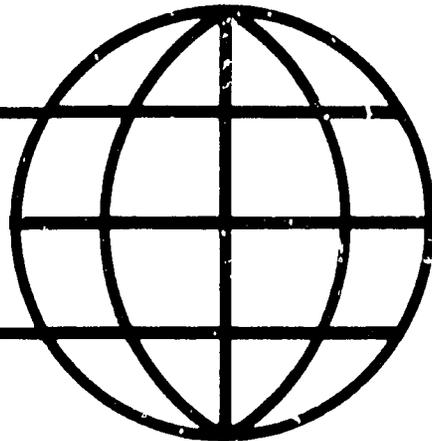


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**COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS
AND NATURAL RESOURCE SYSTEMS ANALYSIS**

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RESOURCE USE IN THE TAMBOPATA VALLEY
PERU: STATE COOPERATIVES AND
COMMUNITY LEADERSHIP ON A
COFFEE FRONTIER

by

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Introduction

The Tambopata Valley is located in Sandia province of the Department of Puno in southern Peru. It is one in a series of tropical river valleys that extend to the north and east from the eastern range of the Andes mountains. During the 20th century highland dwellers from the Peruvian altiplano began clearing areas of the valley in order to cultivate coffee and citrus fruit. The valley was incorporated into the highland production system as the major cash crop-producing component, and a pattern of seasonal migration emerged by means of which households were able to coordinate their productive activities in the highlands and tropical valleys.

The exploitation of the Tambopata Valley is an interesting case study for those concerned with planning natural resource utilization in new lands settlement areas. It offers an opportunity to study resource utilization for an extended period of time, as many of the households that cultivate lands in Tambopata have been doing so for three generations. The movement between the highlands and tropical valleys was studied systematically in the late 1950s by Martínez (1969) and in 1979-1980 by Collins (1981), providing a reliable basis for comparing resource utilization in Tambopata during different time periods.

Although the movement into the Tambopata Valley was a spontaneous one, conceived and organized by highland households and communities, the state has become involved in the areas of land titling and coffee commercialization. The division of labor that exists between household and community institutions on one hand and the state, on the other, is responsible for many of the problems related to resource utilization in Tambopata. The case of the Tambopata Valley also indicates that optimal resource utilization is not necessarily a high priority for those who make policy regarding new lands settlement areas.

The Productive System

The Tambopata Valley has been incorporated into the productive systems of households in two districts of the highland province of Huancané as part of a subsistence strategy based upon diversification (Painter 1978; 1979; 1981; 1982b). The emphasis placed upon diversification by rural households may be seen in a number of areas, including a landholding pattern based upon individual ownership of small, widely dispersed plots, the maintenance of a large number of cultivar varieties, social organization emphasizing reciprocal social bonds between members of different households as the basis of organizing labor for production, and participation in a variety of economic activities that may be organized according to different relations of production.

The highland communities that utilize the Tambopata Valley are located on the north side of Lake Titicaca, at elevations of between 3800 and 3900 meters above sea level. The coffee and citrus producing lands are located approximately 100 kilometers to the north at elevations ranging from about 1300 to 900 meters above sea level. However, the winding route that trucks must follow to reach the tropical valley covers about 365 kilometers, and the journey requires between 18 and 25 hours to complete, depending upon road conditions. Prior to construction of the road, which was completed in 1970, the journey was made on foot with pack trains of llamas and required about ten days each way. Even today, producers may walk as much as four days to reach the coffee groves that are most distant from the roads (Map).

Households are able to coordinate production in such widely separated areas because the periods of peak labor demand in highland subsistence production and

cash crop production in Tambopata are roughly complimentary. In highland production, labor demands are greatest between September and December, for planting, and between March and May, the harvest period. Weeding, clearing new land, and setting out new seedlings are accomplished between December and February in Tambopata, and coffee and citrus are harvested between May and July. The coordination of production in the two areas is also facilitated by aspects of social organization. These include an egalitarian sexual division of labor that permits men and women to perform tasks interchangeably, and highly elaborated affinal and fictive kin networks that enable households to marshal large amounts of labor for the performance of particular tasks.

The ability to coordinate subsistence production with other economic activities is a central aspect of household productive strategies. During normal years, subsistence agriculture accounts for all but between seven and twelve percent of the calories consumed in the households studied by Collins (1981:119; 123), so that the income earned through other economic activities is largely discretionary. However, in the highland environment, households must be prepared for widespread crop failure two or three years out of every ten, usually as a result of drought. Severe localized crop losses resulting from frost and hail are an almost annual occurrence. During such periods, the supplementary resources provided by economic activities other than subsistence agriculture are essential. Likewise, households that depended only upon the income earned from cash crop production in Tambopata would be unable to support themselves (Aramburú 1982).

The exploitation of tropical valley lands has a long history among the altiplano populations around Lake Titicaca. Prior to the arrival of the Spanish they mined gold in the Tambopata Valley as part of their tribute obligations to the Inca as

well as to their local overlords. From the earliest days after the Spanish conquest of the region they are reported to have produced food crops in the tropical valleys, consuming part of it themselves, selling part of it in markets as far away as Cuzco and Potosí, and turning a portion of it over to the Spanish as part of their tribute payment to the new masters (Collins 1981).

Throughout the colonial and republican periods, highland households maintained access to tropical valley products in several ways. In some cases, households actually migrated seasonally to cultivate lands that they either owned or rented. In others, family members would establish a second household in the lowlands that would maintain an exclusive trade relationship with the parent household on the altiplano. In still other cases, independent highland and lowland households would establish bonds with one another through marriage or fictive kin ties to reinforce trade relations. All of these approaches represent a response to the need to supplement highland production, and they all required a constant movement of people back and forth between the altiplano and the tropical valleys (Collins 1981).

However, none of this activity was directed toward the Tambopata Valley of Peru. Rather, contact was maintained with the tropical valleys of Bolivia, which are located to the east. While the Bolivian valleys were and are more accessible to people from the area of Huancané province, it was neither travel difficulties nor ignorance that determined that they should be preferred over Tambopata. Highland populations from the Huancané area had mined gold there for the Incas and later for the Spanish, and several communities have maintained small mining operations there until the present day. Large numbers of highland people were forcibly recruited to extract chinchona bark for making quinine and

and rubber from the valley at different periods. Furthermore, they knew the Tambopata Valley to be very sparsely populated, with most of its aboriginal population having perished by the early 19th century (Collins 1981).

Highland households did not draw upon the Tambopata Valley because they regarded it as unsuitable for cultivation. The Tambopata Valley is very narrow and its slopes are exceedingly sheer. This makes it difficult to control any fires that one might set to burn off vegetation, and, once cleared, the land is extremely susceptible to erosion. Highland households extracted raw materials from Tambopata, but they had no desire to farm there. Cultivation was limited to the wider, more gently sloping valleys of Bolivia (Collins 1981; 1982).

Several factors caused highland households and communities to reassess their utilization of the Tambopata Valley during the 20th century. First, events conspired to threaten their access to the Bolivian valleys. During the 1930s, their presence in the country made them subject to forcible conscription into the Bolivian army to fight against Paraguay in the Chaco War. Those individuals who were not drafted and carried away by the Bolivian authorities found it convenient to return to Peru for the duration of the war. After the war, it was difficult to avoid being caught up in the uncertainty and turmoil leading up to the Bolivian revolution of the 1950s. After the revolution, they were forced to decide between remaining in Bolivia and assuming Bolivian citizenship in order to keep their lands, or returning to Peru. Secondly, in an effort to relieve perceived overpopulation in the highlands and in the interest of populating the tropical valleys in order to bring them under more direct political control, Peru passed legislation in 1946 that created a legal mechanism by which individuals could claim and obtain title to land in Tambopata and other lowland areas at very little cost. Finally, in the 1950s, the altiplano

experienced several consecutive years of crop failure as a result of drought, forcing households to seek a replacement for the Bolivian valleys as a supplement to highland agricultural production as quickly as possible. The drought also roughly coincided with an upturn in international coffee prices that made this an attractive new cash crop for peasants in several areas of Peru, including the Tambopata Valley (Collins 1981; Martínez 1969).

As a result of these factors small numbers of households began cultivating land in Tambopata during the late 1930s and early 1940s. During the 1950s and 1960s, the number of households that began seasonally migrating to the valley increased dramatically. By 1969, 12,450 hectares of land had been dedicated to coffee production (Uría Bermejo 1971). Since 1961, the annual rate of rural population growth in Tambopata has averaged about 4.1 percent with most of the increase accounted for by seasonal migration from the highland province of Huancané (Aramburú 1979; 1982). Most of the landholdings are small with a median size of 1.97 hectares (INP 1980:131). Yields of 900 kilograms per hectare for coffee and 13,000 kilograms per hectare of citrus are modest when compared to other areas of the world. Based upon 1980 prices, producers holding the median amount of land and achieving average yield could supplement their highland food production with over \$1200.00 in net revenue by growing coffee and citrus in the Tambopata Valley (Painter 1981; 1982b).

The Organization of Production

Three sets of institutions organize production in the Tambopata Valley. Households and communities muster the resources necessary to place people in the valley to clear and cultivate land. State cooperatives buy the coffee from the smallholding producers, bulk it, transport it out of the valley, and sell it

on the international market. Private entrepreneurs, whose enterprises vary widely in size, transport highland food staples into the valley for sale to the producers, and they purchase and bulk the valley's citrus production, transport it to the altiplano, and resell it.

Land in the Tambopata Valley is titled to individuals; however, production is organized by and for the benefit of highland households and communities. Individuals are able to migrate to Tambopata because their property will be watched over and tasks such as the weeding of highland crops will be performed by household members who remain behind. Household production allows producers to wait the five years required for their trees to begin to bear with no financial return on their investment in tropical valley production, and it protects against hunger during years of low coffee prices. The revenues from production in the tropical valleys are used to make life more secure for the highland households. By coordinating their efforts and combining their resources, households are able to use revenues generated by tropical valley production to improve the quality of life at the community level, through projects such as the construction of potable water and electricity generating systems.

The only legal purchaser of coffee produced in Tambopata is the state coffee cooperative system. The cooperative system was instituted in 1962, by the Pérez Godoy government as a means of protecting peasant producers from exploitation by bulkers and shippers who controlled the transport of coffee from the valleys to market, improving producers' living standards in order to prevent the growth of a potential guerilla threat in some areas, and bringing international coffee marketing under state control. Producers agree that the revenues they receive from coffee have increased since the cooperative system was instituted; however,

they are unsure how much of this is a result of the cooperative operating in their behalf and how much is simply as a result of generally rising coffee prices since the system was instituted.

In Tambopata, the central cooperative is divided into a number of small cooperatives. All producers must select one of the small cooperatives and become a member in order to legally market their coffee. Each of the small cooperatives elects officers from among its membership; but, their responsibilities are limited to receiving coffee brought in from the fields, maintaining accounts, and paying producers once the harvest has been sold. All policy decisions are made at the central office of the system with no producer participation. Officials of the central cooperative have even declined to disclose how they calculate the amount of money they deduct from the selling price of the coffee to run the cooperative prior to paying the growers.

Generally, relatives and members of the same highland communities elect to join the same branch of the cooperative, so there is some overlap between the lines of communication and authority followed in the highlands and those followed in Tambopata. Highland community leaders frequently are leaders in the small local cooperative as well. This allows producers to elect people they know and trust for local administrative chores. More importantly, however, it allows the small local cooperatives to provide a context in which producers organize and act on a variety of issues that concern them, such as group labor projects to improve roads and build bridges, or investigating more effective marketing techniques for their citrus production. The cooperative system itself is not involved in anything except buying, transporting, and marketing coffee; but, it does provide a setting in which highland patterns of productive organization can function.

Since the establishment of the coffee cooperative system, the role of private entrepreneurs has been limited to transporting foodstuffs such as meat and potatoes from the highlands into the Tambopata Valley and transporting citrus fruit back out. Some operate fairly large enterprises and own their own trucks; however, petty commercialists are the majority by far. Petty commercialists either rent the use of a privately owned truck or they pay passage for themselves and their goods on the trucks of the coffee cooperatives. Many of the petty commercialists are producers who seek to further diversify the economic activities in which they are involved, and many others are either relatives or members of the same communities as producers. Petty commercial activity creates a constant flow of people and information between the highlands and the tropical valley, facilitating communication among household members and allowing them to allocate labor more rapidly and precisely than would otherwise be possible.

Problems in Resource Utilization

The spontaneous clearing and cultivation of the Tambopata Valley has converted a sparsely inhabited, unproductive area into one of Peru's largest coffee producing regions. The only expense to the state has been the implementation of the coffee cooperative system and the extension of a road into the valley, both of which occurred after the effort had proven itself a commercial success. In addition, the income to be earned by transporting coffee before the cooperatives were established stimulated the growth of a number of shipping enterprises, several of which have subsequently expanded into other areas of business; and the revenues earned by producers allowed them to constitute a demand for goods that contributed to the growth of a variety of manufacturing, wholesaling and retailing enterprises in the southern highlands of Peru (Painter 1982a; 1982b).

However, the Tambopata Valley suffers from several serious resource utilization problems that arise from the institutional context within which production occurs. These problems include environmental degradation, inability to cope effectively with coffee rust, and inefficient marketing of citrus. Technical solutions exist for all three problem areas; but, producers and the state have not worked together to implement them.

The most immediate and dramatic symptom of environmental degradation in the Tambopata Valley is soil erosion. As noted above, the steep slopes of the valley walls present special challenges to cultivation. The problem is exacerbated by the practice by most producers of weeding extremely closely around the coffee seedlings, removing all grass and secondary growth once a year. A preferable approach would be multiple weedings throughout the year that protected coffee seedlings from being overrun without removing all other vegetation. However, because of labor requirements in the highland communities most households are not able to schedule their trips to Tambopata in a way that would permit this.

Declining soil fertility is also indicative of the environmental degradation occurring in the Tambopata Valley. The problem is partially a factor of loss of topsoil through erosion. In addition, once land has been cleared for coffee and citrus production it receives no chemical fertilizer and no systematic effort is made to recycle the nutrients in the biomass that is removed by clearing and weeding through the system. As a result, coffee groves last about 30 years, from the time they are cleared until the time they are abandoned. Coffee seedlings require about five years before they begin to bear. Their productivity then peaks rapidly and marked declines in production are noted within 10 to 15 years after an area has been cleared. This means that producers are perpetually claiming

and clearing new lands farther down the valley. It is a rare circumstance when producers pass on to their offspring the same lands that they inherited. The earliest coffee production in the valley occurred at an elevation of about 1300 meters above sea level. This area is now a tangle of abandoned groves and scrub brush punctuated by deep gashes in the land. Most of the valley's present coffee production occurs at an elevation of 900 meters above sea level or less. Producers are aware of the problem, but note that it is cheaper to claim and clear new land than it is to maintain what one has.

The clearing of the Tambopata Valley has been accelerated by coffee rust, a fungus that causes productivity to decline prematurely and eventually kills the coffee trees. The coffee cooperative has printed posters urging producers to spray the rust, and they have made limited quantities of sprayers and fungicides available through the local cooperative. However, many producers who would spray find themselves unable to gain access to a sprayer and fungicide, either because there are not enough to go around or because equipment has broken and not been replaced. Coffee rust is found in many areas of Latin America and is combatted successfully. The variety of coffee grown in Tambopata, Cafe arabica, is particularly susceptible to rust, and persistent varieties, such as Cafe robusta, have not been systematically introduced. The response on the part of producers has been to accelerate their clearing of new land farther down the valley in an effort to "outrun" the rust.

Producers have expressed an interest in diversifying the sources of income they receive from cultivation in Tambopata. This is spurred on in part by the realization that coffee production cannot continue indefinitely given the trends described above and in part by a dislike for depending solely upon coffee for

their income. Several groups associated with different local cooperatives have attempted to increase the profitability of citrus production. Producers presently use only a small portion of their land to grow citrus. The price citrus commands is very low because it is marketed almost exclusively in the southern highlands of Peru. During the months when citrus is harvested the market is flooded, forcing the price down and resulting in large quantities of fruit being wasted. Producers have sought to remedy this by finding a means of storing citrus and releasing it onto the market gradually through the year. So far, their petitions to the state for assistance have gone unheeded and they have been unable to raise the capital necessary to undertake such a project on their own.

The Institutional Context of Resource Utilization Problems

Because of these problems in resource utilization, large areas of land are being cleared annually in the Tambopata Valley, but the amount of land actually producing anything has remained constant since about 1969. This is, in fact, a characteristic of new lands settlement throughout Peru (Aramburú 1982). In the case of Tambopata, this stems from the larger political economy that forms the context for the economic exploitation of the valley.

Households have historically found it necessary to draw upon both highland and valley resources in order to survive, and this imperative forced them to undertake productive activities in the Tambopata Valley after their access to tropical valleys in Bolivia had been severely restricted. In making the transition to cash crop production in Tambopata, households were forced to intensify the exploitation of their own labor through increasingly precise scheduling of the allocation of labor inputs in the highlands in order to migrate seasonally to the tropical valley

(Collins 1982). Through the exploitation of their own resources, highland households established the production of an internationally marketed export crop that, in turn, stimulated the growth of a number of capitalist economic enterprises in the southern Peruvian region (Painter 1982a; 1982b).

The state has taken advantage of the ability of this peasant economy to exploit itself for purposes that have little to do with the long term utilization of resources in the Tambopata Valley or the welfare of the people who are producing there. The state welcomes the revenues generated by coffee production in the valley; but, since it made no investment in establishing that production, it has only a limited interest in investing in efforts to encourage soil conservation, combat declining productivity and blight, or developing infrastructural and marketing facilities.

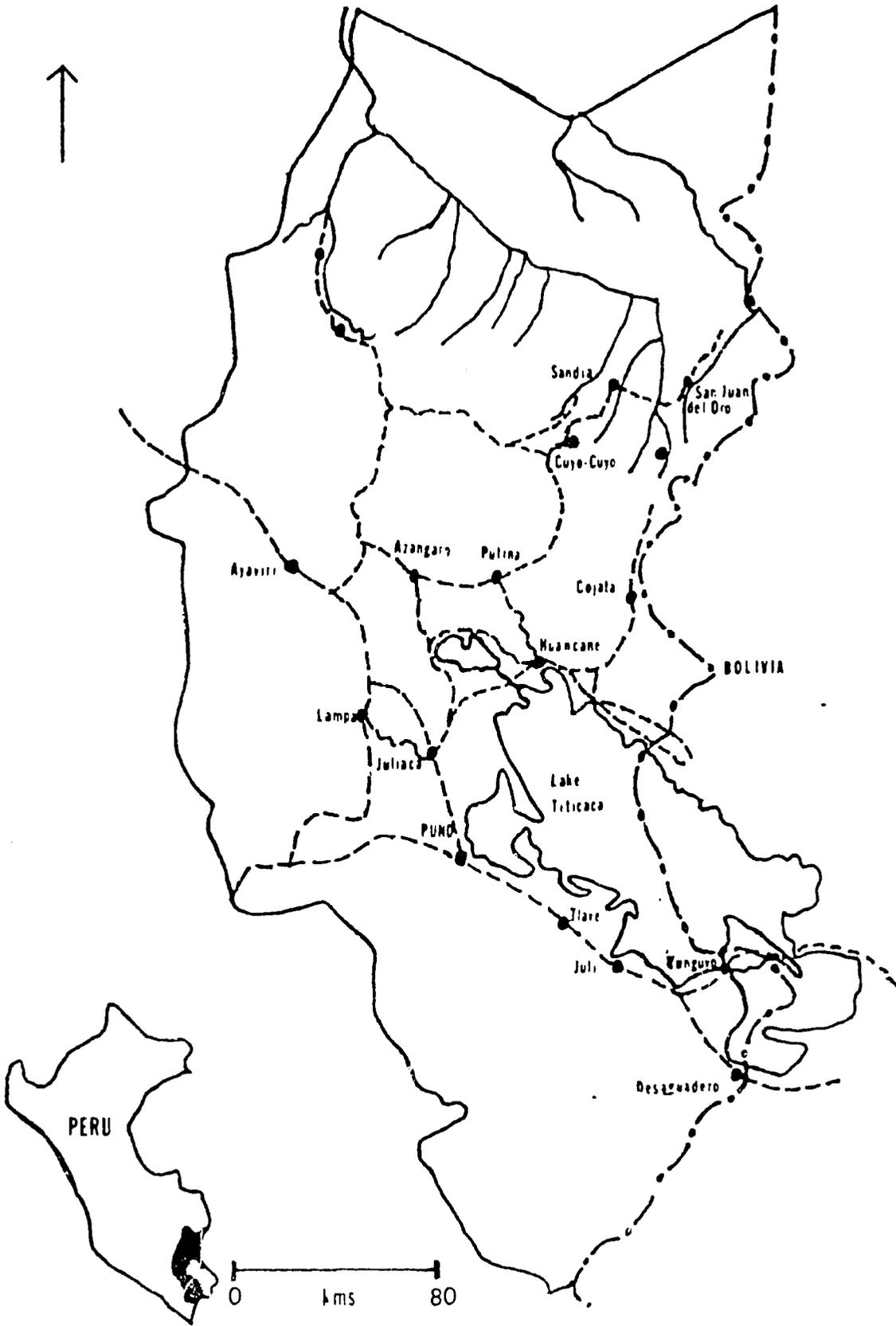
In addition, the progressive penetration of producers into the valley serves the interest of the state in establishing political control in the tropical valley region. Even in the case of its planned colonization projects in the tropical valleys, Peru has been more interested in moving people out of highland areas in order to diffuse explosive situations of resource competition and in establishing visible political control than in integrated resource management. Thus, even in its planned projects, the state has limited its role to the construction of roads and means of communication in the assumption, or hope, that this would lead to regional development (Camino 1982). As a result, all of the country's planned colonization efforts in tropical valleys have been commercial failures (Martínez 1976). This lack of commercial success has encouraged land use planners to look more favorably upon extractive industries that exploit the region for raw materials and agricultural products for export in spite of the widespread ecological destruction that has characterized their activities (Martínez 1978).

From the perspective of the highland households, they are simply making the most rational use of the factors of production given the socio-economic context in which they find themselves. They must exploit both the highland and tropical valley areas in order to survive. Exploiting both areas means that labor is perpetually scarce; but, land in Tambopata Valley is abundant and cheap. As they see it, they would be stupid to tax their labor resources any more than they already are through taking conservation measures such as weeding their coffee three times a year instead of one when more land is readily available, especially when increased labor inputs in the Tambopata would be felt in the form of decreased highland food production.

Producers are also reluctant to make large capital investments in the Tambopata Valley. They are highland people and the purpose of going to Tambopata in the first place was to obtain the resources necessary to make their highland households and communities more secure and permit investment in improving highland living standards. Insofar as any investment of funds in the Tambopata Valley detracts from this purpose, it is done reluctantly. Also, they do not regard their holdings in the Tambopata Valley to be secure enough to warrant substantial capital investments. The producers are members of an exploited peasant class and have experienced seizures of their land and property as a matter of course for more than 300 years. When outsiders point out that they have titles to their lands in Tambopata, they respond that titles have historically provided them with little protection. Many still have titles to land in Bolivia.

The technical aspects of the resource utilization problems in Tambopata are not particularly deep and their solutions are not particularly exotic. The producers themselves would be willing and able to undertake many of them if

it were possible to maintain themselves in the valley without having to allocate labor to highland food production and if they were convinced that their tenure there is secure. However, this would require a fundamental shift in state policy from simply reaping the benefits of peasant production to taking an active role in promoting the social and economic well-being of peasant producers. The case of Tambopata illustrates that effective resource management must not limit itself to the technical questions, but must address the social and economic context in which resources are utilized.



Map I.
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