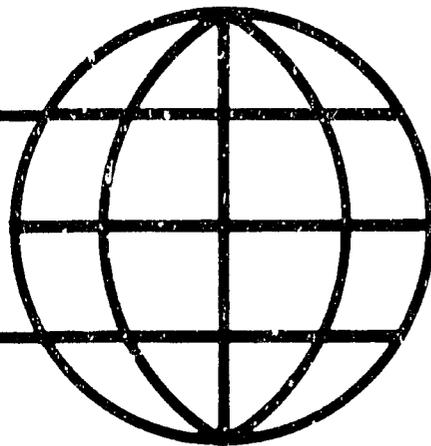


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**COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS
AND NATURAL RESOURCE SYSTEMS ANALYSIS**



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LOWLAND SETTLEMENT IN SAN JULIAN, BOLIVIA:

PROJECT SUCCESS
AND REGIONAL UNDERDEVELOPMENT

by

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Introduction

The San Julian settlement project is located some 150 kilometers northeast of the city of Santa Cruz, in eastern Bolivia. Established in 1972, following the construction of a highway through the area, the project was supported in large part by funds from the U.S. Agency for International Development, and was administered by Bolivia's National Colonization Institute (Instituto Nacional de Colonización, or INC). The United Church Committee (Comité de Iglesias Unidas, or CIU), an informal organization composed of representatives of Mennonite, Methodist, and Catholic churches in the region, was contracted to conduct an orientation program for settlers from Bolivia's highland and valley regions, and to provide them with guidance in the continuing social and economic development of their communities.

The project experienced a number of logistical and administrative difficulties that caused it to be able to settle fewer families than called for in the original settlement plan. Only 1,372 of a projected 5,000 families found homes in the project area between 1975 and 1980. Nevertheless, the orientation program and the community development guidance provided by CIU were widely thought to be exemplary. As a result of these programs, San Julian settlers were felt to be more successful in establishing and maintaining production than their counterparts in other settlement areas of eastern Bolivia.

Partly because of this success, USAID/Bolivia elected to continue to support the San Julian project beyond the initial settlement period, and to do so by expanding the role of CIU personnel. A legally recognized, private, non-profit association was created to take over CIU functions. Named the Integral Development Foundation (Fundación Integral de Desarrollo, or FIDES), this organization signed a Cooperative Agreement with USAID/Bolivia to conduct

a "consolidation phase" of the San Julian project. This new phase was intended to solidify and expand the gains made during the initial years. Under the consolidation program, FIDES conducted a number of projects to diversify agricultural production, support the introduction of livestock, and provide settlers with technical assistance.

At the time of this study, in 1984, the number of settlers in the San Julian project remained small -- approximately 5,436 people were living in some 1,661 households. An additional 2,518 households, containing about 7,730 people have settled spontaneously around the area officially belonging to the San Julian project. About 90 percent of these settlers have migrated to the region from the highland and Andean valley regions of Bolivia, while the remaining ten percent are drawn from the local peasant population of Santa Cruz department (Map 1).

In spite of the relatively small number of people involved, the innovative project features designed and implemented by CIU and FIDES personnel have given San Julian a prominent place in the South American settlement literature. In fact, it has come to be regarded as one of the few examples of successful settlement in the Amazon region of the continent (cf. Scudder 1981). While San Julian has contributed to understanding of how to organize a settlement project, our research has indicated the project faces serious difficulties which threaten the accomplishments that have been made. Inadequate attention has been paid to the position of the project within the regional and national societies of which it is a part. As a result, settlers find themselves poor and geographically isolated, with few opportunities for improving their situation. The kinds of social and economic relationships that prompted settlers to move to San Julian are being reproduced under the project, so that

as time passes a new area of underdevelopment, rather than a zone of prosperity, is being created.

Previous Studies

San Julian has been the object of a considerable amount of attention by academics and development practitioners. Hess (1980) conducted doctoral research on the project, and it has been discussed in published work by Blanes et al. (1984), Fifer (1982), Maxwell (1980), and Stearns (1980, 1983). As a recipient of financial support from the U.S. Agency for International Development in Bolivia (USAID/Bolivia), San Julian also has been evaluated periodically by representatives of that organization (cf. Castro 1978; Curtis 1978; Locatelli 1978; Nelson 1978; Solea et al. 1985; Stearns 1978; Ward 1984).

While some authors have pointed out serious or potentially serious problems confronting the San Julian project, most reports on the project have proclaimed it a success. Three features of the project have earned particular praise:

- 1) A three-month orientation program for new settlers that combined training in land clearing and cultivation techniques with the provision of rudimentary communal shelter and food aid until individual housing could be constructed and initial harvest realized.
- 2) A núcleo settlement pattern, in which 40 settler households are clustered around a central clearing, with triangular 50-hectare farm parcels radiating outward. Eight communities of this type are, in turn, organized around a central community (Figure 1). This settlement design is meant to facilitate the development of linkages between the dispersed settler communities and regional towns and cities. It is frequently cited as a reason for project success because it achieves an equitable and cost-effective distribution of essential services such as water and schools, concentrates the settler population in units thought to be large enough to encourage the establishment of businesses, and facilitates local community organization by promoting face-to-face interaction among settlers.

3) A selection program that discouraged potentially unsuccessful settlers from moving to San Julian. Settlers were self-selected; but, the six-to-twelve month waiting period that followed initial sign-up is hypothesized to have prompted less serious or less capable aspirants to drop out of the program.

As a consequence of these features, San Julian has been reported by many to be one of the most successful settlement projects in South America. Reports point to San Julian as an established agricultural area capable of providing its own food needs and enjoying good prospects for continuing economic development. "The confidence in prospects for growth cannot be overstated," asserts a recent project evaluation. "The feeling seemed to be one of inevitability -- that time and energy were sure to be rewarded" (Solem et al. 1985:19).

Some writers, however, have raised voices of caution concerning the optimism expressed for the future of San Julian. Nelson (1978) warned that the successes enjoyed by the project could be undermined in coming years if a way were not found to assist settlers in overcoming marketing difficulties so that agriculture might become a profitable activity. Fifer (1982) echoed Nelson's concern, noting that the major complaint voiced by settlers was their isolation from urban markets, and emphasizing that the long-term success of the project depends upon successfully linking San Julian with the regional marketing networks of Montero and Santa Cruz, and, later, with those of the Beni.

Maxwell (1980) predicted that high rates of abandonment might emerge in San Julian when settlers begin to cultivate areas of regrowth (barbecho) after the high forest has been exhausted. Areas where this has already occurred, according to Maxwell, have been characterized by declining yields, increasing difficulties in controlling weeds, and falling income. Maxwell did not regard this process as inevitable, but attributed it to inexperience in lowland

cultivation by settlers from Bolivia's highland and valley regions, lack of regard on the part of project planners for soil quality as a criterion for selecting the location of settlement areas, poor roads, inadequate market networks, and scarce capital and credit (pp.165-166). However, Maxwell 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 problem.

Stearman (1983) shared Maxwell's pessimism regarding what the future may hold for the settlers of San Julian. She argued that regardless of how well an individual project is planned and managed, smallholder settlement is destined to be only an intermediate step in Amazonian development, paving the way into the area for large agricultural and cattle raising enterprises. These ultimately displace settlers and consolidate their holdings. Stearman concluded that settlement catalyzes a process of social and economic change that is beyond the control of the agencies responsible for a particular project (pp.53-54).

Project Design Features and Regional Linkages

Recent studies of settlement projects have emphasized the importance of regional linkages in shaping the course of economic development (cf. Scudder 1981, 1984). Creating conditions under which agricultural products can be successfully commercialized would, in turn, facilitate the growth of linkages running in the opposite direction, from regional urban centers to the settlement area, as settlers became increasingly able to constitute a market for agricultural inputs, consumer goods, and urban services. Under such conditions settlers would be able to earn revenues that could be reinvested in

off-farm economic activities, such as agroprocessing and transportation, adding value to their own production, stimulating additional investment in off-farm businesses, and establishing a more diversified economy (see Appleby 1976; de Janvry 1983; Forman and Riegelhaupt 1970; Hackenberg and Hackenberg 1984; Hirschman 1977; Partridge 1979; Smith 1977).

In the absence of linkages between the settlement area and the regional economy, settlers remain primarily subsistence producers, dependent upon the sale of low-value crops for the major share of their cash income. The ties that exist between the settlement area and the regional economy are established either by default or by sectors of the population whose economic interests are different from those of the settlers. Thus, a project which is successful when considered in terms of the individual elements of its design and implementation, when viewed from the regional context may be seen to be reproducing a peasant production system contributing to underdevelopment.

The case of San Julian illustrates the way in which narrowly defined development projects may have long-term results that run precisely counter to the goals of those who conceive them. This is not necessarily due to poor planning and implementation of project components, but may result from a failure to consider the relationship of the project to the social and economic forces at work on the regional and national levels. In the pages that follow, we shall consider the San Julian project in a regional perspective, assessing the ways in which these relationships have contributed to underdevelopment. We also will propose ways in which the problems may be overcome, both in San Julian and in future lowland settlement efforts.

Lowland Settlement in Historical Perspective

With Bolivia's redistribution of land petering out, ... colonization in its spacious, fertile, lightly inhabited areas is the nation's answer to the cry for land. The answer is not, "Go west, young men!" Rather, it is, "Go down!" Down to one of the many areas open to colonists. The future of many a would-be landowner lies here. The future of Bolivia too" (Edelman 1967:54).

Since at least 1650, when Antonio de Leon Pineloa argued that it was the site of the biblical Garden of Eden, the northern Santa Cruz region (Map 2) has been regarded by many as an untapped resource. Bolivians and foreigners alike have viewed the region and its resources as capable of solving many of the social and economic ills associated with life in the highland and Andean valley regions of the country. Soon after the turmoil of the Wars of Independence, republican governments began to seek ways to use the region to their advantage. The Ballivián administration (1841-1847), for example, established colonies of former soldiers in Santa Cruz as a means of dismantling an expensive military whose numbers had swollen during the almost constant fighting leading up to and following political independence (Klein 1982:121).

In 1886, Bolivia established a Ministry of Colonization, and in 1901, it offered large expanses of land in eastern Bolivia to Europeans and North Americans recruited through Bolivian consular offices. Despite offers of easy credit and other inducements, this effort to attract settlers failed (Hess 1980:56). The state's desire to settle the eastern lowlands increased with the loss of large tracts of land to Brazil. In 1905, it designated eight areas encircling the eastern lowlands as a "frontier ring," and demarcated vulnerable points along the international boundaries for defense. According to Fifer, "The great colonization zones became a familiar feature on the maps of Bolivia during succeeding decades, but they were left silently awaiting the crowds who never came" (1982:411).

During the presidencies of José David Toro and Gerónimo Busch (1936-1939) the state talked about, but never enacted, a general land redistribution policy, to be complemented by lowland settlement. One settlement project actually was undertaken, and involved establishing Chaco War veterans near the Yapacani River in 1937. The settlement, named Colonia Gerónimo Busch, had attracted only about 200 settlers by 1940, and the effort was discontinued soon after (Hess 1980:56).

Thus, in spite of the promise the region appeared to hold, distance from Bolivia's centers of population and political and economic power, combined with the difficulties inherent in the exploitation of the tropical forest, caused northern Santa Cruz to remain isolated until the second half of the 20th century. This situation began to change in 1952, with the assumption of power by the government of the Movimiento Nacionalista Revolucionario (MNR). The MNR undertook two major initiatives which radically altered relations of production throughout the Bolivian countryside and stimulated a rapid expansion of capitalist agriculture and industry in Santa Cruz department.

The more widely known of the two initiatives was the agrarian reform, which was enacted in 1953. Prior to the agrarian reform, agricultural production in Bolivia's highland and valley regions was predominantly in the hands of large manorial estates, which extracted rent in the form of labor and personal service from a resident peasant population in return for which it granted usufruct rights to land. The independent peasant communities characteristic of many areas of the Andes had been greatly reduced in size, number, and political strength through a long process of encroachment by the estates.

Under the agrarian reform, the estate lands were expropriated and redistributed among peasant families living on them. Peasants were relieved of the labor and personal service obligations that had restricted their freedom to leave the estates and seek opportunities elsewhere. This new freedom of movement, combined with the fact that large numbers of families found that they were increasingly unable to meet their consumption requirements through agricultural production on the lands they had been allotted under the reform, led many to seek permanent jobs in Bolivia's urban centers and many others to turn to work on commercial agricultural enterprises or migration to the lowlands. For the highland populations affected by the agrarian reform, the changes in their lives also included incorporation into the political life of the nation. They organized peasant trade unions, popular militias, and, in the case of those who found non-agricultural employment, strong industrial labor movements, all of which came to play central roles in transforming the manorial society (Albó and Barnadas 1984; Carter 1964; Kay 1981; Paz 1983).

The agrarian reform affected life in the lowlands of Santa Cruz in a less direct way. In the lowlands, a manorial society had also become established, although it was characterized by a cultural identity quite distinct from that found in the highland and valley regions (Heath 1962, 1966; Stearman 1976, 1985). In the lowlands, little land was actually expropriated. Rather, the MNR used the threat of expropriation to discourage opposition and reward party supporters. The expropriations that did occur were selective (Heath 1969:291-295).

The MNR government gave high priority, however, to the promotion of capitalist development in Santa Cruz. The state hoped that the resources generated by the development of the department would provide economic

opportunities for the large numbers in the highland and valley regions who continued to live in poverty despite the sweeping changes of the agrarian reform. President Paz Estenssoro requested and received large amounts of economic and technical assistance from the United States to support lowland development. Bolivia became the largest single recipient of aid under the Point Four program. Perceiving tremendous agricultural potential in the region, Point Four officials were determined to make Santa Cruz a "showcase" of what development assistance could accomplish, and millions of dollars were spent on a variety of projects (Heath 1969:258).

The threat of expropriation under agrarian reform statutes provided large landowners with an incentive to invest in capitalist agriculture on their estates, and the Point Four program made it relatively easy for them to do so. The program provided large landowners with cheap credit and helped finance the establishment of a machinery pool to facilitate large-scale land clearing. Point Four financed the construction of a sugar mill and alcohol distillery, stimulating the production of cane. It also paid the cost of paving the highway from Cochabamba to Santa Cruz, improving access to markets and facilitating seasonal migration from the highland and valley regions, as peasants sought employment on the expanding lowland agricultural enterprises. Coffee, cotton, sugarcane, and rice came to be widely produced on a large scale. In fact, sugar cane and rice production grew so rapidly that the region was suffering from chronic overproduction of these crops by the early 1960s (Heath 1969:289-299).

The growth of commercial agriculture in Santa Cruz depended initially upon the availability of seasonal labor from the highlands and Andean valleys, as investments were largely confined to land clearing and cash crop introduction

rather than in mechanized production. This pattern has continued to the present. In 1976, agricultural employment in Santa Cruz ranged from a low of 18,000 people in February to 95,000 people in the month of August, when clearing new lands for cultivation is at its peak (Riviere d'Arc 1980:158).

The demand for labor power coincided with state efforts to encourage highland and valley peasants to claim lands for themselves in the lowlands. Large numbers of people went to Santa Cruz as seasonal wage labor migrants and ultimately remained there, either as settlers claiming a parcel of land or as part of the region's expanding proletariat. Census figures indicate that the total population of Santa Cruz increased from 286,145 in 1950 to 715,072 in 1976 (Klein 1982:297). García-Tornel and Querejazú (1984) estimate that, since 1950, some 135,000 people have migrated permanently from the highland and valley regions to Santa Cruz department.

Recent Settlement Policy

As it became increasingly apparent that large numbers of families could not satisfy basic subsistence needs on the parcels of land allotted to them by the agrarian reform, state interest in settling highland and valley peasants on parcels in the lowlands grew. Both spontaneous and directed settlement were encouraged, and peasants in the highlands and valleys were urged to consider moving to the lowlands through radio announcements, leaflet campaigns, visits by government officials, and advice dispensed by foreign and Bolivian representatives of several major churches operating in the country. Directed settlement projects were supported by international donor organizations, including the United Nations, the Inter-American Development Bank, and the U.S. Agency for International Development, as well as by smaller private agencies,

many of which were church-related. In 1965, the National Colonization Institute (INC) was established to coordinate all spontaneous and directed settlement activities in those areas designated as settlement zones. In addition to establishing general policy and guidelines for organizations supporting settlement efforts, the INC was made responsible for administering land allotments in planned and spontaneous settlement areas, and for awarding land titles.

Despite the support of international agencies, directed settlement projects had accounted for only 20 percent of the peasant population moving into lowland areas throughout Bolivia by 1980. In that year, the INC reported that 28,712 settlers had arrived in Santa Cruz department. Of these, 20,810 were spontaneous settlers and 6,058 were settled as part of directed projects. Another 1,844 (about six percent of the total) were classified as private settlers, most of whom either belonged to one of the Japanese or Mennonite groups in the region, or were among the small number of other foreigners to settle in Santa Cruz (Fifer 1982:420,430,431).

Experience with directed settlements proved disappointing. They were plagued with high rates of turnover, dependence upon sponsoring agencies, poor community organization, and problems related to the physical environment, such as flooding or soils unsuited for the crops planned. Generally, these problems were attributed to excessive paternalism by sponsoring agencies coupled with inadequate knowledge of the local area, which, in turn, led to the providing of support services that were inadequate or inappropriate (Fifer 1982:413-417; Hess 1980:102-116).

Spontaneous settlement also showed itself to have serious drawbacks, however. First, when access roads were provided, settlements scattered along

then in such a way as to make it extremely difficult to provide water, schools, and other services. Secondly, in some localities parcel abandonment resulted from the inadequate preparation and support of settlers, who were overwhelmed by weeds and the labor requirements of controlling secondary growth. In addition, spontaneous settlement has been linked in the literature to uncontrolled burning, which aggravates soil erosion and flooding (Fifer 1982:420). This point has been disputed by Riviere d'Arc (1980), who has argued that the bulk of the environmental destruction in forest areas of Santa Cruz has occurred in areas controlled by large landowners.

The Success of San Julian

The San Julian project appeared to offer a solution to the dilemma of how to proceed with smallholder settlement without falling prey to the problems posed by directed projects, on the one hand, and encouraging spontaneous occupation on the other. The project provided orientations on how to clear and cultivate tropical forest land, and attempted to provide basic services such as access to roads, temporary shelter, and potable water prior to the arrival of the settlers. At the same time, it encouraged settlers to organize themselves at the level of each community, with individual communities organizing themselves at the level of groups of nine communities. Settlers were given training in cooperative organization and management, and encouraged to establish cooperatives in their communities. However, once the orientation program ended, all decisions regarding how extensive and how active their community organizations would be were made by settlers (Hess 1980:102-116; Painter et al. 1984:35-38).

The orientation program successfully built upon the experience of highland peasants in organizing themselves to defend their interests. San Julian communities quickly came to manage their own day-to-day affairs, building schools, maintaining roads, and attending to other needs. Today, communities define and enforce standards of behavior and decorum for all who live there. Individuals who want to leave their land for relatively long periods of time, to perform military service or attend to property they continue to own in their home areas, must first obtain permission from the community.

By the same token, settlers rely heavily upon their community organization to define and defend their rights to land, a role that is particularly important given the fact that the INC has not yet issued titles. The strength of the communities in this regard appears to be a function of two factors. One is the success of the San Julian project's orientation program, described previously, in helping settlers establish functioning community organizations immediately upon arrival. A second factor is that most settlers from the highlands are familiar with how community institutions theoretically are supposed to function, regardless of how the institutions in the communities they came to settlement area from functioned in fact. In addition, many San Julian settlers came to the project together with relatives and friends, so they were not strangers to many of the people they needed to work with in establishing the new communities. Perez-Crespo (1985:5-6) has noted that the community asserts its control in this regard in a way similar to the pattern characteristic of highland and valley communities. The community grants land rights to those people it defines as members. Access to land is an expression of membership in a group of people as well as an economic relation, a situation that indicates that the settlers regard the community as the true owner of the

land. Thus, while land is officially viewed and treated as individually owned private property, settler behavior frequently appears to be guided by notions of community ownership.

The Nature of Development in San Julian

In spite of their strong organization, San Julian communities and the settlers who live in them remain extremely poor. The attention given to providing basic services and promoting strong community organization has not created all of the conditions necessary to catalyze a process of regional development leading to improvements in the living standards of settlers, or to an improvement in their position as a class in relation to the rest of the regional and national society. Little attention has been paid to the ways in which the project as a whole is joined to the larger regional economy and to the nature of resource competition between different social classes. The results of not paying attention to these issues may be seen in a number of areas, including inadequate basic facilities and services, agriculture based on the production of low-value crops, and little development of off-farm business and employment opportunities.

Problems of Subsistence and Production

Because the San Julian project included provisions for the perforation of deep wells in each community prior to the arrival of settlers, and because its orientation program provided intensive instruction in how to establish and maintain a subsistence production regimen, project evaluators have tended to assume that the basic needs of the settlers have been met, and that economic

growth and development are sure to follow. For example, Solea et al. (1985:16-17) state:

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.

Such assessments are overly sanguine regarding the security of San Julian's subsistence base and about the prospects for future farm growth and off-farm secondary impacts. First, while USAID/Bolivia allotted funds for the construction of 200 deep wells, only 40 wells actually have been dug, as a result of equipment and logistical problems and the alleged use of pipe and other resources for the construction of wells for large private landowners living in the area Solea et al. 1985:8-2). Almost from the outset of the project, settlers in many communities complained that the water that they obtained from their wells was salty or that it caused diarrhea (Hess 1980). In a survey of 39 of the 40 San Julian communities that received wells under the project, 31 communities, or 79.5 percent, reported suffering from serious water problems. Of these, 14 communities reported that the amount of water supplied by their well was inadequate, while in another 14 communities, settlers stated that the water from their wells was of poor quality, being salty to the taste and causing diarrhea. The remaining three communities reporting water problems said that their water supply was both inadequate and of poor quality (Painter et al. 1984:22).

Water appears to have a direct impact upon settlement development through being closely associated with settler turnover rates. In 29 communities we were able to secure information on both water quality and the number of times parcels have been sold. A chi-square test was used to determine the relationship between those communities reporting water problems and those recording a level of parcel sales greater than the mean number of sales per community in the San Julian project as a whole. We found that throughout San Julian, a mean of 45.6 percent of all parcels have been sold one or more times since their original settlement, and that 11.7 percent have been sold two or more times. We found that whether or not a community reports water problems is related to whether the percentage of parcels sold one or more times was above or below the mean for the project at the .05 level of significance. Whether or not a community reports water problems is related to whether the percentage of parcels sold two or more times is above or below the mean at the .01 level of significance (Painter et al. 1984:23)

In addition to the obvious health risks posed by a lack of potable drinking water, there are less apparent impacts on the ability of families to establish an agricultural production regimen. As a result of the water problems described, large numbers of settlers obtain water from sink holes found throughout the area. During the dry season, when many sink holes dry up, the search for water frequently takes people several kilometers from home and forces them to commit large blocks of time simply to provision themselves with this most basic necessity. This occurs precisely at the time of year when the greatest agricultural labor inputs are required for clearing and planting land. The problem is compounded by concurrent use of dry-season water holes by tigers, wild pigs, and other large and potentially dangerous animals. People

have been attacked or threatened frequently enough that in many communities they only go to carry water in large groups, a task that is easily performed by a child when the community well functions properly.

Thus, large amounts of family labor are consumed simply to provide themselves with water. In some contexts such a labor expenditure would be less significant. However, San Julian settlers do not enjoy access to affordable capital inputs or labor-saving technology, so that the only way that they are able to expand the area they cultivate or establish pasture for livestock raising is through intensifying the exploitation of their own labor-power. As a result, labor is frequently a constraint to improvements in agricultural production, and when this resource is taxed even further by the need to procure water, the impact is felt as declining production.

Economic Growth and Agricultural Production

While the lack of water seriously limits subsistence production in some areas of San Julian, the production system found in the area is itself a limiting factor on continuing economic growth within the project. The bases of agricultural production are rice and corn, which double as subsistence and cash crops, and yuca, which is grown almost exclusively for household consumption. Rice and corn offer several advantages, which make them very attractive in a setting such as San Julian. First, as food staples, they appear less risky to produce than crops the settlers could consume as well as sell. Secondly, although rice is labor-intensive, neither corn nor rice requires specialized agricultural knowledge, or inputs not available locally. Finally, corn and rice are relatively non-perishable, making them well-adapted to the geographic

isolation and inadequate transport facilities that characterize San Julian and the surrounding region.

There is also a crucial disadvantage to rice and corn, however, with regard to the future development of the San Julian settlement. Both are crops characterized by chronic overproduction. Overproduction of rice has been a problem in Santa Cruz department since the early 1960s, when rice production grew more rapidly than the capacity of the market to absorb it during the initial expansion of commercial agriculture (Heath 1969:289-299; Hiraoka 1980). The problem has been persistent since the mid-1970s, as rice production in the department has met or exceeded the national demand in seven of the ten years prior to 1984. In 1984, Bolivia's state rice marketing authority (Empresa Nacional de Arroz, or ENA) estimated rice production in Santa Cruz to be about 150,000 tons, of which Bolivia's national demand was expected to absorb about 70 percent. Prospects for increasing the size of the demand through exports are poor, due to the relatively low quality of Bolivian rice, logistical problems, and a saturated international market (CORDECRUZ 1984a).

The situation of corn is similar, with 1984 production in the department estimated to be 150,000 metric tons, and the national demand estimated to be 100,000 metric tons. Long-term prospects for increasing the demand for corn through exports to other Andean Pact countries are better than in the case of rice. However, this avenue remains impractical due to a lack of money to pay producers without forcing them to wait until their corn is sold on the international market, and due to the necessity of selling the corn at the official peso/dollar exchange rate, which is considerably below the unofficial rate (CORDECRUZ 1984b).

Under such conditions it is apparent that the present agricultural production system of San Julian will not generate revenues that settlers can invest in agricultural processing or other off-farm economic activities. The need to diversify has been widely recognized. Settlers have attempted to introduce vegetable crops and fruits for which they perceive a greater demand in regional and national markets, and to invest in cattle production. Both of these initiatives have yielded disappointing results for most of the settlers undertaking them. Fruits and vegetables must be shipped long distances over poor roads in trucks where people and hardware frequently ride on top of the more fragile cargo. Furthermore, the trucks may sit for several days in the hot sun waiting to be ferried across the Rio Grande on a small raft. FIDES has collaborated with the Tropical Agriculture Research Center (Centro de Investigación Agrícola Tropical, or CIAT) and the United Nations Food and Agriculture Organization (FAO) in an effort to diversify agricultural production. However, the work focused on establishing the technical feasibility of introducing new cultivars and no attention was given to how these might be marketed. As a result, the program has had limited significance for most settlers (Painter et al. 1984:37-38).

Cattle production is expanding slowly due to the difficulties settlers have encountered converting forest to pasture and in purchasing cattle. Settlers do not have the money to purchase either the labor power or the equipment to clear forest for pasture efficiently. Furthermore, establishing pasture land receives lower priority than those agricultural activities that yield more immediate, if more modest, returns in the form of cash income or food. Although a mean of 3.48 hectares per household are cleared annually, only .57 hectares of additional land is maintained each year as pasture. The

lack of income from agriculture also forces many settlers to rely on cattle promotion programs to provide them with animals. The most important one of these in the area is the Heifer Project, sponsored jointly by FIDES and the Mennonite Economic Development Association. However, this program requires that a family have a minimum of five hectares of pasture before it can receive an animal. While the technical reasons for this policy are undisputable, the fact remains that an "average" family would require a decade to create enough pasture to be eligible to receive a cow under the program (Painter et al. 1984:14).

Thus, at the level of the household production system, San Julian settlers find themselves in a dilemma. On the one hand, they are producing corn and rice as a response to poor transport and market conditions. On the other, the production of these crops perpetuates the poor market conditions, by exacerbating the overproduction problem and precluding the generation of sufficient revenues through agriculture to diversify production and invest in off-farm activities.

The Growth of Urban Functions

Project planners hoped that the núcleo settlement pattern of San Julian would promote the growth of urban functions by concentrating people and services in centrally located communities. According to Ward (1984:13), such an approach appears to have succeeded:

Thriving communities with small businesses, livestock, orchards, farms, and schools illustrate the progress. As word of the communities' success spread, new settlers were attracted to the region.

However, in order to assess the significance of the urban growth that has occurred, it is necessary to examine the form that this growth has taken. Just

as the existence of orchards appears less important when one realizes that settlers cannot market fruit production, and the presence of livestock becomes less noteworthy when one examines the constraints on the growth of this activity, the presence of businesses and schools is more appropriately understood in terms of their role in the social and economic life of the project.

In our inventory of 39 San Julian communities, we found that ten (26 percent) contained shops where skilled or semi-skilled trades are practiced. The trades represented in the ten communities include eight rice hulling businesses, six bicycle repair shops, four brickyards, four carpenters, three mechanics, three barbers, and one each of a bricklayer, a wood carver, a radio repairman, and a sandal maker. Twenty-three communities (59 percent) contain stores, including 31 general merchandise retailers selling groceries and household goods; four belonging to the San Julian Multipurpose Cooperative, to which many settlers belong, and which also sell groceries and household goods; two corn beer stands; and one general store that is more oriented toward selling hardware than groceries (Painter et al. 1984:14-15).

Five of the communities surveyed contain both trade shops and retail stores, all of which are located on the main road passing through their area of the settlement project. This indicates that an urban hierarchy based upon centrality of location is beginning to emerge in a pattern similar to that anticipated by the San Julian settlement design. However, none of the businesses provide full-time employment for any member of the families that own them, and in only a few cases is there any indication that the business accounts for the greatest portion of household income. Because of the low revenues associated with agricultural production, San Julian settlers do not

generate sufficient demand for these shops and stores to do more than provide supplementary income.

Rather than reflecting the investment of agricultural revenues as a strategy for developing an expanding economy, the growth of businesses in San Julian appears to reflect household efforts to cope with their inability to meet all of their subsistence needs through the sale of agricultural products. It is a strategy born of the same conditions that spawn labor migration and petty commodity trading in Bolivia's highland and valley regions; the same conditions, in fact, which led many to move to San Julian. This similarity is a reminder that, while they do own more land and are able to produce more of their own food in San Julian than they could in their communities of origin, the linkages that join San Julian settlers to the larger regional and national economies are not greatly different from those they have always known. That this may remain so is the great danger confronting San Julian and lowland settlement areas throughout Bolivia.

Development Implications of San Julian

It is not our desire to cast aspersions upon the reputation of the San Julian project as a successful experience in lowland settlement. The innovations described at the outset of this article greatly facilitate the establishment of settlers from the highlands and valleys in the tropical forest. However, while these represent legitimate and noteworthy advances in the internal organization of settlement projects, project-level innovations do not address the long-term problem facing San Julian and other settlement areas in Santa Cruz department, which is the nature of the relationships that bind

them to the regional and national society in ways that restrict economic opportunity.

Market Access and Resource Competition

Aspects of the ways in which linkages with the larger society influence patterns of economic growth and development in a settlement area have been recognized for some time. Nelson (1973:266) cited inadequate market access as the major obstacle to the successful development of settlement areas. He found scarce and costly transport stemming from poorly constructed and maintained roads to be an important factor in inhibiting access to markets. Clearly, this is the case in San Julian. Taking Nelson's assessment one step further, Wennergren and Whitaker (1976) argue that lowland settlement in Santa Cruz department can best be promoted through the construction and maintenance of adequate access roads into areas targeted for settlement and development. Once this has been accomplished, they continue, development of the designated areas may best be achieved through encouraging spontaneous settlement. Their analysis of the Chane-Piray project, located near San Julian, leads them to conclude that this approach yields the highest internal rate of return for the amount of public funds invested.

Both Nelson and Wennergren and Whitaker cite evidence indicating that spontaneous settlement tends to be more successful economically than planned settlement projects, a view widely held among scholars and planners alike. Provide settlers with access to markets, the reasoning goes, and keep them free from bureaucratic entanglements, and they will rationally pursue their own self-interest more effectively than a sponsoring agency can pursue it for them. This interpretation of the evidence is flawed in several ways.

First, the comparison of spontaneous and planned settlement is inappropriate. Spontaneous settlers usually have their origins in the upper socioeconomic ranks of the sending communities. In the Andean context, they may be pursuing a strategy of increasing their multiple holdings through lowland settlement (cf. Stearman 1973). Those attracted to planned settlements, in contrast, are not so well capitalized. They come from poorer socioeconomic levels, and accept dependence upon planned schemes because they have little choice (Partridge et al. 1982). Nelson's analysis comparing the two is one-sided, focusing upon the costs and benefits of the two kinds of enterprises. But, he compares only public expenditures and does not examine the relatively large amounts of private capital invested in private schemes, which are absent or greatly reduced in the case of planned projects financed by government. This makes it appear that the returns on expenditures are much better in spontaneous settlement areas than they are in planned projects, when in fact not all inputs have been counted.

Secondly, "success" is sometimes hard to define in such comparisons. It may be defined only in terms of short-term economic profitability, rather than in terms of sustainable agricultural systems which do not degrade the environment, for example. Much so-called successful spontaneous settlement is a success only because of the high marginal productivity of cattle in the humid tropics cattle ranching complex. While economic benefits are extracted in this fashion, such success is short-lived as resources are degraded to a point that they will support only extensive ranching by a few producers after a decade or so of such land use (Heckadon and McKay, eds. 1982, Heckadon 1983).

Third, the comparison overlooks the fact that settlers are not alone on the frontier. They are accompanied by loggers, ranchers, and other interest

groups, if not initially then shortly thereafter, and the markets that settlers must gain access to are controlled by groups which enjoy greater political and economic power than do the settlers. Loggers and ranchers dealing in high margin commodities command sufficient wealth to dominate access to truck transport, physical infrastructure, credit sources, market middlemen, and other scarce resources on the frontier. Moreover, little attention has been devoted to the identities of so-called spontaneous settlers. In most such studies, little evidence is presented to permit one to know if the successful settlers are farmers who opened up an area, or if the original settlers were replaced by new ones who brought with them new infusions of capital and labor. The fact of settler turnover must be better controlled in such studies before one can accept the indictment of planned settlement and the praise of laissez-faire capitalism on the frontier. Ranchers consolidating the holdings of many smallholding settlers as the latter flee the region should probably not be considered successful settlers.

Disarticulated Growth

De Janvry (1983) has argued that a key qualitative element in the linkages between a poor population and the larger social and economic order is the location of the market for the consumption goods the population produces. When the final market is located abroad or within a social class whose income derives primarily from profits and rents, any economic growth that occurs is accompanied by growing inequality. This is because such markets have no immediate self-interest in whether or not the producers maintain a standard of living that will permit them to constitute a demand for whatever is produced by the population that forms the market to which they sell. Thus, there is no

mechanism by which the producer can negotiate rising revenues to accompany increases in productivity or by which they can pass along rising production costs.

Under such circumstances, a peasant population finds that it cannot meet its own subsistence needs and is forced to intensify production through a strategy that involves the maintenance of agriculture based on non-capitalist kin and community relations of production and a search for greater involvement in the capitalist economy through seasonal wage labor migration and petty trading (Deere and Wasserstrom 1980). The impoverishment that accompanies this process lies behind such ills as rapid population growth and environmental destruction, which characterize many areas of Latin America (de Janvry 1981). In Amazonia, the environmental destruction associated with settlement frequently has arisen from the impoverishment of the settlers as they have found themselves unable to link the level of revenues resulting from their production to changes in the productivity of their labor or their production costs (Collins 1986).

Summary and Conclusions

In comparison with other efforts to establish agricultural production systems in the Amazon through smallholder settlement, the San Julian project may justifiably be regarded as a success. Organizers succeeded in imparting basic technical knowledge about lowland agriculture and in organizing the settlements so as to maximize access to schools, potable water, and other facilities and services. That this structure was provided as part of an orientation process that promoted community organization and initiative by the settlers themselves is particularly noteworthy.

At the same time, the project suffers from several difficulties which threaten its long-term economic prospects. One of these is the reliance of settlers upon the sale of low-value crops such as corn and rice as their primary income sources. Promoted by project officials concerned that settlers be able to produce enough food to satisfy their own consumption needs as quickly as possible, production systems based on corn and rice do not generate sufficient revenues to permit settlers to invest in labor-saving technology and other capital inputs. The proliferation of shops and stores sometimes pointed to by evaluators as an indicator of settler prosperity is in fact a function of impoverishment in many cases. Families unable to earn a living through agriculture seek to supplement their earnings through participation in petty commerce. However, because families who elect to start a business rarely have funds to stock it with any but the most basic goods or equipment, these off-farm enterprises generate little revenue. In any case, the poverty of the settler population prevents it from exerting such demand for whatever goods and services might be offered.

These problems are exacerbated by an inadequate potable water supply, which exacts a health cost in terms of the morbidity associated with consuming impure water. In a context such as San Julian, where production is so heavily dependent upon manual labor, the removal of family members from agriculture through illness or the need to exert large amounts of effort to obtain water has serious consequences. It is only through intensifying the exploitation of their own labor that settlers are able to establish pasture for livestock, or clear land in addition to that needed for corn and rice production in order to introduce a new cash crop. By limiting their capacity to do this, the lack of

potable water significantly constrains settler efforts to break out of their subsistence production regimen.

The lessons that San Julian's difficulties offer us is a two-part one. First, San Julian teaches us that, no matter how well-conceived a settlement project may be, it will not experience sustained economic growth if all design and implementation occurs at the level of the project itself. As Nelson, Wennergren and Whitaker, and others have pointed out, success in this area demands the creation of economic linkages that will join the settler population to regional and national markets. Secondly, it is not enough to conceive of this task simply as a question of creating or enhancing market access. Market systems reflect the existing distribution of productive resources among the parties participating in them. Strengthening the exchange relationships that link people to markets may exacerbate or perpetuate tendencies reflected in that distribution, but it is unlikely to change them substantially (Smith 1977).

For this reason, it is necessary for consideration of the nature of the market linkages that are established in association with smallholder settlement to be an integral part of the planning process. This means that planning for household production systems needs to go beyond how consumption needs can be satisfied to consider what commodities can be produced that will generate income for investment on the farm and off. Furthermore, questions about the size of these markets, their location, what sorts of goods and services they can supply settlers in addition to exerting a demand for the commodities they produce, the kinds of processing and transport facilities settlers will need to reach those markets, and how settlers can gain access to the necessary processing and transport facilities need to be answered as well.

Answering these questions satisfactorily does not mean that settlement projects need to be carried out on a massive scale and at great cost in order to be successful. Indeed, the world is full of projects that are tremendous in terms of both scope and financial cost, and that are much less distinguished than San Julian in terms of accomplishments (cf. Scudder 1981). It does mean dealing explicitly with the fact that settlers are not alone on the frontier, but are one component of a complex population with diverse economic interests and very unequal access to political power.

Planners must provide answers to questions such as how settlers are to be represented within a state regional development corporation in order to insure that they win a share of development resources used to build roads and improve infrastructure; or how to structure relations between settlers and lumber companies in order to promote responsible logging practices and support settlers in negotiating a fair price for any trees they sell. Unfortunately, planners tend to dismiss urgings that they promote building these kinds of institutional relationships as too time-consuming or politically unrealistic. They prefer to treat settlers' problems as technical in nature, and to address them through measures such as agricultural research and extension or health education. In many cases, they may be correct in their assessments of the difficulties of establishing institutional arrangements that will allow settlers to compete effectively with other interest groups on the frontier for development resources. However, where these arrangements are not established, project-level technical assistance, no matter how good it might be, is unlikely to enhance economic opportunities.

References Cited

- Albó, Xavier and Josep Barnadas
1984 La cara campesina de nuestra historia. La Paz: Unitas.
- Appleby, Gordon
1976 The Role of Urban Food Needs in the Regional Development of Puno. In Regional Analysis. Volume 1. Carol A. Smith, ed. Pp. 147-178. New York: Academic Press.
- Blanes J., José, Fernando Calderon G., Jorge Dandler H., Julio Prudencio H., and Luis Lanza 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.
- Carter, William E.
1964 Aymara Communities and the Bolivian Agrarian Reform. Social Sciences Monograph No. 24. Gainesville, Florida: University of Florida Press.
- Castro, Robert J.
1978 San Julian and Chane-Piray Colonization. Project Evaluation Report submitted to USAID/Bolivia (manuscript).
- Collins, Jane L.
1986 Smallholder Settlement of Tropical South America: The Social Causes of Ecological Destruction. Human Organization 45(1):1-10.
- CORDECRUZ
1984a Arroz boliviano. Boletín Informativo Agropecuario, Departamento de Comercialización Agropecuaria, Corporación Regional de Desarrollo de Santa Cruz 2:1-2.
1984b Maíz: enfrentando una sobreproducción. Boletín Informativo Agropecuario, Departamento de Comercialización Agropecuaria, 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.
- Deere, Carmen Diana and Robert Wasserstrom
1980 Ingreso familiar y trabajo no agrícola entre los pequeños productores de América Latina y el Caribe. Paper presented to the Seminario Internacional sobre la Producción Agropecuaria y Forestal en Zonas de Ladera en América Latin. Turrialba, Costa Rica.

de Janvry, Alain

1981 The Agrarian Question and Reformism in Latin America. Baltimore, Maryland: Johns Hopkins University Press.

1983 Growth and Equity: A Strategy for Reconciliation. In Issues in Third World Development. Kenneth C. Nobe and Rajan K. Sampath, eds. Pp. 19-33. Boulder, Colorado: Westview Press.

Edelman, Alexander

1967 Colonization in Bolivia: Progress and Prospects. Inter-American Economic Affairs 20:39-54.

Fifer, J. Valerie

1982 The Search for a Series of Small Successes: Frontiers of Settlement in Eastern Bolivia: Journal of Latin American Studies 14(2):407-432.

Forman, Sheperd, and Joyce F. Riegelhaupt

1970 Marketplace and Marketing System: Toward a Theory of Peasant Economic Integration. Comparative Studies in Society and History 12:188-212.

García-Tornel, Carlos and Maria Elena Querejazú

1984 Migraciones internas permanentes. In Tras nuevas raíces. Pp. 1-52. La Paz, Bolivia: Ministerio de Planeamiento y Coordinación.

Hackenberg, R.A. and B.H. Hackenberg

1984 Developing Intermediate Cities as Processing Centers: A Project in Western Panama. Regional Development Dialogue 5(1):74-109.

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. By Dwight B. Heath, Charles J. Erasmus, and Hans C. Beuchler. Pp.241-363. New York: Praeger Publishers.

Heckadon Moreno, Stanley

1983 Cuando se acaban los montes. Panamá, Panamá: Editorial Universitaria de Panamá and the Smithsonian Tropical Research Institute.

Heckadon Moreno, Stanley and Alberto McKay, eds.

1982 Colonización y destrucción de bosques en Panamá. Panamá, Panamá: Asociación Panameña de Antropología.

Hess, David

1980 Pioneering in San Julian: A Study of Adaptive Strategy Formation by Migrant Farmers in Eastern Bolivia. Ph.D. dissertation. Anthropology Department. University of Pittsburgh.

Hiraoka, Mario

1980 Settlement and Development of the Upper Amazon: The East Bolivian Example. Journal of Developing Areas 14:327-347.

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. Manning Nash, ed. Pp.67-98. Chicago: University of Chicago Press.

Kay, Cristobal

1981 América Latina: hacia la agricultura capitalista. Historia y Sociedad 24:71-88.

Klein, Herbert

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

Leon Pinelos, Antonio de

1943 [1650] El Paraíso en el Nuevo Mundo. 2 Tomos. R. Porras P., ed. Lima, Peru: Comité del 4to Centenario de Descubrimiento del Amazonas.

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.

Nelson, Michael

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

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

Painter, Michael, Carlos A. Perez-Crespo, Martha Llanos Albornoz, Susan Hamilton, and William Partridge

1984 New Lands Settlement and Regional Development: The Case of San Julian, Bolivia. Binghamton, New York: Cooperative Agreement on Settlement and Resource Systems Analysis.

Partridge, William L.

1979 Banana County in the Wake of United Fruit: Social and Economic Linkages. *American Ethnologist* 6: 491-509.

1984 The Humid Tropics Cattle Ranching Complex: Cases from Panama Reviewed. *Human Organization* 43:76-80.

Partridge, William L., Antoinette B. Brown, and J.B. Nugent

1982 The Papaloapan Dam and Resettlement Project: Human Ecology and Health Impacts. *In* Involuntary Migration and Resettlement. Art Hansen and Anthony Oliver-Smith, eds. Pp. 245-263. Boulder, Colorado: Westview Press.

Paz, Danilo

1983 *Estructura agraria boliviana*. La Paz: Librería Editorial Popular.

Perez-Crespo, Carlos A.

1985 Resource Competition and Human Settlement in the San Julian Project, Bolivia. *Development Anthropology Network* 3(1).

Riviere d'Arc, Helene

1980 Public and Private Agricultural Policies in Santa Cruz (Bolivia). *In* Land, People and Planning in Contemporary Amazonia. Françoise Barbira-Scazzocchio, ed. Pp.154-161. Cambridge: Cambridge University Centre of Latin American Studies.

Scudder, Thayer

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.

1984 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. Executive Summary. A.I.D. Program Evaluation Discussion Paper No. 21. Washington, D.C.: U.S. Agency for International Development.

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

1985 Bolivia: Integrated Rural Development in a Colonization Setting. Project Impact Evaluation Report No. 57. Washington, D.C.: U.S. Agency for International Development.

Stearman, Allyn MacLean

1973 Colonization in Eastern Bolivia: Problems and Prospects. *Human Organization* 32(3): 285-293.

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

Stearman, Allyn MacLean

1978 San Julian Colonization Project Evaluation Study. Sub-tropical Lands Development Project. Anthropologist's 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. Moran, ed. Pp.51-63. Boulder, Colorado: Westview Press.

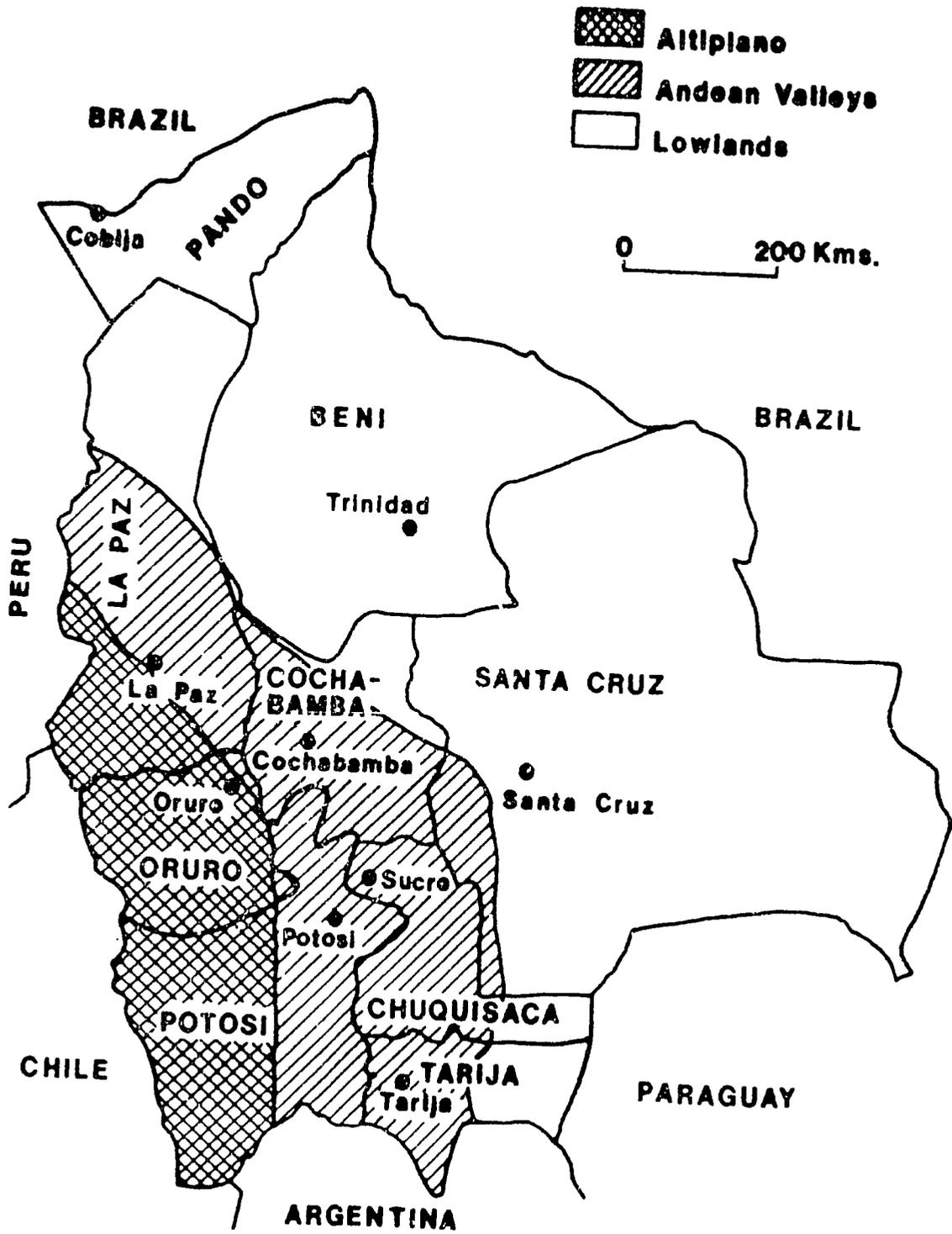
1985 Camba and Kolla: Migration and Development in Santa Cruz, Bolivia. Gainesville, Florida: University Presses of Florida.

Ward, Carol Bradford

1984 Settling Bolivia's Lowlands. *Horizons* (Summer). Pp.13-15.

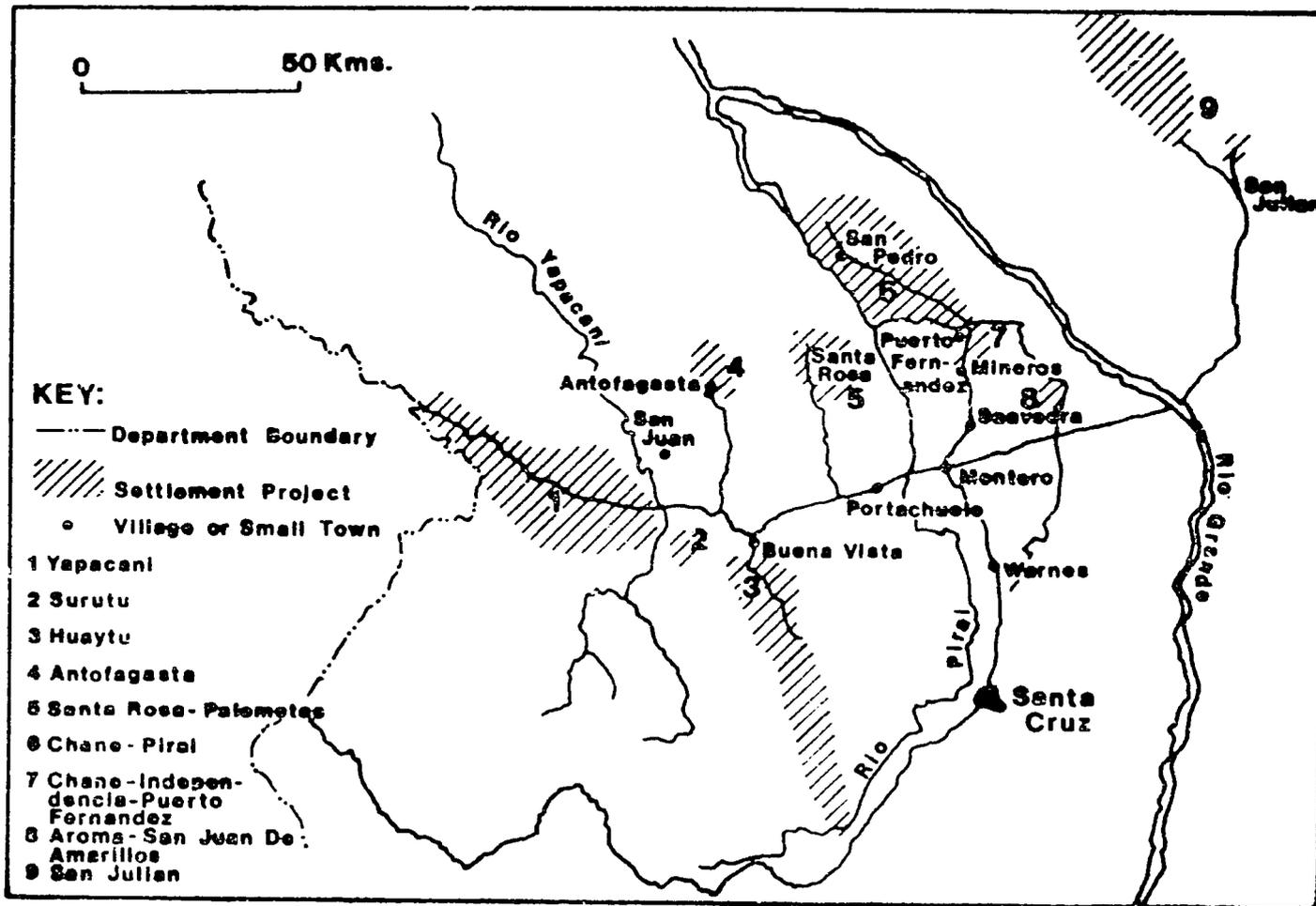
Wennergren, E. Boyd and Morris D. Whitaker

1976 Investment in Access Roads and Spontaneous Colonization: Additional Evidence from Bolivia. *Land Economics* 52(1):88-95.



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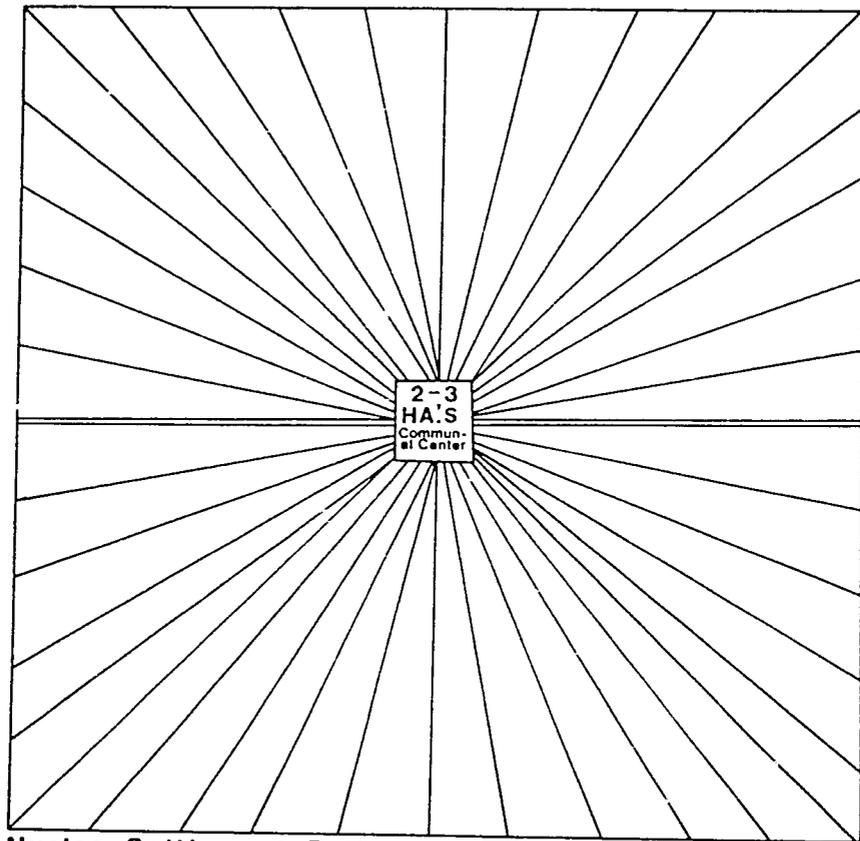
Map 1



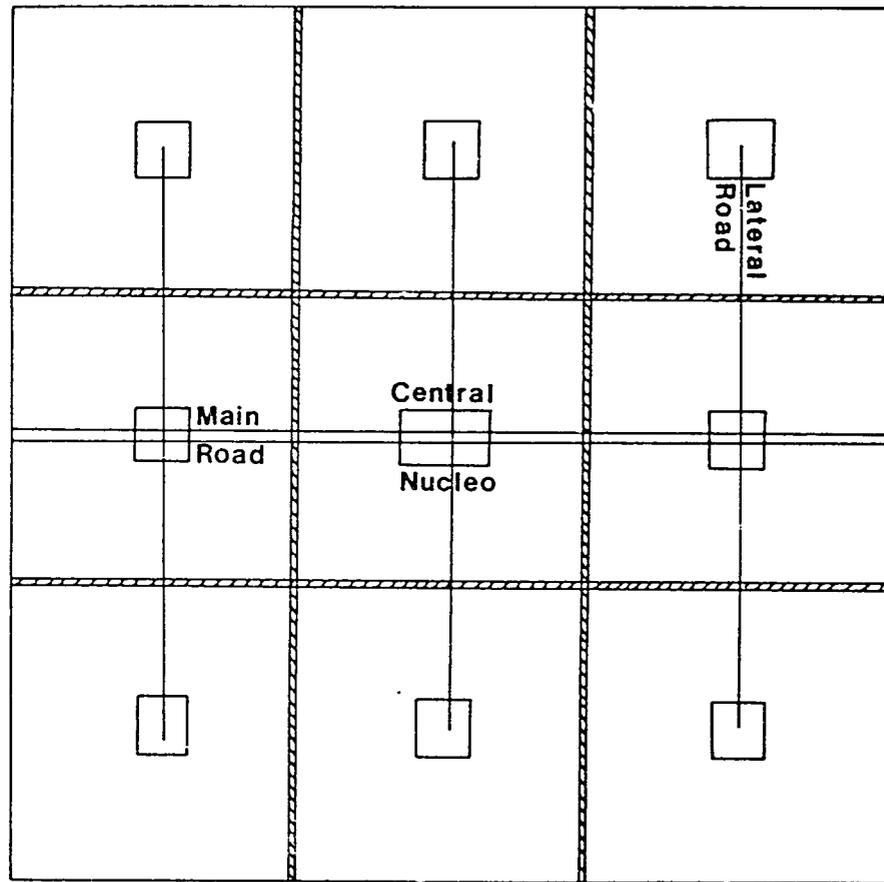
Northern Santa Cruz. State-sponsored Settlement Areas

Source: Riviere d'Arc [1960]

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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 1

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