivia concurred with Hess' assessment. In 1979, acting on a recommendation by Nelson (1978) that a program to consolidate the successes

of the orientation program be implemented, USAID/Bolivia established a Cooperative Agreement for the purpose (FIDES 1980). Because of difficulties experienced with the INC during the orientation program, USAID wanted to award the consolidation program to the CIU. It could not, however, because the CIU had always functioned on an informal, voluntary basis and lacked personería jurídica, or legal standing as an organization under Bolivian law. Therefore, a private voluntary organization, composed of active CIU personnel (most of whom were American missionaries) and several Bolivians (mostly hired as professional staff), was created. Called the Fundación Integral de Desarrollo (Integral Development Foundation, or FIDES), the new organization found itself in possession of USAID funds to conduct the consolidation program even before it enjoyed legal existence (FIDES staff, personal communication).

The cooperative agreement for the consolidation program was originally scheduled to last from October 1979 through the end of 1983; it was extended, however, through the end of 1984 to allow FIDES more time to prepare to operate without the funds it had been established to manage. Under the consolidation program, FIDES entered into an agreement of mutual support with INC. The INC holds legal control of all lands in the settlement area, issuing certificates of colonization to the settlers. It is the legal channel through which land titles theoretically may be transferred to individual settlers, although no settlers in San Julian have yet received titles to their parcels. The INC assumed responsibility for settling the colonist families that arrived under the consolidation program developed by CIU. However, budget cuts and administrative difficulties prevented this from actually occurring. Under the new arrangement, the INC was also to provide technical support to settlers in the form of extension personnel and a cattle-promotion program to stimulate beef and dairy production (FIDES 1981:5).

FIDES activities under the consolidation program focused on providing nutrition education and technical services in agriculture for the San Julian settlers. The centerpiece of its efforts was a diversified farming program, which was to assist settlers in developing diversified agricultural production systems and marketing strategies for commercial farm produce. The goal of the program was to reduce settler dependency on rice and corn as cash crops and to raise farm incomes. To achieve these goals, FIDES entered into various formal and informal relationships with other groups conducting development-related activities in Santa Cruz. These include the Mennonite Central Committee, a missionary organization sponsored by the Mennonite churches in the United States and Canada, which promotes animal traction as an intermediate-level alternative to total reliance on manual labor on one extreme and costly mechanization on the other. FIDES worked with the Santa Cruz office of the Food and Agriculture Organization of the United Nations (FAO) and the Centro de Investigación Agrícola Tropical (Tropical Agriculture Research Center, or CIAT) in testing small silos to protect grains from insects and rodents, and with CIAT in integrated control of insects and experimentation with new cultivars and cultivar varieties. FIDES also became involved in breeding Tilapia fish to serve as food for larger local fish varieties to be raised in ponds and borrow-pits by settlers; in provision of threshing machines through a system of consumer cooperatives established under the orientation program; in introducing and promoting citrus, coffee, and other tree crops; and in supporting settler involvement in cattle production (FIDES 1980;1981).

The consolidation program's emphasis was heavily directed toward technically

feasible activities for settlers to incorporate into their production regimens. While a number of beneficial results were obtained, they came at the expense of other components originally planned as part of the consolidation program. Nutrition education and family-hygiene activities were conducted in a very haphazard manner with inadequately trained extension and home-demonstration personnel sent into the communities with few resources and no clear idea of what they were supposed to accomplish or how. Moreover, the problems associated with commercialization of settlers' produce were never addressed. Although the program showed that many agricultural activities could be incorporated into settlers' production regimens, where the resulting products could be sold or how they might be transported was never considered.

Our research began just as USAID funding for the consolidation program was ending, in late June 1984. FIDES is at once proud of what it has accomplished and aware of the shortcomings of the program described here. While concerned about the possible financial repercussions of losing USAID support, it is particularly anxious to define its own future purpose as an institution. One of FIDES' hopes in agreeing to collaborate with us is that our research would help define future directions for program activities.

APPENDIX C

THE SAN JULIAN EVALUATION RECORD

The San Julian project has been the object of considerable attention by scholars and development practitioners interested in resettlement. The project's early years were subject of doctoral research by Hess (1978;1980), and it has been discussed in published work by Blanes et al. (1984), Maxwell (1980), and Stearman (1980;1983). As a recipient of financial support from USAID/Bolivia, San Julian was evaluated on several occasions by that agency's employees as well as by outside consultants contracted for the purpose (cf. Castro 1978; Curtis 1978; Locatelli 1978; Nelson 1978; Stearman 1978; Solem et al. 1983; Ward 1984).

Some authors pointed out serious or potentially serious problems with the San Julian project. For example, while lauding the project's successful establishment of functioning communities in which settlers could meet most of their subsistence needs, Nelson (1978) warned that this success could be undermined in coming years if settlers were not assisted to overcome marketing difficulties so that agriculture might become profitable. Maxwell (1980) predicted that high rates of abandonment might be provoked by what he termed the "barbecho crisis"; after the high forest has been exhausted, cultivation in areas of regrowth (barbecho) leads to lower yields, increasing difficulties in controlling weed growth, and falling income. Maxwell did not regard the "barbecho crisis" as inevitable, but attributed it to (1) inexperience in lowland cultivation among settlers from the highlands, (2) lack of regard for soil quality as a criterion for settlement, (3) poor roads, (4) inadequate market networks, and (5) scarce capital and credit (1980:165-166). He was not optimistic that the agencies responsible for settlement would be able to mount the comprehensive and coordinated effort necessary for settlers to overcome the "barbecho crisis." Stearman (1983) was also pessimistic about the future of small-holders in San Julian. She argued that, regardless of how well the project might be planned and managed, small-holder settlement

is destined to be only an intermediate step in Amazonian development, paving the way for entry into the region by large agricultural and cattle-raising enterprises. These ultimately displace small-holders and consolidate their lands, in a process of social, economic, and ecological change that is beyond the control of the responsible agencies (Stearman 1983:53-54).

On the whole, however, reports about San Julian have ranged from highly favorable to glowing in their assessments of its success, and several factors repeatedly impressed successive evaluation teams from USAID. First, evaluators have been impressed by the three-month orientation program new settlers received, which combined training in land clearing and cultivation in the lowlands with provision of rudimentary communal shelter and PL 480 food assistance until individual housing could be constructed and an initial harvest realized. Second, they make frequent reference to San Julian's nucleo settlement pattern in which houses are clustered around a central area in each village, with the 50-hectare parcels radiating outward (Figure 3). Eight individual nucleos are, in turn, organized around a central one, which is supposed to develop into an intermediate administrative center to relay urban goods and services to the settler communities from the towns and cities of the region. The nucleo settlement pattern is frequently credited with an equitable and cost-effective distribution of essential services such as water and schools, with concentrating the settler population in units large enough to encourage establishment of stores and small businesses, and with facilitating community organization by maximizing face-to-face contact among settlers. Third, the settler-recruitment program is credited with discouraging many potential settlers with little chance of success from making the move to eastern Bolivia.

Because of these features, San Julian has been proclaimed by many to be one of the most successful settlement projects in South America. While note is taken of problems associated with land titling, road maintenance, and health-care facilities, reports point to San Julian as an established agricultural area capable of providing its own food needs, with excellent prospects for stimulating economic growth on a regional level. "The confidence in prospects for growth cannot be overstated," assert Solem et al. (1983:21). "The feeling seemed to be one of inevitability--that time and energy were sure to be rewarded."

Because basic subsistence needs are met by the first several hectares under cultivation, it is clear that the proportionate contribution to the overall economy will be greater from later farm growth. Likewise, growth of secondary industries is only beginning to be felt in San Julian. As production rises agricultural processing and marketing businesses should emerge. As disposable incomes rise, there should be a marked effect in the nearby cities of Montero and Santa Cruz. More time is needed to see how great these secondary impacts will be (Solem et al. 1983:22).

The same evaluation team suggested why San Julian's perceived success is greater than that of other areas, specifically the nearby Chané-Piray project:

In the San Julian settlement zone, AID "got in on the ground floor," and developments there reflect this fact. All San Julian communities enjoyed the same basic infrastructure investments, the same nucleo settlement

design and for the most part benefitted from the same orientation program at the pioneering stage. When one adds to that the additional five years of technical support not available in Chané-Piray (through AID's 1979 consolidation program), it seems safe to attribute critical differences in economic impacts at Chané-Piray and San Julian to the greater AID involvement in San Julian (Solem et al. 1983:22).

Because of the innovations said to contribute to the success of San Julian, the Institute for Development Anthropology (IDA) became interested in conducting research on the project as part of its continuing study of new-lands settlement projects around the world. An equally compelling interest, however, are the contrasting opinions of independent evaluations that point to serious problems at San Julian and the series of USAID evaluations that emphasize its apparent success.

APPENDIX D

HISTORICAL AND GEOGRAPHICAL BACKGROUND

The Northern Santa Cruz Region

The region of which San Julian is a part extends northward for about 150 kilometers from the city of Santa Cruz and is roughly bounded by the Yapacani River on the west and the highway linking the town of San Ramón with the city of Trinidad in the east. Northern Santa Cruz is a transition area between two major South American ecological zones, the tropical forest of the Amazon to the north and the humid grasslands of the pampas to the south, and both types of ecosystems may be found within the department boundaries. The zone is also the most heavily populated part of Santa Cruz department and the most heavily used for intensive agriculture.

Indeed, the concentration of agriculture and the population growing due to migration from the altiplano and highland valleys of Bolivia define northern Santa Cruz as a region for the purposes of this research. With the city of Santa Cruz as its administrative, social, and economic hub, the spatial growth of the region has been fitful, determined in part by geographic features and obstacles, infrastructural growth, and patterns of planned and spontaneous settlement that often have not adequately taken into account the geographic and infrastructural characteristics of the region.

Since 1650, when Antonio de León Pinelos argued that it was the site of the biblical Garden of Eden, northern Santa Cruz has been regarded by many Bolivians as an untapped resource. Nevertheless, located near the geographic center of South America, the zone's distance and natural obstacles have caused it to remain one of the more isolated areas of the continent until recently. It had no rail connections until 1965, when a line joined the city of Santa Cruz with Brazil; a line linking the area with western Bolivia has been "under construction" since 1900 but never completed.

During the colonial and republican periods of Bolivian history, Santa Cruz was an isolated outpost. A plan laid by national leaders early in the 20th century to integrate the zone more fully into the affairs of the rest of the nation were shattered by the outbreak of the Chaco War with Paraguay

in 1931. The situation did not begin to change until 1952, when the Movimiento Nacionalista Revolucionario (Nationalist Revolutionary Movement, or MNR) instituted comprehensive agrarian-reform legislation and declared the task of overcoming Santa Cruz's isolation a high priority. In comparison to other parts of Bolivia, relatively little land was expropriated in Santa Cruz under the agrarian reform. Nevertheless, the threat of expropriation of unproductive land holdings did encourage some property owners to invest in commercial production. During this period, President Paz Estenssoro asked for and received large amounts of economic and technical assistance from the United States for lowland development, and Bolivia became the largest per capita recipient of the Point Four program in the world. Because of its tremendous agricultural potential, Point Four officials were determined to make northern Santa Cruz a "showplace." Millions of dollars were spent on a wide variety of projects, including paving the Cochabamba-Santa Cruz highway, large-scale land clearing, new-lands settlement programs, and establishment of a large, state-run sugar refinery (Heath 1969:258).

Thus as agrarian reform created incentives to invest in commercial agriculture, the Point Four program made it relatively easy to do so. The program provided large landowners with a source of credit. In 1954 it helped finance establishment of a machinery pool in the city of Santa Cruz, through which heavy equipment could be secured for land clearing. A modern sugar mill and alcohol distillery stimulated production of sugarcane. Paving the highway to Cochabamba improved access to markets and, more importantly, facilitated seasonal migration of laborers from the highlands to Santa Cruz. As a result of these changes, four crops came to be grown on a large scale: sugarcane, rice, coffee, and cotton. The expansion of rice and sugarcane was altogether too rapid, and by the early 1960s the region was suffering from chronic overproduction of these crops (Heath 1969:289-299).

The effort to develop commercial agriculture in northern Santa Cruz coincided with another MNR initiative, namely, the resettlement of highland peasants in the eastern lowlands as a complement to agrarian reform. Settlement of the eastern lowlands had long been a goal that could yield political advantages. During the Ballivián administration (1841-1847), for example, establishing colonies of former soldiers in the eastern lowlands served as a way to dismantle an expensive military whose numbers had swollen in the constant fighting begun with the Wars of Independence (Klein 1982:121). A Ministry of Colonization was established in 1886, and in 1901 large expanses of land in eastern Bolivia were offered to a number of Europeans and North Americans recruited through Bolivian consular offices. In spite of offers of credit and other inducements, this effort to attract settlers failed. During the presidencies of José David Toro and Germán Busch (1936-1939), the state wished to use lowland settlement as a complement to a general land-redistribution policy. However, the only concrete result was the resettlement of a small group of Chaco War veterans near the Yacapaní River in 1937. Named Colonia Germán Busch, the area had attracted only some 200 settlers by 1940, and the effort was discontinued shortly thereafter (Hess 1980:56). See Map 2 for locations of settlement areas in Bolivia.

The MNR policy of encouraging highland peasants to move to eastern Bolivia coincided with the growth of commercial agriculture in Santa Cruz. Its growth depended on the availability of cheap seasonal labor from the highland regions of the country, as investments were made primarily in land clearing and the introduction of cash crops, not in mechanized production (Riviere d'Arce 1980).

Many people who went to Santa Cruz as seasonal laborers ultimately remained there, either as settlers claiming their own parcels of land or as members of the region's growing proletariat. (See Map 3.) Early estimates of the rate of population growth resulting from state settlement policies and the labor demands of commercial agriculture varied widely, from 7,000 to 40,000 people for Santa Cruz department in the early 1960s (Heath 1969:348). Census figures indicate that the population of Santa Cruz department grew from 286,145 to 715,072 between 1950 and 1976 (Klein 1982:297), for a mean annual growth rate of 4% (see Table 1). In 1976, regional agricultural employment ranged from a low of 18,000 in the month of February to 95,000 in August, the peak month for clearing new lands (Riviere d'Arc 1980:158).

While northern Santa Cruz was rapidly becoming one of the most prosperous regions of Bolivia, the infusion of funds was accompanied by increasingly inequitable resource distribution, which, in turn, gave rise to interethnic conflict and environmental destruction. Heath (1962;1966) and Stearman (1976) describe the region's development of a distinctive Camba cultural identity, the parameters of which were defined by the landowning elites and imitated by subordinate social classes. In traditional Bolivian society, class membership was determined primarily by access to land, and inequalities defined in terms of cash income or control of capital were relatively modest. According to Heath:

Until the 1960s, the ease and few comforts the fingueros [large landowners] enjoyed were those of a semi-feudal landlord whose riches consist not in a large income but in an abundance of labor and the security of a modest current income. Extensive landholdings, therefore, long had value in terms of prestige which far outweighed their negotiable economic value. Even in the largest fincas, agricultural techniques were traditionally primitive and the investment capital minimal (1969:289).

This manorial economy came under attack with the agrarian reform and the influx of money and people that accompanied it. Few large landowners, for example, held legal title to their properties, relying instead on customary rights to claim and use a particular area. However, the influx of settlers staking claims to parcels, the arrival of large companies seeking timber concessions from the state, and the agrarian reform that allowed unproductive land to be expropriated combined against the traditional order.

The intensification of resource competition during this period was exacerbated by several factors. Under the MNR, for example, the threat of expropriation was used by the central government to discourage opposition and reward party supporters. Little land was in fact expropriated in Santa Cruz, but the expropriation that occurred was selective (Heath 1969:291-295). Resentment toward highland settlers was stirred by the use of highland peasant troops to violently put down an insurrection in the region in 1959. These same troops remained in Santa Cruz as an occupying force for several months, during which time they committed murders and other atrocities (Heath 1969:347).

Outside agencies inadvertently heightened local resentment against highlanders through poor planning of some development activities. For example, the Andean Mission of the United Nations selected Cotoca, an area to the east of the city of Santa Cruz, as a site for settlement of highland migrants in 1954,

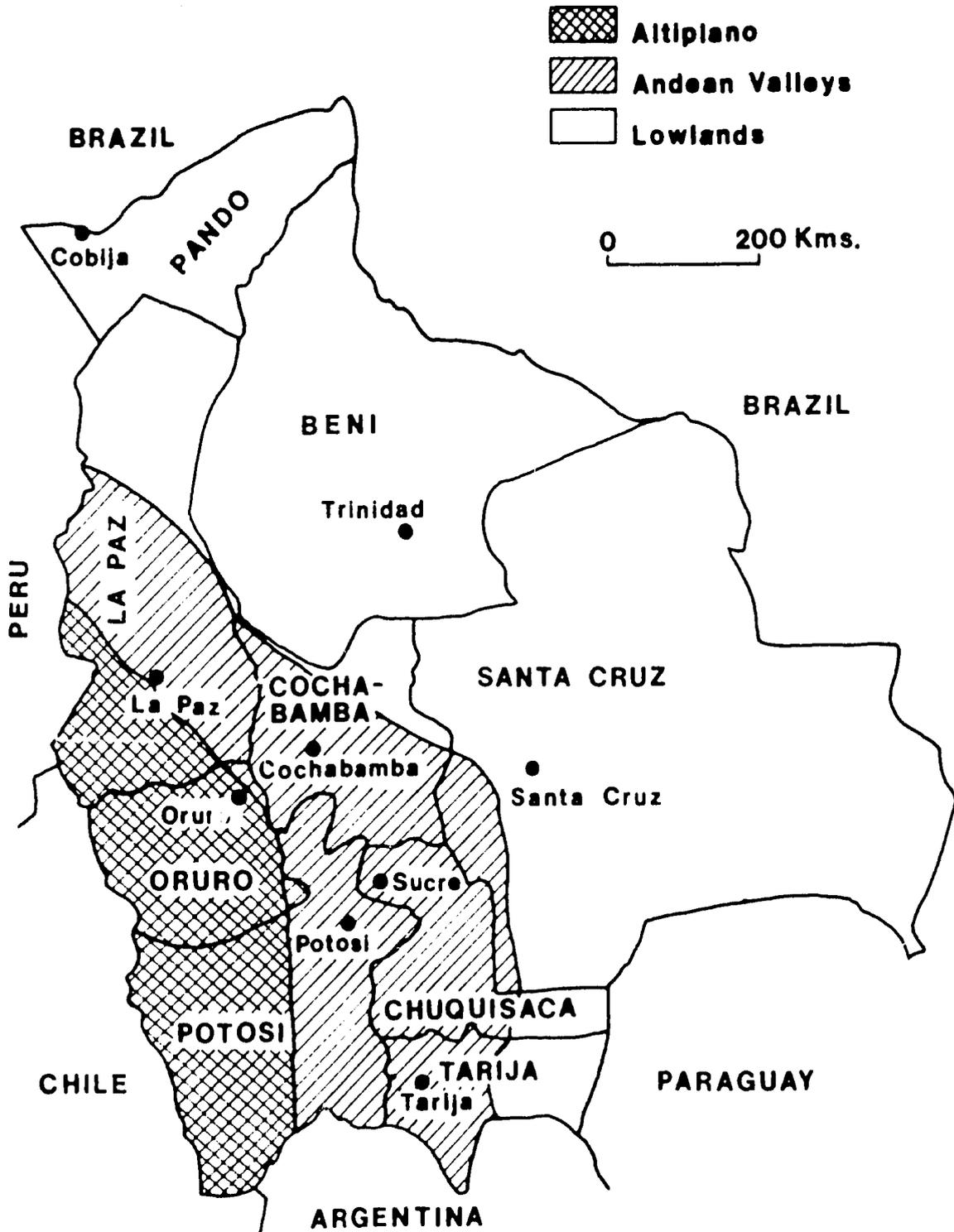
dispossessing local farmers and giving them what they regarded as inferior land in compensation for their properties (Heath 1969:348).

While resentment was building against highland migrants, the regional economy was becoming increasingly dependent on them. Beginning in the 1950s, large numbers of lowland peasants who had worked the estates of large landowners began to claim their own parcels of land. This created a shortage of labor that landowners sought to replace through seasonal employment of highlanders. Many migrant laborers had previously worked in the Argentine sugarcane harvest, but growing border restrictions during this period caused them to turn their attention to northern Santa Cruz (Heath 1969:273,339).

These diverse and often contradictory pressures shaped the regional society in which the San Julian settlement project occurred. Caught between a need to invest in agricultural production and what they viewed as an unstable land-tenure situation, landowners relied on seasonal migrant labor to increase commercial production of rice, cotton, and sugarcane rather than on technical modernization requiring a long-term investment in equipment and inputs. Unwilling to invest, large-scale agriculturalists have come to emphasize quick profits without regard to the environmental consequences of land clearing and cultivation without proper fertilization. The high winds characteristic of Santa Cruz have eroded many agricultural areas, creating desert-like conditions. When confronted with evidence of declining soil productivity, landowners have tried to blame highland settlers, although local development agencies now agree that the carelessness of landowners has been the primary culprit. In some cases, timber companies have sought to discourage colonization that might hinder their access to lumber, forming political alliances with landowners. The lumber interests also compete with landowners and merchants for political control of the department (Riviere d'Arc 1980).

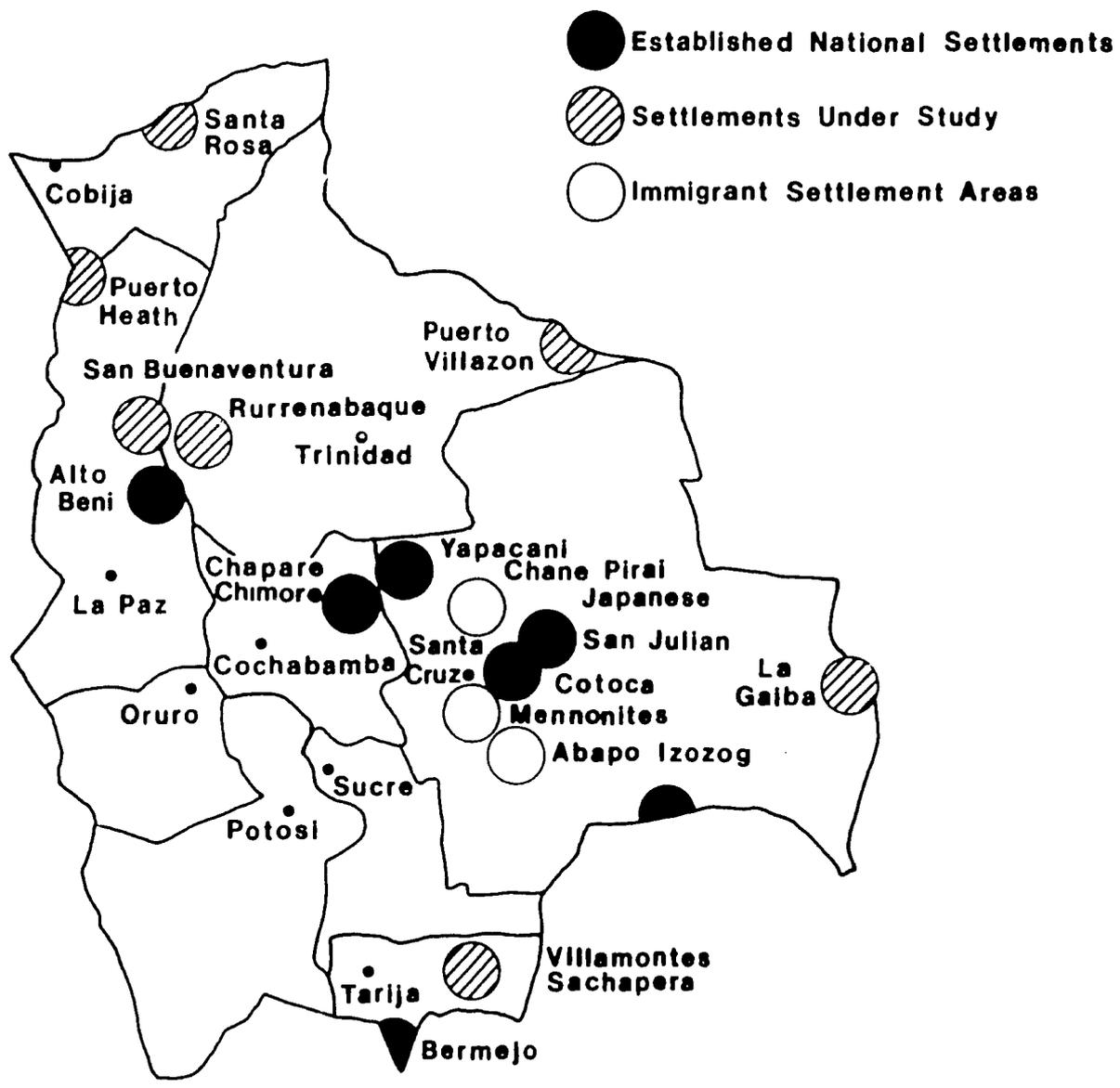
Highland migrants, forced to leave their home communities by poverty and drawn to Santa Cruz by opportunities for seasonal employment, commercial activity, or the chance to claim a parcel of forest land, continue to grow in numbers. The pressure created by their increasing presence sparked a regionalist reaction characterized by chauvinism and violence. Today, as in 1959 (Heath 1969:274), incidents of violence against highlanders do occur. People of highland origin are almost completely excluded from positions in departmental government and regional development agencies. This exclusion logically has its consequences when issues regarding highland settlement in Santa Cruz are brought before departmental government and regional development agencies.

APPENDIX E: Maps, Figures, and Tables

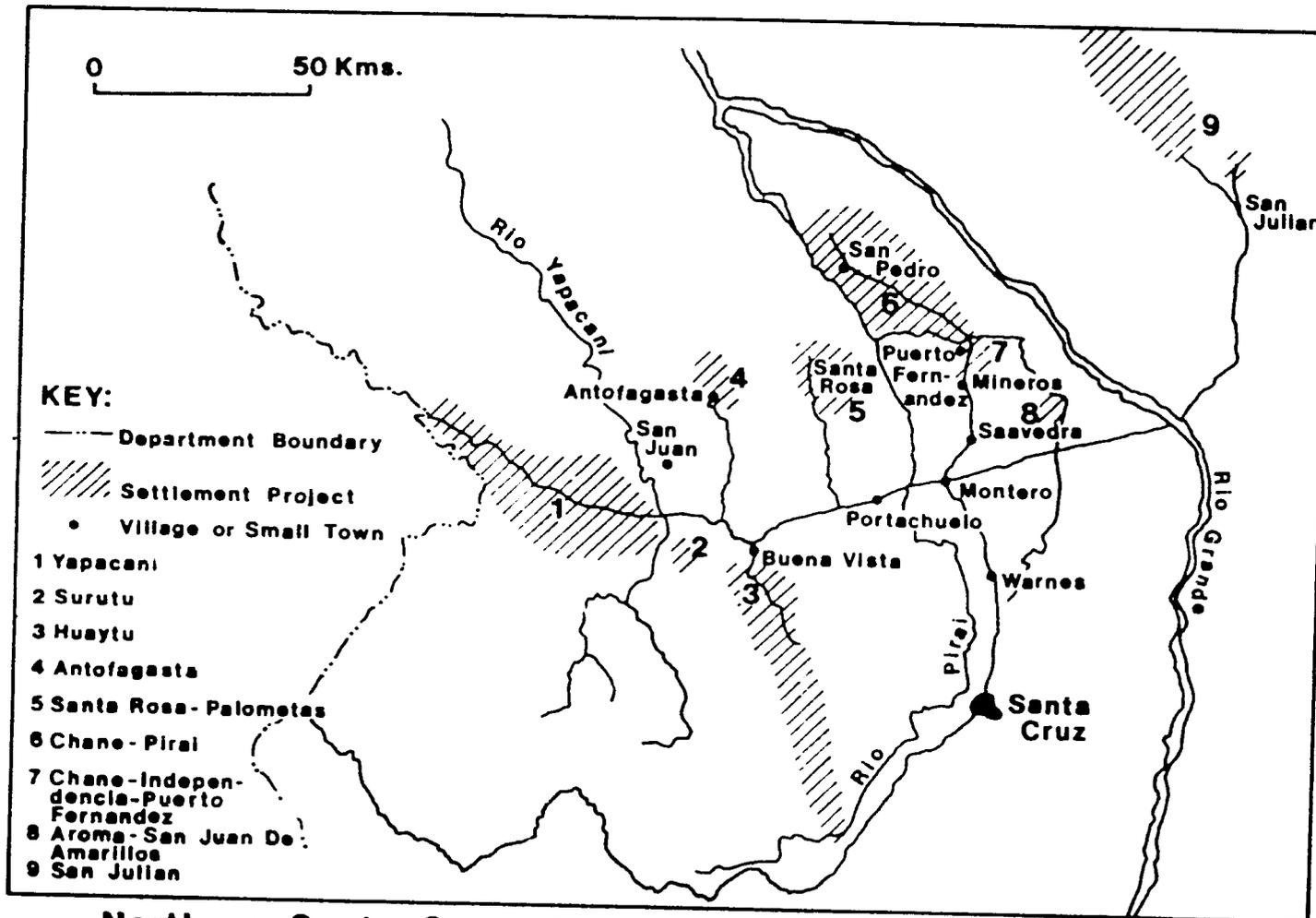


BOLIVIA: Geographical Regions

MAP 1



Map 2
BOLIVIA: Locations of Settlement Areas
Adapted from: Ortiz Lema (1981)



Northern Santa Cruz. State-sponsored Settlement Areas

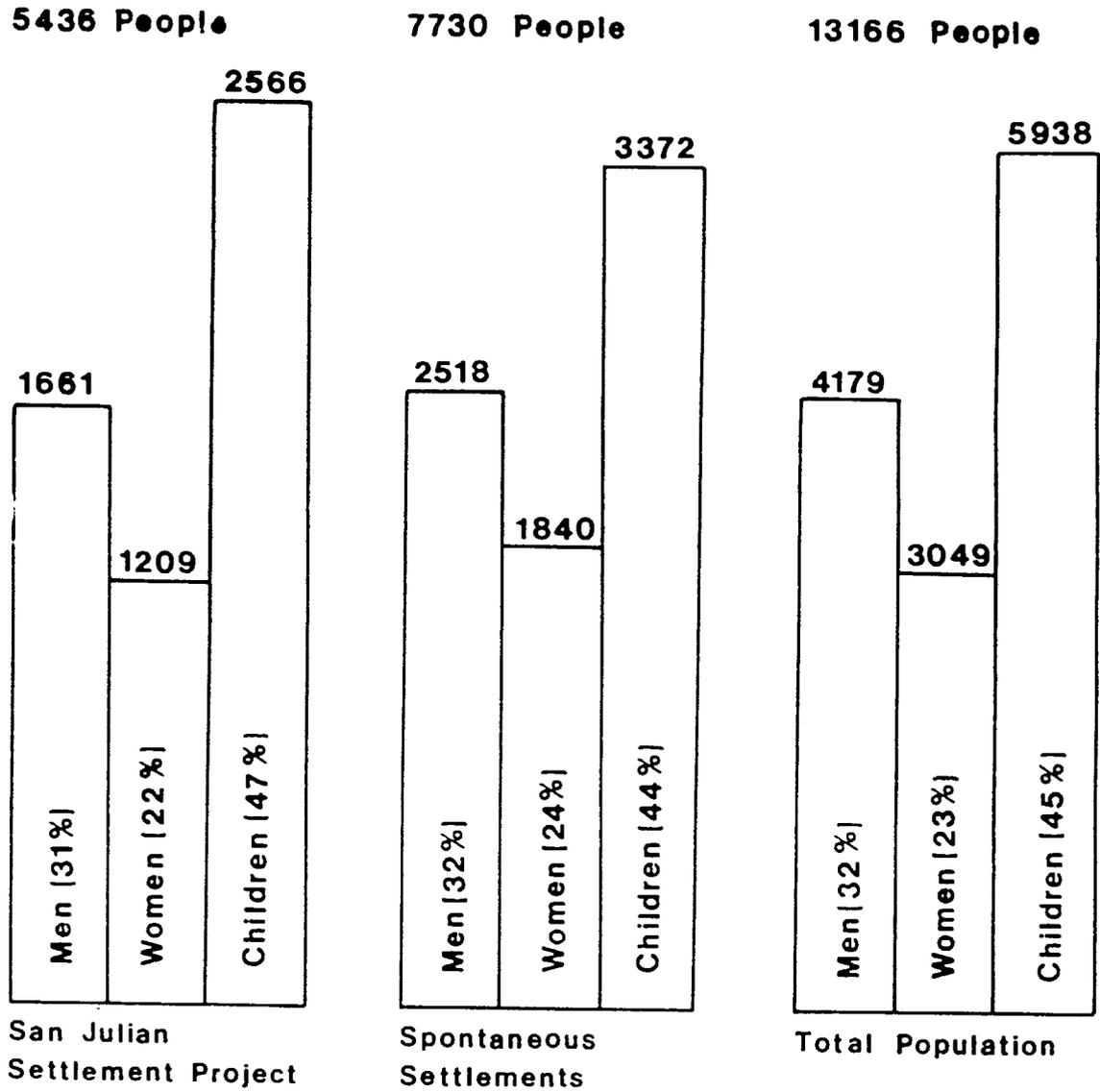
Source: Riviere d'Arc [1980]

47

Table 1: Population Growth in Santa Cruz and Other Bolivian Departments

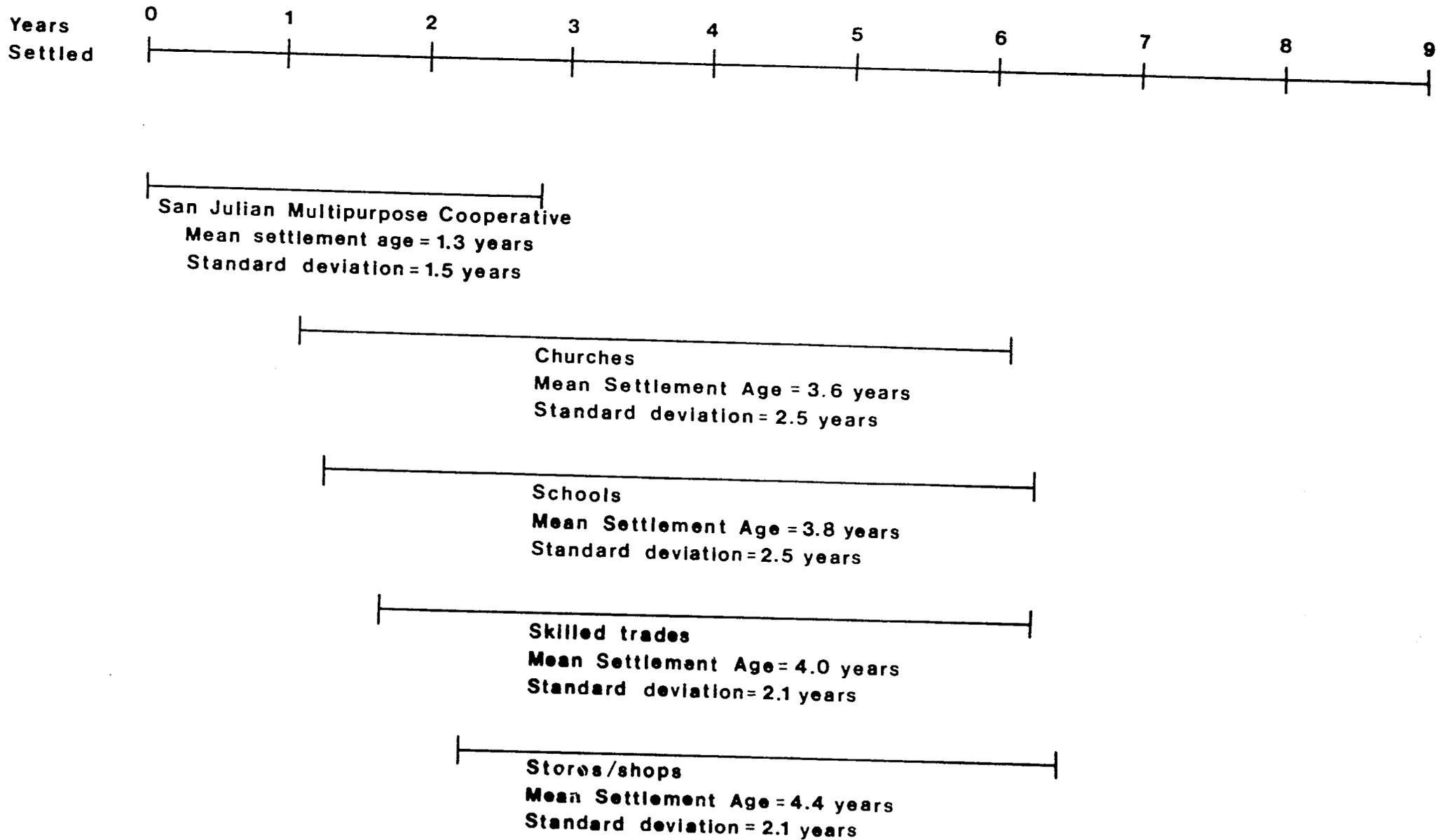
DEPARTMENT	1846	1900	1950	1976
Capital City				
SANTA CRUZ	78,581	171,592	286,145	715,072
Santa Cruz	6,005	15,874	42,476	256,946
LA PAZ	412,867	426,930	948,446	1,484,151
La Paz	42,849	52,697	321,073	654,713
COCHABAMBA	279,048	326,163	490,475	730,358
Cochabamba	30,396	21,881	80,795	205,002
ORURO	95,324	86,081	210,260	311,245
Oruro	5,687	13,575	62,975	124,121
POTOSI	243,269	325,615	534,399	658,713
Potosi	16,711	20,910	45,758	77,334
CHUQUISACA	156,041	196,434	282,980	357,244
Sucre	19,235	20,907	40,128	62,207
TARIJA	63,800	67,887	126,752	188,655
Tarija	5,129	6,980	16,869	39,087
BENI	48,406	25,680	119,770	167,969
Trinidad	3,194	2,556	10,759	27,583

Source: Klein (1982).



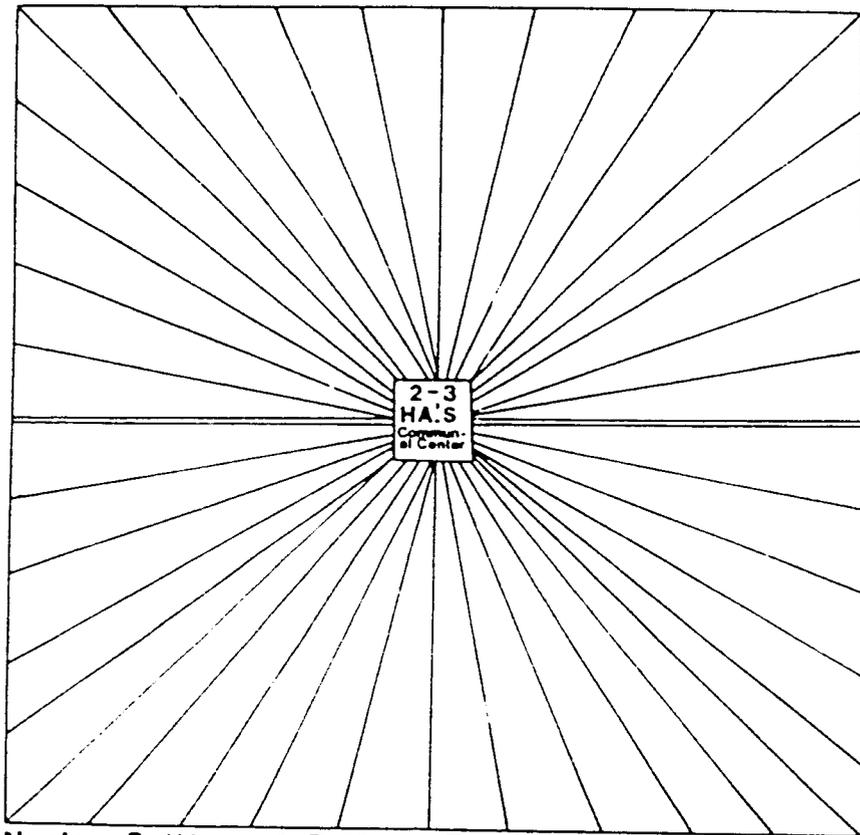
Population Composition in San Julian, Spontaneous Settlements, and Total for the Settlement Area

Figure 1

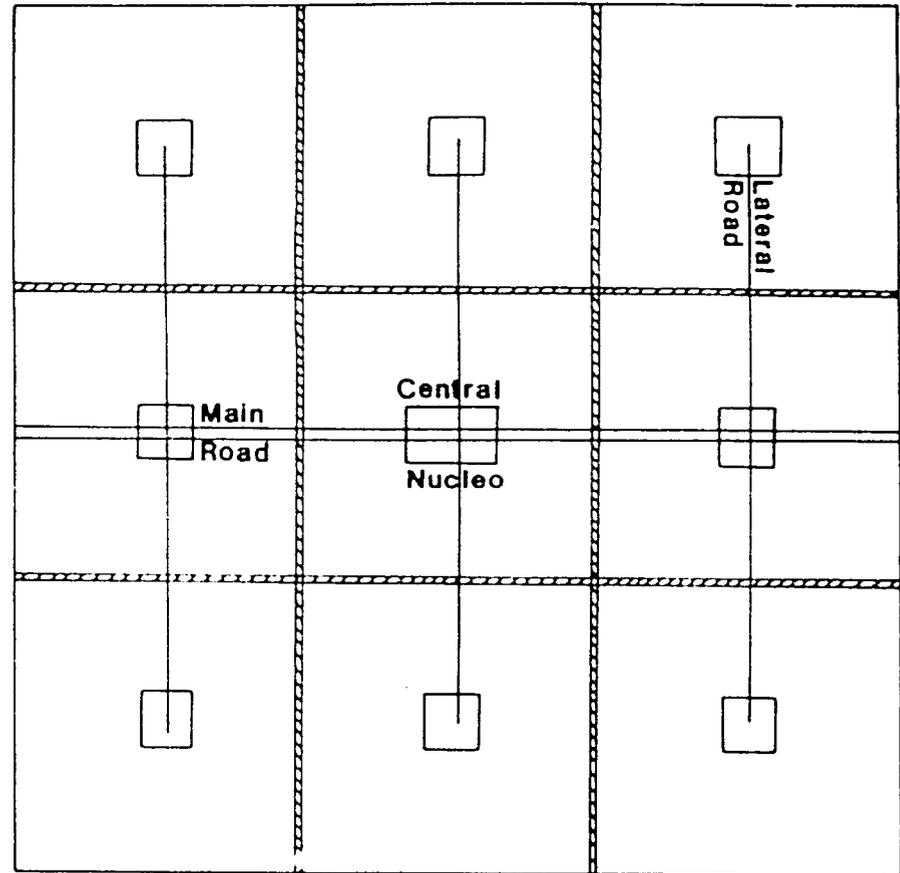


Sequence of Urban Functions Development in San Julian

Figure 2



**Nucleo Settlement Pattern Total Area=2000 Hectares
Each Parcel= Approximately 50 Hectares**



Nine Nucleos with Central Nucleo

 Green Areas

THE SETTLEMENT PATTERN OF SAN JULIAN

Figure 3

REFERENCES CITED

- Ballesteros J., M. Edel, and M. Nelson
1970 Colonización del Papaloapan (Mexico City: Centro de Investigaciones Agrarias).
- Blanes J., Jose, Fernando Calderón G., Jorge Dandler H., Julio Prudencio H., and Luis G.
1984 "Migración rural-rural: el caso de las colonias," in Tras nuevas raíces, pp.53-252 (La Paz, Bolivia: Ministerio de Planeamiento y Coordinación).
- Castro, Robert J.
1978 San Julian and Chane-Piray Colonization, Project Evaluation Report submitted to USAID/Bolivia (manuscript).
- Chambers, Robert, ed.
1970 The Volta Resettlement Experience (London: Routledge, Kegan Paul).
- Collins, Jane L.
1984 Land Tenure, Institutional Factors, and Producer Decisions on Fragile Lands (Binghamton, NY: Cooperative Agreement for Settlement and Resource Systems Analysis).

1985 "Smallholder Settlement of Tropical South America: The Social Causes of Ecological Destruction," *Human Organization* 44(4).
- CORDECRUZ
1984a "Arroz boliviana," Boletín Informativo Agropecuario 1:3-4 (Corporación Regional de Desarrollo de Santa Cruz, Departamento de Comercialización Agropecuario).

1984b Maiz: enfrentando una sobreproducción. Boletín Informativo Agropecuario, Departamento de Comercialización Agropecuario, Corporación Regional de Desarrollo de Santa Cruz 1:3-4.
- Curtis, Ronald
1978 Overview of Project Evaluation Study: Subtropical Lands Development Project, Report prepared for the U.S. Agency for International Development, Washington, D.C.
- Ewell, Peter T., and Thomas T. Poleman
1930 Uxpanapa: Agricultural Development in the Mexican Tropics (New York: Pergamon Press).
- FIDES
1980 Proyecto de consolidación de colonización. Informe Final. Octubre 1979-Diciembre 1980 (Santa Cruz, Bolivia: Fundación Integral de Desarrollo).

1981 Consolidation of Colonization. Annual Report. September 1980-October 1981 (Santa Cruz, Bolivia: Fundación Integral de Desarrollo).

1982 Consolidación de colonización. Informe Anual. Enero-Diciembre 1982 (Santa Cruz, Bolivia: Fundación Integral de Desarrollo).
- Hackenberg, R.A. and B.H. Hackenberg
1984 "Developing Intermediate Cities as Processing Centres: A Project in Western Panama," Regional Development Dialogue, 5(1):74-109.

Hamilton, Susan

- 1985 An Unsettling Experience: Women's Migration to the San Julian Colonization Project (Binghamton, New York: Cooperative Agreement on Settlement and Resource Systems Analysis).

Heath, Dwight B.

- 1964 "Ethnogenesis and Ethnohistory: Sociocultural Emergence in the Bolivian Oriente," Actas y Memorias del XXXV Congreso Internacional de Americanistas 2:149-153.

- 1966 "Ethnohistory of the Eastern Lowlands of Bolivia," América Indígena 26:143-151.

- 1969 "Land Reform and Social Revolution in the Bolivian Oriente," in Land Reform and Social Revolution in Bolivia, Dwight B. Heath, Charles J. Erasmus, and Hans C. Beuchler, eds. pp. 241-363 (New York: Praeger).

Heckadon Moreno, Stanley, and Alberto McKay

- 1982 Colonización y Destrucción de Bosques en Panamá (Panama City: Asociación Panameña Antropológica).

Hess, David

- 1978 "Adaptation to a New Environment: Pioneer Migration in San Julian," paper presented to the 77th annual meeting of the American Anthropological Association, Los Angeles.

- 1980 Pioneering in San Julian: A Study of Adaptive Strategy Formation by Migrant Farmers in Eastern Bolivia, Ph.D. dissertation (Pittsburgh: University of Pittsburgh).

Hirschman, A.O.

- 1977 "A Generalized Linkage Approach to Development, With Special Reference to Staples," in Essays on Economic Development and Cultural Change in Honor of Bert F. Hoselitz, M. Nash, ed. pp. 67-98, supplement to Volume 25 (Chicago: University of Chicago Press).

INC/CIU

- 1981 Evaluación del programa de orientación para nuevos colonos en San Julián (Santa Cruz, Bolivia: Instituto Nacional de Colonización/Comité de Iglesias Unidas), mimeo, 3 volumes.

Klein, Herbert

- 1982 Bolivia: Evolution of a Multiethnic Society (New York: Oxford University Press).

Kraljevic, Ivo

- 1983 Socio-Cultural Analysis of the Self-Financing Primary Health Care Project in Santa Cruz, report submitted to the Office of Health and Human Resources, USAID/Bolivia, La Paz.

Llanos Albornóz, Martha

- 1984a "Observaciones sobre el rol de la mujer en la zona de colonización de San Julián," in Informes preliminares sobre el proyecto de San Julián, Carlos A. Pérez Crespo and Martha Llanos Albornoz (Binghamton, New York:

Cooperative Agreement for Settlement and Resource Systems Analysis).

1984b "Observations on the Role of Women in the San Julian Colonization Project," Development Anthropology Network 3(1).

Locatelli, Eduardo

1978 Evaluation of the Colonization Project in San Julian, report prepared for the U.S. Agency for International Development, Washington, D.C.

Maxwell, Simon

1980 "Marginalized Colonists to the North of Santa Cruz: Avenues of Escape from the Barbecho Crisis," in Land, People, and Planning in Contemporary Amazonia, Francoise Barbira-Scazzocchio, ed. pp. 162-170 (Cambridge: Cambridge University, Centre of Latin American Studies).

Morán, Emilio F.

1979 "Criteria for Choosing Successful Homesteaders in Brazil," Research in Economic Anthropology 2:339-359.

1983 "Government-Directed Settlement in the 1970s: An Assessment of Transamazon Highway Colonization," in The Dilemma of Amazonian Development, Emilio F. Morán, ed. pp. 297-318 (Boulder, Colorado: Westview Press).

Nelson, Michael

1973 The Development of Tropical Lands. Baltimore: Johns Hopkins University Press

1978 Evaluation. Chané-Pirai and San Julian Colonization Projects, report of Regional Development Specialists submitted to USAID/Bolivia, La Paz.

Ortiz Lema, Edgar

1981 Macrozonificación y densidades poblacionales: migraciones y colonización en Bolivia (Tarija, Bolivia: Corporación Regional de Desarrollo de Tarija).

Painter, Michael

1983 La utilización de recursos en el valle de Tambopata, Peru: cooperativas estatales y liderago comunitario en la frontera cafetalera. Binghamton, NY: Cooperative Agreement on Settlement and Resource Systems Analysis.

1984 "Changing Relations of Production and Rural Underdevelopment," Journal of Anthropological Research 40:271-293.

Partridge, William L.

1979 "Banana County in the Wake of United Fruit: Social and Economic Linkages," American Ethnologist 6(3):491-509.

1983 "Relocalización en las Distintas Etapas de Desarrollo de los Emprendimientos Hidroeléctricos," technical paper presented to seminar "Efectos Sociales de las Grandes Represas de América Latina," Organization of American States and United Nations, Buenos Aires.

1984 "The Humid Tropics Cattle Ranching Complex: Cases From Panama Reviewed," Human Organization 43:76-80.

- Partridge, W.L., and A.B. Brown
1982 "Agricultural Development Among the Mazatec: Lessons From Resettlement,"
Culture and Agriculture 16:1-9.
- Péña Davidson, Mauricio, and Miguel Tejada Balcazar
1982 Evaluación de los sistemas de colonización en el departamento (Santa
Cruz, Bolivia: Corporación Regional de Desarrollo de Santa Cruz).
- Perez-Crespo, Carlos A.
1984a "Economía y desarrollo en San Julián," in Informes preliminares
sobre la colonización en San Julián, Carlos A. Pérez Crespo and Martha
Llanos Albornoz, report prepared for the Cooperative Agreement on Settlement
and Resource Systems Analysis (Binghamton, New York: Institute for
Development Anthropology).
1984b "Resource Competition and Human Settlement in the San Julian Project,
Bolivia," Development Anthropology Network 3(1).
- Perez-Crespo, Carlos A., and Martha Llanos Albornoz
1984b Informes preliminares sobre la colonización en San Julián, report
prepared for the Cooperative Agreement on Settlement and Resource Systems
Analysis (Binghamton, New York: Institute for Development Anthropology).
- Platt, Tristan
1982 "The Role of the Andean ayllu in the Reproduction of the Petty Commodity
Regime in Northern Potosí (Bolivia)," in Ecology and Exchange in the
Andes, David Lehmann, ed. pp. 27-69 (Cambridge: Cambridge University
Press).
- Riviere D'Arc , Helene
1980 "Public and Private Agricultural Policies in Santa Cruz (Bolivia),"
in Land, People, and Planning in Contemporary Amazonia, Francoise Barbira-Scazzocch
ed. pp. 154-161 (Cambridge: Cambridge University, Centre of Latin American
Studies).
- Schmink, Marianne
1982 "Land Conflicts in Amazonia," American Ethnologist 9(2):341-357.
- Schuh, G. Edward
1975 "Patterns of Equity Under Agricultural Development in Latin America,"
in Externalities in the Transformation of Agriculture, E. Heady and
L. Whiting, eds. pp. 234-273 (Ames: Iowa State University Press).
- Scudder, Thayer
1973 "The Human Ecology of Big Projects," Annual Reviews in Anthropology,
B. Siegel, ed. pp. 45-55 (Palo Alto, Calif.: Annual Reviews Inc.).
1981 The Development Potential of New Lands Settlement in the Tropics
and Sub-Tropics: A Global State-of-the-Art Evaluation With Specific
Emphasis on Policy Implications (Binghamton, New York: Institute for
Development Anthropology).
1984a 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. Executive Summary, AID Program Evaluation Discussion
Paper No. 21 (Washington, D.C.: U.S. Agency for International Development).
1984b "Reflections Arising From IDA's Global Evaluation of New Lands Settlement,"
Development Anthropology Network 2 (1-2):3-5.

Solem, Richard Ray, Richard J. Greene, David W. Hess, Carole Bradford Ward,
and Peter Leigh Taylor

1983 Bolivia: Integrated Rural Development in a Colonization Setting,
Project Impact Evaluation (draft) (Washington, D.C.: Agency for International
Development).

Stearman, Allyn MacLean

1973 "Colonization in Eastern Bolivia: Problems and Prospects," Human
Organization 32:285-293.

1976 The Highland Migrant in Lowland Bolivia: Regional Migration and
the Department of Santa Cruz, Ph.D. dissertation (Gainesville: University
of Florida).

1978 San Julian Colonization Project Evaluation Study. Subtropical Lands
Development Project, report submitted to USAID/Bolivia, La Paz.

1980 "San Julian--Bolivia's Newest Experiment in Colonization," El Dorado
4(1):28-54.

1983 "Forest to Pasture: Frontier Settlement in the Bolivian Lowlands,"
in The Dilemma of Amazonian Development, Emilio F. Morán, ed. pp. 51-63
(Boulder, Colorado: Westview Press).

Ward, Carol Bradford

1984 "Settling Bolivia's Lowlands," Horizons (Summer): 13-15.

Wolf, Eric

1955 "Types of Latin American Peasantries," American Anthropologist 57:457-471.

Wood, Charles, and Marianne Schmink

1979 "Blaming the Victim: Small Farmer Production in the Amazon Colonization
Project," Studies in Third World Societies 7:77-93.