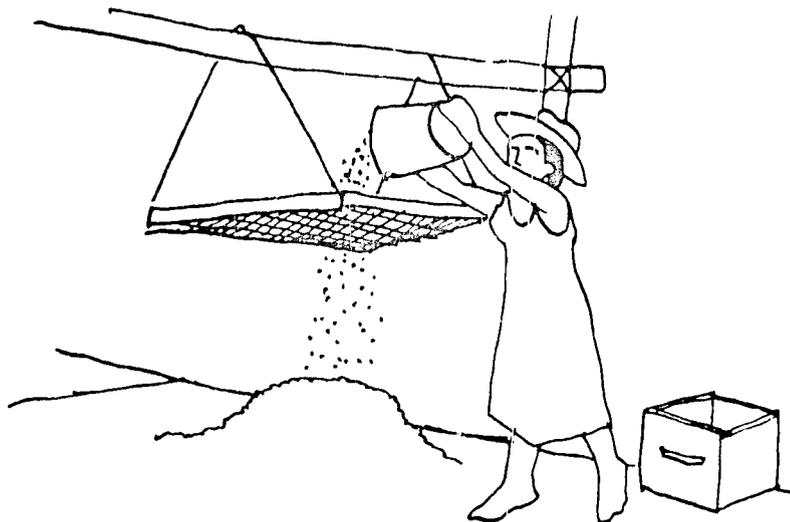


MINISTRY OF AGRICULTURE AND PEASANT AFFAIRS (MACA)
AGENCY FOR INTERNATIONAL DEVELOPMENT (AID)
RURAL DEVELOPMENT SERVICES (RDS)

OUR KNOWLEDGE

TRADITIONAL FARMING PRACTICES IN RURAL BOLIVIA

VOLUME III : TROPICAL LOWLANDS REGION



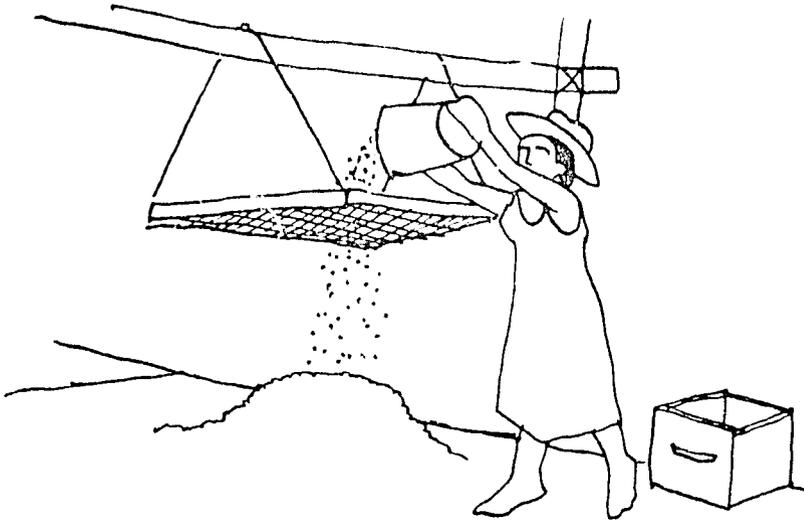
A TEXTBOOK BY SUBSISTENCE HOUSEHOLDS
EDITED AND ILLUSTRATED BY JOHN K. HATCH

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P R E F A C E . T O . V O L U M E . I I I .

This document is the third and final volume of an extensive research undertaking to describe the farming practices of Bolivian peasants in the Altiplano, Temperate Valleys, and Tropical Lowlands regions. For those readers who have not had an opportunity to read the prefaces to Volumes I and II, it is necessary to briefly review the purpose of Our Knowledge, who are its authors, for whom and why the book was written, and how the information was collected and edited.

The Purpose

Our Knowledge is an attempt to provide a comprehensive overview of the subsistence farming practices of Bolivian peasants. Such are the differences from one region to another that each could be considered a separate country and deserves a volume of its own. Each volume describes (1) the communities and rural households that provided the information, (2) general aspects of agricultural activity, (3) farming practices for specific crops, (4) livestock practices, (5) food preparation, (6) hygiene and health, and (7) artisan crafts.

The Co-Authors

In contrast to virtually all other descriptions of rural Bolivia, Our Knowledge was written by peasant households themselves rather than by outside professionals. Exactly 139 rural families from 13 communities participated actively in the study which produced this book. Its contents are based on written narratives and daily diaries kept by these families over a 24-36 month period. The choice of subjects by what the co-authors considered to be important about their lives. Thus, the document represents the viewpoint of the rural poor, not outside observers. Most of the authors are native Aymara or Quechua Indians. About one-third of them are illiterate. They were able to contribute written material for this book by using school children as their scribes and translators. Others contributed many hours of verbal descriptions that were subsequently reported verbatim or in summary form by project field staff.

The Project Sponsors

Our Knowledge is the final product of a three-year enterprise known as the Traditional Practices Project (1979-1982). It began in the Altiplano and Temperate Valleys regions in 1979 and was extended a year later to the Tropical Lowlands. For the first year the only formal project participants were male heads of household, and the focus of information gathering was placed mainly on male-dominated farm activities. But during the project's last two years female household heads were included as informants and the range of project topics expanded to include food preparation, health, hygiene, artisan crafts, and even holidays and celebrations.

The Traditional Practices Project has had four primary sponsors. The project was conceived by Rural Development Services (RDS), a U.S. consulting firm specialized in the design, management, and evaluation of development programs serving the rural poor. In 1979 RDS presented a research proposal to the Agency for International Development in Bolivia (USAID/Bolivia) which agreed to finance the project's external dollar costs. At the same time the Bolivian Ministry of Agriculture (MACA) agreed to help finance the project's local currency costs. To expand the project to cover female respondents, USAID provided budget amendments in 1980 and 1981--the second administered by Cornell University--to help finance the considerably expanded content of the project. Even so, such was the quantity of written material generated by the project that a 3-volume rather than a single-volume study was considered necessary. Initially, there was only enough USAID funding to finance the preparation of volume I and part of volume II. Rural Development Services subsequently financed most of Volume II. Finally, in 1984, a final contract with USAID made possible the completion of the third and final volume.

For Whom and Why the Book Was Written

Our Knowledge was written for two different reasons and for two very different audiences: farmers and non-farmers.

The first reason was simply to demonstrate that it could be done--to prove that even illiterate rural households could actively participate in the preparation of a textbook about themselves. We sought to demonstrate a process--using daily diaries and unstructured narratives--which would allow peasants to explain their way of life to outsiders. The very act of participating and controlling information in this way has been a

source of great pride and a wonderful educational experience for the families involved. By describing themselves they have created their own record; they are no longer "invisible"; they no longer feel apologetic about their poverty or subsistence lifestyle; they now count for something. Every co-author of Our Knowledge has received a personal copy of this three-volume study--a testimonial to their individual and collective efforts.

The second reason this book was written was to educate outsiders or non-farmers about what campesinos know. We sought to demonstrate that peasants have a great deal of worthwhile knowledge that needs to be consulted and integrated with the ideas of outsiders if rural development efforts of lasting success are to be achieved. Our Knowledge provides a handy reference for outsiders who wish to know more about Bolivia's indigenous peoples but lack the time to visit them in their villages or spend hundreds of hours asking questions and listening to farmers' opinions. In particular, it is hoped that this book will prove useful to high school and university students, farm extension agents, agricultural researchers, community development agents, national planners, consultants to rural development programs, government policy-makers, the staffs of international development assistance agencies, and personnel of private sector voluntary organizations working with the rural poor.

How the Information Was Collected and Edited

For each of the three main geographical regions of the country a Bolivian professional was hired to supervise the project. Communities were selected in accordance with considerations of locational diversity, ease of access, settlement type, and most important of all the expression of interest by local residents. Families chosen to participate in the project were selected by the general assembly of residents of their respective communities. When women participants were added to the project, these were for the most part selected from the same households which had been participating since project inception. Each male or female participant was paid a stipend equivalent to \$5 per month to keep a daily diary of his or her activities. Periodically, respondents were asked to prepare written narratives--individually or in groups--on subjects of interest chosen by themselves or suggested by their professional supervisor. Once a month all respondents were visited in their homes by their Bolivian supervisor. About four times a year participants were also visited by external staff. Once a year all participants participated in a conference at the regional or national level.

These events were held to interchange information and to develop organizational and group leadership skills.

Field activities terminated in July 1982. At that time all diaries were read by project staff, xeroxed, and returned to their authors. All narrative descriptions--prepared by peasants or their Bolivian supervisors--were organized into subject matter headings. For each heading, the content presented in Our Knowledge is actually a composite summary taken from narratives and journals of many and all farmers who had anything to say about that subject.

Volume I: Altiplano Region was written between May and November 1982. Volume II: Temperate Valleys Region experienced considerable delay due to the exhaustion of the project budget and had to be mostly financed by Rural Development Services on a piecemeal basis. Its preparation began in December 1982 and was completed 14 months later. Volume III: Tropical Lowlands was completed between July 1985 and January 1986.

The final draft of this volume was written in New York and Phoenix, Arizona--thousands of miles distant from the other co-authors. Since the editor did not have the luxury of contacting his campesino colleagues by phone whenever confronted by a problem of content or interpretation, it is possible that in some instances the facts have been assembled incorrectly. For these errors the editor asks the indulgence of both the document's co-authors and its readers.

All values in Bolivian peso currency given in this volume have been converted to U.S. dollar equivalents at the exchange rate of 20 pesos = US\$1.

In the English text, all terms in Spanish, Ayrara, or Quechua are underlined only the first time they appear in a given section. Where the meaning of these words is unclear, the reader is referred to the Glossary at the end of each volume.

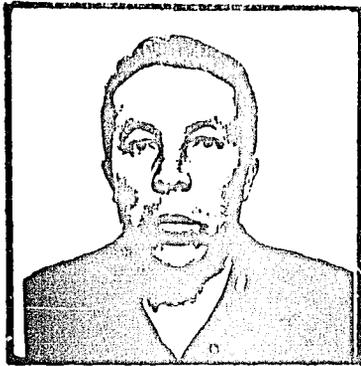
CHAPTER I.

PARTICIPATING COMMUNITIES AND HOUSEHOLDS

This volume on the traditional farming practices of the Tropical Lowlands region was prepared with the active participation of 68 rural men and women who served as the book's co-authors. Nearly two-thirds of these participants (42) did so as married couples representing 21 households; the remainder--12 men and 14 women--were sole representatives of their respective households. These participating families were drawn from five rural communities. Their journal-keeping efforts, written narratives, and verbal descriptions of their practices were conducted under the supervision of two Bolivian professionals: Jaime Mendoza Levy, who worked mainly with the male participants, and Aquilina Tuco Vera, who supervised female participants.

In the following pages we first present a biographical description of the project's two professional supervisors. The remainder of the chapter is devoted to descriptions of each of the five communities covered by the study, followed by the photographs and brief summaries of personal information on each participant.

BOLIVIAN FIELD STAFF FOR THE TROPICAL LOWLANDS REGION



Jaime Mendoza Levy

From March 1980 through July 1981, JAIME MENDOZA LEVY, served as the Bolivian Supervisor of the Traditional Practices Project for the Tropical Lowlands Region. Jaime was born in 1937, in Sucre, Department of Sucre. He graduated at the Escuela Superior Técnica Pedro Domingo Murillo in La Paz. Jaime served as a teacher and Operations Manager with Acción Andina, from 1960 to 1969. He then joined the National Community Development Service as Operations Manager and Regional Supervisor in La Paz, Oruro, Trinidad, Santa Cruz, Potosí, Tarija, from 1969 to 1980. He is presently working for FINCA/Bolivia as Regional Supervisor for La Paz Area.

He has participated in several courses, seminars and events on Community Development in Perú, Colombia, Argentina, and Central America.
expert



Aquilina Tuco Vera

From May 1980 through June 1981, she served as a field supervisor in the Traditional Practices Project. From July 1981 through August 1982, AQUILINA TUCO VERA served as a Bolivian Supervisor of Participating Rural Women in the Traditional Practices Project. Aquilina was born in 1958 in Orinaca-Sarangas, Department of Oruro. She completed her primary and secondary education. She joined the National Community Development Service (SNDC) where she worked as a Promoter of rural women's groups (1978-1980).

Aquilina participated as a field researcher for Rural Development Services in evaluating the impact of the Bolivian Food for Development Program (PL-480, Title III) in January 1982, and in the evaluation of the Small Farmer Credit Program of the Cooperativa Multiactiva "La Merced" in December 1982.

COMMUNITIES AND HOUSEHOLDS

Five communities were selected from Bolivia's tropical lowlands region to participate in the Traditional Practices Project. To facilitate supervision, it was decided to select all lowland communities from the single Department of Santa Cruz rather than attempt to include the more isolated tropical regions such as those in the departments of Beni and Pando. The choice of Santa Cruz was further justified because it is Bolivia's principal colonization zone.

The first three communities--Valle Hermoso, Naranjal, and Torrente-Abritas--are located 125-150 kilometers to the north and west of the city of Santa Cruz, and reached via the Montero-Puerto Greither highway. The remaining two communities--Porongo and Forestal--are located 40-50 kilometers south and west of Santa Cruz, following the Santa Cruz-Cochabamba highway. The selected communities represent a variety of different types of colonizations. Valle Hermoso and Naranjal are settlements organized by the National Colonization Institute. Torrente-Abritas is an example of a spontaneous colonization. Porongo dates its origins to a Jesuit reducción in the 1750's and is one of the region's oldest settlements. Finally, Forestal represents a private colonization project sponsored by a congregation of Catholic nuns.

COMMUNITY OF VALLE HERMOSO

The community of Valle Hermoso is located in the colonization zone of Yapacaní, Province of Ichilo. It is reached by taking the paved highway from Santa Cruz north to Montero, then west to Buena Vista, then further west 11 kilometers past Villa Busch where one makes a right turn and follows an access road for 4,000 meter into the community.

For most local residents of Valle Hermoso this is their second colonization location. Originally they arrived in the region in the mid 1960's as part of an army-sponsored settlement project some 40 kilometers further west near the Ichilo River. There they suffered repeated flooding and severe hardships, such that after several years the National Colonization Institute resettled them in the Yapacaní project at Valle Hermoso. Some 41 families received 20-hectare colonization lots at Valle Hermoso. Of these, only 20 families remain, which testifies to the great difficulties the residents experienced in their new location as well. Almost a dozen sold their properties to neighbors and migrated to Santa Cruz or returned to their highland communities of origin. Among the families who stayed, several now have two and even three colonization properties acquired from former neighbors and/or lots they still own along the Ichilo.

But no matter how abundant their land holdings, residents of Valle Hermoso still lead extremely difficult lives. Progress on both the individual and community levels has been slow. Most families occupy very rudimentary dwellings thatched with palm branches, have very few possessions, and their living conditions display very low standards of hygiene, security, and privacy. The land is flood prone and becomes very swampy during the rainy season. Valle Hermoso has no electricity, telegraph, telephone, potable water, public health, or transportation services.

The community does have a primary school which was recently completed through self-help action with materials donations from the regional development corporation (CORDECRUZ). It has a single teacher and is attended by 23 children. An additional 24 children attend secondary school in Villa Busch and other external locations. The community's access road was also completed by self-help effort. Because of the considerable sacrifice involved to build this road, a tranca or gate was installed at the entrance from the highway to prevent motor vehicles from using the community road on rainy days, which keeps rutting and deterioration under reasonable control. Valle Hermoso also has organized an agricultural cooperative, which currently has nine members, to obtain external credit to finance cash inputs for agriculture and livestock improvement activities. Politically, the community is administered by an Agrarian Syndicate. With regard to religious affiliation, residents profess to be Catholics or Evangelicals.

Because of the distance to major markets, irregular transport services, and the high-risk, flood-prone setting for agriculture itself, crop production in Valle Hermoso is predominantly for subsistence. Most families cultivate no more than 3 hectares in food crops because labor is extremely scarce and farming tasks are largely conducted by hand. Rice, corn, and yuca (cassava) are the principal staples, followed by minor plantings of potatoes, beans, tomatoes, peppers, sugar cane, and peanuts. Usually each household will have up to half a hectare of fruit trees--including plantains, guineo, oranges, mandarines, limes, and mango--and perhaps pineapple and watermelon patches. Unless converted into permanent pasture, the land use pattern is one of slash-and-burn rotations. Land clearance and weed control activities can easily overwhelm a small family's labor resources.

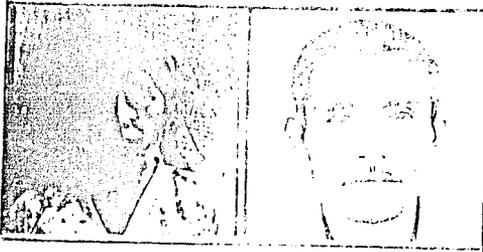
All households in Valle Hermoso raise livestock, particularly draft animals, small herds of dairy and beef cattle, a few pigs, and large flocks of poultry. Sales of eggs in the Sunday market at Villa Busch provide an important source of cash income to the household. With the assistance of Project Heifer, several families have acquired purebred dairy cows, are planting improved pastures, and are gradually becoming involved in small-scale milk production on a commercial basis. A truck from a milk processing plant in Santa Cruz (PIL) now makes a daily pick-up at the entrance to the community.

Participating in the Traditional Practices Project were six male household heads and six females, four of each being husband-wife teams. A profile of the participants follows.

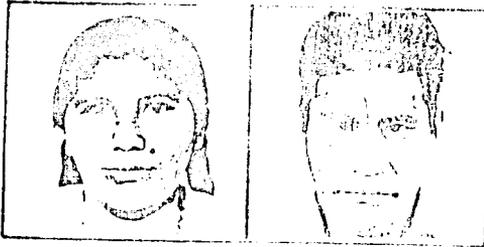
A PROFILE OF PARTICIPANTS FROM VALLE HERMOSO



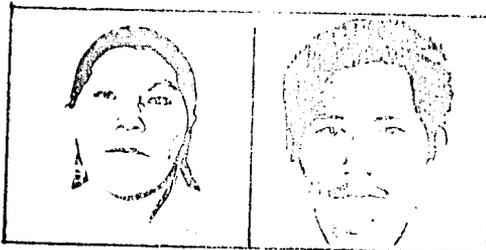
SABINO ARRAYAZA ALMENDRAS, age 32, and his wife ANASTACIA CASTRO HINOJOSA, age 25, are natives of Cochabamba. Sabino has 4 years of school, Anastacia 1 year. They have 3 children, ages 1-7. Although the family cultivates a large rice crop (2.4 has.) it also specializes in dairy farming (11 cows).



AURELIO GARCIA OLIVERA, age 33, and his wife JUSTINA ARAUCO ROCA, age 31, both come from Cochabamba. The couple has 5 and 4 years of school respectively. They have 4 children ages 2-11. Beside traditional subsistence crops, Aurelio has pioneered in growing watermelons. His family also has 3 cows, 4 pigs, and a large flock of poultry.

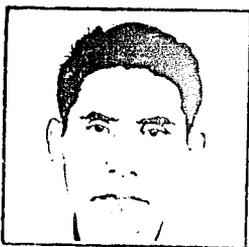


MIGUEL VALENCIA VALENCIA, age 39, and his wife DIONICIA RIOS ALEGRE, age 27, both keep farm records. Miguel is a native of Potosi, Dionicia comes from Cochabamba. The couple do not have any children. Dionicia completed the 4th grade, while Miguel has no schooling. They grow corn and watermelon, raise a herd of dairy and beef cattle (7) and pigs (2).



JULIO PINTO GONZALES, age 31, and JULIANA ROCCA, age 29, are natives of Cochabamba. They have 3 children ages 2-10. Julio has 3 years of school, Juliana 4. They grow rice and watermelon; livestock holdings include 6 cows, 1 bull, 2 pigs, and 40 poultry.

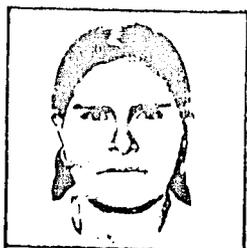
GREGORIO MAMANI IBARRA, age 40, is a native of Potosí. He is married to Benita Llanos Pavi, and the couple has 6 children, ages 8-26. The family cultivates rice, corn, yuca, and corn, utilizing its property in Valle Hermoso as well as its original colonization lot near the Ichilo. Livestock include 1 cow, 1 pig, and 36 poultry.



SEVERO VALENCIA VALENCIA, age 45, comes from Potosí. He is married to Emiliana Ríos Pojas from Santa Cruz. They have 4 children, ages 4-17. Severo has 4 years of schooling. He is an active leader of his Agrarian Syndicate, which limits the extent of his farming activities.



CRESENCIA VARGAS DE VALLES, age 25, Cresencia has three years of schooling. She is married, but lives alone in Valle Hermoso. Her husband works in the colonization project of Km.50. She participates actively in the Mother's Club. She raises 5 pigs and 60 poultry.



RUFINA SANTIVANEZ DE MOLINA, age 27, is married to Silverio Molino, a catechism teacher. The couple has three daughters. Rufina has 2 years of schooling. Her family owns 18 hectares of land of which half is cultivated in rice, corn, beans, vegetables, and potatoes. Family livestock includes 2 cows, a pig, and 15 poultry.

COMMUNITY OF NARANJAL

The community of Naranjal is also part of the Yapacaní colonization area to which Valle Hermoso belongs. Naranjal is located almost directly south of Valle Hermoso, or on the left hand side of the highway from Villa Busch to Puerto Greither, approximately 141 kilometers from the city of Santa Cruz. Naranjal belongs to the Canton San Carlos, Province of Ichilo.

Of the some 80 colonists who settled in Naranjal in the mid-1960's, about 60 families remain. They came from Chuquisaca, Cochabamba, Potosí, and Oruro, and the majority speak quechua and retain (particularly the women) some traditional forms of dress. Because of this diversity of origins, the community has had difficulty uniting itself for self-help community development or social activity. No patron saint's day for the community has been chosen; if celebrated at all, even traditional festivals are organized at the level of individual households. Perhaps the strongest organized group in Naranjal is the Evangelical church, which has a meeting place and holds services or bible readings several times a week.

The life of the colonists at Naranjal has been very difficult. The land of the colonization itself is actually quite hilly compared to other settlements, which spares the community from serious flood risks, but ironically Naranjal's disadvantage is that it suffers from a scarcity of water. Surface and ground water supplies are so scarce, in fact, that most families have difficulty meeting even their domestic needs. They largely depend on the storage of rain water. The water scarcity problem has also been responsible for discouraging community residents from developing herds of beef and dairy cattle on a commercial basis, while efforts to raise vegetables are limited to the rainy season.

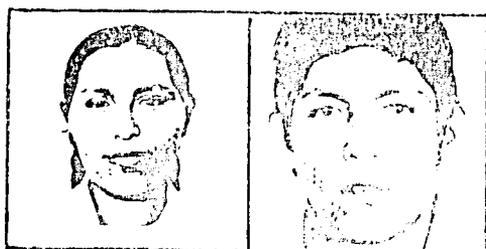
Agriculturally, Naranjal's crop production is subsistence oriented, with most households growing rice, corn, yuca, and small plots of potatoes, beans, tomatoes, and peanuts. For reasons of labor scarcity as well as limited market opportunities, the typical family cultivates no more than 3 of its 20 hectare colonization property. Those families with a few head of cattle will have one or more hectares of land in improved pasture. Of course, everybody has a scattering of fruit trees including citrics, plantains, guineos, mangos, and others which are harvested almost exclusively for family consumption. From a commercial point of view, the primary crop is rice. Farmers either sell major portions of their rice crop to intermediaries who come to the community, or they transport their produce to a number of rice mills--selling part and having the balance milled for home consumption. Because Naranjal is located at a higher elevation than most colonizations in the region (about 350 meters or 1,138 feet above sea level), a few residents have begun to experiment with small plantings of coffee. Another new crop with commercial prospects is watermelon.

The raising of beef and dairy cattle in Naranjal has not been successful in many instances, and several residents have actually eliminated their herd and allowed pastures to return to fallow. Most families raise a few pigs, but by far the most significant livestock activity involves large flocks of poultry. These are tended by women, who also earn important cash income selling eggs at the Sunday market in Villa Busch. Many of the male heads of household in Naranjal are serious fishermen. They travel frequently to the Ichilo and other rivers in pursuit of often very large fish, and this is an important source of protein for the local diet.

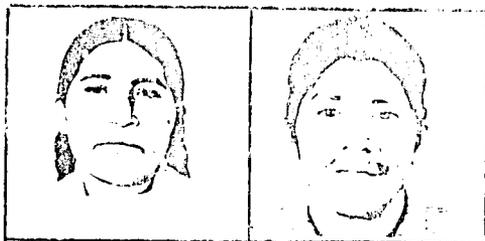
Living conditions in Naranjal remain quite spartan. There is no electricity, telegraph, telephone, potable water, or public health service. Regarding transport, the community is somewhat better off than its neighbors, for it enjoys an all-weather road as far as the school. A couple colonists have invested in small trucks and provide taxi and cargo service from Naranjal to Villa Busch. And given this service, other families have elected to move to this market town in pursuit of improved public services, amenities, and educational facilities; however, rather than sell their colonization lots they commute back to Naranjal to cultivate their property.

Six male heads of household and seven women participated in the Traditional Practices Project. In three instances, both the husband and wife of the male household kept records. A profile of the participants follows.

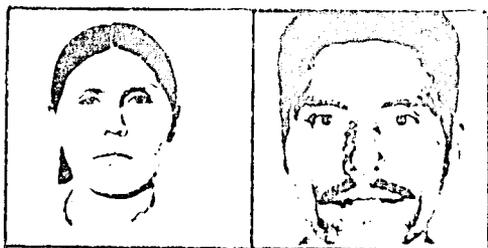
A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF NARANJAL



TIMOTEO FLORES NARANJADA, age 28, is a native of Potosí. His wife FRANCISCA LAZO COCA, age 27, comes from Cochabamba. They have 5 and 2 years of school respectively. They live with Francisca's mother and 3 children, ages 4-8. The land belongs to Timoteo's in-laws. The family plants rice, corn, and recently coffee. Livestock holdings include 21 cattle and 160 poultry. Timoteo works a lot outside Naranjal.



FELIX ALBARACÍN YUCRA, age 44, and CALIXTA SENA ZARATE, age 47, come from Chuquisaca. Felix has 2 years of school, Calixta has none. They have 6 children, ages 5-19. The family plants potatoes, beans, watermelon, and vegetables. It raises 17 cattle and 3 sheep, but no poultry. Felix has 3 colonization lots.



ANGEL CALVA ESCALERA, age 34, and his wife FILIBERTA COCA, age 28, both are natives of Cochabamba, and each has 2 years of school. They have 4 children, ages 3-10. The family plants a large amount of rice (4 hectares). Livestock holdings are limited to a small poultry flock.

JAVIER LAURA ALANES, age 25, is a native of Cochabamba. He manages the farm with a younger brother, age 15. They work two colonization properties. Crops include rice, potatoes, beans, and watermelon. Livestock holdings include 5 cattle, 5 pigs, and a few poultry. Javier has 2 years of school.



DOMINGO CORREA CRUZ, age 29, comes from Potosí. He has 3 years of school. Domingo is a bachelor and is active in the Evangelical Church. He grows rice, corn, vegetables, and watermelon. His livestock includes a horse, 3 pigs, and 30 poultry. He uses some machinery and invests in insecticide.



PABLO MAMANI MENCHACA, age 52, is also from Potosí. He has 6 years of school. He is married to Juliana Paco Paco, and the couple has 6 children, ages 8-25. He plants only 1.5 hectares in crops because he is very active as an Evangelical pastor. Livestock holdings include 2 cattle, 4 pigs, and over 50 poultry.



JULIA WARGAS DE LAURA, age 22, she is married to Javier Laura's brother (Javier is a participant in the project) Julia is an active member of the Mothers Club. She grows 2.5 hectares of Pasto Yara-gua. Livestock holdings include 6 cows, 2 pigs, 10 poultry.



RAQUEL CORREA CRUZ, age 22, She has 3 years of school. She is Domingo Correa's brother. Her main activities are cooking for laborers and raising poultry.



FLORA GONZALES DE SACACA, age 23, she is married to Epifanio Sacaca, Flora has 1 year of school. They have 3 sons, age 1-7 years. They own 20 hectares. They grow rice, beans, yuca, potatoes and watermelon.



ALEJANDRINA OMONTE DE CLAURE, age 21
She is married to Eloy Claire
Zurita. She has 3 years of
school. Alejandrina has 3 children
ages 1 to 3. The family does not
have land of their own, Eloy
works as a hired laborer. She
raises poultry.

COMMUNITIES OF EL TORRENTE AND LAS ABRITAS

The communities of El Torrente and Las Abritas share a common border with each other, and their respective centers are only 2 kilometers apart, which is why they have been considered as a single community for purposes of the Traditional Practices Project. Torrente-Abritas is located about 18 kilometers northeast of Portachuelo. The community belongs to the Province of Sara in the Department of Santa Cruz. It is reached by a dirt road which departs from the paved highway Montero-Portachuelo at the Quimorí River and loops around to exit at San Juan de Palometrillas. This access road is completely intransitable during the rainy season, when the Quimorí overflows its banks and isolates the community. Residents generally travel to and from Portachuelo--their principal market center--on foot, horseback, or on motorcycle taxis.

El Torrente has a total of 10 families and 77 inhabitants, with land holdings of approximately 390 hectares. Las Abritas has 17 resident families, 121 inhabitants, and land holdings of 626 hectares. In addition, there exists a transient population of landless families attached to different farms working as laborers. All resident families are natives of the region, and most were born in Torrente-Abritas. Several different forms of land tenure prevail. Some farms are ex-haciendas, others collectively owned properties by different members of the same family, and still others are individual small farms distributed by the Agrarian Reform. In addition, some properties are rented or granted in usufruct to landless families in exchange for labor services. Also common are share-cropping arrangements with former residents (usually members of the same family) who have migrated to Portachuelo or Santa Cruz, or between different farm families residing in the same community. A number of properties are quite large--in excess of 30-100 hectares--but the area actually cultivated tends to be a very small fraction of the total and is conditioned by each family's labor resource availability.

For the most part, the residents of Torrente-Abritas are subsistence farmers. Principal crops include rice, corn, yuca, gourds, beans, peanuts, sugarcane, and sweet potatoes. A variety of fruit trees surround every homestead, particularly plantains, guineo, citrus, and mangoes. Residents also harvest a broad variety of native forest fruits with such names as Achachairú, Ocoro, Pitón, Guayavilla, Ambaiba, Guapomó, Guapurú, and Pacay. Although not very profitable because of its low yields, the primary commercial crop grown by community residents is rice. Most marketable surpluses are sold to buyers on-farm, and almost never do families go to the trouble of transporting their rice to the mills at Portachuelo because of the very difficult road conditions and scarcity of vehicles. In a few in-

stances, however, families of Torrente-Abritas strike deals with local haciendas, agreeing to sell them rice in exchange for tractor services used for land clearing and plowing tasks.

With regard to livestock, the large majority of local households raise very few beef or dairy cattle, and meat is seldom consumed in the community except when an animal dies or when now and then fresh meat is purchased in Portachuelo. The irony is that in the vicinity of Torrente-Abritas a number of large ranches exist. Aside from a few pigs, the typical family's major livestock investment will be poultry. Large flocks of 80-100 chickens are common, and most of the corn grown in the community is intended for poultry consumption. As in other rural communities described previously, sales of eggs and live chickens are a principal activity of women in the Sunday markets, providing an important source of cash income to the farm household.

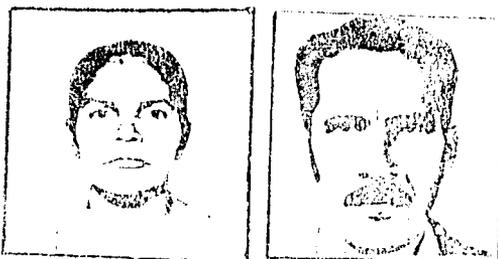
Torrente-Las Abritas has no electricity, telegraph, telephone, potable water, or public health services. Local residents draw their domestic water needs from wells, holding ponds, and arroyos which tend to be quite contaminated. Given the absence of public health personnel, residents depend on family remedies and concoctions to alleviate common disorders. Use of traditional healers or santigueros is widespread also, and not just for human health problems but also to cure crop and animal diseases.

There are two small primary schools in Torrente-Abritas, both offering instruction through the third grade. There is one teacher for each school and 22 and 25 students respectively. Students seeking further schooling must go to Portachuelo. Each community has its own school support committee, but no agrarian syndicate. A corregidor named by the provincial authority is located in El Torrente for local administrative functions. The communities also have two small agricultural cooperatives which were organized to obtain credit and rent machinery; however, production losses have resulted in loan delinquency, and both cooperatives have become inactive.

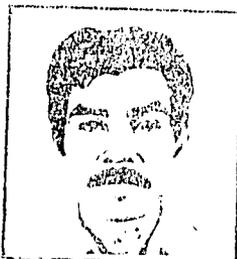
Residents of Torrente-Abritas tend to be quite individualistic. Perhaps because of the dispersion of residents and complete lack of services or public infrastructure (with the possible exception of the tiny schools), there has developed very little sense of community, and self-help projects to develop these two isolated rural districts have been negligible.

Nine male heads of household and eight women from Torrente-Abritas participated in the Traditional Practices Project. In six instances a husband-wife team each kept records. A profile of the participants follows.

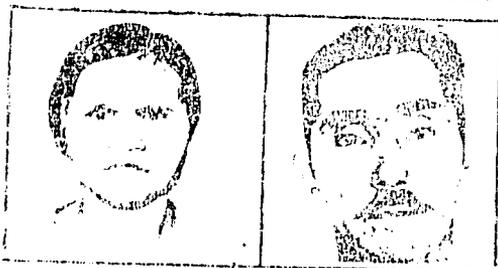
A PROFILE OF PARTICIPANTS FROM EL TORRENTE - LAS ABRITAS



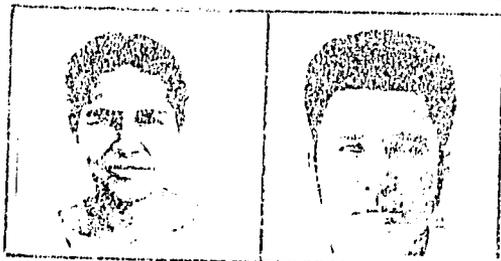
FRANCISCO MEJIA RIVERA, age 42, has served as the supervisor of record-keeping in the community, and his wife LORENZA JUSTINIANO, age 38.



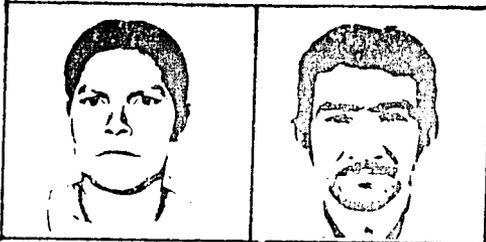
URBANO DUPAN ALPIRE, age 41, and AURORA GUTIERREZ, age 27, have both 3 years of schooling. Their household includes 7 children, ages 3-19. Urbano is Secretary of the Cooperative of Las Abritas. He has 45 hectares of property, but only 3 has under cultivation--in rice, corn, yuca, and fruit trees. Livestock includes 2 cattle and 100 poultry.



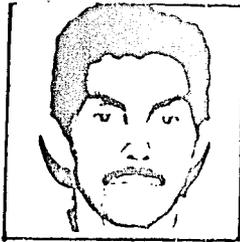
JUSTO JIMENEZ BURGOS, age 51, and his wife MELFI JUSTINIANO HERRERA, age 34, have 2 and 1 year of schooling respectively. They have 4 children, ages 3-6. The family cultivates 2.5 of its 5 hectare property. Livestock includes 1 horse, 5 turkeys, and 40 chickens. Residence: Las Abritas.



JULIAN ALVARADO MERCADO, age 38, and his wife EDITH MENDEZ RIVERA, age 28, have 3 and 2 years of schooling. The couple has 4 children, ages 3-8. The family has 110 hectares in property, but mostly in fallow and pasture. Cultivated crops include rice, yuca, gourds, sugarcane, beans, and bananas. Livestock holdings include 43 cattle, 4 horses, and 15 poultry.



CANDIDO SOLIZ EGUEZ, age 45, and his wife MANUELA MEJIA, age 34, are both natives of Las Abritas with 3 and 2 years of school respectively. Their household includes 11 children and relatives, ages 1-19 years. He cultivates 10 has. of rice, corn, and yuca on a total property of 18 has. His household raises a flock of 75 chickens.



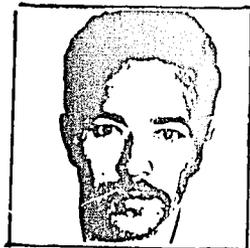
NESTOR DURAN AÑEZ, age 44, has 1 year of school, and his wife LUCIA MENEZ RIBERA, age 36, has 3 years. They have 4 children, ages 3-16. The family comes from Ibañez Province to the south; it rents land in Las Abritas. The household cultivates 8 has. of staple crops and raises 4 horses and a flock of 60 chickens.



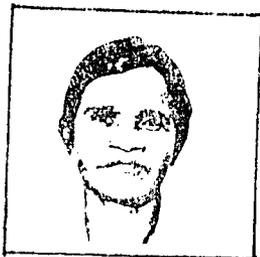
GRISELDO HERRERA NCGALES, age 64, and his wife BLANCA JUSTINIANO age 41, both keep records. Griseldo has 5 years of school, Blanca 2. The family has a property of 15 has., of which 3 has. are planted to staple crops. Livestock holdings include 1 cow, 7 horses, 6 pigs, 90 chickens, and 33 ducks. Residence: El Torrente.



POLICIANO HERRERA, age 65, has 3 years of school. He is married to Martina Morales. Their household includes 10 children and relatives, ages 20-43, all born in El Torrente. The family cultivates 7 has. of rice, corn, has a property of 15 has. Livestock includes 1 cow, 1 horse, and 100 chickens. Policiano is skilled at curing hides.



CARMELO HERRERA MORALES, age 43, has 3 years of school. He lives with his 2 daughters, ages 13-15. The household cultivates 8 has. of staple crops. on a total property of 12 has. Its livestock includes 2 cows, 1 horse 5 pigs. Residence: El Torrente.



ISABEL HERRERA DE JUSTINIANO, age 52, married to Luis Justiniano. She has 2 years of school. They have 10 children. They own 30 hectares, and grow yuca, corn, rice and peanuts. Livestock holdings include 8 cattle and 30 poultry.

COMMUNITY OF PORONGO

Porongo belongs to Canton Ayacucho, Province of Andrés Banaez. It is located about 40 kilometers south of the city of Santa Cruz and is reached by taking the Santa Cruz-Cochabamba highway as far as El Torno, then turning westward on a dirt road to cross the ford of the Piraí River. Porongo lies about 2 kilometers beyond the river.

Porongo is one of the oldest communities in the Department of Santa Cruz. It was founded as a frontier outpost in 1714 to discourage the region's Chiriguayo Indians from not only attacking local settlers but Santa Cruz itself. In 1750 the outpost became a Jesuit mission and for 17 years was operated as a reducción or socialistic Indian reservation. The church built by the Spaniards in Porongo is one of the oldest surviving relics of colonial architecture in Bolivia's tropical lowlands. The community has a large central plaza facing the church, and this is the site of frequent religious celebrations and cultural or civic events. Still, the community has no resident parish priest. Porongo itself is a town of about 350 families with a total population of about 1,700 inhabitants. It rests at the hub of a cluster of smaller settlements and colonization districts with a combined population of about 7,000 inhabitants.

The land around Porongo is characterized by low rolling hills and a number of flat floodplains cut by the Piraí and smaller streams highly prone to flash flooding. The region's virgin timber resources have been fully exploited, so the remaining forest cover consists of scrub and secondary growth. Soils are mostly sandy loam with occasional spots of deep humus which favor diversified cultivation. But Porongo's farmers have chosen to predominantly specialize in permanent orchard crops such as oranges, limes, tangerines, mangoes, avocados, plantains, and bananas. Many farmers have acquired hybrid varieties of citricus from grafts with indigenous stock to produce fruit of superior quality. Fruit harvesting activities occur most of the year. The grading, packing, and marketing of fruit are tasks which are dominated by women. A common practice is for some growers to buy the production of others, which allows for consolidated truckloads. The harvest is purchased not by volume of fruit picked by the seller but by an agreed price per tree and per orchard based on the negotiated estimates of buyer and seller, with the buyer responsible for actual harvesting.

Aside from orchard crops there exists a significant production of yuca, corn, beans, and achiote. Vegetable crops are not common in this area because during the rainy season, which is when vegetables grow best, there exists high risk of intensely cold winds known as surazos that sweep north out of Argentina on a completely unpredictable basis. Corn is commonly grown not in pure stands but in association with other crops, and is used

mainly as fodder for cattle and feed for poultry. Coffee is also grown locally but on a casual, non-technified basis, with production exclusively for home consumption.

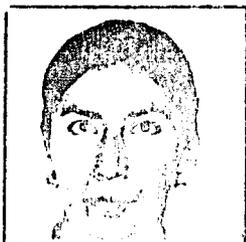
The raising of livestock is rather limited in Porongo, particularly beef and dairy cattle. Most families raise a team of oxen which they principally use not for plowing but to haul carts, which is the major form of transport in the community. Most farms also have a horse or two, sometimes 8-10 pigs, and a large poultry flock. Cattle ranching on a commercial scale is limited to families with the largest properties and who have an ample supply of pasture. The range in land holdings in Porongo is quite broad, extending from one hectare farms up to about 300 hectares. The average holding is about five hectares, which helps explain the predominance of fruit orchards and the limited livestock operations. Absentee ownership of land is quite prevalent in Porongo since many local families have migrated to live in Santa Cruz. The smallest holdings are those of newcomers, most of whom arrived as migrant laborers from the interior provinces and who have worked and saved enough money to buy a plot of land on which they can subsist.

It bears mentioning that Porongo residents earn additional cash income from a variety of sources. Some women specialize in weaving baskets, bags, and mats from palm leaves. Others make candies and marmelades involving sugarcane juice, honey, or fruit. Families living near the rivers earn extra cash by washing and grading gravel.

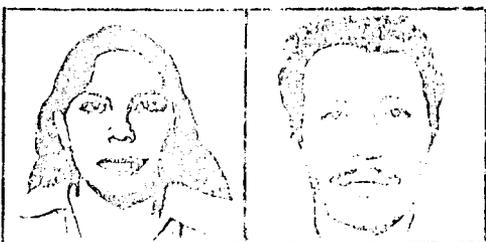
Porongo has two schools which provide primary or secondary education to some 480 students from both local families and surrounding communities. Still, a large number of school-age children do not attend school, and illiteracy remains quite high. A few families send their children to study in Santa Cruz. Porongo has a small health post staffed by a paramedic, but most residents prefer the health services offered in the city. Services of potable water and electricity are available to residents of the central part of town; these are provided by a municipal cooperative. The community also has several pay telephones for communication with Santa Cruz. During the dry season, Porongo enjoys scheduled passenger transport service and frequent truck traffic between the community and the paved highway at El Torno or to the city. However, in the rainy season the Piraf River becomes a dangerous torrent, and frequently Porongo has been isolated for days and weeks by these floods. Each year buyers and sellers of orchard fruit are faced with high-risk gambles that whole truckloads of their fruit will not end up rotting on the community side of the river. Also every year there are cases of vehicles and people who have been lost attempting to cross the Piraf during high water periods.

Porongo has a mayor, public security officer, notary, and two somewhat defunct agrarian syndicates. The community also has three mothers clubs, two parent-teacher associations, a pro-church committee, sports clubs which have produced a number of professional athletes, and several well-known musical and dance groups. Porongo is an eminently Catholic community.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF PORONGO



FEYNELDA MELENDREZ, age 32, has served as the supervisor of record-keeping for both the communities of Porongo and Forestal.



PERFECTO SORIA TERRAZAS, age 34, and RITA CORONADO GUEVARA, age 29, both kept farm records. Perfecto has 4 years of school and Rita has 6 years. They have four children, ages 1-8 years. The family has 4.8 hectares mostly in fruit orchard, with small plots of potatoes and yuca. Their livestock includes 1 horse and 50 chickens.



FRANCISCO TERAN PANIAGUA, age 55, and JUANA LEON VACA, have 6 and 3 years of schooling respectively. Their household includes 4 children, ages 9-23. The family has 10 has., planted to citrics, and subsistence crops. They raise 2 oxen, 2 pigs, and 25 chickens.



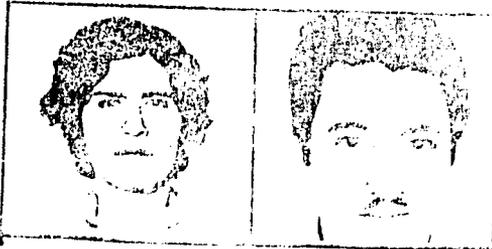
EUMUNDO SAAVEDRA GUTIERREZ, age 39, and ADELAIDA MORALES AURO, 32, have 7 and 3 years of schooling respectively. They have 5 children, ages 4-11. The family cultivates yuca, beans, corn, and sugarcane. Its livestock includes 15 chickens.



PRUDENCIO MOLINA OSINAGA, age 55, and GREGORIA JUSTINIÑO GACHO, age 43, both kept farm records. Prudencio has 4 years of school, Gregoria 7 years. They have 11 children, ages 4-26. The family has a 5 hectare farm planted to fruit orchard and subsistence crops of yuca, beans, and corn. They also raise a flock of 25 chickens. The family has an old truck, buy and sell fruit, and provide transport services.



OCTAVIO SAAVEDRA GUTIERREZ, age 51, has 6 years of school. He is married to Hilda Amaya Ribera. They have 5 children, ages 15-21. The family cultivates corn, yuca, sugarcane, and coffee. Its livestock includes 4 cattle, 1 horse, 1 pig, and 54 chickens.



ZENON SORIA TERRAZAS, age 39, and his wife LUZ CABRERA VALVERDE, age 39, both have 2 years of schooling. They have 6 children, ages 5-16. The family has 4 properties totaling haz., buys and sells cattle and fruit. The family raises 1 pig and a flock of 100 chickens.



ADRIANA SUAREZ DE VACA

SUSANA VERA DE SORIA

COMMUNITY OF FORESTAL

The community of Forestal is located about 55 kilometers southwest of the city of Santa Cruz. It belongs to Canton Ayacucho, Province of Andrés Ibanez, several kilometers up the Pirafí River further west from Porongo. To reach the community one takes the Santa Cruz-Cochabamba highway as far as the Espejos crossing, then follows an unpaved road in a westward direction for 14 kilometers during which it is necessary to ford both the Pirafí as well as make repeated crossings of the Quebrada del León. Forestal has about 65 families and 450 inhabitants. It lies at the center of a colonization region of ten smaller settlements and a total population of about 3,500 inhabitants. Population estimates are imprecise because of the many squatters and transient agricultural laborers in the region.

Forestal gets its name from the rich virgin timber resources which once characterized the zone. In the 1950's logging rights were purchased by the Bartos Company, which took little more than a decade to exhaust the timber supply. By 1963 four families had followed the Bartos logging road into Forestal and settled there. The following year a colonization of 34 families sponsored by a congregation of Dominican nuns settled in the community. The nuns were successful in obtaining from the Government a land grant of 30,000 hectares, of which 6,000 were eventually distributed to colonists in Forestal and the remainder sold or donated to settlers of the surrounding communities. The first colonists were natives of Samaipata and Valle Grande (two "interior" provinces of the Department of Santa Cruz), but the subsequent pioneers came from the Highland departments of Chuquisaca, Potosí, and Oruro. Earnings from land sales were reinvested by the nuns in community projects. In 1969 the first school was built. Two years later there was a health post. Gradually resident families began to abandon their primitive palm thatched huts for brick-walled homesteads with corrugated tin roofs. Today the community offers an image of permanence and modest prosperity.

The topography of Forestal consists of gentle to steep slopes with a few strips of bottomland made exceptionally fertile by annual silt deposits from the flood season. The community occupies a curved valley, is fairly well-protected from the surazos, enjoys a mild climate, and offers opportunities for year-round cropping. The agriculture of Forestal is quite diversified. Fruit crops are a principal commercial activity and include citrics, mangoes, avocados, plantains, and bananas. Field crops include potatoes, tomatoes, yuca, corn, green vegetables, beans, chili peppers, rice, sugarcane, watermelons, and coffee. Although farm holdings range from as little as one to over 100 hectares--with some residents having properties in different communities--the average farm is about 25 hectares, of

which seldom more than five hectares are cultivated at any one time.

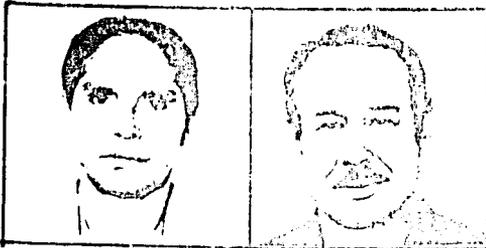
Livestock raising in Forestal include dairy and beef cattle, pigs, horses, and moderate to large flocks of poultry. Animal products such as milk, cheese, and eggs are predominantly destined for family consumption. Most corn grown in Forestal goes as fodder for cattle for feed for poultry. The area in improved pastures is gradually expanding as herds expand. Yet, slaughtering a steer remains an infrequent event, and meat consumption in the community is low. In addition to livestock, a number of families located near rivers earn extra income from the washing, screening, and grading for sale of sand and gravel. Other residents earn cash by making caustic lime from nearby limestone deposits..

Forestal has a joint elementary and secondary school with a combined enrollment of 380 students taught by 12 teachers. It is noteworthy that the majority of students come from neighboring communities, and some children must walk as many as 15 kilometers a day. In 1981 a vocational agriculture school was initiated in Forestal with 60 students and four volunteer instructors. The community health post is open seven days a week and is staffed by nuns. The clinic also sponsors vaccination campaigns. Since the quality of its service is exceptional by Bolivian standards, the clinic attracts a very large number of users from both within and outside the district. Forestal does not have potable water. However, many residents have wells with manual pumps installed in recent years with the assistance of the regional development corporation. Neither does the community have electric service. And finally, there does not yet exist scheduled transport services because Forestal's access road is not an all-weather route due to both frequent river floodings and the extremely slippery nature of the road itself following any rain.

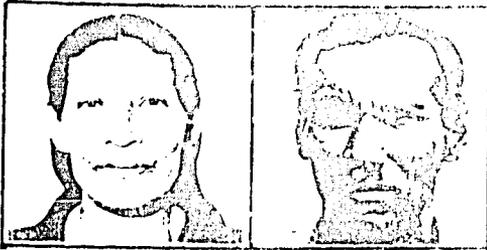
Forestal is politically represented by two agrarian syndicates. The community also has municipal authorities, namely a corregidor and a canton representative who are responsible for tax collections and settlement of disputes. Also, there exist three parent-teacher associations and a community development committee. Cultural and sporting activities in Forestal are organized on an informal basis. The majority of Forestal residents are Catholics, but the community still does not have a priest; the closest mass can be heard at El Torno, where there is also a market day every Sunday. Community festivities are fairly rare in Forestal, but celebrations at the level of individual families are quite common.

Participants in the Traditional Practices Project from Forestal were six male heads of household and eight women. In five cases both husband and wife of the same household kept records. A profile of the participants follows.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF FORESTAL



LUIS MARTINEZ ALVAREZ, age 53, and his wife EUSEBIA ARTEAGA CONTRERAS, age 44, were among the earliest settlers of Forestal. Luis has 6 years of school and Eusebia has 3. They have 7 children, ages 13-23, including one son attending the university. Luis is the corregidor of Forestal. The family specialize in livestock, raising over 50 head of cattle, 11 pigs, 45 chickens, pigeons, ducks, and 2 horses.



SIXTO BANEGAS LIJERON, age 47, and his wife FRANCISCA VACA MENDOZA, age 43, have 5 and 4 years of school respectively. They have 12 children, ages 1-25. The family plants rice, corn, yuca, tomatoes, coffee, and citrics; additional income is made washing gravel. Livestock includes 2 cows, 3 pigs, and 30 chickens.

CRESENCIO COSIO RIBERA, age 41, and VIRGINIA DURAN PARDO, 34, were early settlers at Forestal. They have 4 and 2 years of schooling respectively. The couple has 4 children, ages 6-14. Main crops grown are citrics, yuca, potatoes, and vegetables. Virginia also runs a small store. Livestock includes 6 cattle, 2 pigs, and poultry.



MARCOS VALVERDE VIANCO, age 41, and his wife TEOFILA CASTRO AVILA, age 23, are natives of Santa Cruz Dept. They have 4 children, ages 1-9. Marcos has 4 years of school and Teofila has 2 years. Their principal crops are citrics, yuca, guineos, tomatoes, potatoes, and beans. Livestock includes 1 horse, 10 pigs, and 50 chickens.



REMBERTO VARGAS HURTADO, age 53, and his wife MELVA SORIA SURITA, age 44, are natives of Santa Cruz Dept. Remberto has 7 years of school and Melva has 6 years. The couple has 8 children, ages 4-26. The family cultivates almost all the different crops seen in Forestal, and has 30 hectares of improved pasture. Livestock holdings 17 cattle, 1 horse, 1 pig, and 75 poultry.



FABIAN ARICOMA RAMOS, age 45, is a native of Chuquisaca. He has no formal schooling. He is married to Clementina Corchado Bejarano. They have 6 children, ages 3-16. The family specializes in citrics and vegetables and is one of the first to use pump irrigation. Livestock includes 6 cattle, 12 pigs, and 40 chickens.



MELANIA BANEGAS DE VACA



RUFINA PINTO DE VACA



MARGARITA AGUILERA DE MORALES

CHAPTER II.

GENERAL ASPECTS OF AGRICULTURAL ACTIVITY

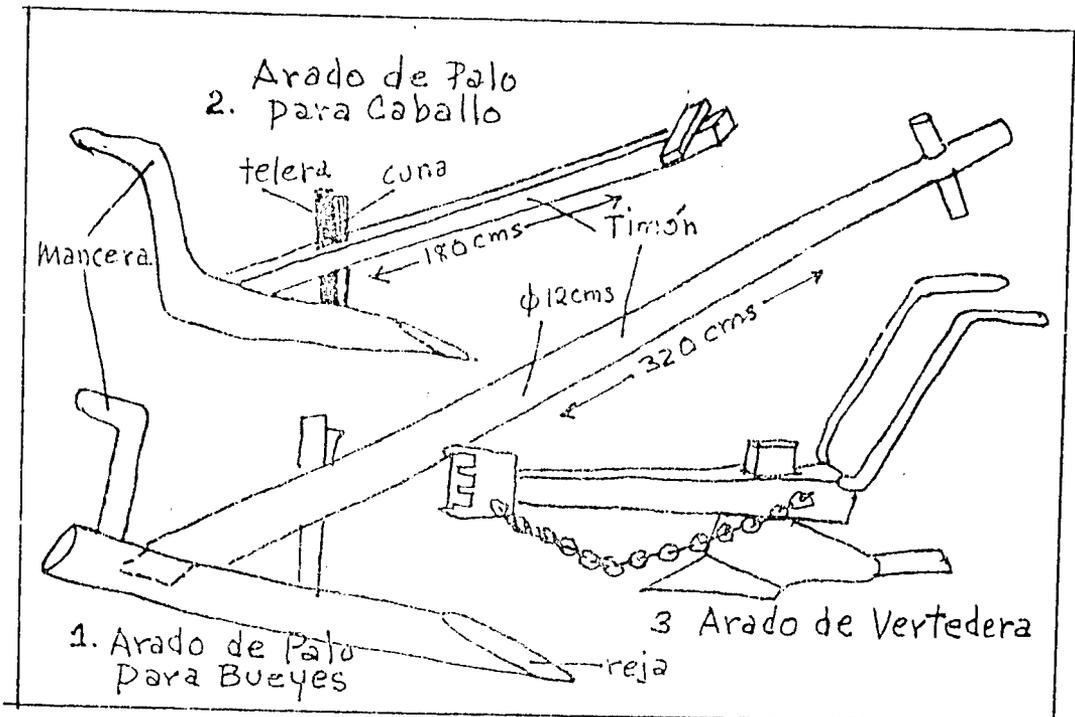
In this chapter are presented a variety of subjects which effect agricultural activities of rural households in critical ways, but seem best understood in a general context rather than as part of the chapter on crop-specific practices.

We begin with a description of the principal farming tools used to clear land, plow, plant, cultivate, and harvest. Next comes a section on basic storage structures for grain crops. This is followed by a review of weights and measures used at different stages of the crop cycle. We then proceed to discuss aspects of rural marketing, including case histories of products bought and sold by rural women. These experiences lead naturally into a description of the activities of the rural housewife. The next to the last section covers different patterns of farm holdings and land use from one community to another, including farm maps of representative growers. The chapter concludes with a brief review of moon beliefs as they relate to the scheduling of different farming activities.

FARMING TOOLS

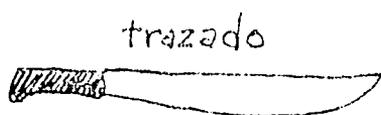
PLOWING IMPLEMENTS

Most small farmers of the tropical lowlands have sooner or later hired tractor services to conduct land preparation tasks for at least a portion of their areas cultivated. Still, there are plots of land too steep, too small, or too cluttered with tree stumps to justify mechanized plowing. So most rural households continue to use one or more of their traditional plows, of which there are three types: (1) ox-drawn wooden plow, (2) horse-drawn wooden plow, and (3) horse-drawn steel moldboard plow. The dimensions and names of different parts are illustrated below.



LAND CLEARANCE TOOLS

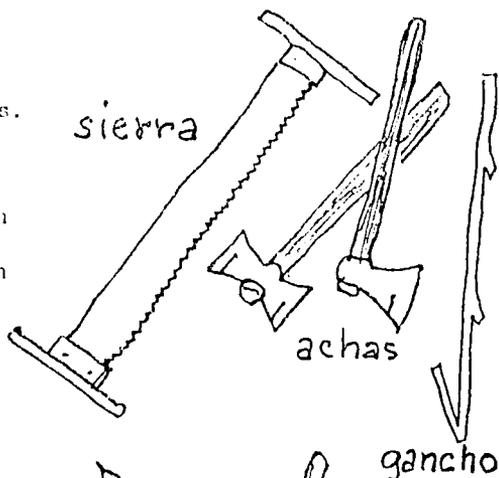
For heavy clearance tasks, the farmer requires AXES and SAWS for cutting down trees and stripping their branches. For lighter clearance tasks, the preferred tools are the MACHETE (trazado) and HOOK (gancho). The latter enables the farmer to bend down grass and brush with one hand so that it can be cut cleanly with the machete. A third brush cutting tool is the SICKLE (joza).



trazado



joza



sierra

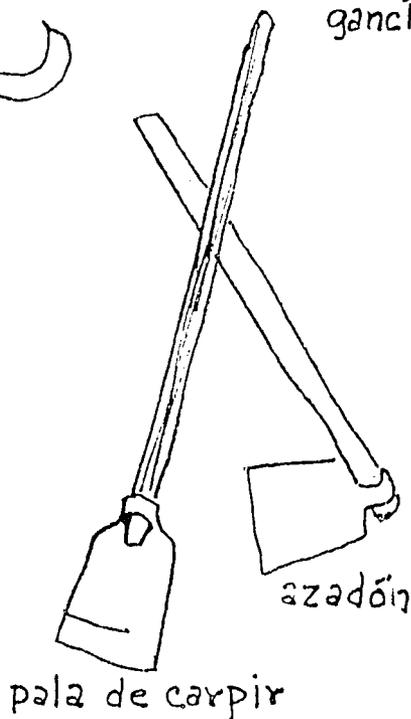
achas

gancho

WEEDING TOOLS

For cutting and uprooting grasses and weeds the preferred tool is the WEEDING SHOVEL (pala de carpir). Of nearly equal weeding effectiveness is the traditional HOE (azadón). However, when simple weeding is combined with the hilling task (in corn, peanuts, tomatoes, peppers, etc.), the hoe is preferred.

Both these tools are also widely used to prepare the soil for planting and transplanting activities. The hoe is appropriate to dig shallow basins for yuca, sugarcane, watermelon, and other seeds which are not planted in seed holes or furrows. The pala de carpir is used to dig square holes for transplanted seedlings such as citrus.



pala de carpir

azadón

PLANTING TOOLS

Most crops in the tropical lowlands are not planted in furrows. Rather, they are planted in seedholes. These seedholes are made with DIGGING STICKS of variable size known as punzónes, which are carved from hardwood and sharpened to a point. Some points are flat, others are rounded, while still others have a broad pointed head that serves as a counterweight and creates a wider seedhole. For planting (transplanting) vegetable crops such as tomatoes and peppers, there is a hand-held digging stick.

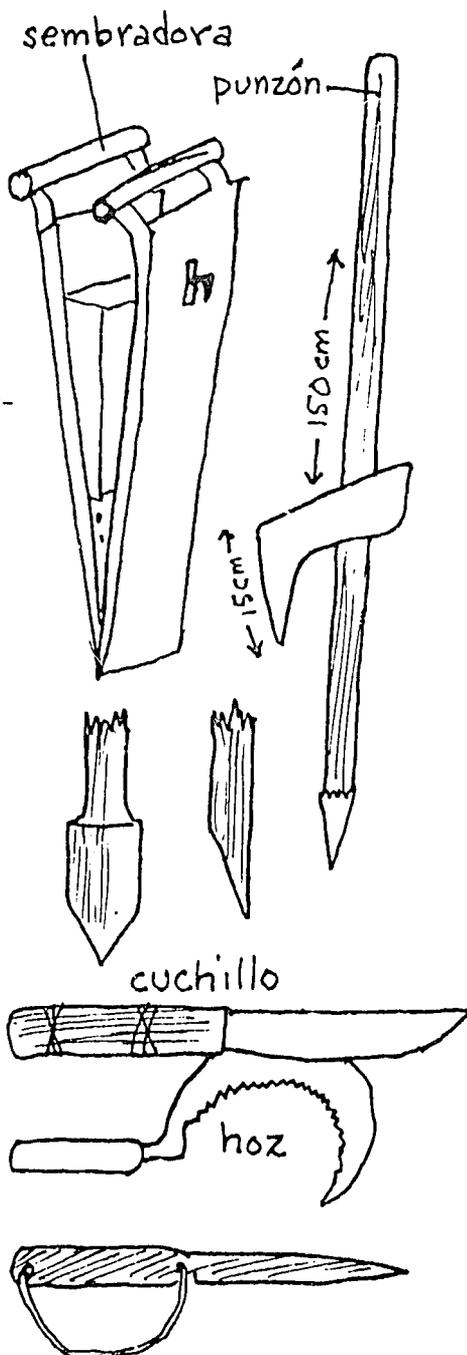
Some farmers are beginning to use mechanical planters. This device was designed by Mennonite settlers. It opens the seedhole and delivers the seed--several grains at a time--with a single blow. It is most commonly used to plant rice, corn, and beans.

GRAIN HARVESTING TOOLS

KNIFE (cuchillo) for harvesting rice. This is a homemade knife with a wooden handle bound by nylon to a metal blade. The rice panicles are cut individually, each with about 5-6 cms. of stem.

SICKLE (hoz) for cutting rice plants, harvesting grass for fodder, and occasional weeding tasks.

HUCK STRIPPER (lipina), a wooden knife used to strip husks from ears of corn

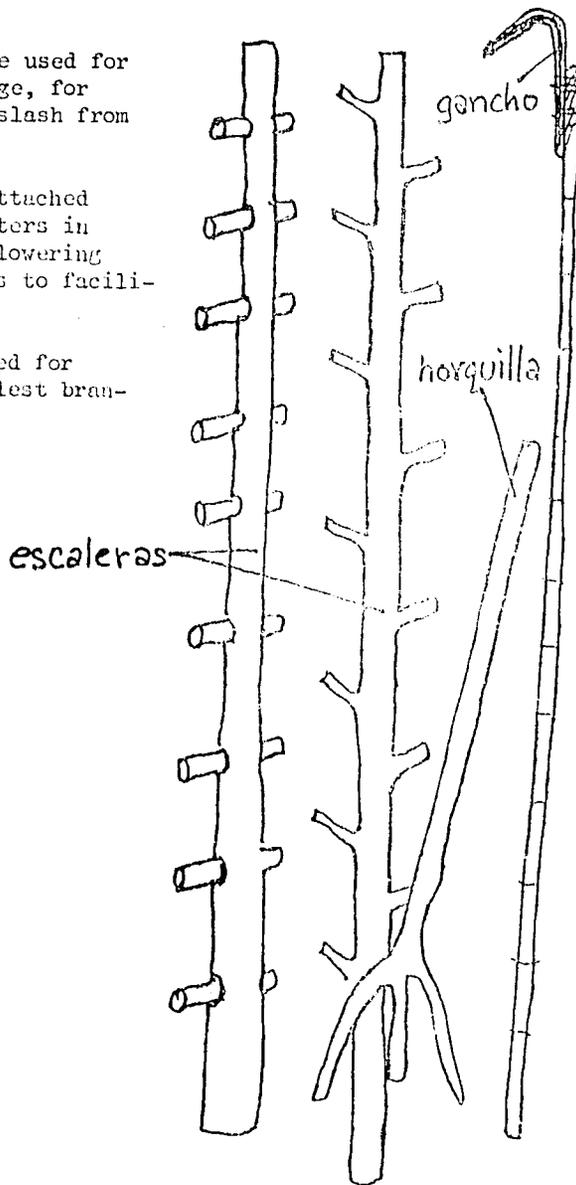


ASSORTED OTHER TOOLS

PITCHFORKS (horquillas) are used for turning over rice in storage, for burning crop residues and slash from land clearance.

LONG HOOKS (ganchos) are attached to the end of poles 2-3 meters in length which are used for lowering the branches of fruit trees to facilitate picking.

LADDERS (escaleras) are used for picking fruit from the tallest branches.

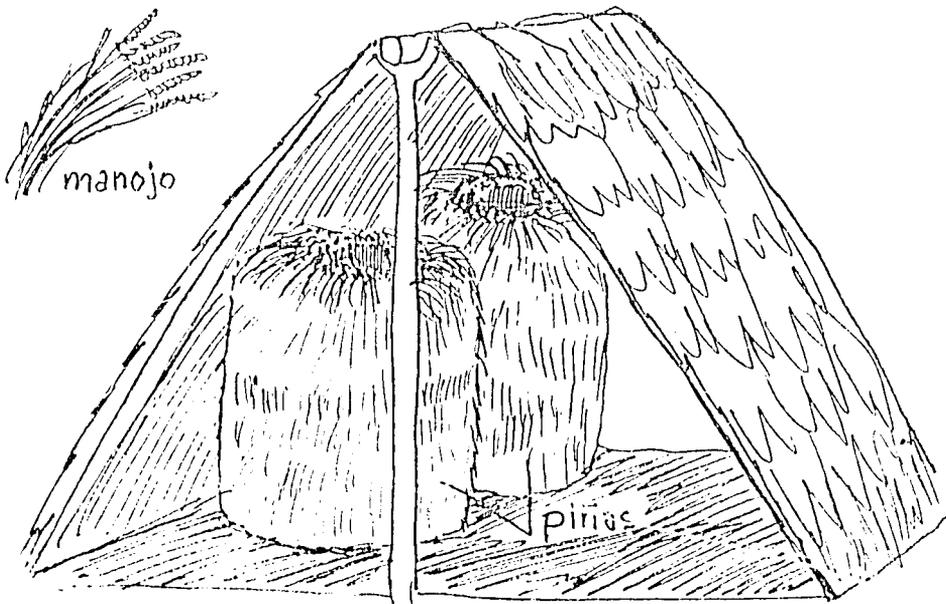


GRAIN STORAGE STRUCTURES

RICE

Rice is harvested by cutting each head of grain (panicle) along with about six inches of stem. The harvester continues to cut and hold stems until he has a fistful or manejo. Before these manojos can be stored for long periods of time they should be thoroughly dried. Sun-drying works during the day, but at night the grain must be stored away from dew and underneath a shelter that will protect it from the rain.

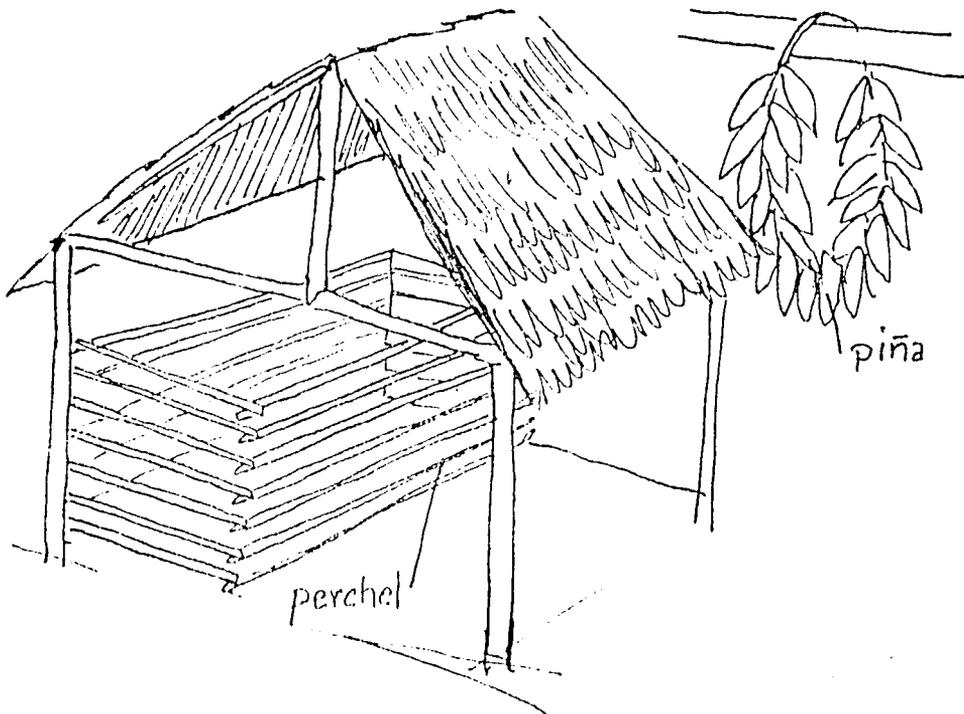
There are two air-drying methods within the rice hut. The first is to simply pile the rice on one or both floors of the rice hut. The grain must then be turned over every few days to keep it drying evenly. The second method consists of piling the rice in a circular pile known as a piña (literally "pine-apple"). The piña is constructed so that the grain heads (panicles) are on the inside of the pile while the cut ends of the stems face out. More precisely, the piña resembles a ring or donut with a hole in the middle for air to circulate freely from the top to the bottom of the inside of the pile.



CORN

Unless the grain is being harvested for immediate market sale (in which case it will be shelled), corn is always stored on the cob and unhusked. Keeping the ears and husks intact discourages moths and borers and helps minimize rotting. Nonetheless, the ears must be stored in such a way that they are exposed to air movement. There are two ways to accomplish this. The first is to build a perchel or corn crib. It is built of slats on all four sides and, of course, located under a roofed shelter to protect it from the rain.

The second method is to knit the ears of corn together, by pairs, and hang them from a wire, ceiling rafter, or elevated frame (paujero). Corn is also stored in clumps or balls made from rope slings. These too are known as piñas.



WEIGHTS AND MEASURES

In this section will be reviewed the different units of measurement employed by rural families in the tropical lowlands region. These measures will be described in accordance with the different stages of the agricultural cycle to which they are applied.

UNITS OF MEASUREMENT USED IN LAND PREPARATION

The endless task of land clearance or chaqueado makes it necessary for farmers to use linear measurements of land area to determine the number of labor days required, estimate machinery costs, etc. The basic unit for such calculations is the meter. This unit is roughly calculated as equivalent to the length of an adult's single pace or the length of the handle on certain farm tools. From this unit is derived the square meter (metro en cuadro), which is the standard unit for measuring land areas to be cleared, planted, cultivated, and harvested, as follows:

<u>Tarea</u> (task)	= 1,000 M ² = an area of land 10 meters wide by 100 meters long
<u>Hectare</u>	= 10,000 M ² = 10 tareas
<u>Cuarto</u>	= 2,500 M ² = 1/4 hectare
<u>Medio Cuarto</u>	= 1,250 M ² = 1/8 hectare

UNITS OF MEASUREMENT USED IN PLANTING AND CULTIVATING ACTIVITIES

During this stage one most commonly hears references to standard dry measures such as the kilo (1,000 grams), libra (pound), and onza (ounce) for calculating quantities of seed, fertilizer, and powdered insecticides. For liquid measures of insecticides and herbicides the most common measures are litro (liter), botella (bottle), frasquito (small flask), and cucharadas (spoonfuls). For measuring quantities of water required for mixing agrochemicals in backpack sprayers, the most common units are latas (tins), galones (galons), baldes (buckets), ollas (cooking pots), and turriles

(cylinders). It is nearly impossible to assign standard metric equivalents to most of these units because they are quite variable. Most farmers approximate them with, as a local saying goes, "the eye of a cooper (wheelsmith)" al ojo del buen cubero.

UNITS OF MEASUREMENT USED IN HARVESTING AND MARKETING

In passing it deserves mention that when farmers harvest commodities only for family consumption they never weigh them. The sole exception to this rule is when they have contracted hired labor and have agreed to pay in kind--for example, one arroba of rice for every four arrobas harvested. Weighing of commodities, then, is only done when the products are to be sold. In such cases the predominant measures are the arroba, quintal, and fanega. However, there are also more traditional measures still widely used such as the almúd, azayes, and quiboro, as follows:

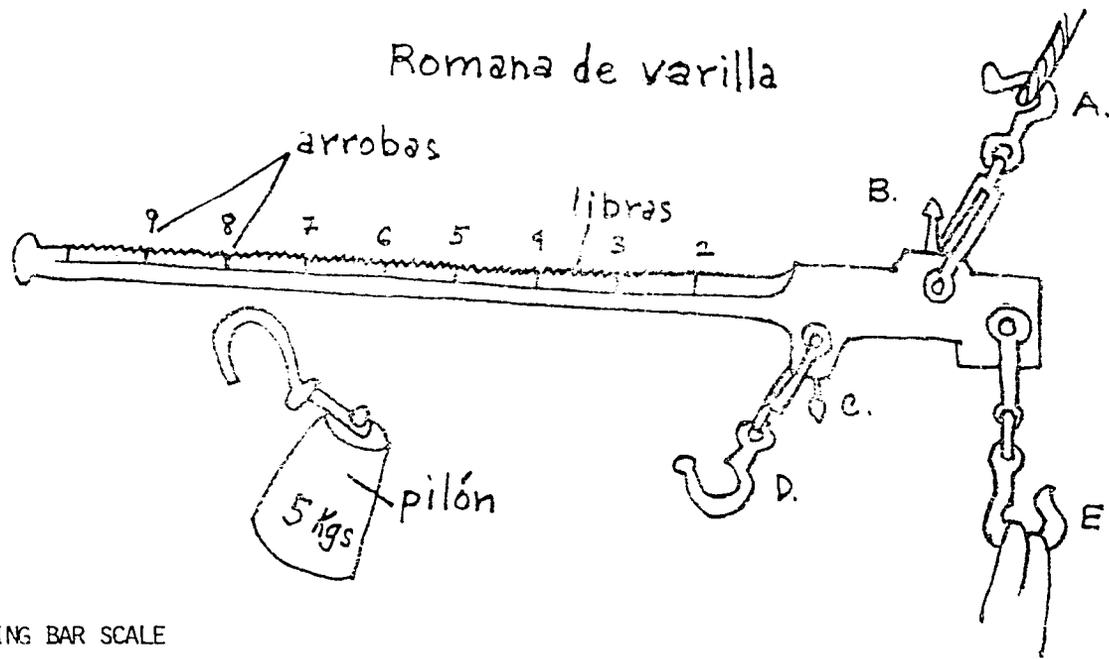
<u>Arroba</u>	= 25 pounds
<u>Quintal</u>	= 100 pounds = 46 kilos
<u>Fanega</u>	= 400 pounds = 4 quintales = 16 arrobas
<u>Almúd</u>	= 32-34 pounds; 12 almudes = 1 fanega

The almúd is a square wooden box 30 cms by 30 cms by 30 cms deep. All the above weights apply to recently harvested (i.e. still humid) unhusked rice. But when rice has been milled the following equivalences exist:

1 fanega of husked rice	= 200 -250 pounds (2 to 2.5 quintales) depending on the quality of the rice
	= 5 quintales of unhusked rice

When we go from rice to other crops, the almúd equivalences change:

1 almúd of shelled corn	= 40 pounds
1 almúd of unshelled peanuts	= 10-11 pounds
1 almúd of coffee berries (<u>café guinda</u>)	= 4 small <u>azayeses</u> (baskets)
1 almúd of wet coffee	= 32 pounds
1 quiboro	= 14-16 pounds



HANGING BAR SCALE

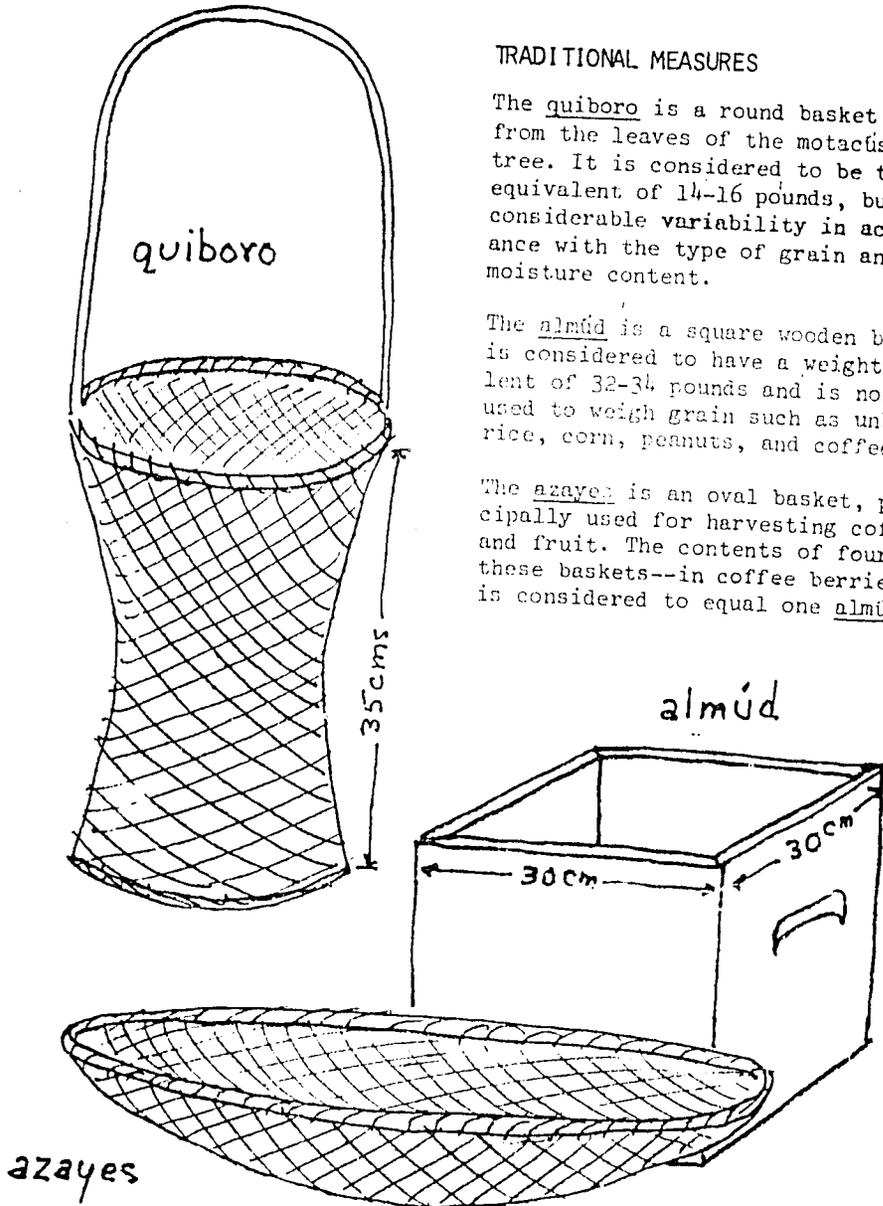
When crops are weighed in libras, arrobas, or fanegas, the weighing instrument is nearly always the hanging bar scale or romana de varilla. The scale accomodates weights up to 10 arrobas (250 pounds). The bar itself is divided into ten arroba segments. Between each are 25 notches, each corresponding to a pound. The scale can be used for both wholesale transactions (see hook A and pointer B) or for retail transactions (hook D and pointer C). Hook E is used to hold up the sack being weighed, or the rope sling in which the sack is placed for weighing. The pilón or counterweight is used to pre-select the desired weight for a weighed unit. Let us assume the sale is to be made in units of 100 pound sacks (= 1 quintal or 4 arrobas). Then add 2 pounds for the tara or empty weight of the sack, or 102 pounds in total. The sack is weighed and balanced until the frame over the wholesale pointer (B) is vertical. If the frame hangs to the right (bar hanging down) the sack is underweight, and more grain must be added until the exact balance is achieved.

TRADITIONAL MEASURES

The quiboro is a round basket made from the leaves of the motacús palm tree. It is considered to be the equivalent of 14-16 pounds, but with considerable variability in accordance with the type of grain and its moisture content.

The almúd is a square wooden box. It is considered to have a weight equivalent of 32-34 pounds and is normally used to weigh grain such as unhusked rice, corn, peanuts, and coffee.

The azayes is an oval basket, principally used for harvesting coffee and fruit. The contents of four of these baskets--in coffee berries--is considered to equal one almúd.



MARKETING

The biggest challenge facing small farmers of the tropical lowlands is not how to grow food. With or without modern technology, with or without adequate capital and labor resources, and despite sometimes highly unfavorable weather, pest, and weed conditions, virtually all rural households are consistently successful in producing enough crops and livestock to meet their subsistence needs. And beyond subsistence, they usually grow considerable surpluses.

Instead, their biggest obstacle is marketing produce. On a week to week basis, the rural household must successfully sell enough farm produce--eggs, chickens, cheese, yuca, fruit, wild game, or whatever--to generate the cash it needs to purchase subsistence supplies that cannot be produced on the farm: noodles, sugar, kerosene, cooking oil, etc. This constitutes the family's short-term marketing imperative. Sales are on a small scale, and the income generated usually matches almost precisely the family's market purchases plus the cost of transport to and from the market.

But no matter how subsistence-oriented the rural household, to survive it must also raise enough cash income--on a much larger scale--to finance major production costs: tractor services, hired labor, bags and boxes, tools, and sometimes agro-chemicals for fumigating and fertilizing. These requirements place a far more difficult marketing burden on the rural household.

In the following pages are described the marketing experiences of different rural families. They cover different communities, a wide variety of crops or sale commodities, and distinctly different marketing strategies. But the one common denominator underlining all experiences is the riskiness of marketing operations. The scarcity of transport services, their relatively high charges for cargo and passengers, rapidly changing market prices, and deteriorated road conditions during the rainy season---these are some of the major reasons preventing rural households from converting more of their hard-earned production into increased income.

But before reviewing individual selling experiences, it is first appropriate to review marketing conditions in general on a community by community basis.

MARKETING IN NARANJAL AND VALLE HERMOSO

The principal crops grown in these two communities are rice, corn, peanuts, yuca, and citrics. During the winter season (May-August) small amounts of vegetables are produced: mainly potatoes, tomatoes, and chili peppers. But since this region is highly effected by both droughts as well as the cold winds known as surazos, crop lots are very small--a "spot" (mancha), a furrow (surquito) there--such that production seldom exceeds family consumption needs. Most families in these communities have a few trees of plantains, guineos, and citrics; however these crops are seldom sold. Pineapples and watermelon production have made their appearance among a few farmers, but their example has not been more widely imitated by their neighbors because these crops require intensive disease control and agro-chemical investments.

To sell their rice, corn, and yuca, farmers weigh these commodities with hanging bar scales (romanillas de varilla) measured in arrobas (25 pounds) and quintales (100 pounds). The products are bagged in jute or plastic sacks provided by the seller. Rice is sold husked, and the principal buyers are the rice mills located outside of the market town of Comando. Corn is sold shelled (desgranado), as are peanuts, and yuca is sold pre-selected by size. These latter commodities are usually sold in quantities of a quintal or less to intermediaries at the Comando market but seldom retailed directly to consumers. Some families in both Naranjal and Valle Hermoso operate as revendedores (intermediaries). They buy from their neighbors as well as other farmers arriving at the Sunday market, then resell to truckers who purchase in wholesale quantities, or sell to wholesalers in Santa Cruz.

Transport services are scarce for residents of Naranjal and Valle Hermoso. Neither community is directly served by public transportation. To arrange for the hauling of their marketable surpluses--particularly rice, which is the only crop sold in large quantities--farmers must travel to neighboring colonizations to strike contracts with other farmers or friends who own trucks, or negotiate service from known truckers based in Comando. Lacking adequate bulk transport, many families have no alternative but to reduce the volume to be sold so it can be carried by someone on foot or by bicycle. When the sale of a major crop is conducted, it is usually the male head of household who conducts the transaction. However, commodities sold in small quantities week to week--particularly eggs, cheese, chickens, and peanuts --are almost invariably the housewife's responsibility.

MARKETING IN EL TORRENTE-LAS ABRITAS

In these two communities, located side by side, their resident families principally grow rice, corn, yuca, some sugarcane, plantains, guineos, oranges, coffee, beans, peanuts, and also harvest some wild fruit on a seasonal basis. The only commodities sold on a large scale are rice, corn, and yuca. The units of measurement for sales transactions is usually the fanega (400 pounds) or the almúd (32-34 pounds) in the case of rice and corn. Yuca is sold by quintales (100 pounds) and arrobas (25 pounds) for most transactions; however, occasionally it happens that yuca will be sold by truckloads of 150-160 arrobas (3,750-4,000 pounds). Weighing is done with the hanging bar scale. Products are normally bagged in polyethylene sacks.

Farmers from El Torrente and Las Abritas rarely sell their commodities to the market towns of Porachuelo or Montero, or to Santa Cruz. This is because there is no public or private bus or truck with scheduled service to these two communities. Moreover, road communications into the area become completely impassable during the rainy season. Other than travel by foot or on horseback, the only transport readily available to local residents is the motor-taxi (motero) or the bicycle. As a result, for large-scale transactions of rice, corn, or yuca, the usual buyers are large landowners with properties bordering the community. These hacendados often provide machinery services (plowing, harvesting, and threshing) in exchange for payments in farm products.

Small-scale transactions involving peanuts, coffee, sugarcane, citrics, poultry, eggs, and plantains are generally conducted between local residents at prices far below those prevailing in regional markets. In Torrente-Abritas women participate very little in marketing activities. The majority devote most of their time to housekeeping, drying products, taking care of minor livestock, and--for a few hours here and there--assisting with harvest tasks.

MARKETING IN PORONGO AND FORESTAL

In these two communities the panorama changes completely. For here the marketing tasks receive greatest importance. Because of the relative proximity of both communities to Santa Cruz (35-40 kilometers distant), families often make several marketing trips per week during harvest periods. Porongo, in particular, is primarily a community of fruit growers. Because farm size is small, most properties are almost totally devoted to fruit orchards: mangoes, avocados, limes, tangerines, oranges, grapefruit, guineo, and plantains. In addition to selling their own production, many families in Porongo

also buy the fruit production of neighboring communities. Such crops are purchased by cortes wherein the buyer, for an agreed fixed price, purchases the entire production of one or more trees; in this case the buyer must also incur all costs of harvesting and transporting the fruit. Consolidating purchased fruit with their own production, these fruit growers select, package, and ship entire pick-up truckloads of fruit--hiring a vehicle for the entire day and selling from the tailgate at Las Ramadas market in Santa Cruz. Tangerines and mature plantains or guineos--because they are so easily damaged--are packaged for transport in large hamper baskets, and subsequently sold by basketloads as well. Plantains are sold by the racimo or stem. Citrics and other fruit are normally sold by cientos or 100 fruit units. Fruit sales in the Santa Cruz market by Porongo growers are usually transacted on a wholesale basis. For example, without identifying high from low quality fruit, or large from small, the whole basketload or the entire bag of 100 is sold at a specified price, a system known as selling de canto or de punta.

For most of the year Porongo growers do not face a serious transportation problem because several pick-up trucks are based in the community and make the trip to Santa Cruz at least once a day. However, Porongo is separated from the paved Santa Cruz-Cochabamba highway by the Piraí River, which becomes impassable following a heavy rain. During the rainy season the river can remain flooded for weeks. When the river is high the only way to get passengers and freight across is by cable car, which is slow and costs more than the fare from the river to Santa Cruz. As the water level recedes, but is still too high for motor vehicles to pass, growers often transport their produce across the river by ox-cart.

As for non-fruit products, residents of Porongo sell limited quantities of yuca, rice, corn, and coffee to the market in Santa Cruz. They usually sell to established buyers whom they have dealt with for years; these are known as "sure buyers" or caseras.

The families of Forestal have much more land than the residents of Porongo. This allows them the advantage of a more diversified farming pattern which includes dairy and beef cattle. Thus, in addition to grain, vegetable, and fruit crops, Forestal's residents sell considerable amounts of cheese as well as other animal products such as eggs, poultry, and pigs. Unfortunately, Forestal is far worse off than Porongo when it comes to transportation. The community is served by only two trucks per week on a scheduled basis, provided the 15 kilometer access road is dry. But to reach Porongo the trucker must cross both the Piraí River (which presents the same problems as with Porongo) as well as the Quebrada El León, which must be forded in five different locations. Because of their transportation constraint, residents of Forestal do not initiate the harvest of a particular crop until they have contracted for a truck to transport it. Under such circumstances it is not uncommon to find a family harvesting a crop at night in order to meet a transport deadline early the following morning.

MARKET DAY AT COMANDO (VILLA BUSCH)

Of the rural families who participated in the Traditional Practices Project, those from Porongo and Forestal usually do their weekly marketing and buying of supplies in the city of Santa Cruz, which is only 35-40 kilometers distant. The residents of El Torrente-Las Abritas also conduct their marketing transactions in Santa Cruz, but less frequently, as well as the more convenient market town of Portachuelo. But for residents of Valle Hermoso and Naranjal their marketing activities are focused on the Sunday market at Comando.

Also known as Villa Busch, Comando is located 124 kilometers north of the city of Santa Cruz, where the highway to Port Grether crosses the Yapacaní River. Most of Comando's nearly 7,000 inhabitants are collas (from the Department of Cochabamba). And since the town lies nearly at the center of the huge Yapacaní Colonization Project--that has predominantly adsorbed colla settlers--its market day attracts thousands of rural families who still dress in the traditional fashions of the Temperate Valleys region. In addition to its market, Comando is an important center for essential services and entertainment. It has a small hospital, private clinics, pharmacies, farm input suppliers, gasoline distributors, municipal offices, public and private secondary schools, Catholic and Protestant churches, bars, and a movie theater.

Comando's Sunday Market (Feria) organizes itself each week on both sides of the Port Grether highway, with each side sub-divided into specialized sections. Set-up of sellers stalls begins several hours before sunrise. The bread sellers (panaderas) occupy the very edge of the highway surrounded by large baskets filled with baked goods. Behind them is the hortalizas or vegetable sellers offering potatoes, carrots, onions, corn, tomatoes, peppers, yuca, beans, rice, noodles, sugar, coffee, peanuts, salt blocks, and many other assorted items; dozens of women sell here, most of them dressed in their traditional polleras (multiple skirts) and white hats which reflect their colla origins. Next to them is the clothing section, where most of the sellers are men. Their racks are loaded with shirts, pants, dresses, polleras, jackets, sweaters, hats, caps, shoes, sandals, rubber boots, ponchos, blankets, mosquito nets, etc. On the corners of adjoining streets are kiosks managed by women selling breakfast, meat pies (empanadas), a blue-corn gruel called api, hot chocolate, coffee, and fruit drinks. Nearby there are tables where roasted meat and fish dishes are served. At one end of the market a cluster of women organize their piles of fruit, plantains, bananas, and watermelons. Facing them--across the highway--half a dozen merchants are selling battery-powered radios, record players, lanterns, kitchenware, and sewing machines. Finally, there is a section devoted to the

sale of medicinal plants, incense, burnt offerings, and a host of other elements of traditional medicine.

On the other end of the market one encounters a line of trucks which belong to whole buyers and sellers. These merchants sell entire sacks of potatoes, onions, salt blocks, and other items in short supply. They sell to revendedoras who break down the commodities into retail-level quantities. The truckers will also buy--in wholesale amounts--commodities which are in high demand outside the region. And once again they will mainly deal with smaller intermediaries who consolidate loads for them. In some instances the truckers will conduct straight barter transactions--potatoes for yuca, for example, or salt blocks for watermelons.

As the day progresses more and more people crowd the market. They arrive any way they can: in trucks, pick-ups, buses, taxis, motorcycles, bicycles, horses, and on foot. Some bring bags of harvested rice to be husked at the mill. But mostly they bring items to sell, because without obtaining cash earnings they will be unable to purchase the supplies they need. So farmwives (or sometimes their husbands) arrive selling rice, watermelons, tomatoes, peanuts, yuca, chickens, eggs, cheese, block sugar, ears of corn, achote, pigs, and sometimes wild game. These offerings are literally swallowed up by the revendedoras, who compete vigorously among themselves for the available supply--even climbing on arriving vehicles to ask their passengers what they have to sell. For most of the morning by far the largest number of market participants are sellers.

By late morning, as the sellers capitalize themselves, the majority of market participants shift into becoming buyers to acquire supplies for the coming week: noodles, potatoes, onions, sugar, salt, oil, lard, matches. Essentially these former-sellers will proceed to spend all their sales income to purchase supplies, reserving only just enough to pay for their return fare back to their communities of origin. By 1 P.M. people begin to climb aboard the vehicles that brought them to the market, and after accommodating their cargoes they begin to depart beginning with those who live furthest away.

By 5 or 6 P.M. the market is quiet, nearly empty, and its thicket of stalls dismantled. The few people who linger are usually young people waiting for the next movie, or folks with something to celebrate in the bars and restaurants of the feria; many will not make it home until the following day.

MARKET TAX AND TRANSPORT:
AN INTERVIEW WITH MARGARITA AGUILERA

Margarita Aguilera, of the community of Forestal, not only does the marketing for her family but also buys commodities from her neighbors to "complete" her loads. During the fruit season she makes marketing trips several times a week when transportation facilities permit. For other products and in other seasons, she may only make a marketing trip once every two or three weeks. As we learn in the following interview, conducted by Project Supervisor Aquilina Tuco in October 1981, the most critical consideration for undertaking a marketing trip is not the availability of a harvest surplus but rather the availability of a truck to take the produce to market. Furthermore, there are trucks that pass through the community which do not always stop, and a truck that sometimes serves the community specifically. Only when one is assured that transportation is available will it be appropriate to harvest and assemble the load destined for market. On the day of this interview, Margarita was selecting and bagging yuca that her husband was harvesting.

AQUILINA: Doña Margarita, are you always the one in charge of selling these products?

MARGARITA: Just me, because Conrado (her husband) has a bad eye and hardly ever goes to market, and when he does we both go.

AQUILINA: Where do you sell your produce, Doña Margarita?

MARGARITA: In Las Ramadas

AQUILINA: The truck takes you from here all the way to Las Ramadas?

MARGARITA: All the way, yes.

AQUILINA: In Las Ramadas don't they make you pay the market tax (sitija) charged by the municipality? And how much is it?

MARGARITA: When we take in a lot of produce and we don't sell it directo (immediately, to a single wholesale buyer) then they make us pay. But when one arrives and sells directo, they don't pay. When we have a lot of produce we pay 20 pesos (US\$0.80) per day; when it's just a little we pay 5 pesos (US\$0.20). It all depends how much we take in.

AQUILINA: Can you clarify something, Doña Margarita? Say you have only five arrobas (125 pounds) of yuca to sell, do they make you pay the sitiaje?

MARGARITA: With yuca we don't pay any tax. We sell it directly. Only with fruit do we pay sitiaje, because fruit you can't sell directly.

AQUILINA: It says in your notebook that you sold limes. What price did you sell them for.

MARGARITA: I sold some for 50 pesos (US\$2) per 100, others for 40 pesos (US\$1.60), depending on the size. Generally the prices fluctuate a lot: sometimes 50, 60, 40, 35, even 10 pesos when the fruit abounds. In that case I don't market limes because the freight charge alone is 7 pesos per 100, and to sell at 10 leaves nothing. I always wait for the price to rise to 40, 50, 60 pesos. Of course, a lot of fruit falls but there is always some that can be picked late to sell at the higher prices.

AQUILINA: Now that you're getting ready for market, how many arrobas of yuca do you plan to sell?

MARGARITA: I'm thinking of taking 11 or 12 arrobas (275-300 pounds), but its not very good, lots of skinny and small yucas; they need to be selected

AQUILINIA: Who does the harvesting (arranca or pulling)?

MARGARITA: Conrado does the actual pulling. I help him with piling and to select the small yucas to feed to my pigs.

AQUILINA: To prepare that much cargo, how long will it take?

MARGARITA: By the time the truck returns everything will be ready. It will be back at 3, 4, or 5 P.M. this afternoon; the truck does not have fixed hours. But the cargo will be ready by 3 P.M.

AQUILINA: In which truck are you going to load your things? The one that just passed.

MARGARITA: If the truck that normally provides service here doesn't show up, I'll ask that one (that passed). But I don't think he'll want me because the truck's from another community--León--and usually has no room for our freight. Sometimes he provides us with service, but he charges a lot. He charges for every bag of fruit, of yuca, while the truck that serves us doesn't bother to charge anything for 100 fruit or a bag of yuca.

AQUILINA: So you feel your local truck is better to transport your produce?

MARGARITA: Our truck waits for us until we've sold our yuca. It waits until we sell our fruit before we pay him, which is a lot better for us. And he brings us home. He takes us in the afternoon today and tomorrow he brings us back. The other truck takes us into Santa Cruz and dumps us; we have to find another truck to bring us home.

AQUILINA: How often do you go into Santa Cruz to sell your produce?

MARGARITA: Well, before I was going every week; but now it has been two weeks since I went, because the weather has been ugly and the trucks don't enter this far. And that causes another problem. Because everybody has all this cargo waiting for market sale, but there is not enough room in the truck so they have to wait until the truck returns on its next trip.

As Margarita had correctly predicted, the "other" truck (from León) passed by later in the day but made no pick-up in Forestal because it was completely full. Margarita was left waiting at roadside with her bagged yuca, waiting for another vehicle to take her cargo.

SELLING DURING THE RAINY SEASON:
AN INTERVIEW WITH MELVA SORIA

In late September and early October 1981, Doña Melva Soria de Vargas, of the community of Forestal, was selling yuca, cheese, and eggs to the Santa Cruz market. The quantities sold were relatively modest, first because the purpose of the sales was to finance family necessities from one week to the next. But more importantly, this was a period of heavy rain in which road conditions had so deteriorated that trucks were not entering the community. Thus, all produce to be sold had to be carried by foot or by horseback for a distance of 14 kilometers to reach the paved Santa Cruz-Cochabamba highway. On Wednesday, September 23rd, Melva took to market five pounds of cheese and 60 eggs. She sold each pound of cheese for 40 pesos (US\$1.60) and each egg for 3 pesos (US\$0.12), generating cash income of 380 pesos (US\$15.20). On Friday, October 2nd, she made a second marketing trip to sell ten pounds of cheese, and on Tuesday, October 6th, she made a third trip to sell ten arrobas (250 pounds) of yuca. The following interview, conducted by Aquilina Tucu, took place four days later.

AQUILINA: Doña Melva, when you sold the yuca what did you have to pay for transportation?

MELVA: From the asfalto (highway) to the city I paid 15 pesos (US\$0.60), and from the bus terminal to the market 10 pesos (US\$0.40) or a total of 25 pesos per sack.

AQUILINA: How many sacks did you take?

MELVA: Two sacks, and in each there were five arrobas (125 pounds).

AQUILINA: Tell me, Doña Melva, from Forestal to the highway didn't you have to pay anything?

MELVA: We took it out by horse, and since the horse is ours we didn't have to pay. Remberto (her husband) helped me by taking the horse and the cargo as far as the highway. Then he returned and I went to town with the yuca. Since one never knows how long a wait there will be for the colectivo, he left me with the sacks at the side of the highway and returned; I waited alone for the transportation.

AQUILINA: Why did you use a horse to bring out the yuca to the highway?

MELVA: Because the road was ugly. These days we've had nothing but rain, and the road gets so bad no trucks can get in. So we had no choice but to use the horse.

AQUILINA: How long does it take to get to the highway?

MELVA: To go and return takes four hours. It takes just as long to go by horse or by walking.

AQUILINA: But when the road is dry you use a truck?

MELVA: Sure, provided there is a truck available we take it.

AQUILINA: From here (Forestal) to the city, how much is the fare?

MELVA: Because I live a little closer, they charge me 15 pesos per bag and another \$15 for my fare. The families that live over there pay 20 pesos per bag and per person.

AQUILINA: When the road is dry you can always get a truck?

MELVA: When the road is in good condition they provide normal service on Mondays and Saturdays. When it rains, however, there is no service at all until the road is dry. They are also afraid of the quebradas (streams), because they get real dangerous when it rains.

AQUILINA: Doña Melva, where do you sell your yuca when you go into town?

MELVA: Before I sold at Las Ramadas. But then they (municipal authorities) threw us out and sent us to El Abasto. I had to sell in El Abasto because that's where the buses and trucks stopped.

AQUILINA: And how is it like selling at El Abasto? They say prices there are cheaper.

MELVA: Well, the sale of yuca is fairly good, because when yuca costs 35 pesos in Las Ramadas it sells for 40-45 pesos in El Abasto, so they pay well. In contrast, to sell fruit there is very pele (worthless); you can't even give it away.

AQUILINA: Doña Melva, do you always do the marketing for your family?

MELVA: For the most part, yes. Lately I've been doing it, but before Remberto did it more than I did; and sometimes we went together to sell, other times he went alone or I went alone. But he does it better because he takes the products to market, sells them, and brings home the money or supplies. But

when I go, after finishing my sales I have to take something to my married children in the city, because married or not I worry the same about them and like to help them out. Of course, I also buy supplies for the kitchen, but sometimes I come home without anything--no money, no supplies. But Remberto knows how to make money last.

AQUILINA : So what supplies do you buy?

MELVA: I bring home sugar, noodles, coffee, meat, and various other things depending on what we need and how much money there is. We buy our supplies little by little, replacing things as they run out.

AQUILINA: Doña Melva, where do you sell your cheese?

MELVA: In Las Ramadas market. I have people there who order from me. All I have to do is arrive and deliver the cheese.

AQUILINA: How do you sell your cheese?

MELVA: By the pound. I've never sold by kilos. A pound costs 40 pesos.

AQUILINA: When you sell cheese, is it already weighed when you leave home or when you deliver it?

MELVA: I weigh it here at home first, and mostly my buyers take my word for it. But sometimes they weigh it too in case of doubt.

AQUILINA: How often do you sell cheese?

MELVA: It depends on my supply. I collect the cheeses day after day. Sometimes when I make bread (horneado) we eat cheese at home, so that week I might only take six pounds; otherwise I usually take ten pounds. But we always eat quite a bit of cheese in this house, particularly when we eat mote (boiled corn) which is nearly every day.

AQUILINA: When do you sell your eggs, Doña Melva, and who buys them?

MELVA: I also sell them in Las Ramadas, where I have my buyers. They cost 3 pesos (US\$0.12) apiece. Since they are criollo (local breed) eggs, they sell fast. I collect them and take them to market nearly every week. I always take them to sell, never Remberto, because it requires so much patience.

AQUILINA: How do you transport the eggs?

MELVA: I get me a medium-sized basket and some shelled corn. I lay down a base of corn, then place some eggs one by one, then put down another layer of corn, then another layer of eggs. This way they can be transported safely and never break.

BUYING AND SELLING PEANUTS

Julia Rocha of Valle Hermoso helps supplement household income by buying peanuts in the regional market of Comando (Villa Busch) and reselling them to wholesalers of Las Ramadas market in Santa Cruz. In February 1981 over a period of three Sundays she purchased 8.5 arrobas (212.5 pounds) of peanuts in Comando. These she left in storage with a relative in Comando until, after the final purchase, she took her entire supply of peanuts into Santa Cruz. The reason she was unable to buy her stock all at once is that there are several other women who buy and sell peanuts just like Julia, and they compete with each other to purchase available supplies.

On February 17th she left her home in Valle Hermoso about 5 A.M. and got a ride with the milk collection truck into Comando. The lift cost her 7 pesos (US\$0.28), which is less expensive than the normal fare of 10 pesos charged by non-scheduled truck traffic on the highway. In Comando she collected her peanuts, split them into four small sacks of 50 pounds each, and hailed a bus (colectivo) to Santa Cruz. The normal fare into the city is 10-15 pesos (US\$0.40--0.80) per large sack of 100 pounds or more; but since Julia had divided her load into smaller quantities the bus driver didn't charge her a freight charge. He only had her pay her single fare of 50 pesos (US\$2). From the bus terminal in Santa Cruz, Julia paid another 15 pesos (US\$0.60) for a taxi to Las Ramadas market. There she ascertained prices at several warehouses that buy peanuts. She finally settled on a price of 350 pesos (US\$14) per arroba (25 pounds), selling her entire load to one buyer. The entire marketing operation--spread over a period of three weeks--yielded a net income of 508 pesos (US\$20.30), as follows:

EXPENSES	Pesos	US\$
Purchase of peanuts--8.5 arrobas	2,075	83
Round trip bus fares	100	4
Milk truck fare: Valle Hermoso-Comando	7	.28
Return fare: Comando-Valle Hermoso	10	.40
Taxi in Santa Cruz	15	.60
Total	2,207	88.28
INCOME		
Weight of peanuts at time of sale-- 195 lbs (7.8 arrobas) x 350/arroba	2,730	109.20
NET INCOME	523	20.92

Estimating that Julia spent a total of one day (over three Sundays) to buy peanuts, and another day to travel to Santa Cruz to sell them, she earned 262 pesos (US\$10.46) for each day she devoted to her marketing operation.

SELLING TANGERINES

Juana León de Terán sold three shipments of tangerines to the Santa Cruz market in April 1982. The fruit came from her own orchards. Its picking as well as the transport of the fruit to the farmhouse is usually the responsibility of Juana's husband, Francisco Terán. From that point on Juana takes over. She selects the fruit by size, cleans them with a damp rag, and carefully places them in baskets. She makes all the transport arrangements, accompanies the fruit to the Santa Cruz market, and sells it.

The results of Juana's first three shipments of tangerines to the Santa Cruz market in 1982 are presented below.

<u>First Shipment</u>	<u>Pesos</u>	<u>US\$</u>
INCOME		
-Sale of 3 baskets--750 fruit x 100 pesos/per 100	750	30
EXPENSES		
-Transport freight charges: 3 baskets x 15	45	
-Passenger fare round trip	40	
-Market tax (<u>sitiaje</u>)	<u>5</u>	
NET INCOME	90	3.60
	660	26.40
 <u>Second Shipment</u>		
INCOME		
-3 baskets of tangerines--650 fruit (various prices)	390	
-4 bags of limes--800 fruit (various prices)	<u>380</u>	
	770	30.80
EXPENSES		
-Freight charges and passenger fare to Sta.Cruz	125	
-Market tax	5	
-Other sales expenses	2	
-Return passenger fare	<u>25</u>	
NET INCOME	157	6.28
	613	24.52

Third ShipmentINCOME

	<u>Pesos</u>	<u>US\$</u>
-4 baskets of tangerines--1,100 fruit (various prices)	800	32

EXPENSES

-Freight charges and passenger fares	90	
-Market tax	5	
-Food	106	
-Return fare	30	
	<u>231</u>	9.24
NET INCOME	569	22.76

The net income listed above does not take into account costs of production. These are quite minimal under normal circumstances because pruning and fumigating tasks are usually not conducted, while most other labor investments involve family laborers and thus do not require a cash outlay. Assuming one person-day of harvesting for each of the three shipments, plus one day of cultivation labor for every 1,000 fruit (see section on Citriculture, Chapter III), the Terán household earned--for every day of family labor used--a net income of about 400 pesos (US\$16.37)

BUYING AND SELLING GUINEO

Luz Cabrera de Soria, like most other housewives in Porongo, devotes a considerable amount of her time to marketing fruit. However, in addition to selling the fruit of her own family's orchards, Luz also buys and resells the fruit of other families. Fruit marketing from Porongo is a pretty risky business. This is so not simply because market prices are so unstable from one day to the next, but because the fruit must be transported across the Pirafí River, which becomes impassable after a heavy rain. But Luz clearly enjoys the business. She admits to have lost lots of money but also to have gained her profits too. She buys and resells limes, tangerines, oranges, and mangoes as a general rule. But in mid-March 1982 she bought unexpectedly a stock of 176 racimos (clumps) of guineo over a period of two days. She bought them at the doorstep of her home. The growers who sold them were taking them to market in Santa Cruz, but a sudden flooding of the Pirafí River made the crossing impossible; so they sought out Doña Luz and offered to sell their fruit at a precio de refugio or refuge price. She bought it at prices ranging from 20-24 pesos (US\$0.80-0.96) per racimo, investing a total of 3,946 pesos (US\$157.84).

She stored the fruit in different rooms of her home to wait for the first opportunity to cross the river. As the fruit matured, she carefully placed the ripe hands in large baskets, making sure they would not get crushed. But her strategy was to sell most of the fruit green, by whole racimos; because with the river high, she expected there would be many growers with mature fruit. To slow down the maturation process, she covered her fruit with rags, blankets, and old clothing.

Three days after completing her purchases the river had gone down enough to be crossed by carretones (ox-carts), although still not by pick-ups and other motor vehicles. So Luz hired an ox-cart and made the first river crossing. She hauled 30 racimos of guineo, 5 baskets of mature guineo, and 700 tangerines. The fruit was then transported by truck from the far side of the river into the market in Santa Cruz. The green racimos she sold for 50 pesos (US\$2) apiece, the baskets of mature guineos for 120 pesos (US\$4.80), and the mandarines--selected by size, large and small--for 150 pesos (US\$6) per 100 and 80 pesos (US\$3.20) per 100 respectively.

For the next three days Luz Cabrerra continued to send fruit into Santa Cruz. Her second load consisted of 40 racimos of guineo verde, 12 baskets of mature guineo in baskets. The river level had risen again, so she was obliged to pass the fruit across on a cable car. In Santa Cruz the fruit

prices were falling for tangerines--90 pesos (US\$3.60) per 100--but the guineo prices were stable. However, Luz was only able to sell 12 of the 40 racimos. Storing the balance of her fruit in Santa Cruz, she had to return to the market the following day to sell it. She finally had to sell it de punta (for a single fixed price, the whole lot) to another intermediary for 40 pesos (US\$1.60) per racimo, and each basket of mature guineo at 60 pesos (US\$2.40).

For her third shipment, Luz sent 40 racimos of green guineos, 5 baskets of ripe guineo, and 2,000 tangerines purchased the previous day. But this time she traveled by pick-up truck from Porongo to Santa Cruz because the river could now be forded by motor vehicles. The market was flooded with fruit. During the course of the day the price of a racimo of green guineo fell from 40 to 15 pesos; in contrast, ripe guineos actually increased to 100 pesos per basket. The tangerines Luz had bought for 80 pesos per 100 climbed to 100 pesos. Accompanied by her husband Zenón Soria, the couple also sold three quintales of urucú (achiote) which they had bought at 1000 pesos (US\$40) and resold at 1,200 pesos (US\$48). They spent the entire day selling and spent the night in Santa Cruz with relatives.

The net result of an entire week of guineo marketing was a profit of 664 pesos (US\$26.56), as follows:

EXPENSES	Pesos	US\$
Purchase of 176 racimos	3,946	157.84
<u>First Trip</u>		
Fare from home to river	60	
Fare to cross river	50	
Fare from river to Santa Cruz	200	
Food during the day	50	
Return fare to Porongo	25	
Sub-Total	385	15.40
<u>Second Trip</u>		
Fare from home to river	100	
Fare for cablecar crossing	100	
Fare from river to Santa Cruz (carga)	200	
Food during the day	40	
Round trip fare to Santa Cruz	60	
Sub-Total	500	20.00
<u>Third Trip</u>		
Fare: pick-up truck to Santa Cruz	300	
Food during day	150	
Sub-Total	450	18.00
TOTAL EXPENSES	5,281	211.24

INCOME		
	<u>Pesos</u>	<u>US\$</u>
<u>First Trip</u>		
Green guineos: Of 30 racimos, 20 sold x 50 each	1,000	40
Ripe guineos: 5 baskets (of 3 racimos) x 120	<u>600</u>	<u>24</u>
Sub-Total	1,600	64
<u>Second Trip</u>		
Green guineos: Of 40 racimos, 12 sold x 50	600	24
Ripe guineo: of 4 baskets, 2 sold x 120	240	9.60
Next day:		
green guineos: 38 racimos <u>por punta</u> x 40	1,520	60.80
Ripe guineos: 2 baskets x 60	<u>120</u>	<u>4.80</u>
Sub-Total	2,480	108.20
<u>Third Trip</u>		
Green guineos: 40 racimos at different prices	1,365	54.60
Ripe guineo: 5 baskets x 100	<u>500</u>	<u>20</u>
Sub-Total	1,865	74.60
TOTAL INCOME	5,945	237.80
less expenses	<u>5,281</u>	<u>211.24</u>
NET INCOME	664	26.56

Assuming one day to purchase and select the guineos and five person-days to sell them, the Soria household earned 111 pesos (US\$4.44) for every day of family labor invested in guineo marketing activities. This amounts to a return only slightly better than the wage rate for hired laborers (80 pesos/day).

ACTIVITIES OF THE RURAL HOUSEWIFE

Throughout this volume constant mention will be made of the "farmer", the "grower", and "the producer". If these nouns suggest an exclusively masculine reference, it is unintentional. Nothing could be further from the truth that "men do all the field work" while their wives take care of the house and children and cooking. Indeed, even though the term "housewife" is used repeatedly in this text, we by no means wish to suggest that the wives of farmers largely restrict their activities to the farmhouse.

To the contrary, rural women participate in nearly all the field tasks that men do--with the possible exception of the particularly arduous activities of land clearing and plowing. It is true that women spend much less time in field tasks than men, but this is because they have so many different responsibilities to take care of during the day. When one reviews the wide variety of routine tasks conducted by women on a routine basis, it appears remarkable that they have any time left to spend in the fields.

The rural housewife's day normally begins well before sunrise, about 5 to 5:30 A.M. or "when the chickens come down from their roosts". Usually her first task is hauling water, which depending on the distance to the water source can take 15 minutes to an hour. Next, she must prepare breakfast--not only for her family but also for any hired laborers that have been contracted for a multi-day commitment. When the day involves considerable field-work, the breakfast is more than a hot beverage and bread; it becomes a full-fledged heavy meal--virtually the same as lunch, which is the heaviest meal of the day. Family and hired laborers then depart for their work (about 7 A.M.) to take advantage of the somewhat cooler early morning hours. The housewife proceeds to prepare lunch so she'll have it out of the way. This gives her the flexibility of leaving the house during the day and having something already prepared if she has to leave her children alone; and if she works in the field later on, she can take the meal with her in a pot, heat it at the work site, and save time for herself as well as family and hired laborers. While lunch is cooking, the housewife shells corn to feed her chickens. She takes kitchen scraps, and sometimes afrecho (bran), mixes it together with the water in which food has been boiled, and feeds her pigs. (Rural housewives always refer to chickens and pigs as "their" animals). She collects eggs. If the family owns a cow, it is the housewife who is expected to do the milking every morning. If the milk is destined for cheese, she must strain it and put in the coagulant (cuajo) immediately after milking. Finally, the housewife will make the beds, clean up her kitchen, and sweep the house and patio before starting her next round of tasks.

By mid-morning the housewife is ready to take on her special task for that day--whether at the farmhouse or away from home. She may have a load of laundry to be taken to the river to wash. There may be produce that needs to be sun-dried, threshed, or shelled. If it is planting season, the housewife may be expected to prepare seed or bundle transplants from the nursery. She may have baked goods she is planning to sell at the Sunday market, or a home remedy that needs to be prepared for a sick child, or a neighbor.

But most likely, the housewife will be most needed in the field. There she can be found on most days of the year helping her husband with planting, transplanting, weeding, burning residues, hauling water for irrigating vegetables or mixing a chemical solution for a backpack sprayer, and of course harvesting. At noon she will prepare a fire, heat the lunch she has prepared, and serve all family and hired laborers present. After the mid-day break, she will continue her fieldwork.

The housewife leaves the field earlier than her husband to get a start on her end-of-day chores. She may have coagulated milk ready to be molded into cheese. She may have to bring the cow and calf in from pasture. She needs to prepare supper. Once again she needs to feed her chickens and pigs. After serving supper, she washes the dishes and prepares her kitchen for the next day's activities. Then--not long after sunset--she puts her family to bed and finally can sleep herself.

What has been described is the basic structure of a rural housewife's daily activities--her routine. There are, of course, hundreds of variations in accordance with family circumstances. For example, many of the tasks for which the housewife is responsible are commonly shared with small children, who learn to haul water, feed livestock, and lead animals to and from pasture at a very young age. A mother with an infant will continually be slowed down in her task performance by the need to breastfeed, change diapers, and bathe the child. But children--even infants--are largely integrated into the mother's routine: they go where she goes, they share her tasks, and the infant--carried in an aguayo (small poncho) on its mother's back--literally feels her every movement throughout the day. Some rural housewives have small stores which they tend, others bake bread, make clothes, or are active participants in a prayer circle or mother's club. And finally, many women are deeply involved in marketing activities.

It will be readily seen that the rural housewife provides the glue that makes a subsistence lifestyle possible.

COOKING FOR THE RICE HARVESTERS

On February 26, 1981, Domingo Correa of Marañal was harvesting his rice crop. Since Domingo is a bachelor, he asked his first cousin, Teodora, to help out with the cooking for the harvesters, of which there were 14 persons. Since hired laborers are sometimes scarce in the region, it is wise to treat them well so that they will have an incentive to return. And aside from the wage--in cash or in kind--the best incentive is to keep them well fed. This means not only a heavy mid-day meal, but breakfast and supper as well.

To cook for this labor force, Teodora got started at 4:30 A.M. to fetch water, gather firewood, and prepare the ingredients for the day's menu. For breakfast she served arroz granado (fried rice) mixed with diced yuca and accompanied by hierba mate tea. The food was eaten from large bowls using spoons. Some of the laborers ate sitting around the kitchen table, others sat on their bedrolls in the hut off the kitchen where they had spent the night. When all had finished, they equipped themselves with bags, klapichunas (sheets for rice harvesting), and knives and departed for the harvest site, leaving Teodora to clean up by herself.

After washing the dishes and cleaning the kitchen, Teodora went out to the crop lots with a bag and an aguayo (poncho used by women for carrying babies and other small loads) to harvest some choclos (fresh ears of corn). She soon returned with both containers full, emptied them, and returned to the farm lots again with a machete, this time to harvest some firewood. Leaving this second load in the kitchen she went out again to pull some yuca, returning with about 12 pounds of these tubers. She then washed a big aluminum cooking pot, filled it 3/4 full, and began to heat it on the fireplace built on the kitchen floor. She then proceeded to husk some 50 ears of corn, peeled the yucas, and shelled and ground several pounds of peanuts; she also washed a kilo of beans and peeled several onions. Finally, when the above ingredients had been placed in the pot to boil, she added two heaping plates of milled rice and an equal quantity of noodles. While this meal was cooking for an hour, she took advantage of this time to shell some corn for the chickens and sweep the farmhouse.

At 11:30 A.M. Teodora emptied the cooking pot's contents into two smaller pots. She loaded plates and spoons and cups into her aguayo and departed for the harvest site carrying one pot in each hand. There she found Domingo, turning over piled rice with a pitchfork inside the rice hut. He called in the laborers to eat: They arrived one or two at a time. Nearly all had a second helping, and some even three. As the workers were eating, Teodora

returned to the farmhouse and brought back a five-gallon plastic container filled with fresh drinking water. There was some grumbling among the workers because the mid-day meal had not contained any poultry or meat. Normally peanuts are used as a meat substitute in rural households, but today the practice was criticized. So that afternoon, Domingo jumped on his motorcycle and made an emergency trip into Comando to buy meat. He returned in the late afternoon with 8 kilos--half destined for the evening meal and the rest for the following day. "That should make them eat quietly", he assured his cousin.

During Domingo's absence, Teodora remained at the harvest site supervising the workers. She spent this time harvesting rice herself, because like the other laborers she would be entitled to receive 8 pesos (US\$0.32) for every arroba harvested or, if she preferred, be paid in kind one arroba of rice for every four arrobas harvested.

At 4 P.M. Teodora returned to the farmhouse to begin preparing the evening meal. She already had enough choclos (ears of corn) from the morning's harvest, but she lacked more yuca and another load of firewood. She followed the same procedures as she had that morning, except that this time she also boiled the meat. When partially cooked she removed the meat from the bones, separating the quantity reserved for the following day. For the entire day, her cooking had consumed just over 12 pounds of rice, 25 pounds of yuca, over four dozen ears of corn, and 6 pounds of noodles.

All in all, this was one of her easier days, because the harvest site was only about 500 meters from the farmhouse. Days earlier, when Domingo had harvested a crop lot he has near the cemetery at the edge of town, Teodora had carried the cooking pots for a distance of nearly two kilometers. With periodic stops to rest, it had taken her an hour to reach the harvest site.

HARVEST MANAGEMENT

In March 1981 Julio Pinto traveled to the Chapare region (Department of Cochabamba) to harvest rice as a hired laborer to generate extra cash income to meet his debts. He left his wife Julia Rocha back home in Valle Hermoso to manage the harvest of the family's rice crop.

The harvest began on March 21st. Doña Julia began the day at 5:30 A.M. with her breakfast preparations. The meal consisted of fried rice and hot milk. She had just finished serving her three children and herself when the first harvesters arrived around 7 A.M. This was Doña Felicidad and her son, who arrived with their own bags and harvesting knives. Both were served breakfast before entering the rice field to begin their work. Julia and her oldest son followed them, carrying additional bags for any harvesters who might show up later that morning. A few minutes later a young man named Benjamin, a cousin of Julia's, showed up at the harvest site. Julia gave him a waist bag, groundcloth, and knife and put him to work. An hour later, at 9 A.M., a young woman named Isabel (another cousin) appeared and also asked for a bag, groundcloth, and knife. Around 11 A.M. Julia returned from the field with a k'epi of rice (about 20 pounds) and unloaded it in the rice hut next to her kitchen. Hurrying now she took a large bucket and went off to fetch water 300 meters away in the arroyo. Meanwhile another harvester named Miguelina (also a cousin of Julia's) arrived at the farmhouse. She explained she was late because her mother was absent and she had had to prepare lunch for her father. Julia sent her into the rice harvest and continued with her own preparations for the mid-day meal. As the water heated, she rapidly peeled yuca and potatoes, washed rice, measured noodles, lard, and other ingredients for the soup pot. While the meal was cooking she fed her pigs with kitchen slops and then hung the hanging bar scale from a beam beside the rice hut.

At 12:30 P.M. she called her workers to their mid-day meal. They came out of the field carrying all the rice they had harvested up to that moment. Each harvester first ate their meal. Afterwards each brought forward his/her harvested grain for weighing by Doña Julia before emptying the rice in the hut. In the afternoon two more harvesters (Feliza and Marcos) appeared at the farmhouse and asked for work. After cleaning up her kitchen, Julia joined the harvesters again. In the late afternoon she returned to prepare supper. The other harvesters came out of the field at sunset, and the last of their loads Julia had to weigh by candlelight. Her cousins she paid in rice--one arroba for every four harvested--because their family had lost their harvest this year. The other laborers earned 8 pesos per arroba, the going wage in the community. All outside harvesters were fed supper by Julia before returning to their homes.

THRESHING RICE

Doña Manuela de Soliz of the community of Torrente does all the threshing of her family's rice crop. She admits she likes the job because it is a welcome respite from household chores. She also considers it an easy task, but one that allows her husband to devote his time to more important work such as land clearing, weeding, and harvesting.

Manuela threshes on a cowhide. She prefers this floor to plastic or cloth because it heats in the sun and helps to dry the rice more completely. The threshing (despicar) is done with a slender pole about 130 cms. long and 5 cms. in diameter. The pole must be green, Manuela explains, so that it will deliver blows with a little bounce to them. She beats and beats the grain stems, slowly separating the grains from their stems. At intervals she separates the rice (unhusked) to one side, the stems to another. Usually only that quantity of rice is threshed which will meet the family's consumption requirements for the next few days. The threshed grain is finally winnowed to separate the chaff.

How does she know when the rice is dry enough for threshing? She samples a few grains by biting them. If the grains split in half the rice is sufficiently dry; if the grain gets mashed when bitten it is still too humid. But after threshing, the rice must still be husked. This is done in a lacú (pestle) and pounded by hand. But for this milling to work efficiently, says Doña Manuela, the rice must be warm as well as dry. Here is another reason she prefers the cowhide: it warms the grains prior to milling.

The Soliz family has never been attracted by the idea of mechanical threshing or taking their threshed rice to a rice mill (ingenio) for milling. Because she has threshed and milled by hand since she was a small child, Manuela is accustomed to these tasks and does not find them tiring. Moreover, she now has children old enough to help with these tasks as well. With these advantages, it seems to her inappropriate to spend money on something the family is perfectly capable of doing itself. Furthermore, threshing and milling by mechanical means involves a double expenditure --the processing cost itself plus the transport charges for taking the grain to the mill and returning it again to the farmhouse. And finally, there is neither a mill that is close by nor scheduled transport services to haul the grain back and forth.

So Manuela continues to do the threshing and actually enjoys it. After all, she says, "it keeps me from getting bored".

A WOMAN'S PARTICIPATION IN THE WATERMELON HARVEST

In 1981 Aurelio Garcia of Valle Hermoso planted a crop of watermelons during the winter season. The cold surazo winds that year severely damaged the crop to the point that Aurelio, anticipating a financial loss, began to seek employment in neighboring colonizations to raise money to pay his debts. He owed money for tractor services and a loan he used to buy a cow.

Although she was nearing her ninth month of pregnancy, Aurelio's wife Justina decided to do everything she could to rescue and sell as many watermelons as possible. For three days--after her housework was done--Justina went to harvest the fruit, taking her pre-school son and daughter with her. Out in the hot sun of the watermelon patch she squatted plant by plant and inspected every vine for fruit that could possibly be sold. To determine ripeness she lifted every watermelon, inspecting its underside for a yellow color, before cutting it. She then gathered the selected watermelons, piled them by size, and covered the piles with motacú palm leaves to protect them from the sun.

Aurelio had arranged for a friend from a neighboring colonization to provide his pick-up truck to haul the melons from the field to the farmhouse. Justina helped with the loading, hauling the fruit in a bedsheet from the pile to the truck. All in all she loaded 400 watermelons. These were stacked two rows deep in the bed of the pick-up and it took three separate trips to move the fruit from the field to the farmhouse. The use of the pick-up cost 150 pesos (US\$6) for an afternoon's work.

The following day the same pick-up truck took Justina and her 400 watermelons from Valle Hermoso to the Comando market. Justina ignored offers to buy the fruit on a wholesale basis because they were too low--only 5 pesos (US\$0.20) per fruit--so she elected to retail the watermelons herself. In the course of the day she managed to sell 250 of the 400 watermelons at prices ranging from 5 to 20 pesos. She left the fruit she couldn't sell at the home of a relative and decided to return to Valle Hermoso that night; because in addition to seeing to her children, she also had to milk the family cow. There were no pick-ups or buses operating that evening which could drop her off at the entrance road to her community. Justina was finally obliged to get a ride on a logging truck (tronquero). She reached home tired and experiencing pain all over her body, but resolved to finish selling the watermelons the next day.

Late that evening she gave birth to her fourth child. Two days later Justina's sister went into Comando and sold the watermelons for her.

FARM HOLDINGS IN VALLE HERMOSO

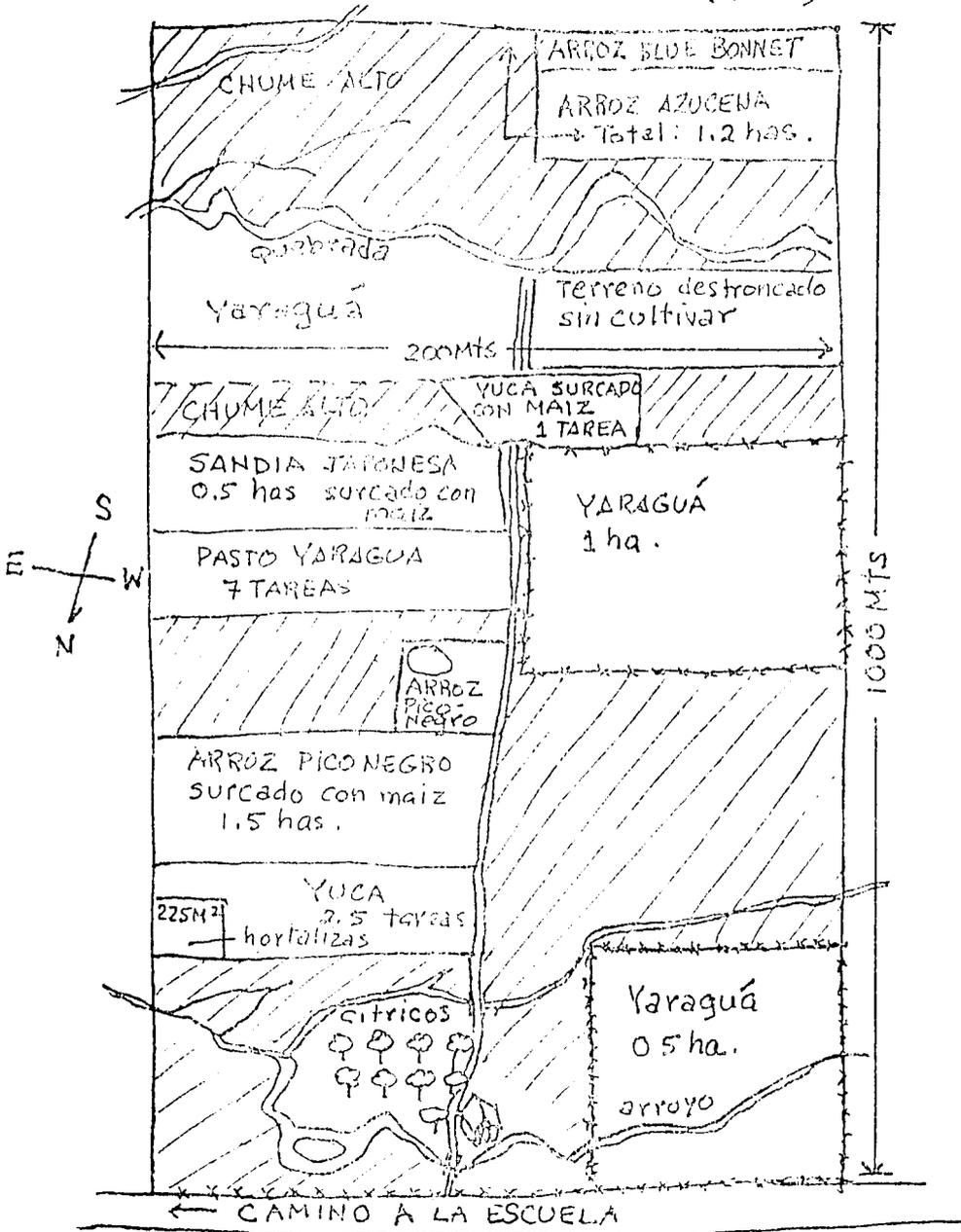
As a part of the Yopacaní Colonization, the land holdings in Valle Hermoso are divided into fairly standardized 20 hectare units. These properties are for the most part shaped in rectangular strips of 200 meters wide by 1,000 meters long. On this basis the smallest farm in the community consists of the minimum colonization unit of 20 hectares. However, some colonists have bought out the farms of families wishing to abandon the community and thus acquired two units totalling 40 hectares; in no instance, though, are these units contiguous.

Total farm size is one thing but area cultivated quite another. In no case does any farm household cultivate more than five of its 20 hectares on an intensive basis. By a "cultivated" crop we do not include the pasture grass yaraguá, which alone covers areas ranging from 1.5 and 3 hectares to 9 and 11 hectares. Yaraguá makes minimum demands on family labor because once planted it is repeatedly "harvested" during the course of the year by grazing livestock, reproduces itself, and does not require human intervention for its maintenance. Also not included in the intensive category are fruit trees. Most households have several dozen citrics and other fruit trees planted near the farmhouse; in all they occupy no more than half a hectare per farm. These trees receive negligible weeding, fumigations, or prunings. They are there to be harvested, but mainly to meet family subsistence needs and sometimes to generate a little extra cash income.

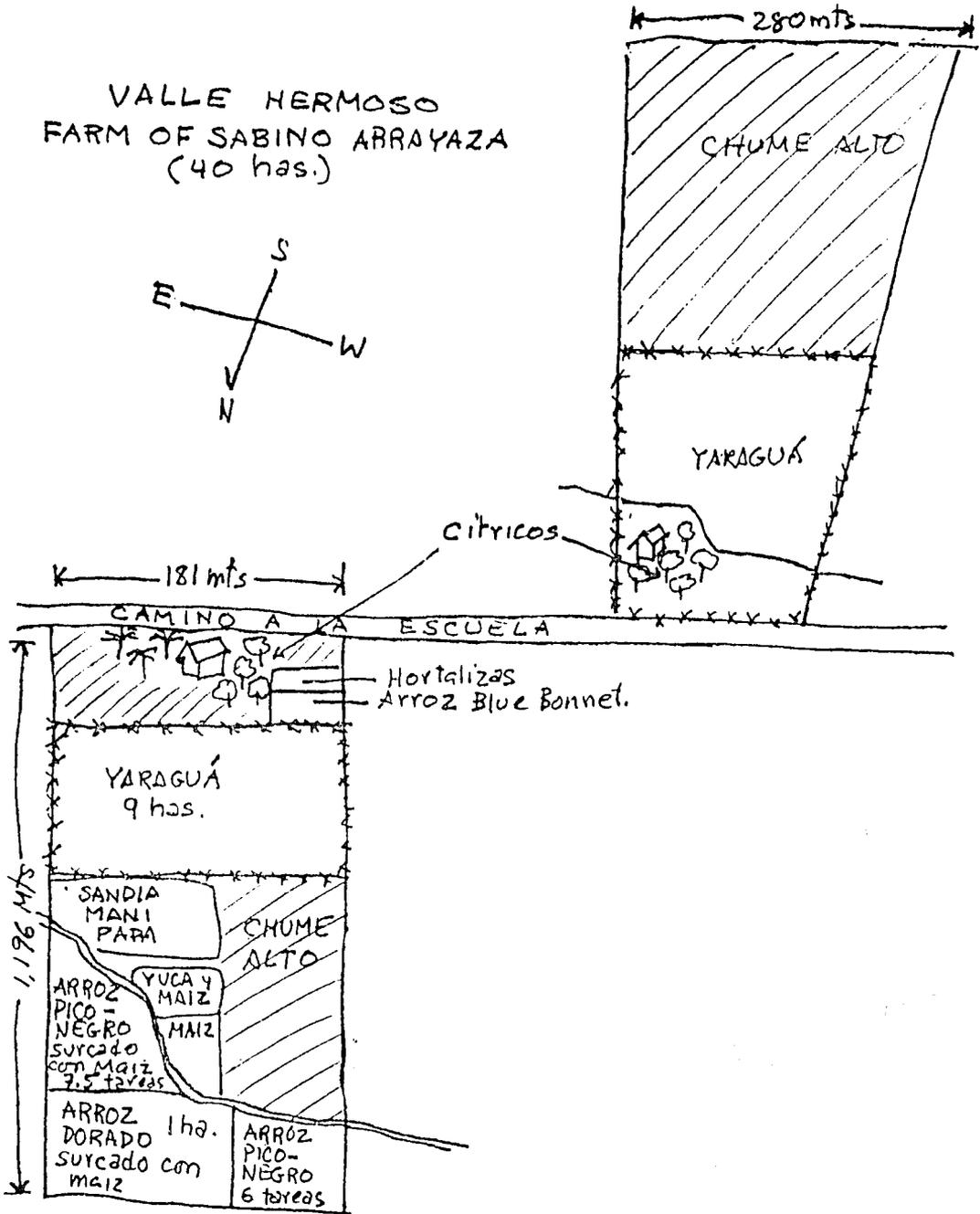
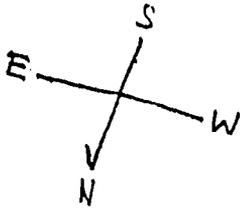
So the intensively cultivated farm in Valle Hermoso involves only involves 1-5 hectares and usually includes rice, yuca, corn, peanuts, vegetables, and perhaps watermelon or sugarcane. Of these, rice is the only crop grown on a commercial scale exceeding a hectare. Normal rice plantings run on the order of 1, 1.4, and 2.3 hectares. In turn, this crop is usually divided into two or more crop lots, each dedicated to a different variety: Carolina, Piconegro, Blue Bonnet, etc. It is clear, then, that the cash income fortunes of the rural household--its main income-generating enterprise--rise and fall with the success of the rice crop. In contrast, all other crops are grown in areas usually not exceeding 1-2 tareas (the tarea equals 1/10th hectare) and even smaller areas called manchas (stains, blots).

In the following pages are presented the farm plans of Sabino Arrayaza, with two colonization lots totaling 40 hectares, and that of Aurelio Garcia with the normal 20 hectare farm. Chume Alto or shaded areas refers to un-cleared land.

VALLE HERMOSO: FARM DE AURELIO GARCIA (20 has)



VALLE HERMOSO
FARM OF SABINO ARRAYAZA
(40 has.)



FARM HOLDINGS IN NARANJAL

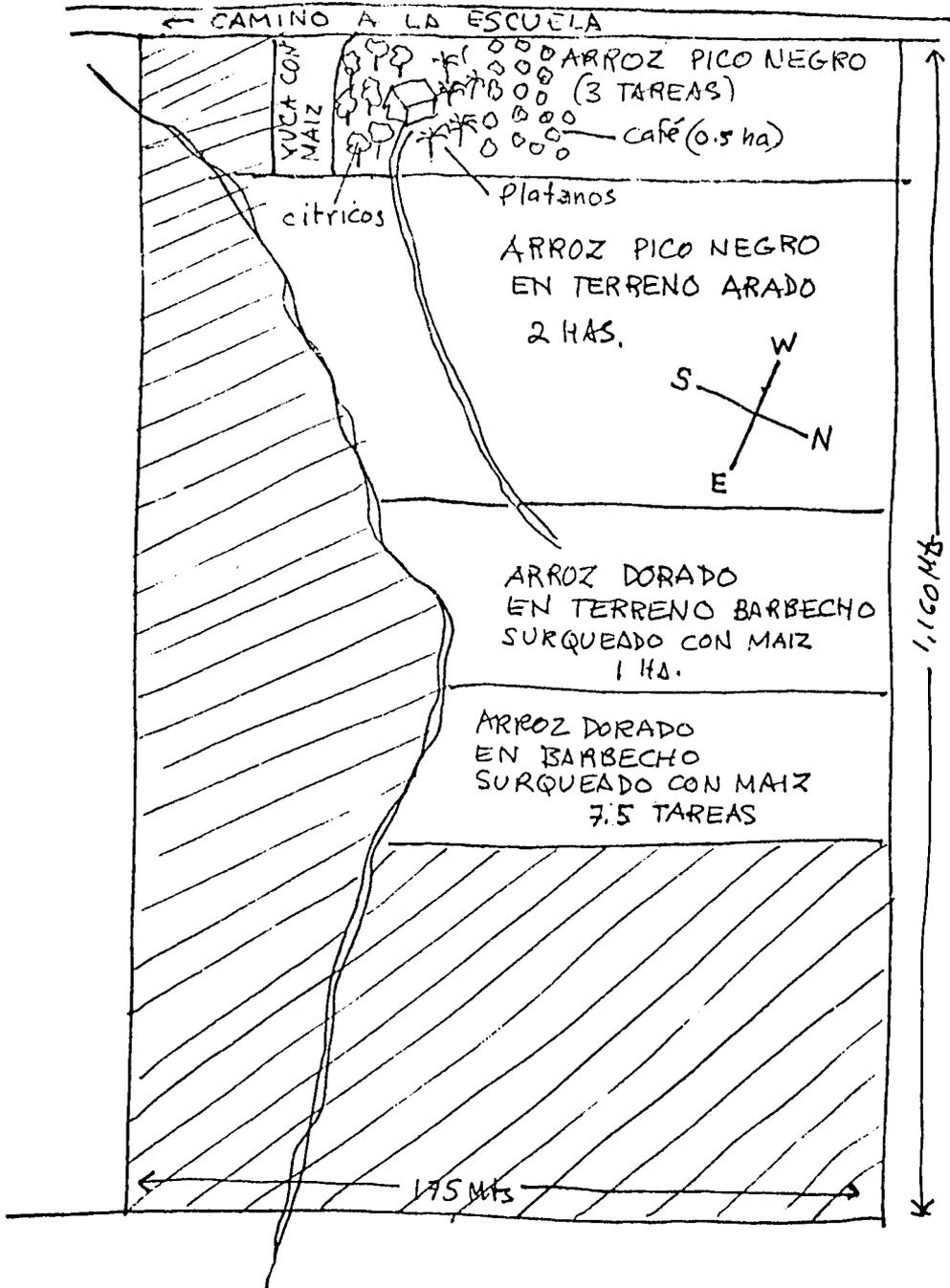
Since Naranjal is also part of the Yapacaní Colonization, its land holdings --like those of Valle Hermoso--are divided into standardized properties of 20 hectares each, which sets the limit for the smallest sized farm. But being a slightly older settlement than Valle Hermoso, the consolidation of properties resulting from colonist abandonment has advanced even further. Some residents now control three properties or a total of 60 hectares, and in a couple instances their various holdings are contiguous.

The cropping pattern is somewhat different in Naranjal because the community's relative scarcity of water resources has discouraged diversified plantings as well as pasture crops. Here, as in Valle Hermoso, the only crop grown on a commercial scale is rice; however, area planted to rice is significantly higher in Naranjal and crop lot size tends to be larger as well. The larger crop lots, in turn, reflect a growing specialization and dependence on tractor plowing.

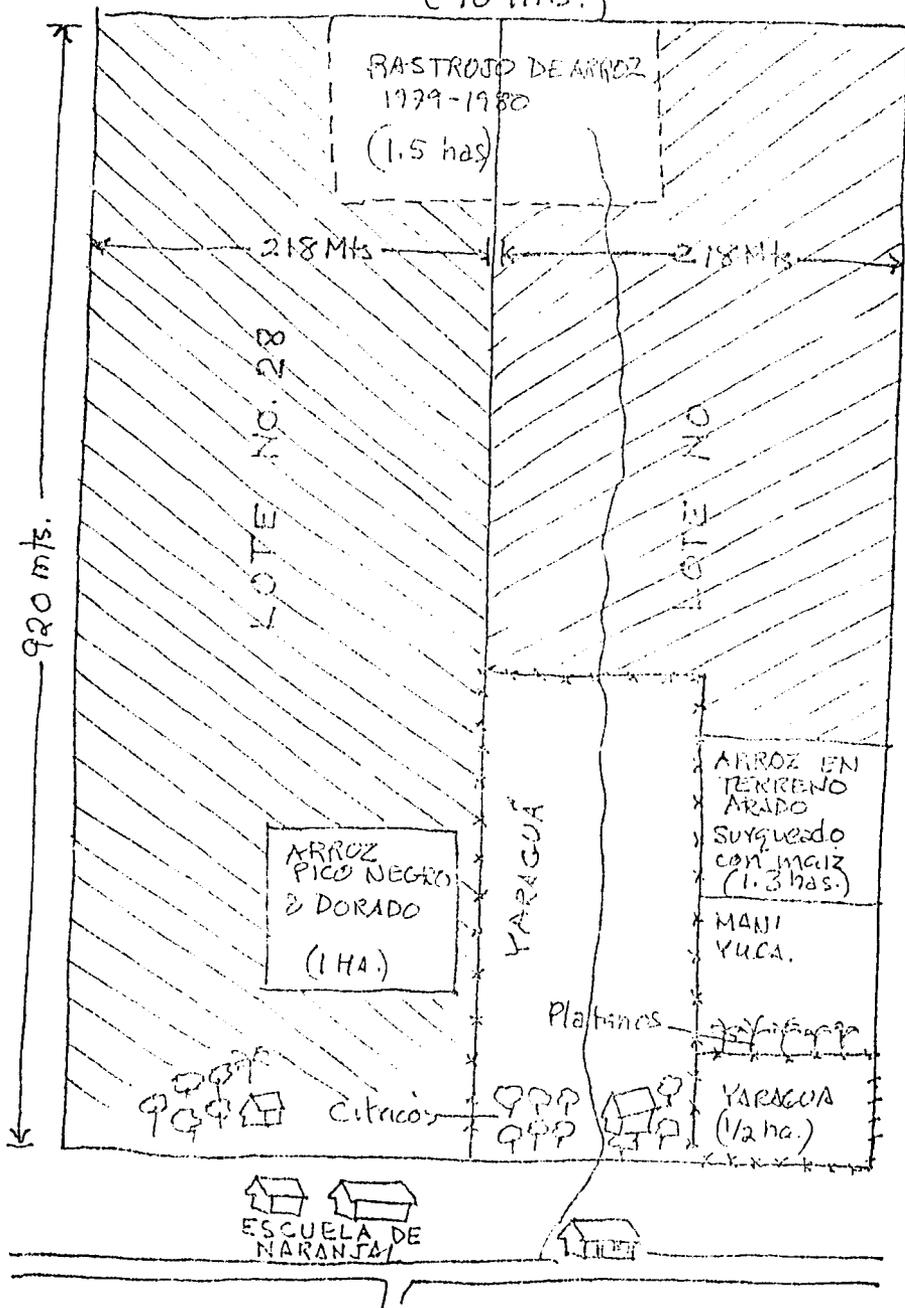
As in Valle Hermoso, area cultivated remains a fraction of total farm size in Naranjal. This reflects a crop rotation strategy wherein a field is used for 3-4 years for intense cropping, then left in fallow for three times that long. Aside from rice, residents of Naranjal grow a smattering of subsistence crops--yuca, peanuts, and a few vegetables--in small plots located in close proximity to the farmhouse. Corn is never grown in pure stand but rather in rows interspersed with the rice crop, an association known as surqueado. Of course, every farmhouse is surrounded by a small orchard of citrus trees which are harvested mainly for subsistence use and therefore not subject to technical management. A few families have begun to establish coffee plantings among their fruit trees, but again this crop is also to meet family consumption needs.

Presented below are the farm plans of Angel Calvi (20 hectares) and the two contiguous properties of Pablo Mamani (40 hectares). Areas not identified by a crop use reference constitute fallow or uncleared land.

NARANJAL: FARM OF ANGEL CALVI (20 has)



NARANJAL : FARM OF PABLO MAMANI (40 HAS.)



FARM HOLDINGS IN EL TORRENTE--LAS ABRITAS

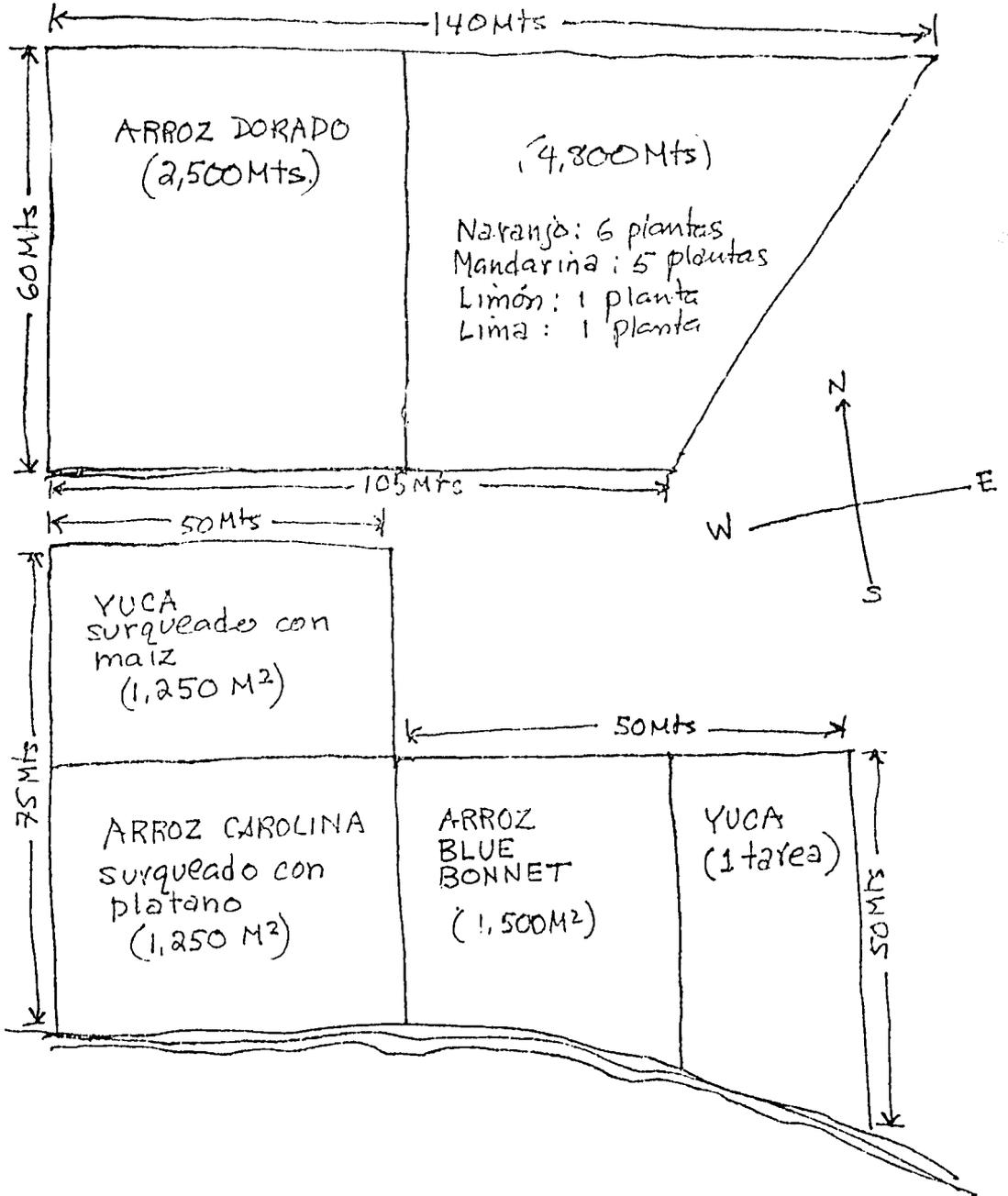
These two communities represent a wide diversity of land tenure, farm size, and cropping characteristics. The earliest settlers--like the Alvarado family--control over 100 hectares. At the other extreme there are families who arrived later as landless laborers seeking employment on the large farms and--because they were given or loaned plots of land to farm as an incentive to stay--now control 1-2 hectares of land. In between are composite properties that have been extensively sub-divided among heirs but still farmed collectively to facilitate economies of scale with regard to plowing services, harvesting, and marketing. The smallest farms, of 1-2 hectares or less, are intensively farmed in their entirety, with the possible exception of areas devoted to fruit orchards. On the larger properties, area cultivated amounts to about 2-7 hectares, or less than one-tenth of the total farm property. Lands in this area were largely cleared of virgin timber years ago. Today the non-cultivated portions are either devoted to non-improved pasture and/or left to revert to scrub forest.

In the following pages we present examples of three different farms--small, medium, and large. For the first case we have the farm of Nestor Duran. It consists of two separate properties totaling 1.2 hectares. The first property of 7,300 square meters (7 tareas) was a gift to the Duran family by a large landowner named Miguel Mejias. It is divided into two crop lots, the first (2,500 M²) planted to Dorado variety rice. In a piece of the second lot (4,850 M²), the Duran's have planted 6 orange trees, 5 tangerines, 1 lemon tree, and 1 lime. Nearby this modest orchard they someday plan to build their house. The Duran's second property has been loaned to them for two years. They have divided the land into four crop lots as follows: rice associated with plantains, Blue Bonnet rice in pure stand, yuca in pure stand, and yuca mixed with corn.

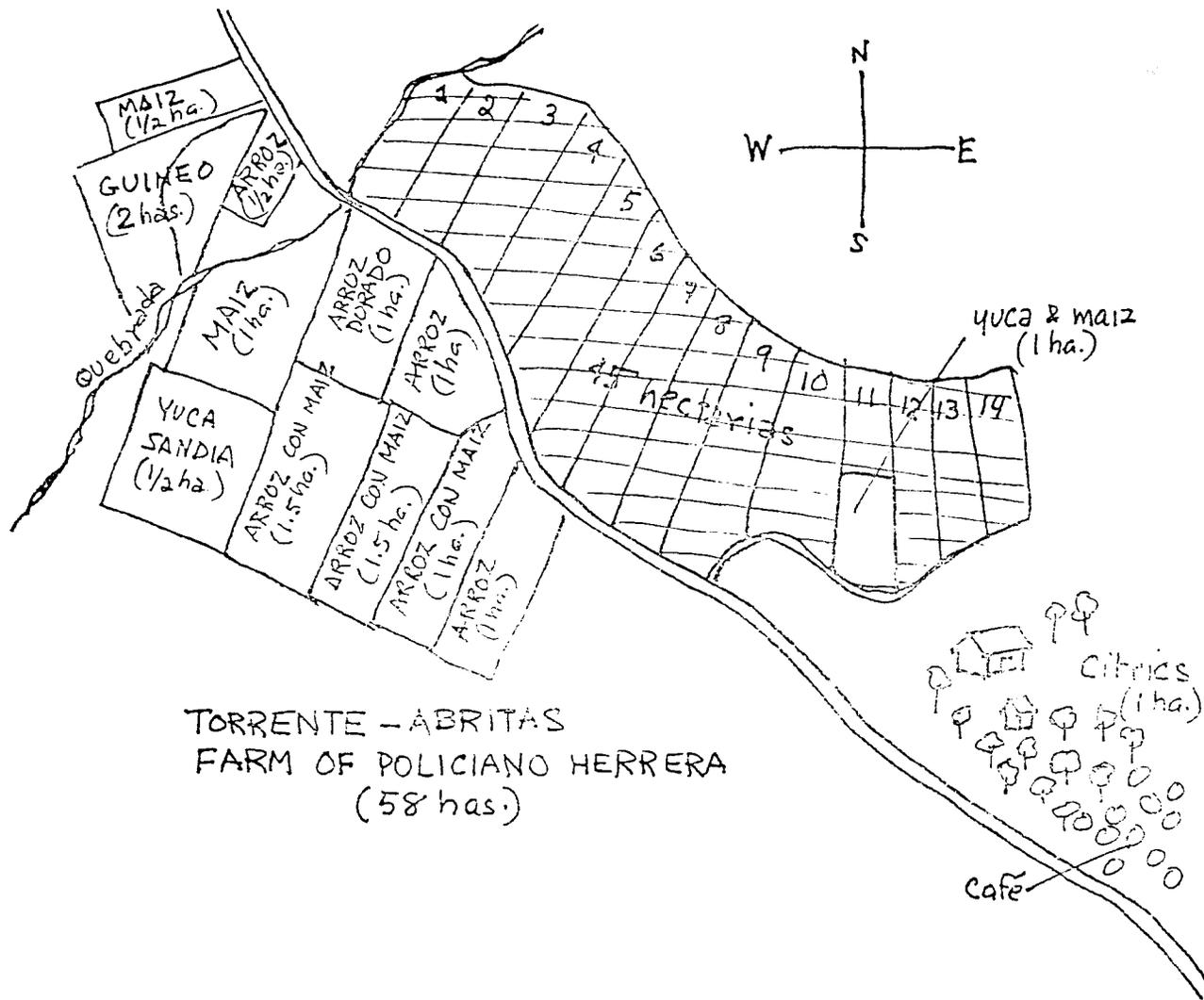
The second example is a 58 hectare property belonging to the Herrera family. The farm is managed by Policiano Herrera, but investment costs and the harvest are shared with three brothers who have moved to the city. Aside from the fruit orchard near his house, Policiano in 1981 planted 13 crop lots totalling about 12 hectares--7 in rice associated with corn and the rest in corn, plantains, yuca, and watermelons.

The third example is the 110 hectare farm of Julian Alvarado, of which only 2.7 hectares are planted--in 7 crop lots--to rice, yuca, sugarcane, beans, corn, and guinea.

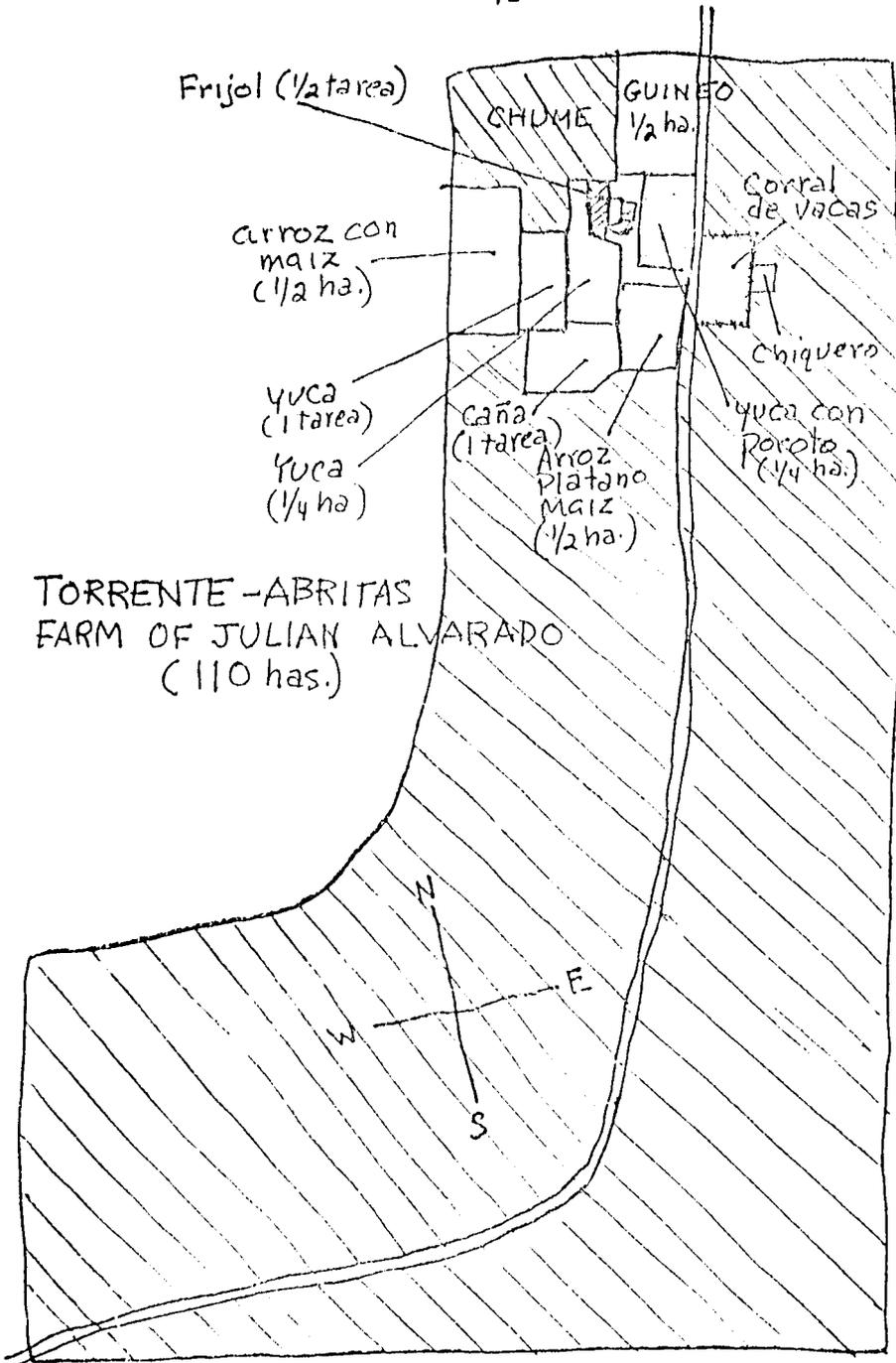
TORRENTE-ABRITAS; FARM OF NESTOR DURAN
(1.2 has)



70



TORRENTE - ABRITAS
FARM OF POLICIANO HERRERA
(58 has.)



FARM HOLDINGS IN PORONGO

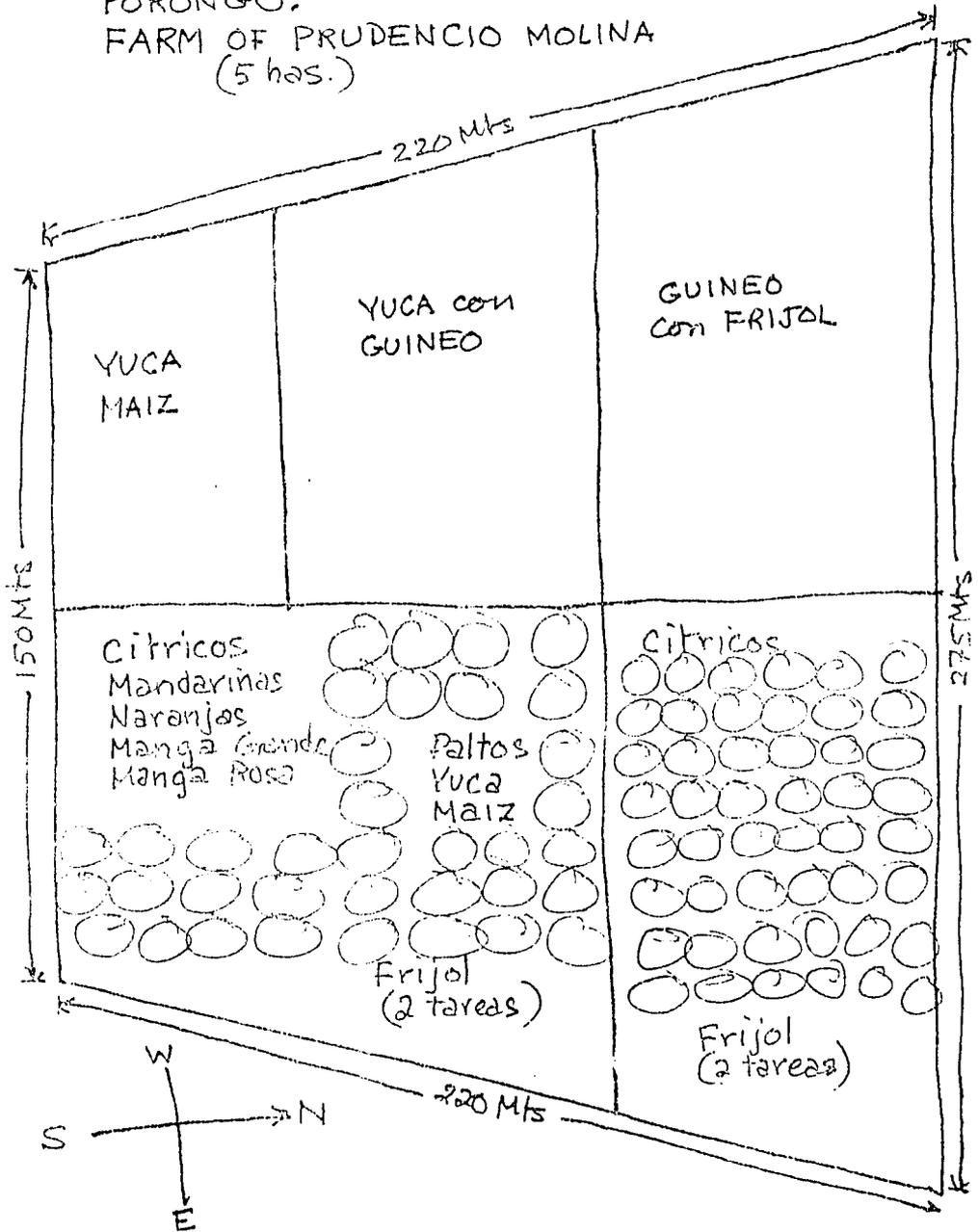
Porongo is essentially a community of fruit growers. Here farm properties are relatively small, ranging from 3-8 hectares per family. In distinct contrast to other colonization areas, in Porongo virtually all of the farm's area is devoted to crop production. Of course, most of the available area is devoted to fruit orchards. These include oranges, tangerines, lemons, limes, grapefruit, plantains, guineos, mangoes, and avocatoes. Somewhere on the farm property there is bound to be a piece of land devoted to tree nursery production. A few growers have introduced small coffee plantations.

Because of their specialization to permanent orchard crops, farm lots tend to be angular in shape--either squares, rectangles, or triangles--and distributed into about half a dozen subdivisions. The larger producers have been able to buy additional farm properties scattered in different locations, which makes for dispersed operations but provides a margin of error for damage resulting from insect blight or localized weather phenomena.

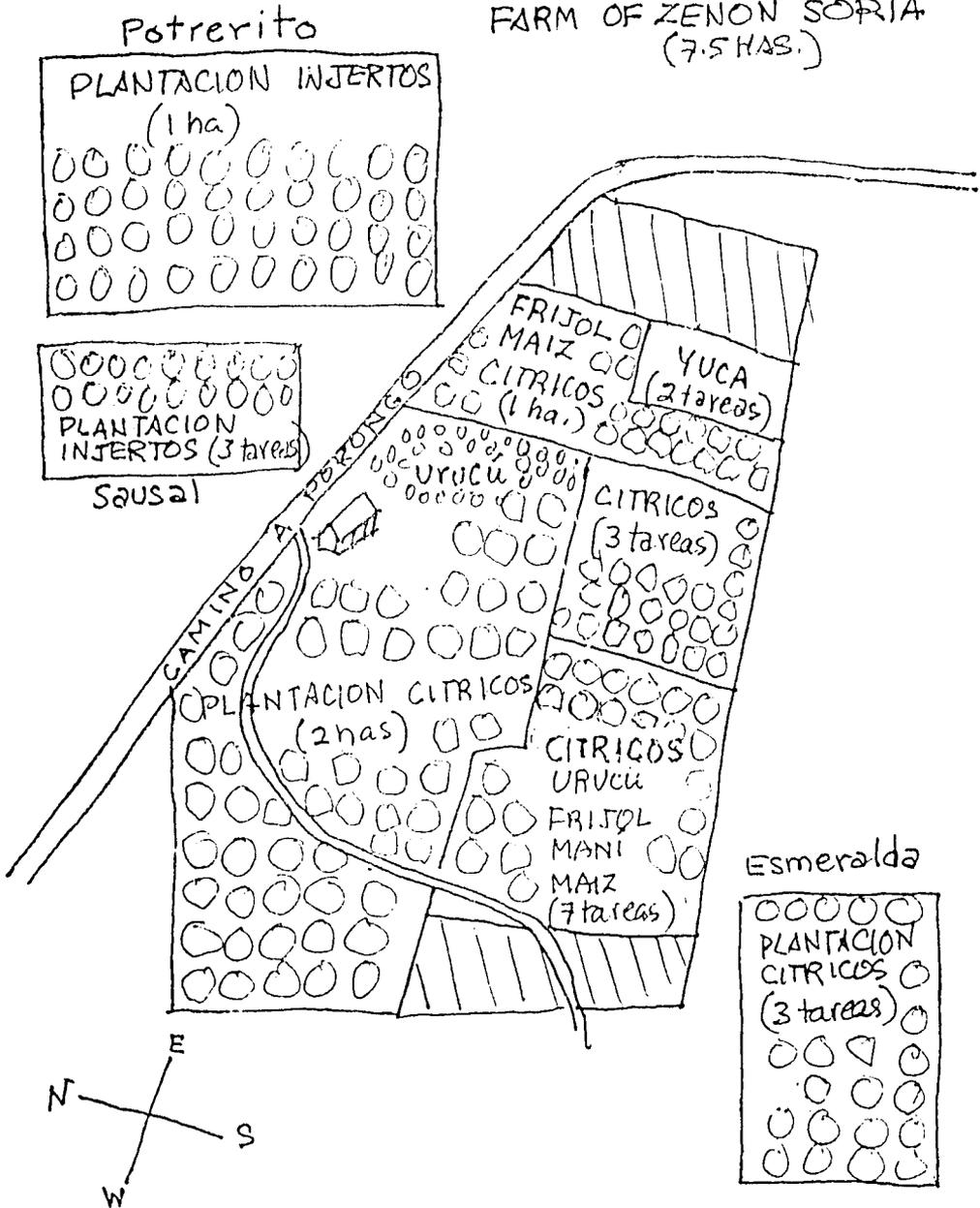
In addition to fruit, most farmers in Porongo also grow other crops. These include yuca, corn, beans, sugarcane, and urucú (achiote). A few have invested in dairy cattle, which has obligated them to devote a portion of their already limited farm area to a pasture crop, particularly yaraguá. It is not uncommon for growers to raise these crops in association with their orchard crops. This is especially true in the early years of an orchard's development, when the young trees have not yet developed large leaf canopy's that completely shade out the orchard floor. Rows of corn, yuca, and sugar cane are frequently grown between the trees.

In the following pages we introduce the farm plans of two growers. The first is the five-hectare farm of Prudencio Molina, which is divided into five crop lots and contains associated plantings of beans, yuca, and corn. The second is the farm of Zenón Soria, who owns a total of 7.5 hectares distributed over four widely separated locations. The principal farm property consists of 5.9 hectares and is divided into seven lots. The balance of this grower's holdings consist of 3,000 M² in the community of Esmeralda, another 3,000 M² property in Sausal, and a one-hectare orchard of hybrid citrus in the community of Potrerito.

PORONGO:
FARM OF PRUDENCIO MOLINA
(5 has.)



PORONGO
FARM OF ZENON SORIA
(7.5 HAS.)



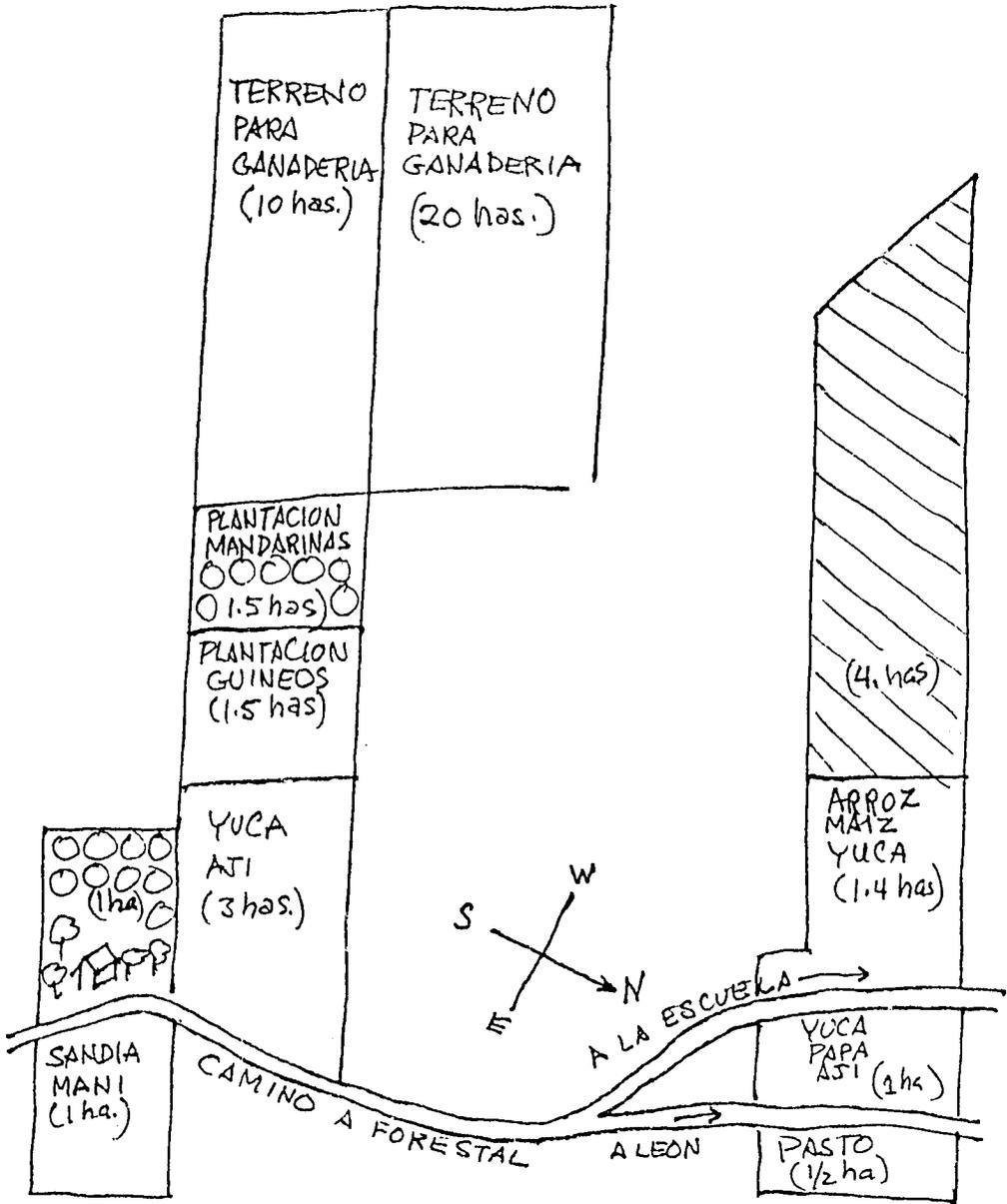
LAND HOLDINGS IN FORESTAL

Forestal was colonized under a private sector initiative resulting from a government land grant. The original properties were distributed in long rectangular strips of roughly 15 hectares apiece. As with the other communities reviewed for this study, a process of land consolidation has occurred as a result of early colonists selling out and migrating to Santa Cruz or returning to their regions of origin. There are now families which have acquired title to 50, 100, even 250 hectares of land. At the other extreme, there are landless and near-landless families who came to Forestal providing labor services and remained there to settle on small properties donated or sold by the larger landowners.

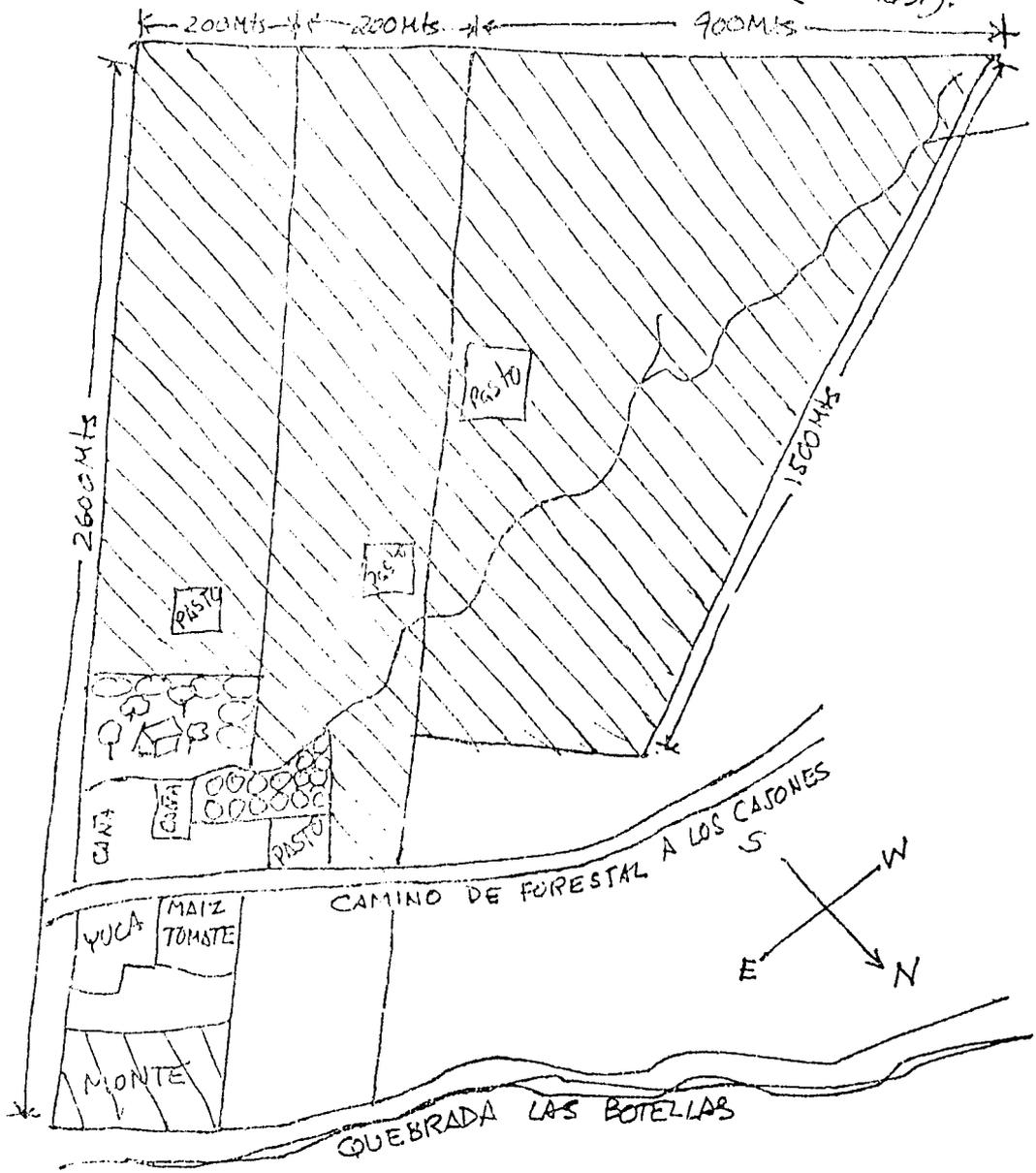
Of all the communities surveyed, Forestal is by far the most diversified. To begin with, dairy and beef cattle constitute a major enterprise here, so those families with larger farms have dedicated large areas to natural pasture supplemented by plots of yaraguá grass. But in addition, farmers in Forestal literally grow a little of everything. One finds citrus orchards near the farmhouse along with plantains, guineas, and mangoes. Then, in small plots in scattered locations about the farm can be found yuca, rice, corn, tomatoes, chili peppers, peanuts, potatoes, watermelons, and sugarcane. Many of these crops are grown in associations--usually interspersed with rows of yuca, corn, or plantains.

Below we look at the farm plans of Remberto Vargas (45 hectares) and Luis Martínez (250 hectares). The Vargas property is divided into two separate (noncontiguous) holdings of 38 hectares and 7 hectares, of which only about $\frac{1}{4}$ and 2.5 hectares respectively are cultivated intensively (excluding tree crops). In the case of the Martínez property, cultivated area amounts to only $\frac{1}{4}$ hectares; the balance is left to uncleared forest and natural grazing land for the family's herd of 50 head of livestock.

FORESTAL: FARM OF KEMBERTO VARGAS (45 has.)



FORESTAL: FARM OF LUIS MARTINEZ (250 has.)



MOON BELIEFS

Most small farmers in the tropical lowlands still plan a variety of agricultural and subsistence tasks in accordance with different phases of the moon. These beliefs are inherited from parents and ancestors, yet their current practitioners can invariably cite incidents from their own experience that demonstrate the validity of "moon power". While the moon's influence is an article of total faith, nobody can explain how this power actually works or why; but it does work.

PLANTING

It is best to plant after the moon has passed out of its first quarter and is waxing toward full. Planting can safely continue through the third (waning) quarter.

To plant crops with fruit that grow beneath the ground--like potatoes, yuca, peanuts, etc.--the best day is on the eve of the full moon.

When planting crops with fruit that grows above ground--like corn, beans, rice, tomatoes, sugarcane, and fruit tree crops--it is best to wait until the moon has entered its waning stage (third quarter only).

HARVESTING

Three days after the full moon is the best time to harvest grain crops such as rice and corn.

OTHER TASKS

The best time to prune fruit trees is in the third (waning) quarter. This is also the best time to conduct weeding, to prepare yuca and sugarcane seed, and to harvest poles for tool handles, posts for home construction and fencing.

CHAPTER III.

FARMING PRACTICES FOR SPECIFIC CROPS

In this chapter are reviewed the most frequently grown crops of farm households who participated in the Traditional Practices Project. We begin with a description of the trio of staple crops of the rural diet--rice, corn, and yuca. Next are presented three vegetable crops which are gaining recent importance as commercial enterprises for many farm households--beans, tomatoes, and chili peppers. The chapter then proceeds to cover a fairly wide variety of tree crops. These include coffee, oranges, tangerines, lemons, mangoes, plantains, guineo, and achiote. We conclude with a number of miscellaneous crops including sugarcane, yaraguá pasture grass, peanuts, and watermelon.

RICE

SUMMARY OF CROP PERFORMANCE (1980-1981)

Of those farmers from the tropical lowlands who participated in the Traditional Practices Project, 16 kept complete crop records regarding their production of rice. These farmers represent four of the five project communities: Valle Hermoso (3), Naranjal (4), Forestal (3), and Torrente-las Abritas (6). A summary of their efforts is presented below.

AREA AND QUANTITY PLANTED: The above growers planted rice in lots which varied from 0.125 to 2.0 hectares, with the average area being just under a hectare (9,700 square meters). The average quantity of seed planted was 2.8 arrobas (70 lbs). No natural or chemical fertilizer of any kind was employed.

LABOR USE: The average family employed 29 days of family labor and 20 days of hired labor to plow, plant, cultivate, and harvest their rice crop. For the land preparation stage average labor use was 12 person-days, for planting 3.5 days, for cultivation (weeding and fumigating) 10 days, and for the harvest 21 days were required. No use of animal traction was reported; all farmers prepared their land with hired tractor services. The average household reported an expenditure of 600 pesos (US\$24) for tractor services, including a single plowing and harrowing. These costs, of course, do not include expenses incurred for land clearance in areas of virgin forest or properties which had laid fallow several years. For their fumigation tasks, farmers reported the use of insecticides (Endrin, Azodrin) and herbicides (U-46D, 2-4-D, Tordon, Sorcopur, and Stam). The average investment in these chemicals totaled 300 pesos or US\$12.

YIELDS: Rice production is generally measured in fanegas, with each fanega equal to 16 arrobas of unhusked rice (arroz en chala). The average farmer harvested 109 arrobas of threshed but unhusked rice. Participating farmers estimate a loss in the milling process of 20-25%, which would leave some 80-90 arrobas of milled (husked) rice or about 30-35 arrobas of product for every arroba of seed planted.

INCOME: For the 1980-81 crop year, production costs averaged 5,292 pesos (US\$211.68). Utilizing an average price of 71 pesos per arroba of unhusked but threshed rice (arroz despigado en chala), the average harvest totaled 13,979 pesos (US\$559), which gives an income of 183 pesos (US\$7.31) per day of family labor utilized. In 1980-81 hired laborers received a wage averaging 80 pesos per day, so the return to family labor was 2.3 times higher.

For the 1981-82 crop year, harvest income less production costs generated an average net income of 296 pesos (US\$11.84) for every day of family labor utilized. The prevailing wage rate for hired labor during that crop cycle was 130 pesos per day, again yielding a return of 2.3 times higher to family labor.

LAND PREPARATION TASKS

Land clearance tasks are required before a rice property can be plowed. These clearing activities can be extremely labor intensive, particularly if carried out in areas of virgin forest. They include brush cutting (rozada del chume), tree cutting (tumbada), burning (quemada), reburning (basurada), and trunk pulling (destroncada).

BRUSH CUTTING: To clear a hectare of brush and undergrowth takes about 15 labor days. It is conducted by hand with the laborer using a hook and machete. The hook is simply a stick which is hooked at one end. It is used to hold brush upright so it can be cut down with a single swing of the machete. Additionally, the hook protects the worker from (1) scratching himself in thorny underbrush, (2) being cut by the machete itself, and (3) from possible snakebite. Whether or not the brush cutting occurs in areas of heavy or light tree cover, the rozada del chume is the first task of the land clearing sequence and needs to be repeated every time the land has been left in fallow.

TREE CUTTING: In lands allowed to lie in fallow, trees are obviously much smaller. Their trunks are cut at ground level when the circumferences do not exceed a few centimeters in diameter. In areas of virgin timber or simply mature trees, their trunks must be cut about 50 cms above ground level using axes or saws. The fallen trees must in turn be cleared of their branches so they can be dragged or rolled to the field boundaries once a tractor is available. The debris from cut branches and fallen trees is left to dry for several months prior to burning. At least six days of labor is required to conduct tree cutting on a hectare of land.

BURNING: Once allowed to dry, the brush and tree debris is burnt. Prior to starting the fire, the farmer takes two precautions. The first is to clear an open space around the perimeter of the area to be burned, a task known as the chaqueada. This is intended to create a fire lane to prevent the accidental burning of adjacent land. The second precaution is to advise one's closest neighbors that a quemada is to take place. At least two laborers are required to conduct (and control) the burning.

REBURNING: The second burning or basurada consists of gathering and burning all the branches, trunks, and other debris that did not completely burn the first time. Once this task has been completed the property is considered chaqueado (burnt). It is noteworthy that in areas of heavy tree cover, the quantity of ash residue resulting from the burnings will be much larger than when only brush and small trees have been cleared. Heavy ash can be harmful to the future crop unless first allowed to be dissolved following one or more days of rainfall. Furthermore, the choice of the day for burning will depend on the direction of the wind. Farmers usually wait for a day when the wind is blowing from the north, because such winds tend to be constant in both direction and intensity. In contrast, winds from the south are considered dangerous--even "crazy"--because they shift and their intensity fluctuates.

PULLING TRUNKS: In land with formerly heavy tree cover, pulling trunks is the hardest task of all and can easily consume 20-30 days of labor per hectare. Farmers often contract specialized laborers with power saws to conduct this task for them. For a hectare of trunk clearing a trato or contract is negotiated. The contractor is required to dig around the root of each trunk, sever the major roots with axes or saws, pull the trunk, and fill the hole left by the uprooted trunk. Later, when the farmer has procured a tractor for plowing, he will establish another contract with the tractor driver to haul the uprooted stumps (and unburnt tree trunks) to the edge of the cleared field. In 1980-1981 farmers participating in the Traditional Practices Project were paying no less than 1,500 pesos (US\$60) per hectare plus meals for a trato de destronque and another 200-300 pesos (US\$8-12) per hour to the tractor operator for stump hauling.

PLOWING AND PLANTING TASKS

Plowing tasks include one or more plowings (aradas) and one or more harrowings (rastreadas). Planting tasks include seed preparation, which in turn involves threshing, soaking, and disinfecting the seed itself, then planting (usually done with a mechanical planter), replanting, and finally delineation of planted areas with crop boundaries seeded to another crop (surquenda).

PLOWING AND HARROWING: Most farmers plow and harrow with a tractor. Depending on the size of the tractor, it takes up to five hours to plow a hectare of land and another two hours to harrow. In early 1981 the cost of plowing one hectare ranged from 1,500 to 2,000 pesos (US\$60-80), and the cost of a single harrowing about 450-500 pesos (US\$18-20) plus additional "favors" to the tractor operator like meals, beer, cigarettes. The typical plowing depth is about 30 centimeters. The most critical factor regarding the plowing task is to make sure grass and weeds are thoroughly uprooted and buried. If planting does not immediately follow plowing and harrowing, it will be necessary to plow and harrow again to dispose of the weed growth that has grown up meanwhile.

PLANTING AND REPLANTING: Although planting is sometimes done with a tractor-drawn planter, most farmers employ a hand-carried planter. This implement holds a tolde or storage chamber for two pounds of seed. Each blow of the planter deposits some 10-15 seeds. These "hills" are spaced at 35 centimeter intervals and in rows of equal distance one from the other. Low-lying sections of the field are planted first. If it rains during planting the entire field must be harrowed and replanted. This is because following a rain the soil surface bakes to a hard crust which prevents the seedlings from sprouting. When the field is planted manually, it takes 3-4 days of labor per hectare. Seeding by tractor for the same area only requires an hour.

Once a planting is completed, the complimentary task of surqueo or "bordering" is carried out. About every ten rows and at intervals of one meter between hills, the farmer plants corn. This crop serves to divide up the field into harvesting task areas. The corn, of course, is mainly planted for home consumption rather than commercial sale. These plants also serve as a wind screen.

SEED PREPARATION: Most farmers use rice seed stored from their previous year's harvest. To prepare it for planting, it is first necessary to despicar or thresh the seed to separate the grain from the stems. This is done with a pole and heavy blows to the piled grain clumps. The threshed rice is then soaked in a large barrel of water. The good grain sinks to the bottom while the diseased or rotted kernels and stalk residues float to the top. The grain is then removed, squeezed of excess moisture, and left to dry on a leather hide. Next, the seed must be disinfected. A solution is prepared consisting of 10-12 tablespoons of Azodrin 40 for every 20 liters of water. The seed is then soaked in this chemical solution for about 30 minutes, then squeezed and again left to dry. For every hectare to be planted, a farmer needs to thresh, wash, disinfect, and dry about three arrobas or 75 pounds of seed. During the seed preparation process there will be a shrinkage in quantity of about 8-10 pounds. Had the farmer purchased this amount of seed instead of preparing his own, he would have had to spend about 225 pesos (US\$9).

CULTIVATION AND HARVESTING TASKS

WEEDING: The first weeding or primera carpida is usually undertaken when the rice plants are about 30-40 centimeters high. The task can be conducted with a variety of tools including the shovel, hoe, or machete. If the soil is sufficiently humid, weeds are often pulled by hand. The major consideration is to make sure the grass or weeds are completely uprooted. Of course, weeding in this fashion is an extremely labor-intensive task. For a single hectare some 10-15 person-days of labor are required. Such labor investments can be replaced by the use of herbicides, the most common ones being Herboxone (at US\$9 per liter) and Supernox (at US\$7 per liter).

For most rice crops a second weeding (segunda carpida) is required, and sometimes even a third. These subsequent weedings are somewhat less demanding, however, absorbing about 3 days of labor per hectare.

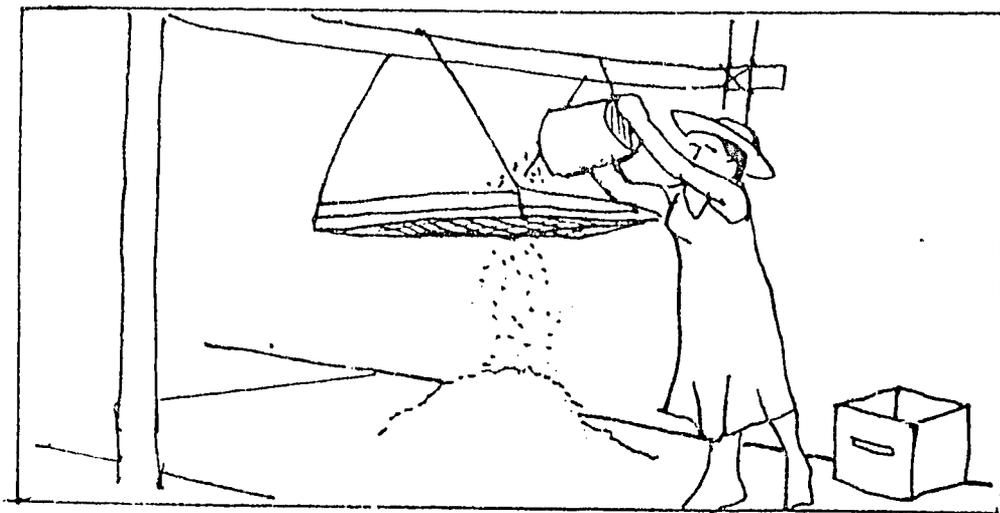
FUMIGATION: The rice crop is mainly attacked by two blights. The first is known as Petilla and is treated with Endrin or Ambus. The second is the Quarteador, which is treated with Folidol or occasionally Endrin. These chemicals are mixed in water and applied with a backpack sprayer. The task usually requires two laborers: the person spraying and another to mix the chemicals. Fumigations will be repeated as often as necessary until the rice plants sprout their grain heads. A few farmers also apply liquid fertilizers such as Poliar and Nitrofosca to treat those sections of the field where growth appears deficient or sickly.

HARVESTING TASKS: When the rice field is located far from the farmhouse it is necessary to construct a rice hut or choza for temporary storage of harvested grain. A large ground cloth or mantel is hung from the shoulders of each harvester such that the mouth of the resulting bag is slung about waist high. Rice is usually harvested with knives or sickles. The stalk is cut about six inches below the panicle, leaving the remaining stalk to be harvested as rastrojo (residue) by grazing livestock. The panicles are cut one by one, plant by plant, until a fistful is held. This fistful is then dropped in the harvesting sack, also called a quepichana. When the sack is full it is taken by the harvester to the choza and weighed. Hired laborers in early 1981 were being paid 6-11 pesos (US\$0.24-0.44) per arroba of 25 pounds. To harvest a hectare of rice approximately 20-25 days of labor are required. Harvested rice not placed in a rice hut is usually stored temporarily in the field, in piles called pirhuas. These are covered with nylon sheets to protect the grain from unexpected rain. When the rice harvest is complete, the contents of each pirhua are then transported to the farmhouse. There they are placed in thatch-roofed rice huts and allowed to dry until ready for threshing. It is important to turn over the contents of the rice hut every few days so that the grain will dry evenly, and also to avoid destruction of the grain because of humidity-caused rotting or spontaneous combustion.

In a good year, farmers can expect to harvest about 30-40 quintals (3,000-4,000 pounds) per hectare. Normal production is closer to 25 quintales. These estimates refer to yields with traditional criollo varieties, for which the return is roughly 40 pounds for every pound of seed utilized. Farmers using improved, high-yield varieties can expect a doubled yield exceeding 90-120 pounds harvested for every pound of seed. These figures refer to unhusked rice. In early 1981, first-quality unhusked rice sold for about 1,500 (US\$ 60) per quintal, while second quality sold for a slight discount or about 1,400 (US\$56) per quintal.

But before it can be sold it must be threshed. There are three principal threshing methods. The first is mechanical threshing, which is conducted at a rice mill and cost--in early 1981--some 20-25 pesos (US\$80-1.00) per fanega of 400 pounds plus the cost of transporting the rice to the mill. The second method is to beat the rice with clubs. The third is to pile the grain and stalks on a threshing floor, then drive horses around and around on it.

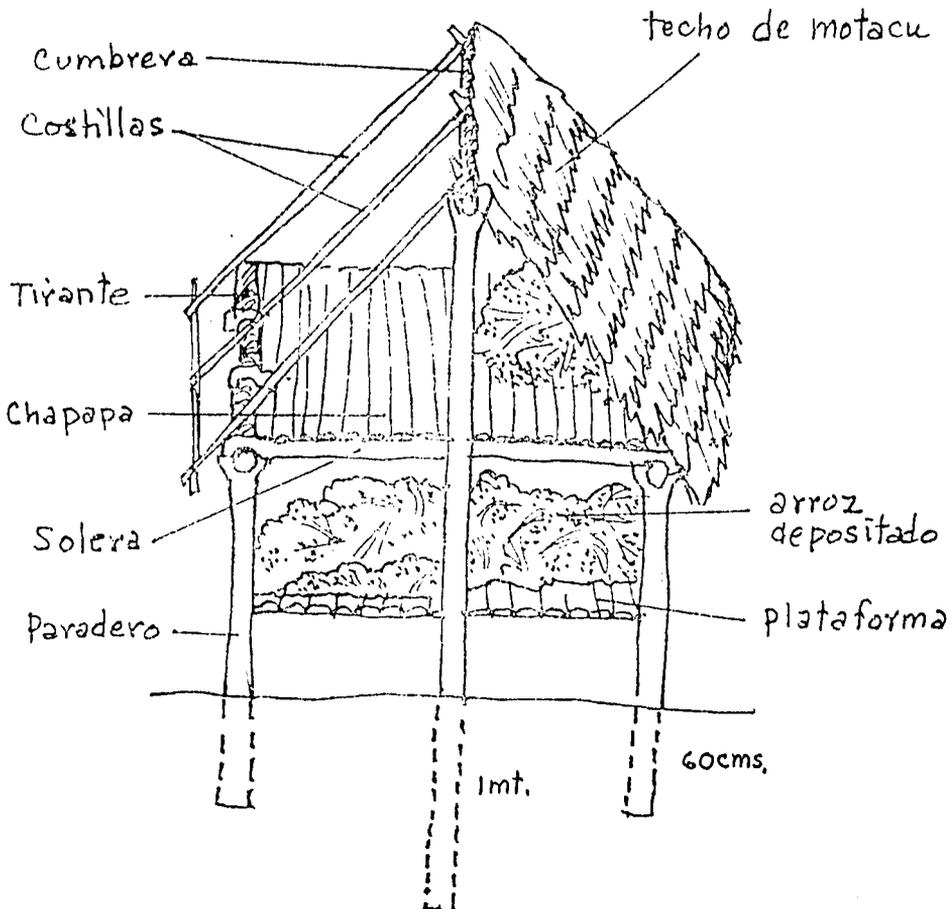
Once threshed, the grain is sifted through a saranda or elevated screen. The clean, unhusked grain falls through and is collected below on a plastic sheet. The residues of twigs and stems--collectively known as jachi or malojo--are saved and fed to pigs. There are still finer residues to be separated, however, and this chaff (known as jachisingo) are winnowed away by pouring the rice from a gourd during a windy hour of the day. The cleaned grain is finally left to sun-dry for a few days until a buyer is selected. At night, though, the grain must be brought inside the farmhouse or rice hut to protect it from dew.



Screening Unhusked Rice

RICE STORAGE HUT

Most small farmers store their rice harvest in a storage hut or choza de arroz. The structure is entirely built from local materials and put together by the farmer himself. The choza usually consists of two floors or platforms and is supported by posts. The center-posts are sunk as deep as a meter, the corner posts about 60 centimeters. The roof is constructed of split branches of the motacu palm tree. The rice itself is stored in clumps, with the grain still attached to the stems.



CORN

SUMMARY OF CROP PERFORMANCE (1980-1982)

Virtually all rural households who participated in the Traditional Practices Project grew corn in 1980-81 and 1981-82. Most of these producers planted corn for subsistence purposes, not commercial sale: for delineating task area borders, for providing shade to coffee seedlings, and as associated plantings among citrus orchards. The principal varieties used were Cubano Amarillo and Cubano Blanco. However, during the two-year period cited, a total of 12 project participants also grew corn in pure stands on a commercial basis. It is their composite performance that is summarized below.

AREA AND QUANTITY PLANTED: Area planted varied from $\frac{1}{10}$ ths to 2 hectares, with the average planting being 1.1 hectares. The average quantity of seed utilized was 1.2 arrobas or 30 pounds. None of the participants bothered to disinfect their corn seed nor utilized natural fertilizer. Only one farmer used chemical fertilizer, and only in a symbolic quantity (spending a mere 100 pesos or US\$4). With regard to land preparation, only five farmers employed a tractor to plow and harrow the land subsequently planted to corn.

LABOR USE: The average participating family utilized 23 days of family labor and 15 days of hired labor to plow, plant, cultivate, and harvest their corn crop. For the land preparation stage, average labor use consisted of $\frac{1}{2}$ days of family labor and 6 days of hired; for planting it was 3 days and 1 day respectively; for cultivating tasks 9 days of family and $\frac{1}{2}$ days of hired were used; and for harvesting, 8 days of family and 5 days of hired were employed. It is noteworthy that all labor at harvest went to gathering and storing corn in the form of ears, not shelled grain. Hence, no labor was spent for shelling.

YIELDS: The average yield was 120 arrobas (3,000 pounds) of unshelled corn (maíz en chala). Since no shelling took place, the net yield in pure grain can not be calculated precisely. However, estimating a net grain yield of 40% of total unshelled ear weight, the average result would be about 1,200 pounds of grain. This would yield about 40 pounds of grain for every pound of seed planted.

INCOME: Excluding the value of family labor, the production costs of the average corn-growing household totalled 1,336 pesos (US\$53.44) in the 1980-81 agricultural year. The average price at that time was about 44 pesos (US\$1.76) per arroba (25 pounds) of unshelled corn, or some 3,780 pesos (US\$151.12) in total. This would result in a net income of about 105 pesos (US\$4.20) for every day of family labor invested in the corn crop. Hired laborers were earning 80 pesos (US\$3.20) per day during that crop cycle.

In 1981-82, at an average price of 53 pesos per arroba, the net income for every day of family labor invested in the corn crop came to 214 pesos or US\$8.56. By comparison, hired laborers were earning 115 pesos (US\$4.60) per day.

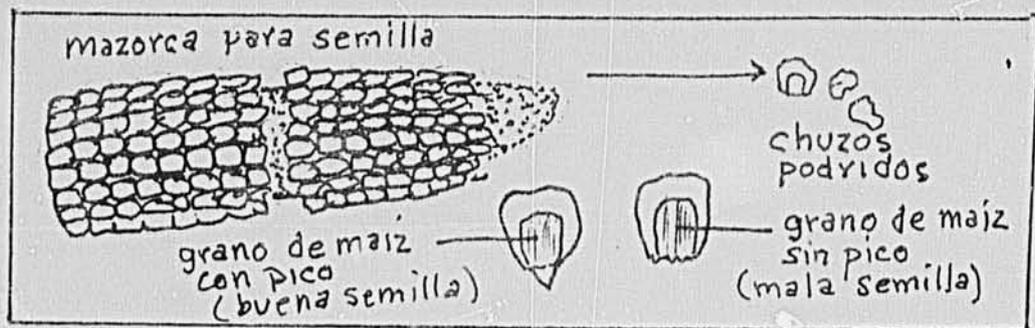
LAND PREPARATION TASKS

Corn is planted mainly as a subsistence crop, usually in association with other crops such as rice and yuca. Thus, the land preparation tasks are the same for both crops. When the crop is to be planted in virgin or long-fallowed land, the conventional tasks of mosada (brush cutting), tumbada (tree cutting), quemada (burning), resaca (reburning), and destroncada (trunk pulling) are required. These have already been described in the section on rice.

In contrast, when corn is planted in pure stands following a previous crop, the major land preparation task is the clearing away of the residues, known as chaqueo. This amounts to a heavy weeding and is performed with a shovel. Farmers seldom plow under the crop residues in preparation for a planting of corn. Instead, the residues are chopped down, gathered, left to dry, and then burnt. In the case of a dry year, farmers will often leave the chopped residue in place on the soil surface, a practice which helps preserve soil moisture.

PLANTING TASKS

SEED SELECTION AND PREPARATION: Most farmers use their own seed, stored from a previous harvest. The grain is stored unhusked and in whole ears until it is ready to be used for seed or consumed by the farm household. To prepare the seed the farmer must first select the largest ears. Next, each ear is husked. Once husked, it is customary for the tip of the ear to be stripped of its kernels, for these tend to be of inferior size and quality. Called chuzos, this inferior grain can be used as feed for chickens. A good ear of corn (mazorca) suitable for seed should have some 14-16 rows of kernels.



The unhusked ears can then be shelled by hand, or the kernels chipped off with a knife point, or beaten in a tacú (wooden mortar). The beaten kernels make for better seed because they separate cleanly, the whole kernel intact. In contrast, slower shelling methods often result in the breakage of kernel tips, thereby spoiling their use as seed.

When shelling corn in a tacú, it is first necessary to remove one row of kernels from each ear. This keeps the ears from jumping out of the mortar when beaten.

Farmers do not disinfect their seed. The principal varieties used are of the white and yellow Cubano varieties, known for their exceptional hardness. This is an important feature considering the hand-shelling methods farmers use for seed preparation.

PLANTING: There are two ways to plant corn: in pure stand or cerrado, and in association with other crops. Corn planted in pure stand requires a much more dense pattern of seeding, with distances between rows varying from 50 centimeters to one meter. These rows are called surcos (rows) or hileras (lires) or callejones (alleys). Farmers usually space the distance between hills of the same row equal to the distance between row. This is known as planting en cuadro (in square). Spacing varies a great deal from one farmer to the next in accordance with the producer's perceptions of the quality of the soil and its humidity; the more fertile and humid the soil, the denser the seeding pattern.

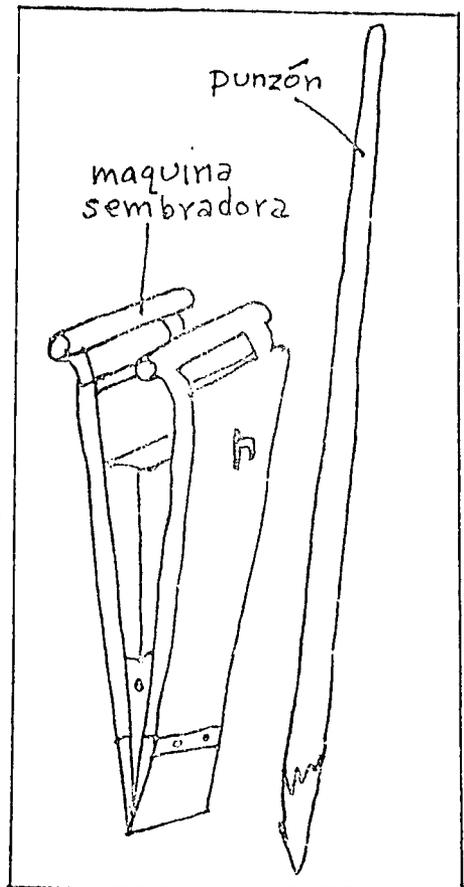
When planted in association with another crop, farmers usually abandon the cuadro system, planting one row of corn every 5-10 meters. The distance between plants remains highly variable depending on whether the corn is being used as a windscreen, for delineating harvest task areas, for shade, or to meet family consumption. Planting spacing is also influenced by the farmer's perception of weather factors. If he perceives a "bad" year, he may reduce seeding density to minimize losses. On the other hand, if the household owns

major livestock, like a team of oxen or several cow, which are dependent on corn stalk fodder, the farmer may actually increase the density of planting; in such a system corn is seen as a fodder crop, with the grain a byproduct.

There are three principal planting methods. The first is planting by furrows plowed by an ox-drawn wooden plow (arado de palo) or a horse-drawn steel plow (arado de vertedera). The furrow is completed with two passes of the plow. On the first pass the plowman opens the furrow. He is followed by a second person who seeds the furrow. On its return trip the plowman closes the furrow.

In many parts of the Tropical Lowlands farmers have begun to use manual planters. The device was invented by Mennonite settlers. It consists of a two-handled planting tool which tapers to a metal point. Between the handles there is a small seed bin with a lower opening that can be regulated to deposit a variable quantity of corn seed--4-6 kernels at a time. If used for planting rice, the tool can be regulated even more finely. The major advantage of the manual planter is that it allows both the opening and planting of hills by the same worker.

The most traditional planting technique employs a simple planting stick known as the punzón. It is round and pointed at one end. The harder the blow the deeper the seed hole. The task involves two people, one to open the holes and a second to seed and cover the hole with dirt pushed with the foot. The punzón is ideally suited for planting tasks conducted in areas of recently-cleared land, where the presence of tree trunks and other debris precludes use of draft animals.



Traditional and Modern Plowing Implements

CULTIVATION TASKS

Lowlands farmers generally do not bother to fumigate their corn crop. Perhaps because it is regarded primarily for subsistence consumption than for market sale, farmers generally do not invest in insecticides, herbicides, or leaf fertilizer for their corn crops.

The only cultivation tasks conducted are weeding, of which there are usually two. The first weeding generally occurs after about one month following germination. The second occurs about the time the corn crop begins to flower, usually in the third month. As with other crops, the task of weeding corn can be conducted in a variety of ways using the shovel, hoe, machete, or even the hands. The major consideration in weeding, of course, is to make sure the weeds are fully uprooted.

Once the corn crop matures to the soft corn or choclo stage the field must be defended from bird attack. The bird threat is heaviest for those farmers who plant earlier than their neighbors. The standard bird defence activities include the erecting of scarecrows and the use of slingshots. The most serious of bird predators is the parrot which, because of his powerful beak, can rip through the husk of the ear and expose the kernels. Once exposed, many other smaller birds can attack these ears as well.

HARVESTING

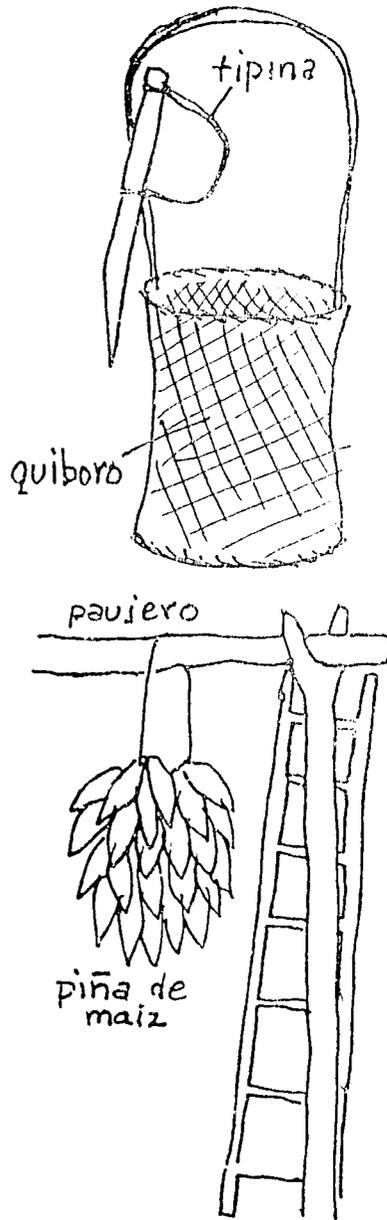
There are actually two harvest stages for corn. The first begins after the crop is about three months old. This is a 3-4 week period when the ears are filling or filled out and their kernels sweet and tender--the choclo season. The family simply begins to harvest a few ears a day according to its needs. The ears are neither counted or weighed unless the farmer plans to sell them, which is rare. For a variety of recipes involving choclos, the reader is referred to the chapter on Nutrition.

It is only when the corn has dried hard on the stalk that it actually is considered maiz. This crop can then be harvested after 5-6 months following planting. If the corn is to be sold, the ears will be husked at the time they are stripped from the stalk. For this task a farmer will use an implement known as the tipina for opening and removing the husk. The tipina is made out of wood, pointed at one end, and has a leather handle. The harvester loads the husked ears into a shoulder basket called the quiboro, made of woven motacu palm leaves, or uses the shoulder-slung sack (also used for harvesting rice) known as the quepichana.

Corn for commercial sale must first be shelled (desgranado) and then winnowed (venteado) until it is clean. Working all day long, a farmer can shell in a tacú about 100-150 pounds of grain in a single day. In early 1981, shelled corn was selling for between 40 and 60 pesos (US\$1.60-2.40) per arroba of 25 pounds.

But as mentioned previously, dry corn is fundamentally considered a subsistence crop to be consumed on-farm, particularly by poultry. The ears are harvested and stored with their husks. This practice minimizes damage by moths and borers. A common technique for storing corn is to tie the ears together (using pieces of husk as twine) and hanging them on a rope slung from a roof beam, elevated caje (paujero), or tree branch. The clustered pairs of corn ears are called piñas.

The stalks of the corn plant left in the field are called huero. If the farmer has major livestock, he will use these residues as fodder. For this the stalks must be chopped down and carried to the farmhouse. There they are placed in elevated storage, such as the crotch of a tree, or in some form of primitive silo. Raisers of livestock often grow --on an overlapping basis--as many as three crops of corn per year. No more than two of these crops are expected to produce grain yields of any significance due to unfavorable weather conditions (extreme cold in the winter, drought in the summer). But all three crops produce fodder.



YUCA

SUMMARY OF CROP PERFORMANCE (1980-82)

Yuca is a major staple of the Tropical Lowlands diet. Most rural households use yuca in a wide variety of dishes as well as a substitute for bread. Production is predominantly for subsistence consumption rather than market sale. The following summary of crop performance is based on the journal annotations of ten participants in the Traditional Practices Project, of which four grew the crop in 1980-1981 and six in 1981-1982.

AREA AND QUANTITY PLANTED: The crop lots planted to yuca varied from 0.2 to 1.3 hectares, with the average area being 0.6 hectares. Seed consisted of pieces of stalks taken from the best plants of the previous year's harvest. These pieces are called cañotos; they are about 3 centimeters in diameter and 10-15 cm. long, with multiple eyes per piece. The cañotos are gathered into armloads (brazadas) known as jases which, depending on the size of the worker, can contain from 50-80 stalk pieces. To plant the average area of 0.6 hectares indicated above, participating farmers utilized an average of eight jases. No farmer assigned a value to the seed planted because it came from his previous harvest. In general, farmers do not buy yuca stalks for planting.

LABOR USE: The average yuca planting required 34 days of family labor and 11 days of hired labor. Nine days of family and 2.5 days of hired labor were used in the land preparation stage. The planting stage incurred 5 days of family and 2 days of hired labor. Cultivation tasks--which only included weeding--required 15 days of family and 4 days of hired labor. Harvesting involved 5 days of family and 3 days of hired labor.

It is necessary to point out that the above averages understate labor use, particularly for harvest tasks. In the first place, since yuca is mainly a subsistence crop, and because it spoils quickly (after a week), most families "store" their yuca harvest under the soil, pulling only a few plants per week to meet household subsistence needs. This practice causes many farmers to not assign a labor value to yuca harvesting since in any given day only a few minutes were spent on this task. In the second place, five of the ten producers who kept records sold their harvest planta parada, i.e., the buyers purchased whole sections of the field for a fixed price, before it was harvested, and had to supply their own labor which, of course, was not recorded by project participants.

None of the yuca growers used machinery nor animal traction for land preparation tasks or planting.

YIELDS: Farmers estimate that it is generally possible to harvest from 1/4 to 1/2 an arroba, i.e. 6-12 pounds, from each yuca plant. For the average area of 0.6 hectares summarized here, the estimated production is 471 arrobas (11,775 pounds), which is equivalent to 118 quintals or 5.3 metric tons.

INCOME: As mentioned previously, yuca is grown mostly for family consumption. When the crop is sold, it is customary for the buyer to purchase a given area of field and harvest its contents at his own expense. This is the preferred method of sale because of the scarcity and high cost of transport services.

In 1980-81, the average farmer obtained a net income (in-kind and/or cash) of 274 pesos (US\$10.96) for every day of family labor invested in the yuca crop. The daily wage paid hired laborers at that time was 80 pesos (US\$3.20), suggesting a return 3.4 times the going rate for hired labor.

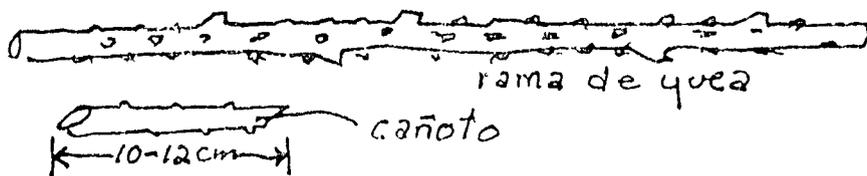
In 1981-82, the average farmer obtained a net income of 645 pesos for every day of family labor invested at a time when private labor could be contracted at 120 pesos per day. This suggests an even higher net return of 5.4 times the hired labor wage rate.

LAND PREPARATION

Yuca is usually planted in a crop rotation which follows rice. This means that the land has already been prepared for the earlier crop, and all that is really necessary is a chagueo to gather and burn any remaining stubble and its accompanying weed growth.

SEED PREPARATION

Yuca is grown from stalk segments remaining from a previous harvest. A farmer selects those stalks or branches that are the thickest in diameter--at least 3 centimeters--and which have an abundance of eyes. The selected branch is first trimmed of its offshoot branches. It is then cut into segments of 10-12 centimeters in length. Once cut, each segment is tapered on an incline at both ends with a couple blows of the machete. Each segment should also have six or more eyes. When the segment is cut it should emit a white, milky resin from both ends. This is where the new roots will grow; new stalks will grow out of the eyes.



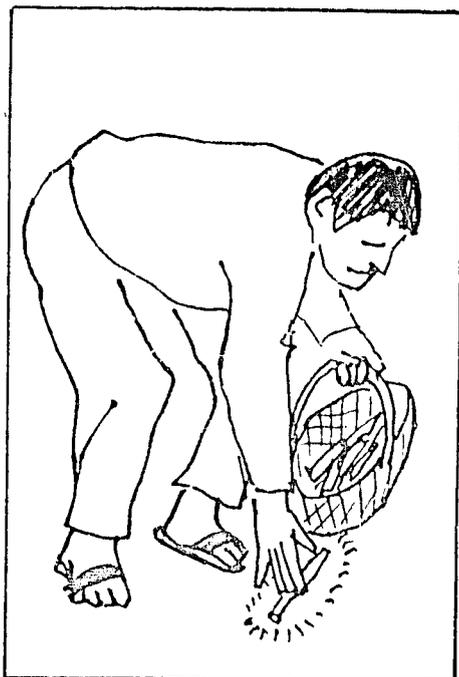
The stalk segments or cañotos are gathered in quantities sufficient to cover the field to be planted. The planting density can vary from 80 to 120 centimeters between plants; thus, anywhere from 1,000 to 1,500 segments may be needed to plant a hectare.

PLANTING

Yuca is usually planted en cuadro or "squared" such that there is a uniform distance between plants and between rows. When planted by hand, the first task is to carve out little basins in the soil about 10-15 centimeters deep. These should be just long enough to accommodate the seed pieces. Once the holes are dug, the planter places one seed segment per hole. The segment is placed horizontally, not vertically. The planter then kicks a thin layer of soil over the segment to bury it.

When yuca is planted in tractor-plowed land, the soil is soft enough so that it is not necessary to carve basins for the seed pieces. The planter simply places the pieces on the ground and teps on them, driving them below the soil surface.

Yuca can also be planted by furrow. The ox-drawn plow opens the furrow on the first pass, the seed pieces are placed at the designated interval, and on the return pass the seed is buried.



Planting Yuca

Yuca is commonly planted in association with corn, with the latter crop planted between every other row of yuca. This association works well because yuca takes 9-10 months to mature while corn matures in 3-4 months. In its early stage of growth, the yuca is protected by the wind-shielding and shading effects of the corn. Then, by the time the yuca plants reach the flowering stage--at about six months--the corn crop has already been harvested.

It takes a single laborer about 6-8 days to plant a hectare of yuca by himself. If the soil is humid, the plants will sprout in 10-15 days; if dry, in 25-30 days. At that time the farmer can take stock of which plants failed to germinate; he then replants. Since yuca is usually harvested over a period of several weeks, if not months, the month difference between original and replanted plants will hardly be noticed.

Yuca is usually planted between August and October. The most commonly planted varieties reported by farmers are Criolla, Moja Blanca, Colorada, Rosada, Rama Negra, and La Taparita. The last-mentioned variety is a fast-growing one which is reputed to be harvestable after six months.

CULTIVATION

For the most part, farmers do not fertilize their yuca plantings. Neither do they employ insecticides. The only cultivation task is really that of weeding. Given the plant's longer growing cycle, at least three weedings are usually required. The first weeding is normally conducted about one month after germination. Subsequent weedings will be conducted at intervals of 1-2 months. About mid-way through its nine month growth the yuca plant's leaf canopy becomes sufficiently thick to create shade conditions that finally retard weed competition.

HARVESTING

About a week after it is harvested, yuca tubers begin to turn black. For this reason the rural household only harvests what it already has a contract to sell or what it plans to consume within the next few days. Fortunately, yuca stores well in the pre-harvest stage and can be harvested over a period of several months.

Yuca harvesting is called arrancada or pulling. The harvester takes the plant stalk, heaves with his shoulders, and uproots the whole plant roots tubers and everything. This is always possible when the soil is humid. As the soil becomes dry it increasingly becomes necessary to dig up the yuca plant with a shovel or pick to loosen the soil.

Depending on planting density, a hectare of yuca can yield from about 1,000 arrobas (25,00 pounds) to twice that quantity. Although the yuca tubers are not really fully mature until the ninth or tenth month, rural households often begin to harvest for home consumption beginning in the sixth month.

When farmers sell their yuca, it is usually to owners of trucks, and the quantity sold is usually an entire truckload. A common transaction unit is the camionada (truckload) of 150 arrobas (3,750 pounds), which is about what a single pick-up truck can carry in a single trip. The price for this quantity in early 1981 was 2,000 pesos (US\$80). It is the buyers responsibility to provide the laborers to harvest this contract, which would represent the production of about 1/10th of a hectare.

TOMATOES

Only five farmers who participated in the Traditional Practices Project grew tomatoes, and complete crop records were only kept on three of them. There are good reasons why only a few households attempt this risky crop. The commodity requires intense labor investments as well as heavy expenditures on agricultural chemicals. Highly perishable, tomatoes can not be grown for commercial sale in those areas where transportation arrangements are uncertain. Finally, market prices for tomatoes in Santa Cruz usually fluctuate markedly from one day to the next. To grow potatoes, then, the producing household requires not only good technical skills but good marketing skills as well. Because of the risks involved, those families which do grow tomatoes only plant a fraction of a hectare. The following narrative is based on the experience of Sixto Banegas of the community of Forestal. Sixto planted a total area of 3,000 square meters.

LAND PREPARATION

Sixto prepared two separate crop lots: the first in fallow land and the second in a field previously planted to rice and corn. The first required heavy land clearance tasks including cutting, burning, and reburning. The second crop lot was simply cleared with machete and the residues burnt. The total investment in land preparation tasks came to 12.5 days of family labor and 5 days of hired labor.

NURSERY AND TRANSPLANTING

In a small piece of land, containing a rich supply of humus, Sixto prepared a nursery on an elevated platform 1.5 meters wide and 6 meters long. The soil for this nursery was well-tilled and with no clods of any kind. Before planting, the soil surface was leveled with the handle of a shovel. It was then seeded with 2 ounces of seed, sprinkled evenly throughout the bed. The seed was then covered with 1-2 centimeters of sprinkled soil. On top of the bed Sixto constructed a roof made of palm leaves to protect the seed from birds and rodents, on the one hand, and on the other to prevent a rain from caking the soil surface. The seeds germinated within four days. Thereafter the roof of the nursery was removed and the bed hand-watered on nearly a daily basis until the seedlings reached their transplanting size of 20 centimeters high.

The tomato seedlings were transplanted en cuadro or squared at intervals of 80 centimeters between plants and from one row to the next. The holes for the seedlings were prepared first, with the above spacing, and carved to a depth of 10 centimeters. Before removing the seedlings, the nursery was watered to loosen the soil so the plants could be easily removed without damage to their roots. Normally, one plant per hole was placed; but in cases of smaller seedlings, two were planted to a single hole. The transplanting occurred over a period of four days, utilizing only the mornings. It is not advisable to do it faster because one runs the risk at harvest of having too much produce maturing at the same time. In total, the Banegas household invested 20.5 days of family labor to tomato transplanting.

The best months to plant tomatoes are from March to June. Thereafter it becomes very risky because of the season of winter winds, known as sures (southerns) which literally burn the plants with cold.

CULTIVATION TASKS

The tomato cultivating method used by Sixto and most other tomato growers of the region is to leave the vines and fruit on the ground. He admits to knowing about another method where the tomato plants are staked and their stalks supported on wires. This is the preferred method, he says, when tomatoes are grown only for family consumption.

Weeding of his tomato crop began a week after transplanting. He proceeded to conduct three additional weeding. His total labor investment for weeding came to 34 person-days, of which half were family laborers and the other half hired. The second and fourth weeding were combined with a second task: that of aporque or hilling. This latter activity was conducted with a hoe and incurred another 11 days of labor.

Sixto invested 15 days of family labor and 750 pesos (US\$30) of agricultural chemicals to fumigate his tomato crop. He employed 1.5 spoonfuls of Parathion, 3 spoonfuls of Antracol, and 1.5 spoonfuls of leaf fertilizer. These products were mixed directly inside the tank of a backpack sprayer with water taken from a river 600 meters away. Sixto maintains that fumigations should not be conducted if it looks like it is about to rain, because a heavy rain will wash away the chemical residues remaining from the fumigation. He says that he has also used his backpack sprayer to spray water on his tomato plants during a period of drought.

HARVESTING

Ten weeks after transplanting, Sixto began to harvest his tomato crop. He harvested in three separate cortes or cuttings lasting over a period of four weeks. Using only family labor, the Banegas household invested a total of 29 days of labor during the harvesting process.

The harvest tasks involved hand-picking, selecting, boxing, and transporting the tomatoes. To begin, the boxes were piled at the center of the tomato patch. Each harvester hand-picked the fruit, collecting it in baskets. These basketloads were then piled and consolidated for selection. The fruit was separated into three categories: (1) first quality, i.e., the largest but not quite ripe tomatoes; (2) third quality, consisting of already-ripe, bruised, or rotten tomatoes, which are reserved for household consumption or as feed for livestock; and (3) the remaining produce, of secondary quality, consisting of small or medium-sized produce, green tomatoes of all sizes, etc. Each box was then packed two-thirds full with second-quality tomatoes, followed by two layers of first-quality fruit "to present a good appearance". Once selected and packed, the boxed tomatoes were transported in a wheelbarrow to the roadside, to await transport to market.

Each box of tomatoes holds about 20 kilos of tomatoes. Local truckers mainly engaged in the transport of timber or gravel constitute the principal source of transportation to market. Sixto's wife Francisca was responsible for accompanying the produce to the Las Ramadas market in the city of Santa Cruz. In four separate trips she sold 90 boxes to market intermediaries, buyers who purchase by the boxload and resell by kilos. It cost Francisca 15 pesos (US\$0.60) per box in transport charges per box plus another 15 pesos for her own fare to accompany the load.

Francisca sold the 90 boxes of tomatoes at an average price of 78.55 pesos (US\$3.14) per box, generating gross earnings of 9,564 pesos (US\$382.56). After subtracting all cash outlays for seed, hired labor, agro-chemicals, and market transport costs, the Banegas household earned an average of 51 pesos (US\$2.05) for every one of the 104 days of family labor it invested in its tomato crop. The going wage for hired laborers at the time was 80 pesos per day.



Tomatoes Awaiting Market Transport

CHILI PEPPERS

During the 1980-1981 crop year, Remberto Vargas of the community of Forestal grew a crop of chili peppers of the variety known as Cubarito. In total, he planted 1.7 hectares of this crop distributed among five different plots of land. His experience and growing practices are described below.

SEED SELECTION AND NURSERY

From his previous pepper harvest Remberto selected an arroba (25 pounds) of the very largest peppers. These he gently ground in a tacú (pestle) to remove the seeds, which came to a pound. He then washed the seed in the river, allowing the clean seeds to soak for an hour until they lost their spicy taste. The seed was then sun-dried for several days. Once dry, the seed was stored inside the farmhouse in a hemp bag.

For his nursery, Remberto selected a location with soil rich in organic matter. Adding sand, he mixed and sifted the soil to a fine texture. From these materials he constructed two seedbeds, each 20 centimeters high, 150 cm. wide, and 8 meters long. After leveling the beds, Remberto sprinkled the selected seed across the surface as evenly as possible. He next covered the seed with a thin layer of dirt about 2 cm. thick. Over the beds he placed a roof of motacu palm leaves to protect them from rodents, birds, and intense sunlight. Once planted, the two seedbeds were watered (through the roof of palm leaves) with a sprinkler can. Subsequent waterings took place every three days. The pepper seedlings germinated in five days, after which the roof protecting each seed bed was removed. A month after planting the seedlings were ready to be transplanted.

SOIL PREPARATION AND TRANSPLANTING

The land selected for the pepper crop had previously been planted to corn and watermelons. Remberto plowed the soil with the traditional wooden plow drawn by oxen. He conducted two plowings or pasadas (passes), the second at right angles to the first. This land preparation task was completed for one hectare in the space of four days, working only 3-4 hours a day; the remaining 7/10s of a hectare were prepared by hand with a hoe, with the soil being turned to bury crop residues and weed growth. Finally, the holes for the seedlings were prepared. These were done with a digging stick called the punzón. The holes were spaced at 80 centimeters en cuadra (squared) between plants and between

rows. Each hole was planted with one seedling apiece, with the soil pressed by hand around the base of the seedling. Through the first two stages of land preparation and planting, Remberto Vargas invested 25.5 days of family labor and 23 days of hired labor. Of these 48.5 days, one-third (16.5 days) were devoted to transplanting and nursery activities, the remainder to land preparation tasks.

CULTIVATION

Remberto weeded his pepper crop four times and conducted three fumigations. The first of these fumigations took place one week after the completion of transplanting. To conduct each fumigation, Remberto filled a 200 liter cylinder with water. To this water he added:

- Antracol: 600 grams
- Metasystox: 25 spoontfuls
- Bayfloan: 1/2 liter (leaf fertilizer)
- Adherent: 5 tablespoons

These medicines were mixed together inside the cylinder and stirred vigorously with a pole. Using a ground and sieve, Remberto filled the tank of his backpack sprayer some 16 times for each fumigation. The chemical solution was applied plant by plant.

In total, Remberto invested 51 days of family labor and 71 days of hired labor for weeding and fumigations of his pepper crop. Additionally, he spent 1,711 pesos (US\$68.44) on purchases of agro-chemicals.

HARVESTING

Four months after transplanting, the pepper crop was ready for its first corte or picking. Over a period of six weeks there were three more pickings. In a single day, a harvester can pick about two arrobas (50 pounds) of peppers. This product must be sold as quickly as possible, because out of a single arropa (25 pounds) the weight loss can reach 16 percent (4 pounds) in 3-4 days. In total, Remberto invested 42 days of family labor and 117 days of hired labor to pick his pepper crop. He spent another 31 days of hired labor to select and bag the peppers. Because the commodity spoils so quickly, several selections are usually necessary--one on the farm, and one or more at the point(s) of sale. The classification of the fruit is not only by size and weight but also by color--red, yellow, and green.

The total yield on Remberto's pepper crop was 524.5 arrobas, of which 17 arrobas were lost through spoilage and weight shrinkage. Sold at an average

price of 69.30 pesos per arroba, the crop generated gross sales income of 36,560 pesos (US\$1,462.40). Cash outlays for hired laborers and agrochemicals came to 19,341 (US\$785.64). The net income of 16,919 pesos (US\$676.76) amounts to 142 pesos (US\$5.86) for each of the 119 days of family labor invested by the Vargas household. Since the going wage for hired laborers at the time was 80 pesos per day, returns to family labor were nearly double what they could have earned by selling their labor services directly.

BEANS

Beans are being grown by an increasing number of small farmers in the tropical lowlands region. Three of the 31 participants grew this crop in 1980-1981. In the following narrative is described the experience of Domingo Correa of the community of Naranjal, who planted seven tareas (7/10 hectare) of beans in June 1980.

LAND PREPARATION

Domingo planted his bean crop in a field formerly planted to corn. He contracted a tractor for a single plowing and two harrowings, for which he paid 150 pesos (US\$6) per tarea or 1,050 pesos (US\$42) in total.

PLANTING

To plant his seven tareas of land, Domingo used his own seed which had been stored in pods from the previous year's harvest. By storing beans in their pods they are less likely to be damaged by borers and other insects. To prepare the seed for planting it is therefore first necessary to thresh the pods. This can be done in either of two ways: by beating the pods with a pole, or by walking on top of the pods. Once threshed, it is necessary to winnow the beans to remove sticks and other impurities. Also, the seed should be inspected for signs of borer holes, and the damaged seed discarded. Some farmers purchase their seed from commercial suppliers; in 1980 bean seed sold for about 150 pesos (US\$6) per arroba, or US\$0.32 per pound.

Because of weeding and harvesting labor demands, many farmers prefer to stagger their plantings by stages, with each stage separated by 4-6 days. This was the case with Domingo Correa. He planted three tareas of land initially and then, four days later, planted four additional tareas. Domingo waited in both instances for a rain prior to planting. He planted his bean crop using a planter (see section on corn) designed by Mennonite settlers. He

regulated his planter so it would drop 3-4 seeds with each blow (hill). The crop was planted with a spacing of 40 centimeters en cuadro. Using this device, Domingo completed his two-stage bean planting with only three days of family labor.

If Domingo did not own a planter, he probably would have planted his bean crop with a more traditional implement--the muzón. This is a rather heavy, sharply-pointed planting stick about 3-4 cms. in diameter. The planter opens each seed hole, deposits his seed load by hand, and closes the hole by pushing some dirt over it with his foot. When the seed used is of poor quality, the farmer will usually increase his seed load from 3-4 to 5-6 bean seeds. When the planting stick is used the seed hole is usually only 3-4 centimeters deep.

CULTIVATION

Domingo Correa's bean crop germinated in four days due to abundant soil humidity. Within 15 days he began the first of three weeding. The second began after six weeks, the third at ten weeks. Domingo also conducted two fumigations, the first using Dimecrón mixed with a leaf fertilizer, the second using Nevaerón. His total investment for these tasks came to 4.75 days of family labor, 4 days of hired labor, and 200 pesos worth of agro-chemicals.

HARVESTING

Beans flower at about 35 days, pods are produced at 2.5 months, and the crop reaches harvestable age at three months. Beans are usually harvested in 2-3 separate cortes or pickings. The beans are mature when the color of the pod changes from green to yellow. It is important not to let the pods get too dry, because they will crack open and spill their seed on the ground.

Domingo began his bean harvest on September 4, 1980. The harvesters hand-picked the pods, placed them in waist sacks or baskets, and emptied their loads at a central collection point. The pods were subsequently sun-dried for a week, then threshed with poles, winnowed to remove impurities, and finally bagged in yute sacks for market sale. Domingo sold 11.3 quintales or 1,130 pounds of beans at a price of 400 pesos per quintal, thereby generating gross income of 4,532 pesos (US\$181.28). Minus cash outlays for plowing, hired labor, and agro-chemicals, the Correa household earned a net cash income of 3,042 pesos (US\$121.68) which amounts to 78 pesos (US\$3.12) for every one of the 39 days of family labor invested in the crop. Since the going wage for hired labor was 80 pesos per day at that time, Domingo Correa appears to have broken even with his bean crop.

COFFEE

Many small farmers in the tropical lowlands region grow coffee. The typical holding consists of a few scattered trees rather than a plantation, and coffee is grown predominantly for family consumption rather than market sale. For the most part, coffee production reflects very casual growing practices characterized by an absence of fumigation, fertilization, or frequent weeding. The following description is based on the experience of Griseldo Herrera of the community of El Torrente, who started a coffee plantation in 1980; and also Edmundo Saavedra of Porongo, who has grown coffee for years.

TRANSPLANTING

Griseldo Herrera began his coffee plantation with seedlings he obtained free of charge from other growers. These seedlings had sprouted beneath the trees of the donor plantations from coffee seeds which fell to the ground during the previous year's harvest. Griseldo first obtained 100 seedlings, and then 230. He dug up the seedlings himself, placed them in plastic bags along with some rich soil to protect their roots, and brought them home. He planted these seedlings in association with his fruit trees, spacing them 3 meters en cuadro, i.e., 3 meters between seedlings and between rows, in a crop lot with an area of three tareas or 3,000 M². For each seedling he prepared a hole 20 centimeters deep and a diameter equal to the width of his shovel. Prior to planting each seedling in its hole, he cut open the plastic bag surrounding its root system. He conducted this transplanting in March 1981 to take advantage of the rainy season.

CULTIVATION

It takes three years for a coffee tree to reach its initial production stage. During that time some farmers will conduct two weeding per year, others one, still others none at all. The weeding themselves are mainly conducted for the benefit of an annual crop with which the coffee is associated, like corn or yuca. If the coffee is grown in a fruit orchard--citrus trees, for example --the annual land clearing and weeding tasks are commonly performed just prior to harvest, to facilitate the access of laborers to the producing trees and the subsequent transport of harvested fruit. Also, during the first year

of a new coffee plantation, the grower may go to the trouble of watering each young tree by hand in times of prolonged drought. But aside from the above activities, coffee trees receive very little attention as a general rule. Trees are seldom pruned, fumigated, or fertilized. The trees are pretty much left to la bondad de Dios, the will of God.

HARVESTING

Coffee matures somewhat unevenly, therefore the berries are normally harvested over a period of three months and about three separate pickings. The first picking or gorta usually occurs in March-April, the second in May, and the third in June. The coffee berries are picked by hand and very selectively, the object being to harvest only the largest and reddest ones while leaving smaller and greenish berries to mature for the subsequent pickings. The harvester deposits the berries into a basket or waist sack. These, in turn, are emptied into wooden boxes called almudes. The almud is the traditional unit for measuring harvested coffee, rice, corn, and peanuts. It is square--30 centimeters wide on four sides and 30 cm deep--and is considered to have a full weight of 32-34 pounds. A coffee harvester can usually pick 2-3 almudes of coffee in a single day.

The selective harvesting process described above is generally practiced when the rural household has the time and the labor resources to carry it out. But this is not always the case. Many households will conduct only one picking, taking red and green berries together. In such instances the coffee harvest has been assigned very low priority relative to other crops, and a single picking is preferable to letting the coffee entirely go to waste. As described below, green berries are processed differently.

PROCESSING

Coffee yields are highly variable due to weather conditions, age of the trees, maturity of the berries, and number of pickings. An average yield under normal conditions would probably not exceed 1/4 almud per tree. The harvested berries are transported to the farmhouse where they are selected --the mature red berries (pintónes) to one side, the green berries apart. The red berries are then placed in a barrel of water to soak for an evening. The next day they are husked in a hand-operated coffee mill known as a peladora using plenty of water. The dehusked beans are left to dry for a day or two before washing; this delay reputedly "strengthens" the taste of the coffee beans. The beans are then washed thoroughly using several changes of water to remove all remaining husk fragments along with a sticky membrane that still clings to the grain.

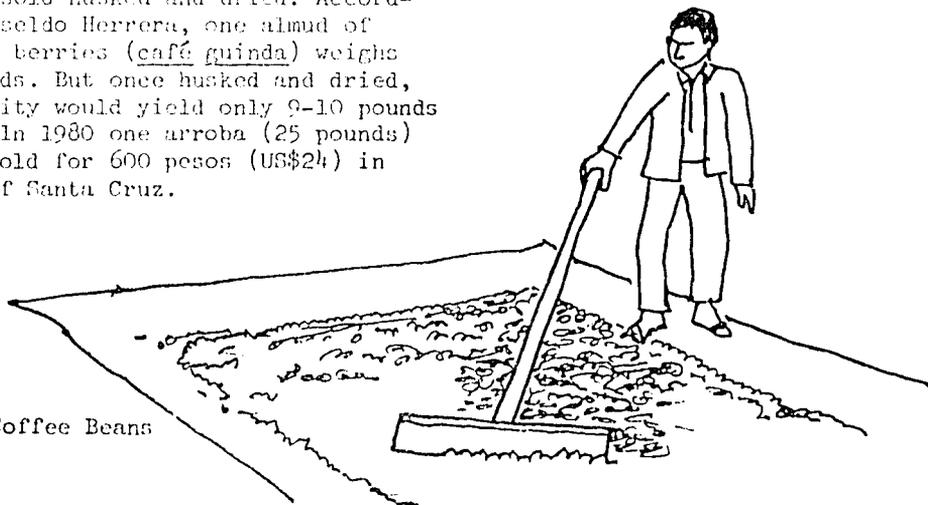
After washing, the beans are spread out on a patio to dry for about a week under strong sun. The grain should be turned over at least once a day with a wooden rake so that the beans dry evenly. When sufficiently dry, the beans begin to split in half, and they become so hard that they cannot be indented by a fingernail. At this point they can be placed in dry storage until ready for home consumption or market sale.

Coffee that is harvested green receives a different treatment. It is not soaked in water nor is it husked. Rather, the beans are sun dried directly inside their husks. They are then stored unhusked as well. The husks are removed just prior to use by beating the beans in a tacú (pestle). Some farmers prefer coffee from green berries because they say it has a much stronger taste.

CONSUMPTION AND MARKET SALE

Before it can be brewed, coffee must first be toasted and ground. The toasting of the beans is done in a ceramic pot or tiesto. A quantity of beans, say 1/2 pound, are placed in the tiesto under strong flame. The beans must be turned over continually to keep them from burning. It will take about 15 minutes for the beans to toast adequately. To strengthen the taste and darken the color, some families toast the beans together with brown sugar, which is burnt. Once toasted, the beans are placed in the tacú and pounded to a powder. The ground coffee is now ready for brewing.

Coffee is sold husked and dried. According to Griseldo Herrera, one almud of red coffee berries (café quinda) weighs 35-40 pounds. But once husked and dried, this quantity would yield only 9-10 pounds of beans. In 1980 one arroba (25 pounds) of beans sold for 600 pesos (US\$24) in the city of Santa Cruz.



Drying Coffee Beans

CITRICULTURE

Whether on a limited or large scale, there is hardly a rural household in the tropical lowlands that does not supplement its subsistence or commercial farming activities with one or more citrus crops. The principal citric fruit grown are oranges, tangerines, grapefruit, lemons, and citron. Other fruit crops of a non-citrus variety--mango and plantain--are almost always found nearby the farmhouse. In the following sections are first described many of the generalities concerning the growing of citrus fruit. These descriptions will then be supplemented with specific examples of different fruit harvests by selected participating households.

NURSERY

When a rural family wishes to have a few fruit trees strictly for family consumption, it will obtain seedlings from a neighbor's orchard (which have sprouted from fallen fruit). However, for a much larger number of trees--to start one's own orchard--a nursery will be necessary. As with other nursery crops, the soil must be rich in vegetative matter, humid, and well worked to eliminate clods. The seedbed's size will depend on the number of seedlings desired. For example, for about 40-50 seedlings one needs two rows (raised seedbeds) of 10 meters in length. The seed can either be purchased or, most commonly, saved from fruit the family has been consuming. It seems to make no difference whether this seed is dried or fresh. The seed is planted in a shallow furrow (about 5 cm. deep) at 30-40 cms. intervals, then covered with a thin layer of dirt. Some families construct the nursery in the patio of the farmhouse itself so a close watch can be kept and the sprouting seedlings adequately watered and protected from livestock. It is common to fence the nursery with sticks and palm leaves. Also, it is necessary to cover the seedbeds with a roofing of palm leaves until the seeds have sprouted.

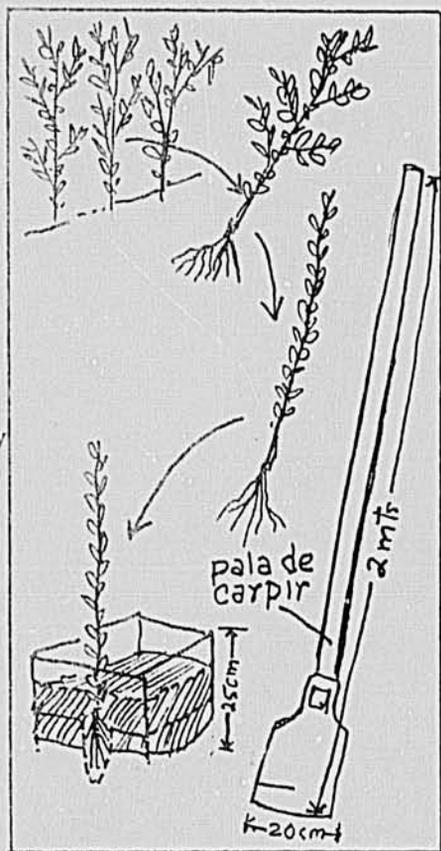
Nurseries are usually begun with the rainy season in October-November. The seedlings will sprout in 2-4 weeks. In the event of a drought, the nursery must be watered by hand every 2-3 days. Once sprouted, the seedlings will be left in the nursery to grow for 12-18 months, or until the plants reach a height of 80-100 cms.

TRANSPLANTING

Orchard crops are seldom planted alone but rather in association with annual crops until the fruit trees reach a height that creates too much shade, a practice that makes for more efficient utilization of land. For example, local criollo varieties of oranges and tangerines take 7-8 years to reach the stage of harvestable production; at least six of those years the grower can grow corn, rice, yuca, or other annual crops in between his fruit trees. For this reason the seedlings must be planted with a wide spacing, for example 6 meters en cuadro (squared) between plants of the same row and between one row and the next.

The holes for the seedlings are dug with a weeding shovel (pala de carpir). The hole itself is square, its length and width equal to the width of the weeding shovel's blade (about 20 cms) and only slightly deeper (25 cms). Inside this square another hole is made at one edge using a punzón (planting stick).

The seedlings are carefully pulled from the nursery seedbeds by hand, making sure no part of their root systems is broken. They are collected in a bunch, tied with a string or vine, and transported to the orchard location. Before being placed in its respective hole, the seedling is gently pruned of its branches. It is then placed in the square hole such that the stem is resting against one side and the root system is inside the round hole made inside the square. Loose dirt is then placed inside the square and pushed firmly into place around the plant. The square hole is dirt-filled to about 20 cms., leaving another 5 cms. open at the top to facilitate the puddling and retention of moisture from rainfall or hand waterings.



It is important to emphasize that growers prefer to transplant their seedlings in stages, say 15 plants one day, 15 more the following month. This approach not only allows for reduced risks--by planting under diverse weather conditions--but also helps to spread labor demands over a longer period, which makes orchard development a gradual process of crop substitution based on accumulating experience.

CULTIVATION

Most growers do not fumigate their citrus trees. The principal reasons are (1) a desire to reduce costs of production in the face of highly uncertain fruit marketing opportunities; and (2) almost complete lack of technical information about orchard diseases, chemicals to treat them, and how to use these expensive inputs correctly and safely. Since foraging livestock often eat fallen fruit, growers also fear that orchard fumigations can poison their poultry and pigs. The only insect control practice reported by farmers was that of digging holes into the root systems of their trees and applying ashes. This treatment is reputed to discourage cutter ants from attacking trees and is believed to help young seedlings from drying out.

In the early years (pre-production), it is customary for growers to weed their orchard crop on a semi-annual basis. In periods known for heavy wind, some farmers hill their young trees to keep them from being blown over. The hilling task is also conducted during periods of excessive rainfall, which can loosen root systems and cause plants to collapse. A few farmers also conduct annual prunings. This task is usually done in July-August. If the grower does not have pruning scissors or shears, he will use a machete. The pruning of fruit trees is often discontinued after the trees reach harvestable age. Special care must be taken in pruning citrus trees because of their thorny branches.

HARVESTING

The citrus harvest period begins in March-April and can continue through August-September. The first trees to reach maturity are the lemons and citrones. These are relatively few in number and are harvested almost exclusively for home consumption or to provide stock for grafting more commercial citrus crops. Next comes the tangerine harvest in April-May, followed by grapefruit in May-June. Last come the oranges in June-July and continuing as late as August-September. In years of abundant rainfall the fruit crop matures earlier while drought conditions delay the harvest. The harvesting itself is conducted in several separate pickings or cortes. Normally, the grower will only harvest enough fruit in any given day to meet an established market contract or an amount that he knows can be readily sold. For example, a common volume of daily

harvesting for sale would range from 800 to 1,500 fruit, or some 4-8 basketloads. This quantity can be hand-picked by two laborers in a period of 2-3 hours.

The fruit is picked by hand, one by one, and placed in baskets. The lower branches are harvested first, then the higher ones. Where the fruit grows beyond the picker's reach, he will employ a hooked stick to bend the branches low enough to pick. Frequently he will also use a ladder. The basketloads of fruit are emptied in a pile on the ground, where another laborer selects the fruit by size and quality--large, medium, and small--while also discarding rotten and badly bruised or otherwise damaged fruit. The selected fruit is now separated into 100-unit loads and bagged for sale.

MARKETING

The grower can sell his fruit in either of two ways. The easiest and fastest way is to sell by treeloads. A buyer will arrive and offer to buy the entire production of one or more trees at a negotiated fixed price. Both buyer and seller will estimate what is the probable volume of fruit that can be harvested from each tree and make their offers and counter-offers accordingly until a mutually acceptable price is established. At that point the buyer pays and becomes the owner of that year's corte (picking). He also becomes responsible for hiring the labor to harvest the crop in addition to financing all subsequent marketing costs such as bags, boxes, and transportation charges.

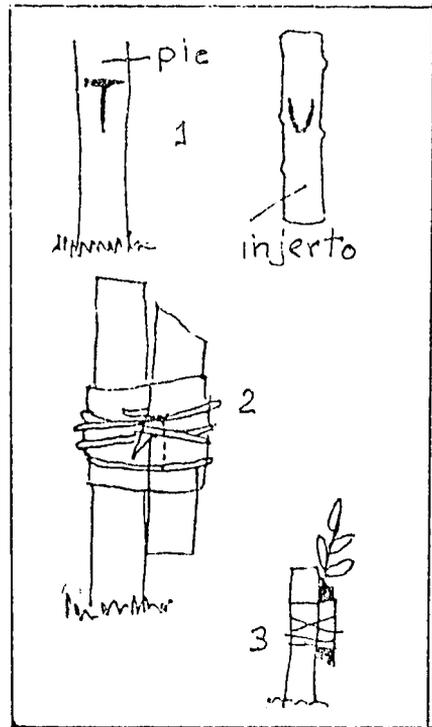
Of course, the grower can also harvest and market the fruit crop himself. As mentioned previously, marketings are usually conducted in 100-fruit units and sold to wholesalers. In 1980-1981 fruit prices fluctuated in a wide range of 35 to 90 pesos (US\$1.40--3.60) per bag of 100 fruit. These were the prices offered in the Santa Cruz market. But the net price to the growers was much less because of transport costs. In the community of Porongo, for example, where the primary source of farm income comes from the sale of citrus crops, the growers face especially high transport costs because they are separated from a paved highway to market by the unpredictable and dangerous Piraí River. To bring the fruit by ox-cart from Porongo to the river cost 200 pesos (US\$8). Each basket then had to be transported over the river on a primitive cable car--cost: 10 pesos (US\$0.40). From the other side of the river to the Santa Cruz market involved another fare of 15 pesos (US\$0.60) per basket plus another 15 pesos for the person accompanying the load to market. Thus, given a load of four baskets (800 fruit), the transport costs alone would reach 315 pesos (US\$12.60), which would amount to 39 pesos per sale of 100 fruit. Once at the market, the grower has to pay a market tax called the gitaaje plus possible fines by municipal agents if caught selling his fruit for more than the fixed prices established by municipal government.

GRAFTING

Of all the communities participating in the Traditional Practices Project, Porongo was the only one where fruit growing constituted the principal source of farm income. Because of this relative specialization in fruit production, residents of Porongo were the only farmers who practiced the technique of grafting. Farmers from other communities have heard about grafting but have still not attempted it themselves even on an experimental basis for lack of technical orientation.

Since lemon trees are highly resistant to local diseases and insects, and because their fruit commands a much lower market price than other citrics, the lemon trees are used as the principal grafting stock. Other host stocks used in Porongo are citrón and grapefruit. By grafting an orange or a tangerine to a lemon stock, the former will reach production age in 2-3 years rather than 6-7. Grafting also improves the quality of the fruit, increases the useful life of the tree itself, and provides it with greater resistance to desiccation.

To perform a graft, one needs pruning scissors, a small saw to cut branches, and twisted plantain leaves which serve as binding material. Beeswax is also a helpful product. The first step is to select the host plant or stock, known as the pie or foot. It should be about 30-100 cms. high and 3-4 cms. wide. It should first be stripped of its branches. Next, a yema or bud is selected for the location of the graft. At this place a cut is made in the shape of a "T". The second step is to prepare the graft or injerto, which is selected from a large and healthy orange or mandarine tree. It should also be about 3-4 cms. wide and about 30-50 cms. long; it too is stripped of any offshoots. Then, at the location of a bud, a cut is made which is shaped like a fingernail. This tab is inserted into the T-cut of the stock. The graft is now bound tightly together with the plantain leaf. To complete the operation, the pie is trimmed with a flat cut, the injerto with a slant cut. Some growers prefer to coat the outside of the graft site with a layer of bees-



wax to protect the graft from damage by rain, because if the graft gets wet it will rot. It takes between 1-4 weeks for the graft to sprout. Finally, farmers suggest that grafting only be attempted when the moon is fairly full. They cannot explain why, but grafting when the moon is new (a slender crescent) will not be successful.

EXAMPLES OF YIELD, COSTS, AND INCOME

ORANGES: In 1981 Cresencio Cosio of the community of Forestal conducted 12 pickings of his orange crop. From 84 trees he recorded a yield of 6,700 oranges. These were sold at an average price of 69 pesos per 100 and produced a gross income of 4,623 pesos (US\$184.92). Cresencio invested 8 days of family and 4 days of hired labor. After subtracting total production costs of 2,000 pesos (US\$80)--of which 440 pesos (22 percent) were for transportation charges--Cresencio achieved a net income of 2,623 pesos or 328 pesos (US\$13.13) for every day of family labor contributed by the Cosio household.

The same year Zenón Soria of Porongo harvested his 150 orange trees, obtaining a yield of 20,380 oranges. These were sold at an average price of 60 pesos per 100, resulting in a gross income of 12,250 pesos (US\$490). Zenón invested 27.25 days of family labor and 22 days of hired labor. His total production costs (excluding family labor) came to 2,450 pesos (US\$98), of which 850 pesos or 35 percent were for transportation charges. The result was a net income of 9,800 pesos or 360 pesos (US\$14.40) for every day of family labor contributed by the Soria household.

TANGERINES: In 1981 Perfecto Soria of Porongo harvested 47,565 tangerines from 100 producing trees. These he sold at an average price of 93 pesos (US\$3.72) for 100 tangerines and earned a gross income of 44,312 pesos (US\$1,772). Perfecto recorded labor investments of 47 days of family labor; he employed no hired laborers at all. His only cash outlays were for transportation charges, which came to 4,555 pesos (US\$182.20). The Soria household thus earned a net income of 39,757 (US\$1,590) or 846 pesos (US\$33.84) for every day of family labor contributed to this crop.

CITRON (LIMAS): Marcos Valverde of Forestal harvested 13,300 citrons from 16 trees. These were sold at an average price of 41 pesos per 100 to generate a gross income of 5,520 pesos (US\$220.80). Marcos made a labor investment of 17.5 days of family and 9.75 days of hired labor. His total production costs (net of family labor) came to 1,048 pesos (US\$41.92), of which 265 pesos or 25 percent represented transportation charges. The Valverde household thus earned a net income of 4,472 pesos (US\$178.88), which represents 255 pesos (US\$10.22) for every day of family labor invested.

MANGO

While there is almost always one or more mango trees to be found on the property of a small farmer in the tropical lowlands, only a few grow this fruit on a commercial scale. The following description is based on the experience of two such producers: Prudencio Molina and Francisco Terán, both of Porongo. The mango orchard of the Molina household totals 116 trees, that of the Terán family has 330 trees. About one-third of the mango orchard of both farms is planted to the variety mango grande (large mango) and the balance to mango rosada (pink mango), which is considerably smaller.

TRANSPLANTING

Mango seedlings sprout naturally from the fallen fruit of existing trees. Indeed, it is so easy to get seedlings started that planting seeds is unnecessary. The seed is simply thrown on the surface of the ground and will sprout by itself amid existing plant residues and trees. Indeed, the seed can sprout in as short a period as eight days. The mango seedling should be transplanted when it reaches a height of about 30-40 cms. tall. In transplanting mango seedlings it is very important to avoid breaking any part of their young root systems, for this will cause their immediate desiccation.

The seedlings are planted with variable spacing depending on the wishes or needs of the grower as well as the variety of the mango. If the mango grande, the seedling should be planted with a spacing of not less than 10 meters between plants. If the mango rosado, a typical spacing would be 3 meters en cuadro (squared). The holes for the seedlings are made with the punzón (planting stick) and should not exceed 20 cms. deep.

CULTIVATING

Normally, mango trees are neither pruned or fumigated. The mango is quite disease resistant to begin with, but farmers are also reluctant to fumigate this fruit because if it subsequently falls to the ground it could poison poultry or other foraging livestock. About the only cultivation tasks required with mangoes is that of weeding. Two weedings per year are suggested. The residues of uprooted weeds and grasses are gathered in small piles and burnt. The ashes are then scattered around the base of the tree.

HARVESTING

The manga rosa takes only three years to reach production age, the mango grande requires six years. The fruit of the latter variety usually matures slightly earlier and is harvested first. The mango harvest normally begins in the month of November. Usually two cortes or harvests are possible. Unlike the more delicate citrus fruit, mangoes are not necessarily picked by hand; rather, they are harvested by vigorously shaking their branches and causing the fruit to fall. This is possible because the fruit is harvested on the greenish side and then allowed to mature for a week or so in the farmhouse prior to sale. The fruit is then cleaned with a damp cloth.

Like citrics, mangoes can be sold in units of 100 directly to market wholesalers, or the yield of one or more trees--the harvest rights for a single season--can be sold for a fixed price. Yield of fruit per tree is highly variable. A tree of mango grande will, depending on its age, yield from 500 to 5,000 fruit; the mango rosado will yield from about 100 to 2,000 fruit. Weather conditions can greatly effect mango yields. The biggest danger to this crop is the surazo or cold southern windstorms. These tempests, together with heavy rainfall, destroy a mango crop at the flowering stage. Another threat is unseasonably long drought, followed by heavy rain, which causes fruitfalls.

In 1981 Francisco Teran harvested and sold 37,650 mangoes from a total of 330 trees, mostly mango rosado. At an average price of 65 pesos (US\$2.60) per 100, the crop generated gross income of 37,650 pesos (US\$1,506). The crop received an investment of 19 days of family labor and 12 days of hired labor. Total cash outlays came to 2,448 pesos (US\$89.92), of which 1,398 pesos or 57 percent of total costs represented transport and marketing expenses. The family's net income thus came to 35,202 (US\$1,408), which amounts to 1,852 pesos (US\$74.11) for every day of family labor contributed to this crop.

PLANTAINS

The plantain is another of the tree crops which is almost always found growing in different locations of the property of a small farmer in the tropical lowlands. It is mainly grown for family consumption, although surpluses are sold. The stalks of the plants as well as the skins of the fruit constitute a principal source of food for pigs and cattle. The plantain is often grown in association with other crops--usually to provide shade. It is often used as well as a filler crop, occupying little corners of land here and there not devoted to fruit, grain, vegetable, or pasture production. There are two types of plantains grown. The first is the platano largo, which also represents a cluster of different varieties such as Oloroso, Morado, Mata Borracho, Huatoso, Guayaquil, and Bellaco. The other is the guineo, which is not a plantain at all but belongs to the banana family and produces stubby but sweet fruit. Both are described under the heading of plantains because their growing practices are identical.

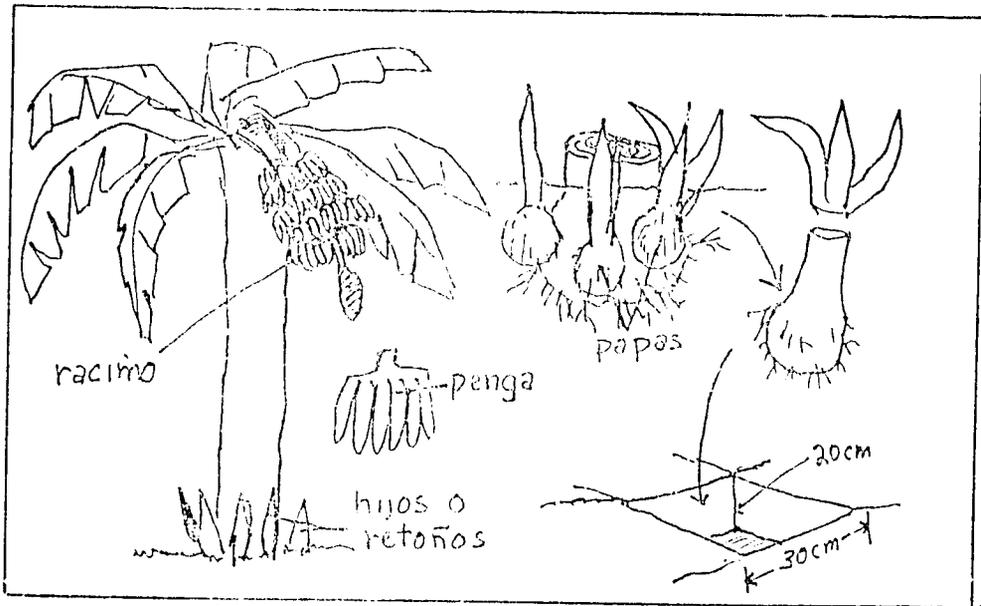
TRANSPLANTING

A plantain tree lasts about six years, a guineo up to 15 years. Both yield one crop per year consisting of a racimo (clump) made up of many separate hands of 6-12 fruit. After reaching maturity, the plantain tree sprouts its shoots--a process known as hijear or the production of "sons". Each hijo or retoño (shoot) is produced from a bulb (papa) produced within the root ball of the mother plant. A single plantain tree will produce up to a dozen of such shoots, with the norm being 6-8 shoots.

When the mother plant has been harvested, the stalk is cut down with a machete (or it falls of its own accord eventually). The grower's task is to select the strongest and healthiest shoot to replace the mother. The other shoots should then be removed from that location to avoid congestion and competition for nutrients and sunlight. However, since each retoño is a seedling, these can be carefully dug up--each with its own rootball intact --and transplanted to a new location. Farmers recommend that these retoños only be dug up on days of buena luna or "good moon", i.e., when the moon is not in its new or crescent phase. It is also best to do the transplanting during periods of abundant rainfall. But aside from these considerations, plantains can be transplanted almost any month of the year. The plantain seedling is ready for transplanting when it has reached a height of 15-20 cms.

above the ground and has begun to sprout leaves of its own.

The seedlings are planted in previously-prepared holes which should be about 30 cms. on all four sides and 20 cms. deep. The spacing of the holes is variable. The platano largo should not be planted with a density of less than 5 meters en cuadro; the guineo not less than 3 meters. After the seedling has been placed in the hole, it should be packed in place with loose dirt, then stamped firm with the feet. Many growers prefer to prune the stalk of the seedling. The new leaves will sprout after 15-20 days. If transplanted in pure stand, about 400 seedlings of platano largo will fit in a hectare.



Plantain and Transplanting Process

CULTIVATING

Within a week or two after the plants have sprouted, the plantain crop should be weeded; thereafter it should be weeded at least two more times-- at two months and four months until the shade canopy is established and weed growth is slowed down. Growers do not fumigate their plantain trees. Neither are hillings or prunings necessary. However, following the flowering of the plantain crop after nine months the fruit clumps gain steadily in size and weight until reaching harvestable age at 12 months. During this late growth stage it is often necessary to support the trunks of some plan-

tains with posts to prevent them from toppling over from the weight of their fruit. This problem is especially prevalent following heavy rainfall, which loosens the root systems of the plants.

HARVESTING

The plantain is harvested in one or two ways. If the tree is still needed for its contribution of shade to other crops, it will be left standing; in this case only the fruit clump will be cut. Otherwise, the entire tree is cut down with one or more sharp blows with a machete. The racimo (fruit cluster) is cut from the fallen plant and transported to the farmhouse, where it will be allowed to mature for several days prior to market sale or home consumption.

Because local markets are easily saturated with fruit supplies during the harvest season, the grower will usually only harvest no more than 20-30 racimos in a single day, or the quantity which he feels can be sold at the market without difficulty. It is nearly always the farm housewife who is responsible for transporting the fruit to market and conducting the sales. Plantains are sold in a variety of units--by penqas (hands) of 10-15 individual fruit, by cientos (units of 100), by canastas (basketloads), and by racimos (whole fruit clumps). In late 1981 the price of a single racimo of plantains was 40-50 pesos (US\$1.60--2.00) in the city of Santa Cruz. A basketload cost as high as 100 pesos (US\$4) because it holds as much as 2.5 racimos, when cut up into individual hands. It is also common for farmers to sell the harvest rights to one or more plantain trees. In such cases the buyer pays about half the existing market price for every tree or racimo purchased--say 20 pesos (US\$80) apiece, but he is responsible for conducting the harvesting and transportation of the fruit.

EXAMPLES OF YIELDS, COSTS, AND INCOME

In 1981 Prudencio Molina of Porongo harvested a total of 493 racimos and 3 canastas of guineos. He sold the racimos for an average price of 15.64 pesos (US\$0.62) to generate 7,711 pesos (US\$308.44). Each basketload sold for 60 pesos (US\$2.40) or 180 pesos in total. Prudencio also sold guineo seedlings to other farmers and earned an additional 250 pesos. Thus, his total harvest income came to 8,141 pesos (US\$325.64). The labor invested in this harvest totaled 40.25 days and was all provided by the Molina household. The only cash outlay was 150 pesos to pay transport expenses. The net income therefore amounted to 7,991 pesos (US\$319.64), which amounts to 199 pesos (US\$7.96) for every day of family labor contributed to the crop.

Julian Alvarado of Torrente-Las Abritas also harvested guineos, producing a total of 264 racimos. These were sold for an average price of 10.81 pesos (US\$0.43) per racimo to merchants who purchased the produce at the farmgate. Total income for the harvest came to 2,853.84 (US\$114.15). Only family labor was used to cultivate and harvest the crop, which involved ten days. No cash outlays of any kind were incurred. The net income for the Alvarado family for this guineo harvest thus amounted to 285 pesos (US\$11.40) for every day of family labor invested in the crop.

ACHIOTE (URUCU)

Achiote is used as a food colorant. It comes from bright red and dark brown seeds which, in turn, are produced in pods grown twice each year by a bush-like tree. Most rural households have a few of the achiote trees growing about the farmstead. However, their production is usually harvested to meet family needs. Nonetheless, a commercial market exists for achiote, and a few farmers sell the crop. Much of the following narrative is taken from the case of Francisco Teran of Porongo, who has 60 achiote trees.

LAND PREPARATION AND PLANTING

Since achiote is not planted in orchards or pure stands, there is no specific land preparation task required. The tree is grown in association with other crops and would be planted at low density intervals of, say, six meters. Achiote is not planted in the seed form but transplanted as seedlings. The seedlings are taken from the base of the mother plant, where they have grown from seed pods that fell to the ground. In other words, most farmers have their own source of supply of achiote seedlings. Those that do not can borrow them from a neighbor. The cost of the seed itself, then, is minimal. The seedlings are planted in holes carved about 20 centimeters deep. They must be hand-watered initially until the plant has clearly established itself.

CULTIVATION TASKS

The achiote tree is highly resistant to insects. About the only insect that is attracted to the plant is the black ant known as tururu, which in turn is considered a delicacy by farm poultry. For this reason farmers do not fumigate their achiote trees. Neither are the trees pruned, because despite their age they never grow taller than about 1.5 meters: a height that allows even small children to participate in the harvest. Most owners of this tree crop also do not bother to weed; they do so only in conjunction with the weeding of another crop with which the achiote is associated.

In the case of Francisco Teran's achiote crop--for which a record was kept during 1980-1981--no labor or cash investment was made for land preparation, planting, or cultivating tasks.

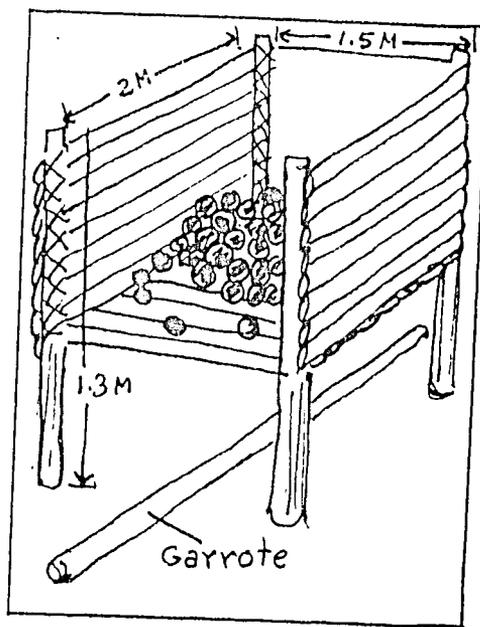
HARVESTING

To harvest its 60 trees, Francisco Teran's family spent 14.5 person-days of labor. Eight days of labor were devoted to the harvesting of seed pods and another 6.5 days to beating the pods to remove the seeds.

The achiote tree produces a harvest of seed pods twice a year: the first in February-March, the second in August-September. The pods must be harvested very carefully by cutting them off their branches using a knife or pruning scissors. This task is normally conducted by family labor in its spare moments.

The pods are collected in baskets. They are then sun-dried for a week. During this period it is very important to make sure the pods do not get caught in a rain, because this will cause a rotting and discoloration of the seeds.

Once dried, the pods are placed in a wooden bin known as a chapapa. It is open on one side, is constructed of slats, and stands on four legs. The purpose of this bin is to thresh the achiote pods by beating with a stick. By standing off the ground, the chapapa makes it easier for the thresher--who can beat the pods at waist level. The beating should be done with firm but not hard blows.



The Chapapa

The volume or weight in pods is never weighed. But in two separate harvests, Francisco Terran's 60 achiote trees produced a total of 18 arrobas (450 lbs.) of seed. Sold at 280 and 250 pesos per arroba respectively, the crop yielded a total income of 4,800 pesos (US\$192). After subtracting harvesting costs (for hired labor and transport), the Terran household earned net income of 324 pesos (US\$12.97) for every day of family labor invested.

SUGARCANE

Nearly all the participants in the Traditional Practices Project grow sugarcane in some form or another. The largest planting of cane among them did not exceed 1/2 hectare; smaller areas--planted in patches, rows, association with other crops, and even scattered locations to indicate field boundaries--averaged about 1,000 plants. Given such small-scale operations, it is not profitable for growers to sell their crop to commercial cane processing mills. Instead, farmers grow cane predominantly for family consumption. Using handmade mills, they process their cane into juice, syrup, and hard blocks of brown sugar. They also use the stalk residues for animal forage and fuel. A few even distill the raw cane juice to make a potent alcoholic beverage known as guarapo.

LAND PREPARATION

Once planted, sugar cane produces annual harvests for an indefinite period of years. The stalks of one year's crop are cut down, and from the plant base new sprouts emerge. Planting of sugarcane, then, is usually conducted to expand area planted. If the crop is grown in previously fallow land, heavy land clearance tasks (as described in the section on rice) are required. If the crop is to be planted on land previously cropped and harvested a few months before, land preparation for sugarcane may require no more than a pre-planting weeding. Of course, in the case of an already established sugar plantation, no land preparation is required.

SEED PREPARATION AND PLANTING

The seed for sugarcane, like yuca, is prepared from pieces of mature stalks. The farmer selects those stalks which are highest and thickest. He cuts off their leaves of each stalk with a machete, then cuts off the flowering tip. The rest of the stalk is then cut into pieces about 30 centimeters long. It is important that each cut piece have 3-4 nudos or eyes. These cane pieces are known as cañotos. They are planted on a slant or horizontally, one per seed hole; the latter are dug with a hoe and should be about 30 cms. in diameter by 10 cms deep. The planter covers the cañoto with a thin layer of dirt; shod over the hole with his feet. Sugarcane is usually planted en

cundra (squared) with variable spacings--depending on farmer preference and soil fertility--ranging from 80 to 150 cms. between plants and between rows. Farmers agree that planting should coincide with a period of rain to facilitate sprouting, preferably during the months of October to December. The planting task itself is fairly labor-intensive, requiring about two person-days of labor for every tarea (1,000 M²) planted.

CULTIVATION

If the soil is humid, it will take about 15 days for sugarcane to sprout; under drier conditions sprouting will take up to a month. During this pre-sprouting period some farmers conduct a burning of crop residues. They argue that the ashes serve as a fertilizer. But more important, the burning serves as a retardant to weeds and grasses, and also discourages the predations of a black ant known as the turiro.

It is customary for farmers to conduct weeding of their cane crop on three separate occasions. The first weeding is recommended about two months after planting, or when the cane plants are about 50 centimeters high. The second weeding should be conducted in the pre-flowering stage, when the plant is nearly 2 meters high. The final weeding is recommended just before harvest, to help the crop fill out and to facilitate access of laborers into the canefield or cañaveral. Unless the crop is grown under irrigated conditions, there are no more cultivation tasks that are customary. Growers do not bother with fumigations or fertilization.

HARVESTING

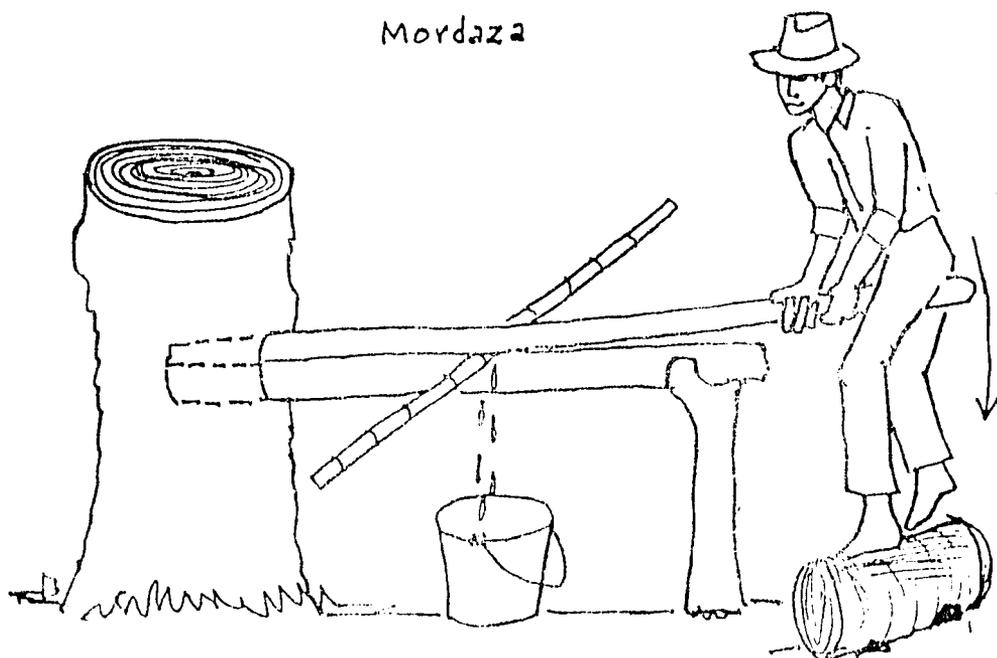
Sugarcane begins to flower after eight months. One month later the zafra or cane harvest can commence. Since the cane is mainly harvested for subsistence consumption, it can be cut little by little in accordance with family needs or processing capacity. Many households harvest their cane over a period of 4-5 months.

The harvesting task itself consists of cutting each stalk of cane about 5 cm. from ground level. The stalk is then trimmed of its leaves. Finally, the plant's flowering tassel is lopped off. The trimmed stalks are piled in the field until they can be transported to the farmhouse for processing. Harvesting sugarcane is about as labor-intensive as planting it: two laborers can harvest a tarea (1,000 M²) of cane in about two days. Because their production is usually for home consumption, farmers seldom count the number of stalks harvested or calculate their yield. However, as a rule of thumb, many growers estimate they can harvest about 1,000 stalks of sugarcane in an area of 200 M².

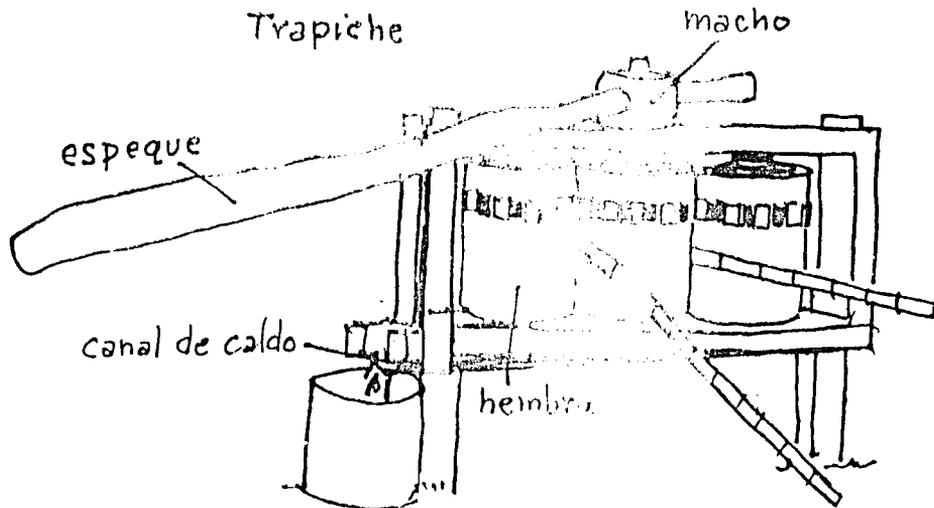
MILLING

Since sugarcane is mainly a subsistence crop, every family that grows it must also establish some capacity for processing the cane juice. The most primitive milling device is known as a heque heque or mordaza (literally, large bite). Its construction and operation are illustrated below:

Mordaza



A much more efficient milling device is the traniche or wooden cane mill powered by animal traction. The mill consists of three wooden rollers which roll in unison against each other by means of interlocking wooden gears. The center roller is known as the macho or male, the two side rollers are each known as an hembra or female. The entire mill is powered from the axle of the macho roller, which is in turn turned by a long post to which draft animals are yoked (espeque). The mill is located on a platform which allows the espeque to pass over the heads of the workers feeding cane into the rollers. Beneath this platform is a trough (canal de caldo) which collects the cane juice and pours it into a barrel.



PREPARATION OF SYRUP AND HARD SUGAR

While the cane juice is being collected, a fire is built under a cooking caldron known as a pailon. The pailon is filled with the caldo or juice and brought to a boil. This liquid is then boiled for four hours, slowly thickening as it cooks. During this time someone must tend the fire constantly, making sure the contents of the pailon do not overflow while at the same time watching out for and removing impurities such as pieces of cane fiber, charcoal, etc. Both responsibilities are managed by means of an implement known as the bomba--a sieve attached to a long pole. After the fourth hour the cane juice reaches a precise point where it quickly thickens and acquires a dark coffee color. If the liquid is to be used for syrup, it must be removed and cooled immediately. Some families bottle it and sell this syrup to their neighbors for about 25 pesos (US\$1) per bottle.

If the cane syrup continues to cook it crystallizes into sugar. This rapidly-thickening substance is called empanizado. The pailon is removed from the fire, stirred briskly for half an hour, and now reaches a stage known as jalea. Using a gourd, the jalea is scooped up and emptied into wooden molds which resemble those used for brick-making. These "sugar bricks" indeed become hard blocks after cooling for another four hours. Each brick weighs about 12.5 pounds and two equal an arroba. Also known as chancaca, these bricks if sold are worth about 100 pesos (US\$4) per arroba.

PASTO YARAGUÁ

Pasto yaraguá is a cultivated pasture grass which some farmers of the tropical lowlands are planting to improve pastures for their livestock. An example is Aurelio García of Valle Hermoso. Aurelio has acquired two dairy cows and has begun to improve their grazing resources. He now has three hectares planted to yaraguá. He occasionally allows yaraguá to go to seed for two reasons: first, to expand his own pasture area, and second to sell to other farmers for some additional income. Ranchers like yaraguá because it is considered very resistant and recuperates quickly from mistreatment such as excessive trampling by cattle.

HARVESTING SEED

Yaraguá grass is most nourishing and appetizing to cattle when it is newly sprouted. But if left to grow, the grass will eventually produce stems that reach as high as 2-3 meters. At this stage the plant tassels and goes to seed; it essentially has no fodder value. These seed tassels are harvested with a knife, much like rice, i.e., each tassel is cut with about 8-10 cms. of stem. The time to cut is when the leaves and stalk of the plant has yellowed and turned dry. The cut seed tassels are collected in a ground cloth and left to dry in the sun for up to a week. The grain is then threshed by hand with the braverster briskly beating the tassels against the ground. Because the seed is so light, it is not appropriate to winnow the grain after threshing because of the risk of it being blown away. The yaraguá seed should be stored in a jute bag until planting season arrives. If sold, yaraguá in 1980 was priced at 200 pesos (US\$8) per arroba (25 lbs).

PLANTING

To plant a hectare takes 2-4 arrobas (50-100 pounds) of seed. The best season for planting is October to January. Prior to planting the field should be cleared and burnt. The very next day the field should be plowed and planted. It can be planted in plowed furrows provided they are very superficial; otherwise, the grass can be broadcast. Once planted and sprouted there are no fertilization, cultivation, or weeding requirements with Yaraguá. Thereafter all yaraguá not grown for seed will be harvested by grazing livestock. Once a year it is recommended that the field be burnt. This causes the grass to sprout more thickly, with new growth appearing only about five days after burning.

PEANUTS

Most small farmers in the tropical lowlands grow peanuts, but in small quantities and mainly for home consumption. The main reason peanuts are not grown for sale is because the crop is extremely labor-intensive, both in harvesting and in shelling. Still, many households bother with this commodity because it is an excellent source of protein and thus helps to fill the gaps of a meat-scarce diet.

LAND PREPARATION

Peanuts require the same basic land preparation tasks as other crops. If planted in virgin or long-fallowed land, the crop lot must be cleared of timber and brush, burnt, and residues reburnt. If the crop is to be planted following previous crops, removal and burning of weeds and grasses is required. Either way, a burning of brush or residues invariably occurs; the farmers regard the ashes as an important soil nutrient. The plowing of the field usually occurs in two cruzadas or passes by tractor or ox-drawn plow. This plowing should be as superficial as possible, only about 20 centimeters deep.

PLANTING

Peanuts are usually planted with the rainy season in October or November. A tarea of land requires about one kilo of seed. The seed is usually prepared from peanuts remaining from the previous harvest, which are normally stored in their shells. The shelling is usually done by hand and is nearly always the work of women and children. It takes a person all day just to shell a single arroba (25 lbs). Once shelled, the peanut grains must then be screened carefully to remove all rotten or broken pieces. The principal reason peanuts are not shelled with threshing methods using the feet or poles is because the grains break so easily. In any event, the rotten grains are fed to pigs and chickens, the broken grains are consumed by the family.

The seed holes are variably spaced according to the wishes of each farmer. Some plant en cuadro (squared) while others have narrower spacing between plants than between rows. Between-plant spacing seems to range from 60-80 centimeters while between-row spacing is roughly 80 cm to 1 meter. Each seed hole is made with a hoe, creating a shallow basin no more than 10 cm. deep. Into each hole 2-3 peanut grains are placed. The planter then pushes a thin layer of soil over these seeds with his feet or hands (about 2-3 cm.

CULTIVATING

Depending on soil humidity, it takes 8-10 days for peanuts to germinate. As soon as the young plants have sprouted a replanting occurs, if necessary. The grower immediately begins with the first weeding. Usually two weedings are necessary, but more may be required in the event of abundant rainfall. One month after germination a second weeding combined with a hilling of the plants takes place. Since the peanuts grow very superficially, the hilling of soil provides additional space for the root system and the peanuts to grow. Most farmers do not bother to fumigate their peanut crop. However, one who does is Domingo Correa of Marañal. In October 1980 Domingo planted two tareas. He conducted two fumigations, the first with Dimecrón (15 spoonfuls) and leaf fertilizer (6 tablespoons); the second with Novacrón combined with Folidol. These agro-chemicals cost him 170 pesos (US\$6.80). Domingo also rented the spraying equipment, which cost another 100 pesos (US\$4) per fumigation.

HARVESTING

The peanut plant flowers at about two months; the root system and fruit begin to grow vigorously thereafter. Anywhere from four to six months the peanuts reach harvestable age. The plant itself never grows very high--something like 40-50 cms and appears like alfalfa. Maturity of the fruit is indicated by a yellowing of the plant and the loss of its leaves. To be sure, though, it is usually necessary to dig up a few plants to check the shells and make sure they have become hard.

Harvesting peanuts is extremely labor-intensive because it proceeds in two separate stages. First, the plants are pulled out of the ground, i.e., entirely uprooted. This is fairly easy because the plants have very superficial roots and the shells are located quite close to the soil surface. The uprooted plants are then left to dry on the ground up to about five days. The second stage now begins, which consists of stripping the peanut shells from their vines. The latter task is even more meticulous and time-consuming; for this reason it is frequently assigned to children. To harvest a single tarea of peanuts will require--for both harvest tasks--about 25 days of labor.

Harvested peanuts are stored in their shells inside the farmhouse in tin cans or sacks. When a portion is to be consumed, or sold, only then is it shelled. As explained earlier with reference to seed preparation, peanut grains split too easily to be shelled by foot or pole threshing methods; so, shelling must be done by hand. Shelling is one of those tasks usually assigned to fill the free moments of women and children. If the family elects to sell peanuts, the market price in Jan-Feb. 1981 fluctuated between 900 and 1,250 (US\$36-50) per quintal (100 lbs).

WATERMELON (SANDIA)

SUMMARY OF CROP PERFORMANCE (1980-1982)

A total of eight crop records for watermelon--three for 1980-1981 and five for 1981-1982--were collected for the Traditional Practices Project. These records represent six farmers from four communities.

AREA AND QUANTITY PLANTED: Watermelon is mostly grown surqueado or in association with other crops, such as corn and yuca; the corn provides a windscreen, the yuca reaches maturity long after the watermelon has been harvested. Three of the participants grew watermelon in this fashion, the others did not specify. Area planted varied from 0.25 hectare to 4 hectares, with the average being 1.4 hectares. The amount of seed to cover this area averaged 20 ounces. In crop lots which were not sufficiently humid, the seed was first soaked for 1-2 days to help it germinate. Plants which failed to germinate were replanted. At the time of planting, no natural or chemical fertilizer was used.

LABOR USE: The labor investment for watermelon growers averaged 38 days of family and 14.5 days of hired labor. Of this total, land preparation involved two days of family and two days of hired labor. Planting involved an average of 3.5 days of family and one day of hired labor. The most labor-intensive stage involved weeding and fumigations, which accounted for just over half of all labor employed in the entire crop: 25 days of family labor and nine days of hired. Harvesting of watermelons, over a period of several cycles or cuttings, lasted about six weeks and involved eight days of family labor and two days of hired labor.

USE OF ANIMAL TRACTION, MACHINERY, AND INPUTS: In all but two instances watermelon producers used land that had been tractor-plowed and harrowed; their machinery investment ranged from 1,500 to 1,800 pesos (US\$60-72) per hectare. The total average expenditure for land preparation came to 2,956 pesos (US\$118). Seven of the eight watermelon crops documented utilized chemical fertilizers, insecticides, and fungicides. The average investment in chemicals reached 227 pesos (US\$9) for fertilizers and 937 pesos (US\$37) in insecticides and fungicides.

YIELDS: The average yield of watermelons per participant came to 1,760 sandias per year. This outcome suggests a yield of 80 watermelons for every ounce of seed planted. It must be observed that in 1981-1982, two of the watermelon growers--Aurelio García of Valle Hermoso and Timoteo Flores of Naranjal--lost the major share of their harvest to excess rain. Excluding these two cases, the average watermelon yield climbs to 2,272 units or 110 watermelons for each ounce of seed planted.

INCOME: The size and quality of harvested watermelons varied widely, resulting as well in wide differences in prices and incomes. The largest watermelons are selected for sale, the smallest ones for family consumption.

In 1980-1981, the income received from watermelon sales plus the value of watermelons consumed by the rural family produced an average income of 19,000 pesos (US\$720). After subtracting costs of production, the net income per day of family labor amounted to 416 pesos (US\$16.64). The daily rate for hired labor at that time averaged only 76 pesos (US\$3.04).

In 1981-1982, of the five farmers who planted watermelons, two lost their crop entirely due to excess rain and flooding. These two growers lost a combined total of 47 days of family labor plus cash outlays of 7,559 pesos (US\$302.36). The remaining three farmers achieved net positive income from their watermelon crop totaling 438 pesos (US\$17.50) for every day of family labor invested. At that time the daily wage for hired labor was 100 pesos (US\$4).

It is worth mentioning that prices for watermelons averaged considerably lower in 1981-1982 than during the previous year. In 1980-1981 prices ranged from 11 to 21 pesos (US\$0.44--0.84) per unit, with an average of 14 pesos (US\$0.56). In 1981-1982 watermelon prices ranged from 7 to 15 pesos (US\$0.28--0.60) per unit with an average of 9 pesos (US\$0.36).

LAND PREPARATION AND PLANTING

As mentioned above, watermelons are usually planted in association with other crops in land which has been tractor-plowed and harrowed. The principal land preparation task is therefore not soil tillage per se but rather the preparation of seed holes. These consist of low troughs about 20 centimeters in diameter and 5-10 centimeters deep. They are carved out with a hoe several days before planting in hopes of catching and puddling rain water. If the rain does not come it may be necessary to conduct

a pre-planting irrigation--filling each hole with water from a bucket. It is also customary to pre-soak watermelon seed for a day or two.

On planting day each hole is given 2-3 seeds. The farmer covers these seeds with a thin layer of dirt about two centimeters thick. Watermelon hills are usually planted en cuadra, that is with equal distances between plants of the same row and between one row and the next. It takes about six days for the seed to sprout. At this time the farmer usually undertakes a replanting to fill hills that failed to sprout. A few farmers have begun to experiment with plastic sacks to cover the new seedlings and reduce their infestation by insects.

CULTIVATION TASKS

The first weeding of watermelons occurs about ten days after planting. This is conducted with the hoe or shovel. Thereafter, subsequent weeding will be required almost on a continuous basis. As the plant shoots out its ground vines, it becomes necessary to weed by hand so as not to damage them; this stage is reached after about two months.

Watermelon growers usually fumigate their crop with a variety of insecticides, fungicides, and leaf fertilizer. For example, Remberto Vargas of Forestal planted 8,000 meters of watermelon and invested 925 pesos (US\$37) in agro-chemicals as follows:

	<u>Pesos</u>	US\$
-1 liter of Tamarón 600	600	24
-1 liter of leaf fertilizer Bayfolan	75	3
-1 kilo of Cobox	125	5
-1 kilo Cupra-Vit	<u>125</u>	<u>5</u>
	925	37

The first fumigation occurs more or less when the plants are about 5 centimeters high; the others follow as needed. Farmers prefer to fumigate when there is lots of sun and the prospects of rain are slight.

HARVESTING

The harvesting of watermelons begins after about three months and can last for about six weeks. The fruit matures at different dates, so there can be 3-4 or more cortes or cuttings. The fruit is ready to be harvested when its lower half begins to yellow and the vines start to dry. As fruit is harvested it is sold. Normally, farmers select their fruit, separating the largest watermelons for sale and the smallest ones for home consumption. In early 1961 the large watermelons sold for 20-25 pesos apiece (US\$0.80--1.00), the smaller ones for 5, 10, and 15 pesos (US\$0.20--0.60). Some farmers prefer their fruit unselected, asking a fixed price for their entire production large and small. This is called vender de canto.

CHAPTER IV. LIVESTOCK PRACTICES

Livestock practices documented in the following pages are generally distinguished by very low levels of technical care and financial investment. From the family's dairy cow to the much abused dog, livestock holdings of farmers in the tropical lowlands follow a fairly strict subsistence rather than commercial orientation wherein the major objective is not to maximize output but to minimize costs. For the typical farm household, their livestock plays a secondary role with regard to the generation of income; hence, the quality and quantity of animal care leaves much to be desired.

In this chapter we first present an overview of livestock inventories for participating households. We document holdings, value, and differences between communities for the major livestock types. Next are described the livestock practices for the three principal kinds of animals found around the rural household: cattle, pigs, and chickens. The chapter concludes with a description of how farmers hunt wild game, and how they raise the dogs that make much of that hunting possible.

LIVESTOCK HOLDINGS IN FIVE TROPICAL LOWLAND COMMUNITIES

In February 1981 livestock inventories were taken for 31 rural households participating in the Traditional Practices Project and representing the five communities of Naranjal, Valle Hermoso, Torrente-Las Abritas, Porongo-Ayacucho, and Forestal-Espejon. The inventory results show a rather narrow range of livestock ownership mainly based on cattle, poultry, and swine, with one out of every three families owning a horse.

CATTLE

Nineteen of the 31 families surveyed raise dairy or beef cattle. With regard to dairy animals, the average herd amounts to six head with a range from one cow (25% of all families) up to 30 cows. The average value of each cow came to 7,740 pesos or US\$310.

Twelve of the 19 cattle-raising families reported holdings of bulls or oxen, usually two animals. The highest value was assigned to oxen, averaging 13,166 pesos (US\$527) per animal, followed by breed bulls (US\$400) and ordinary bulls (US\$332).

In 15 of the 19 instances, families reported the existence of calves or terneros in a ratio of one each for every cow or bull. The average number of calves was four, with an average value of 2,889 pesos (US\$116) each.

POULTRY

All but one of the 31 families surveyed raise chickens. The average flock size is 44 hens and roosters plus about 19 chicks. The average value of the adult birds was reported at 87 pesos (US\$3.48) while chicks averaged 20 pesos (US\$0.80). Three of the families interviewed raised ducks, one family raised turkeys, and one raised pigeons.

SWINE

Nineteen of the 31 families surveyed raise swine. The average holding consists of two sows or boars, averaging 1,716 pesos apiece (US\$69) and six piglets averaging 442 pesos (US\$18) apiece.

HORSES

Eleven of the 31 families interviewed raise one or more horses. The average holding is two animals with a value per head of 10,394 pesos (US\$416) apiece. Three of the eleven families owning horses also reported the existence of colts (one per family) with an average value of 1,267 pesos (US\$51) apiece.

DIFFERENCES IN LIVESTOCK HOLDINGS BETWEEN COMMUNITIES

Cattle raising is least-developed in the community of Porongo-Ayacucho, where total holdings of only six animals were reported, of which two were oxen. The community with the largest herd size is Forestal, with 70 head of cattle reported in the survey, followed by Naranjal (55 animals), Torrente (41 animals), and Valle Hermoso (37 animals).

Poultry-raising is fairly uniform over the five communities surveyed. The largest flocks were reported in Forestal (108 birds), with Valle Hermoso and Porongo tied in second place with flocks averaging 87 birds per family, and Naranjal and Torrente tied for third place with 77 birds per family flock.

The most-developed swine producing community is Forestal, where all families surveyed raise these animals and the total herd size is 37, or over twice as many as the second-place community of Naranjal with 18 animals and Valle Hermoso with 15 animals. Swine production is least developed in Torrente and Porongo, with only six and four pigs reported by a minority of households surveyed.

VALUE OF THE LIVESTOCK INVENTORY

For the five communities surveyed, the average value of livestock holdings would be \$3,576, of which 88% would be in cattle, 7% in swine, 4% in poultry.

<u>Animals</u>	<u>Quantity</u>	<u>Price</u> (US\$)	<u>Total Value</u>	
			(US\$)	%
Cows	6	310	1,858	52
Bulls (oxen)	2	420	840	23
Steers, heifers	4	116	464	13
Chickens	44	3.48	153	04
Chicks	19	0.80	15	00
Swine	2	69	138	04
Piglets	6	18	108	03
			<u>3,576</u>	<u>99</u>

CATTLE

The predominant characteristic of cattle-raising among small farmers of the Tropical Lowlands Region is that it is a relatively casual, non-technified farm operation. Animals are predominantly of unimproved local (criollo) breeds, they are left mostly to graze and breed alone in the monte, they largely eat natural pasture, milk production is exceptionally low and mostly oriented to family consumption, health problems are mostly treated without veterinary assistance, and virtually the only physical improvements invested in by most cattle owners is barbed wire fencing.

BREEDS AND BREEDING

In addition to the predominant criollo or local breed, small farmers of the region do not invest very often in improved breed cattle such as cebú, brown swiss, or holandés (dutch). It hardly pays to make pure-breed investments because cattle-raising practices are so uncontrolled and bloodlines quickly degenerate from indiscriminate breeding. From a productivity perspective, the breed itself does not seem to be the critical limiting constraint anyway but rather lack of improved pasture.

Farmers report that the breeding season is usually August through November, with October being the most intense breeding month. When the cow enters heat she becomes nervous, her vulva becomes inflamed, she cries often, and sometimes attempts to mount other animals. If by coincidence the farmer finds one of his cows in this condition he will bring the animal back to the farmhouse and attempt to rent a breed bull from a neighbor. In this case the only preparation taken is to tie the cow by her horns to a tree so as to facilitate the bull's mounting. As for the bull, if it is used for breeding it will normally be given an enriched diet based on corn and yucca. But the typical case is for breeding to take indiscriminately and unsupervised in the monte. The breeding age begins when animals are 18-24 months old.

ACQUISITION OF ANIMALS

For owners of established herds, the acquisition of new animals is mostly left to natural reproduction. The exception to this rule is when a calf dies during birth. In this case cattle-raisers usually try to buy a replacement calf from a neighboring herd. This practice makes sense both to ease the physical stress of interrupted lactation in the mother, and also because--as a preliminary to milking--a calf is used to suckle the cows teats to activate the flow of milk.

Adapting a new calf to a strange mother is not as difficult as getting the cow to accept a calf that is not her own. To expedite maternal acceptance a number of stratagems are employed. One is to smear the calf with milk from its adopted mother so that it will smell familiar. Another is to take the hide of the dead calf and wrap it around the replacement calf when it attempts to feed from its new mother. In addition to these precautions it is also necessary to tie the legs of the foster cow so that it will not kick the replacement calf. Finally, it is customary to tether cow and foster calf in close proximity to each other during periods between feedings so that the two animals become increasingly familiar with one another. Under ordinary circumstances the adjustment period will only last about 3-4 days.

Of course, when starting a new herd from scratch, would-be herders often begin with one or more animals received as an inheritance or a wedding gift. When this is not possible and cattle must be purchased, the least expensive but slowest option is to buy one or more calves and wait for them to mature and reproduce naturally.

BIRTHING

Once again, the birthing of most calves takes place under uncontrolled conditions. Owners keep a watchful eye if they know the cow's approximate breeding date, from which they calculate a little more than nine months to reach full term; and after the ninth month the cow may be tethered close to the farmhouse and kept under observation. However, most calves are born in the monte.

The major birthing problems reported by farmers include the cow's failure to evacuate the placenta, and worm infestation of the navels of newborn calves. Under normal conditions the placenta should be evacuated within two hours of birth. If not evacuated within a day or two the placenta will rot inside the animal, causing infection and even death. To expedite placenta evacuation some owners place the cow on the ground, tie its legs, then force it to drink a purgative made of the juice of a cactus known as caragore mixed with salt water. A second method is to reach into the vaginal cavity and gently attempt to pull the placenta free. If this fails, some farmers attach a thin rope to the placenta tissue while at the other end they attach a flat rock weighing about half a pound. This weight is left to dangle as the animal walks around.

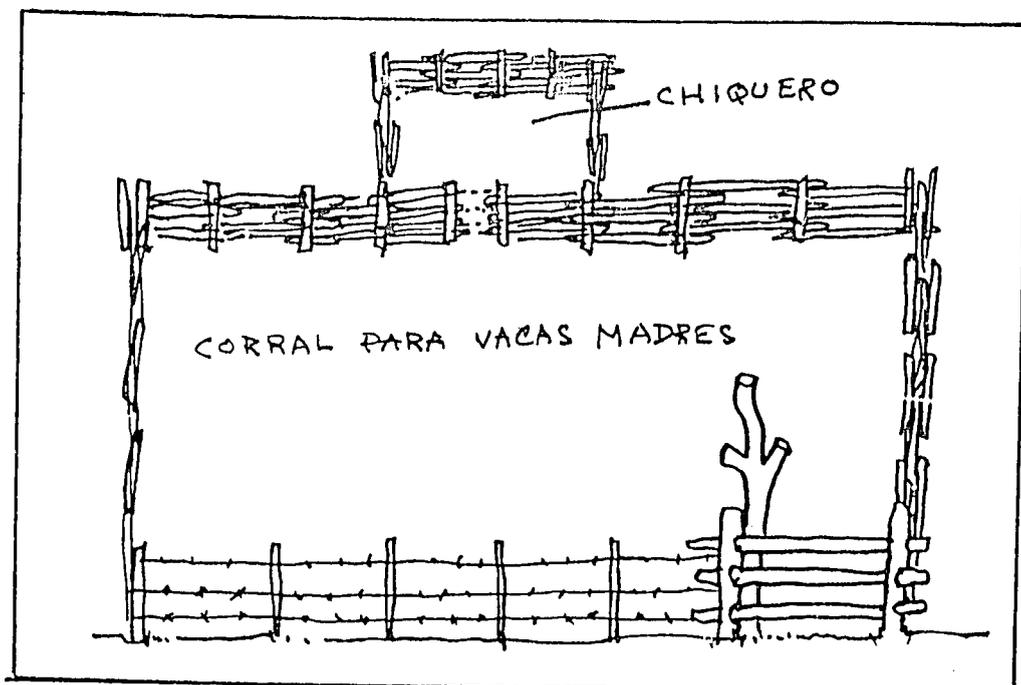
Infections of the calf's navel are normally treated with an all-purpose livestock disinfectant known as "E.O."

If a newborn calf dies out in the monte and is not detected for a day or two its carcass, of course, rots and becomes useless except perhaps for the hide. However, if a dead calf is detected opportunely it will be butchered immediately. Entrails and organs will be consumed by the farm family whereas fresh meat may be offered for sale to neighbors. If to be consumed by the family, the meat is usually cut into strips, salted, and sun-dried as charque.

MILKING AND WEANING

Calves are weaned after 7-9 months, either by physical separation from the mother or by use of a tabla or brace attached to the calf's mouth which permits the animal to graze but not nurse.

If a family has enough animals to justify commercial milk production, it is likely to have a rustic corral where the cows are kept and milked, along with a smaller, adjacent corral called the chiquero where calves are kept. Most families milk once a day, first thing in the morning. To guarantee a reasonable milk supply for milking, the calves are separated from their mothers the night before and placed in the chiquero.



The milking procedure for criollo cows is quite laborious for the meagre results it provides. The cow must be first tied by her horns to a post. Next, her hind legs are bound. Once the cow is properly secured, her calf is released from the chiquero and allowed to briefly nurse consecutively one teat after another. This activates the milk flow. The calf is then tied up and the milking begins, a task normally left to the female head of household. Squatting and facing the cow from the side, the milker first cleans the udder and teats with water. She then squeezes one teat at a time, collecting the milk in a small gourd which is subsequently emptied into a bucket. If the teat is dry, it is customary to soften and lubricate it using milk from another teat or from another animal.

The milk yield is typically very low. In a single milking a cow will rarely give more than three liters. To obtain 10-12 liters it would be necessary to milk at least four cows. Furthermore, the milking process itself is quite time-consuming. It takes about 15 minutes to obtain a single liter, which amounts to about four gourds of milk, known as tutumadas. Owners of dairy cattle are fully aware of low low is their milk production, so much so in fact that they sometimes dispense with milking altogether and let their animals remain for days at a time in the monte. The low milk yields are most commonly blamed not on breed but inadequate pasture. Those farmers who do grow cultivated pasture simply do not produce nearly enough for their entire dairy herd. Everyone talks pasture improvements but few carry them out for lack of time and capital.

FENCING

Aside from acquiring the herd itself, the only major impediments to getting into cattle-raising for most tropical lowland farmers are (1) having enough land, and (2) fencing the land. The latter prerequisite must occur even before the land is cleared or timbered off, because without fencing cattle will wander into one's own or a neighbor's crop lots--one of the primary causes of disharmony in a rural community. Poles for the fencing are normally harvested from the farm property itself. The only cash investments are to purchase barbed wire and, if necessary, to hire a laborer to assist with pole preparation and wire stretching. Farmers report that it costs about 6,000 pesos (US\$240) to fence a single hectare of land, which includes an allowance for 20 days of hired labor at 100 pesos (\$4) per day. The barbed wire is stretched and stapled in three rows, usually each separated from the next by a distance of 30-35 cm.

PASTURE AND FEEDING

Once the fencing is up, unsupervised cattle grazing can begin within the enclosed monte. The cattle forage almost entirely on native grasses of which there are a variety but farmers seldom remember the names of more than one or two varieties. Rotation of herds from one enclosed pasture area to another is rare. Following the harvest of a crop, cattle are allowed to graze that crop's residues. In this instance they are usually staked to a specific location, then the grazing area changed three times during the day. This process is called mormear.

If farmers plant any cultivated pasture it is usually yaraguá (see Chapter III for description of cultivating practices), which is normally harvested as cut fodder rather than left for grazing. In addition to availability and quality of pasture, the remaining most critical constraint on cattle feeding is a reliable water supply. Most farmers of the region have a natural water source on their property, like a spring or an arroyo (small stream) where their cattle are able to drink at least once a day. Most cattlemen also provide their animals with mineral salts about once a month.

CASTRATION, MARKING, AND REMOVAL OF HORNS

Most farmers do not castrate their bull calves. Those that do claim that the practice helps the animal to "develop" (greater size and weight). The operation consists of cutting open the scrotum with a very sharp knife, removing each testicle one at a time and cutting its tube, then sewing up the scotum again with needle and thread. A disinfectant in spray form known as Curabichera is applied to minimize the risk of worm infestation.

As for branding, this is rarely done because herd size is usually so small and cattle grazing mostly takes place within fenced areas. Horn removal is practiced only in case of a horn infection, known as Carcoma. The disease is treated by sawing off the horns and treating the stumps with applications of hot grease or the disinfectant known as E.Q.

DISEASES AND AILMENTS IN CATTLE

Aside from ailments mentioned previously (placenta retention, worm infestation; and carcoma), the principal health problem facing cattlemen is aftosa or hoof-and-mouth disease. Formerly there was a government-sponsored vaccination service in the region to mass vaccinate cattle against this scourge. But once the service was cut back, farmers gradually began to learn to do their own vaccinating. Most cattlemen have a syringe and buy pre-measured vaccine doses at 10 pesos (US\$ 0.40 apiece). The vaccine is applied to the sub-cutis below the hide, not the muscle below, with a dosage of 10 cm for adult animals and half that much for small.

After aftosa, most cattlemen only need to worry about knowing enough first-aid to treat their animals for a wide variety of external parasites and wounds to the skin including snake bites. Ticks, fleas, and mange are common problems. External infections are treated with a disinfectant known as Asuntol or E.Q. Sometimes cattlemen encounter goiters in their animals which must be treated with iodine. Internal parasites causing anemia in animals are sometimes treated with an antibiotic provided the cattleman can afford to purchase it.

It is noteworthy that small farmers surveyed do not build cattle dips for bathing their animals, which is much more common in the Altiplano. Instead, lowlands farmers bath their animals by hand using a cloth soaked in disinfectant.

SALES

Most cattlemen surveyed sell their cattle on-farm. Butchers or their agents go out to the farms and buy the animals directly, usually without intermediaries. Because of the greater distances between farms, as well as between the farms and the regional markets, the weekly market days so prevalent in the highlands are not as common in the lowlands.

The price of a cow or bull is pretty much determined al ojo or rapid visual inspection based on the animal's general characteristics of size and weight and age. This means that prices can change sharply from one day to the next and from one farm to another. For the most part, however, in early 1981 steers were selling for about 8,000 (US\$320) apiece. In the case of cows, a pregnant animal sells for considerably more than one that has not yet been serviced. In the first case, the early 1981 price was roughly 10,000 (US\$400) per head while the unserviced animal only commanded 6,000 pesos (US\$240).

PIGS

About two-thirds of the households in the tropical lowlands raise pigs, but in a very rustic and casual way. The food source and schedule of feedings is highly variable, shelters are primitive, vaccination and other medical attention is rare, and sales (or consumption benefits) probably rarely cover the full costs--including an hour per day of family labor--of producing these animals. It would appear that the decision to raise pigs probably has less to do with economics than with other, more subjective considerations. For one, many rural households simply do not like the idea of wasting kitchen scraps and left-overs. For another, pigs make noise, they are a form of companionship, they make the farmhouse less triste (sad) during the day when most of the family members are away in the fields.

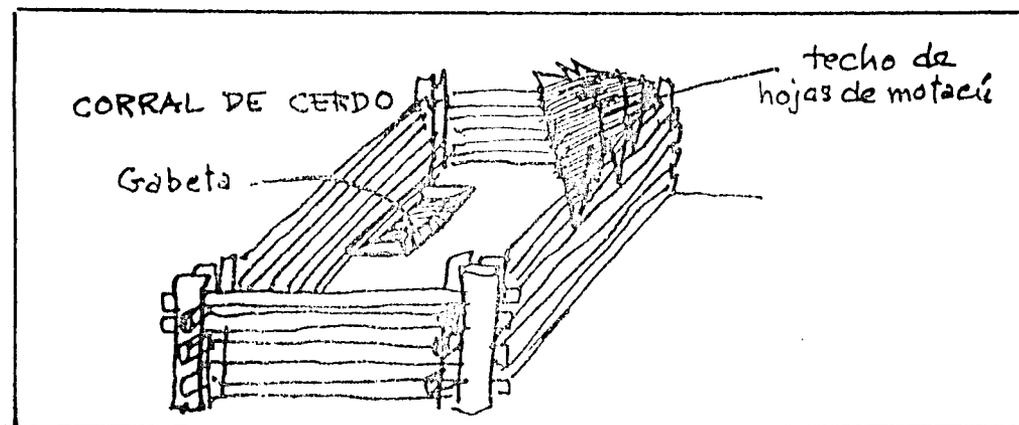
BREEDS

None of the project participants surveyed raise pure-breed pigs, although they are familiar with their names--like York and Duroc. Rather, all pigs inventoried were mixed-breeds or simply criollo. The typical holding is limited to an average of two adults and about half a dozen piglets. The size of the pig enterprise appears to be most directly influenced by the number the family feels it is capable of feeding with its limited production and cash resources.

A swine operation is normally begun by purchasing piglets, male and female. At the time of the inventory taken in early 1981, the price of piglets was in the range of 500 to 700 pesos (US\$ 25-28) apiece.

FACILITIES

There are two basic pig-raising strategies among small farmers: amarrados or "tied up" and alambrado or corralado, i.e., "fenced or corraled-in". No matter what the strategy chosen, pigs will be kept close to the farmhouse to facilitate their feeding. A typical pig corral is illustrated below. It consists of a rectangular area fenced in with wooden posts and woven sticks, with one corner covered by motacú palm leaves to provide minimal shelter from the rain and hot sun. When pigs are raised under the "staked" or "tied-up" method, a rope is attached to one hind leg and a tether of several meters is provided. A common place to stake pigs is in the midst of a shady grove of fruit trees or plantains.



BREEDING AND BIRTHING

When there is no boar, and the sow comes into heat, it is customary for the swine-raiser to seek out a neighbor who has a boar. He ties the sow on a teather and takes the animal to the neighbor's farm where the breeding service occurs. Depending on familiarity or degree of consanguinity with the neighbor, the owner of the sow faces several payment options: the breeding is free, it can be paid in cash, or it can be handled al partir, that is, the breeder will receive one piglet from the forthcoming litter --which suggests that a breeding service is worth about 500 pesos (US\$20).

The sow can first be bred at an age of 4-5 months of age. If raised in a corral with boars, the latter must be separated after about three months if a breeding control is desired. Once impregnated the sow takes another 3.5 to 4 months before giving birth to her litter. During the lactation period it is important for the mother sow to be given an enriched supply of food. Weaning often comes naturally after about three months, when the sow again enters into heat and becomes impregnated. At this point the animal stops lactating and actually drives her young away by force.

CASTRATION

Castration of boars is commonly practiced because it serves to accelerate their fattening. The procedure is conducted when the animal is 4-5 months old and is virtually identical with the method described for cattle

FEEDING

The primary food source for all pig operations are kitchen scraps and food left-overs, including dirty dishwater. Mixed with this will be additional foods such as corn (shelled or on the cob), corn husks, rice bran, rotted fruit and vegetables, and sundry crop residues. The two most important ingredients are corn and rice bran. It is said that if the pig is primarily raised on corn, it will produce much more lard than the pig raised on rice bran or afrecho. For a single adult sow or boar the family must purchase about 25 pounds of bran per week. This commodity is sold by local rice mills and is purchased by the family as part of its weekly market day activities.

Feeding schedules with pigs are highly variable. During periods of peak agricultural activity, pigs might not get fed more than once a day; other-times they may receive three feedings a day. It is customary too for pig-raisers to heavily salt the mush and food scraps they serve swine, but this is not intended so much for a nutritional benefit but simply to get the animals to eat with greater relish.

DISEASES AND AILMENTS

Farmers surveyed reported no experience with, or threat from, the peste porcina (pig fever), and they said they did not vaccinate their animals. What was reported was diarrhea, presumably caused by intestinal parasites, but against which no measures were taken. Also mentioned was the common occurrence of ticks, fleas, and mange--but again these ailments mostly go untreated. Farmers mentioned that if a pig fails to gain weight after persistent feedings, the animal is most likely to be butchered rather than an attempt made to cure its disease.

SALES

Castrated pigs (barrows) are normally raised for 8-12 months before being sold or consumed by the farm household. In early 1981, pigs were being sold in the community to outside mañazos (livestock intermediaries) or merchants of pork fries. Pigs are usually sold parado or standing, i.e., alive, at 1981 prices ranging from 2,500 to 3,500 pesos (US\$100-140).

BUTCHERING A PIG

The project participant Marcos Valverde Vianco of Forestal describes how to butcher a pig: "One must first sharpen 2-3 knives on a stone. Then it is necessary to boil water for removing the pig's hair. The day before butchering the pig should be given nothing to eat so that its stomach will be empty at the time it dies. The animal is dispatched by stabbing a knife through its heart at a point just behind the foreleg (left side)."

"Once dead the pig must be boiled in scalding water, and then the hair is removed by scraping with the knives. Once scraped the animal is placed on its back on a wooden slab to be gutted and butchered. All the guts are carefully removed and placed in a basket, making sure not to rupture the gall bladder which is located next to the liver; this organ must be cut off and thrown away. The guts placed in the basket must then be taken to be washed; everything is saved, nothing is wasted."

"The carcass is then hung by its snout from a tree. Hanging vertically allows the blood to drain and the meat to cool. It is not good to eat pork cooked while the meat is still warm, because it upsets the stomach. We cut the meat in strips, starting at the neck and moving downward. Those who help me with the butchering are relatives of mine and so they do not charge me anything for their assistance, but I always give them a pound of meat or I give them some of the guts. Everything is eaten. We even make a special dish, patasca, using the head.

CHICKENS

In terms of the number of participating households, raising chickens is the most popular livestock enterprise among rural families in the Tropical Lowlands. It is a critically important enterprise as well, for it is virtually the only farm activity that produces commodities that can be sold on a daily or weekly basis. Selling milk would fill this need too, except that the large majority of families with dairy cattle do not produce enough milk to fill a single tacho or 25 liter milk cannister, the threshold supply requirement for milk sales. So it is left to poultry--through the sale of eggs and live birds--to sustain the family cash flow from one week to the next.

And poultry stocks are not insignificant. The typical family raises some 30-40 birds, not counting chicks. This quantity of poultry consumes some 15 pounds of food per day--be it corn, yucca, or rice--and probably represents a heavier drain on farm production and stored foodstocks than any other source, including the family itself. For this reason the size of the poultry flock varies considerably during the course of the year, expanding in the post-harvest season when grain supplies are most abundant, and shrinking back as food reserves dwindle during the lean season.

BREEDS AND REPRODUCTION

The chickens found in and around the homes of the rural poor are predominantly, if not exclusively, of the criollo or native varieties and almost entirely unimproved. The rapidity of flock expansion depends on the number of roosters relative to hens. This, in turn, effects the trade-off between flock expansion (hatching of new chicks) versus egg production. In general, hens who fertile and show a readiness to incubate are given up to a dozen eggs for hatching. These are selected from the largest sized eggs available and the product of hens of proven egg-laying capability. The rural housewife prepares a nesting platform called a chapapa and usually arranges a fresh nest for the mothering hen, a nest lined with soft plantain leaves designed to enhance heat retention as well as to cushion eggs from inadvertent breakage. When an old nest is reused, it is necessary to dust it with an insecticide known as bolina which serves to eradicate a dangerous poultry flea called la Hita which attacks newborn chicks as they emerge from the shell and sucks their blood until they die. The speed of incubation varies from about 17 to 21 days. The faster-incubating hens are those that move around more on the nest, which in turn moves the eggs about slightly and enhances a more uniform distribution of heat.

CARE OF NEWBORN CHICKS

Chicks are fed a soft mush made of ground rice and water during their first week of existence. Thereafter their diet shifts to broken rice (granillo) for the next ten weeks, after which they are graduated to normal shelled corn. Of course, chicks must be confined to the security of the farmhouse or other enclosed structure during the evenings--until they are old enough to fly--at which time they can begin to roost in the trees surrounding the farmstead. Farmers prefer not to build chicken coops or hen houses for a variety of reasons: they can not afford the investment, the coops require rigorous hygiene to avoid becoming malodorous, and cooped birds are easier prey to bats and rodent predators.

FEEDING OF BIRDS

There is far more to the care and feeding of chickens than first meets the eye of the casual observer. To begin with, farm families like to set a specific location and feeding time that remains constant. Whether the birds are fed once or twice a day, the feeding hour(s) stay the same. This practice has the practical effect of disciplining the birds to "stay out of the way". For once chickens receive their farmhouse grain feeding, they know there is no more to come and so they move away into a foraging activity in the monte where they scratch for insects, grubs, worms and other protein to supplement their diet.

The poultry flock diet is actually based on three principle staples in the case of most lowland families surveyed: corn, rice, and yucca. Normally, all three commodities are rotated within the diet every 1-2 days, at least as long as supplies last. This is intended to accustom the flock to a more varied diet, which makes the birds less vulnerable to the sudden loss or depletion of any one of the food sources.

1. Corn

A flock of 30 birds consumes about six pounds of corn in a single morning or afternoon feeding. Normally the corn is supplied from on-farm production, where it is stored on the cob and unhusked. The worst-quality ears are selected, husked, and then shelled by hand one at a time. Just to prepare for a single feeding can take 30 minutes or more. The corn diet (alternating with the other commodities rice and yucca) will continue until the corn supply approaches exhaustion. At that point the family faces the alternative of either selling off a significant number of the birds or shifting to a rice-yucca diet or buying corn, which is the least likely since this would signify an outlay of US\$4-5 per week for a 100-pound sack (quintal) and with all the attendant problems of its purchase and transport back to the farm.

Almost by definition, then, when the corn runs out the "lean season" begins. This happens most commonly in the months of December, January, February, and part of March, which also coincides with the rainy season. During this period egg production declines markedly.

2. Rice

This commodity is often in shorter supply than corn and may run out even earlier. Its supply is most critical in the case of a flock with large numbers of chicks. Roughly six pounds of rice is required to feed a flock of 30 birds for a single morning or afternoon feeding, just as with corn.

3. Yucca

However, it is often left to yucca to provide the margin of error in the poultry diet when grain supplies are becoming depleted. If used exclusively, some 15 pounds of yucca per day would be required by a 30-bird flock. The yucca must be harvested, then machucada or split-up into small chips. This is done with an axe blade (without the handle) and a chopping block

SUPPLEMENTING THE LEAN SEASON DIET WITH "TURIRU"

Throughout the tropical lowlands there thrives an ant-like insect known as the turiru. It is especially appetizing to poultry because its body is larger yet softer than the ant. Turirus build round nests in the branches of trees. The rural housewife seeking a food source for her poultry flock will find a nest, cut off the branch to which it is attached, bring it back to the farmhouse, then slice the nest in half and let her birds feast.

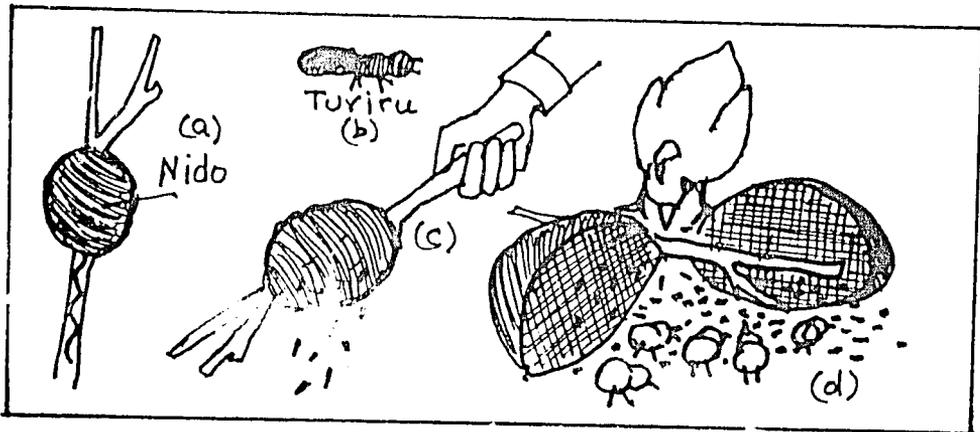


Illustration of (a) Turiru nest, (b) the turiru, (c) form of transporting the nest, and (d) the nest cut in half, for feeding.

Rural housewives assert that supplementing the poultry diet with turiru has a definitely positive effect on growth of chicks and increasing egg production.

AILMENTS AND DISEASE IN CHICKENS

Nearly all housewives surveyed complained of a poultry disease called moquillo, which caused on occasion serious mortality among newborn chicks. However, neither the cause of the disease nor its cure could be explained by these respondents. The best anyone could say was that a "gringo" in the market town of Comando (Villa Busch) sold a medicine which, mixed with water, was very effective in combating ailments in poultry.

The only other serious ailment was that of la hita, the flea which attacks newborn chicks. It is treated by dusting old nests with an insecticide called Bolfo prior to using the nest again for a new incubation.

SALES

Given an egg supply of about forty per week, the housewife will usually reserve no more than a fourth for family consumption and sell the rest on marketday. In early 1981 eggs were selling for 2.00 pesos (US\$0.08) apiece in markets like Comando and Montero. The larger eggs sometimes brought as much as 3 pesos (US\$0.12).

Hens are usually sold off once their egg production drops off. In early 1981 hens were selling for 100-130 pesos (US\$4-5.20) apiece. The birds are mostly sold to restaurants and ambulatory food sellers.

BUYING AND SELLING POULTRY, EGGS, AND OTHER PRODUCTS

We conclude this section on poultry with the story of Doña Julia Rocha, a resident of the community of Valle Hermoso, who makes a modest living buying and reselling poultry, eggs, and sundry grains in the markets of Comando and Montero. Her story, as reported by Aquilina Teco of the Traditional Practices field staff, is particularly instructive because it not only shows commercial resourcefulness but also the sometimes extremely intense pace of a rural housewife.

One Sunday morning in December Doña Julia awoke at 6 A.M., prepared breakfast and at the same time prepared the condiments and other contents to be used in the mid-day meal, which she would have to prepare before departing for the market in Comando. Having served breakfast, and while cooking lunch, she fed her pigs and checked on her cows. By 8:30 A.M. she was ready to

leave the house. Leaving her two oldest sons at home, and carrying her youngest son on her back, she walked the 600 yards to the highway at kilometer 11 to await public transportation to the market. She caught a bus to Comando, paying 6 pesos (US\$0.24), reaching the market by 10 A.M.

She immediately began to meet new arrivals reaching the market by vehicle and by foot, offering to buy their chickens, eggs, and other products for a few pesos more than other buyers were paying. She purchased the birds at prices ranging from 70-100 pesos apiece, according to their size, and eggs for 2 pesos each. By mid-day she had purchased 500 eggs for 1,000 pesos (US\$40), 10 chickens for 820 pesos (US\$32.80), and six arrobas (150 pounds) of peanuts for 1,060 pesos (US\$42.40). Her purchases complete, she left the eggs and peanuts with a friend in Comando and proceeded to buy her own supplies for home consumption including bran for her pigs and milled rice for her family. Carrying her son, 10 hens, bran, rice, and groceries, she caught a ride with a pick-up truck back to the entrance of Valle Hermoso. There she left the chickens with her mother and continued on foot to her home. Upon her arrival she proceeded to cook supper, feed her chickens, her pigs, and corraled her cows.

The next day at 5 A.M. Doña Julia woke, prepared breakfast, lunch, fed her livestock, and by 6:30 A.M. had picked up the ten hens (left with her mother) and was waiting for a ride at the highway. By 7 A.M. she was picked up by a milk truck which slowly proceeded to Comando, picking up milk canisters along the way. When the truck stopped in Comando, Doña Julia loaded the eggs and peanuts bought the day before and continued her journey, reaching the town of Montero by 10 A.M. For herself and her cargo she paid a total of 30 pesos (US\$1.50). In Montero she sold all the eggs except for five, which had broken in transit, for which she earned 1,237.50 (US\$49.50). She sold her ten chickens for 1,000 pesos (US\$40). Then, catching an inter-provincial taxi (for which she paid 17.50 pesos (US\$0.70), she traveled on to the city of Santa Cruz to sell her peanuts in the marketplace of Los Pozos. There she sold the 150 pounds of peanuts for 1,350 pesos (US\$54). Leaving Santa Cruz at 4 P.M. she made it back to Valle Hermoso in three separate vehicles, paying a total of 45 pesos (US\$1.80) in fares. She reached her home at 8 P.M. and immediately prepared supper for her children.

In total, after subtracting her costs (including lunch and fares) from her earnings, Doña Julia turned a profit of 575 pesos (US\$23) for her weekend transactions.

HUNTING

For a few farmers, hunting wild game is one of their most important activities. On the one hand, hunting provides an additional source of meat for family consumption. On the other, wild game can be readily sold in local markets, thus contributing to household income. In this narrative are described a number of practices for the hunting such wild game as the tatu, peji, jochi, and wild pig. These practices are based on the experience of Angel Calvi of the community of Naranjal.

DAYTIME HUNTING (CAZA DIURNA)

Daytime hunting is usually conducted with dogs. The hunter stays on the move for hours and may walk 15-25 kilometers of forest in a single day. In addition to his weapon, the hunter takes cigarettes and a small bundle of coca leaves, which he will chew so as to not feel hunger, fatigue, or drowsiness.

The hunting procedure itself is fairly straight-forward. The hunter follows his dogs and the dogs pick up the scent of a wild animal. They start barking and following the scent until eventually they pursue the prey back to its cave. The object is to encuevar or "cave" the animal. Once the lair is found, its tunnels are dug up and the animal caught. On a good day 3-4 smaller animals will be captured in this way, and their carcasses will be carried out of the forest by the hunter. With larger game, the animal is gutted and dressed in the forest, its carcass left behind in a shady place until the hunter has returned with a horse or bicycle. The last activity of the day for many hunters is to build a tree platform (chapapa) that will allow him to hunt at night.

NIGHTTIME HUNTING (ESPIADA)

Most wild game is attracted to a wild berry bush known as the frutero. Once a hunter finds such a bush, he will study the surrounding area looking for the tracks of local game animals. It is necessary to leave the berry bush and its environs as undisturbed as possible. The hunter then selects a tree for building a spying platform which will be located as close as possible to the berry bush. Around 6 P.M. the hunter climbs up to sit on the spy platform. He takes with him coca leaves, which will be chewed to avoid drowsiness and hunger. The platform itself should give him a direct view of the berry bush.

berry bush. The hunter then waits until the animals begin to arrive. The smaller animals begin their foraging in the early evening, the larger animals later. The tracks around the base of the bush tell the hunter in advance what animals he can expect. Sitting in total darkness, the hunter waits with his ears cocked for the sounds of wildlife. When the sounds indicate that the animal is in the frutero, the hunter flicks on a flashlight and beams it to illuminate the berry bush so his prey can be seen. Most animals freeze when spotted by the beam of the flashlight. The hunter slowly lifts his rifle, supports it with the hand holding the flashlight, and fires. Needless to say, the hunter at best will have only one or two good shots from his tree platform on any single evening. And obviously, this type of hunting does not require dogs.

NIGHT HUNTING ON THE FARM (ESPIADA EN CHACRA)

Many farmers in the tropical lowlands occupy settlements where large stretches of virgin forest are only a few hundred meters from some of their crop lots. In such cases, it is common for wild game to come out of the forest at night and forrage in the crop lots. The alert farmer will be able not only to identify crop damage resulting from these animals but also find their trails going to and from his fields into the forest. The hunter then sets up much as he does for normal night hunting. He creates his blind beside the game trail, hides himself with a gun and a flashlight, and waits for his prey. The hunter will chew coca to ward off drowsiness. Upon hearing an animal moving he will illuminate the path with flashlight, locate his prey (if it's there), and fire.

A variant of on-farm hunting is to use dogs. The hunter brings his dogs with him for a walk in the dark after supper. Unless the dogs pick up a scent elsewhere, the hunter will take them to the location of the wild game trail that most interests him and turn the dogs loose. If there is a scent to be followed the dogs will start howling and follow its trail. Eventually they will track the animal to its cave, just like with daytime hunting. Once the prey is "caved", the entrance and exit tunnels are blocked, then slowly dug up foot by foot until the animal is located and dispatched with a blow of the machete or a club. In this type of hunting a gun or rifle is not really necessary.

DOGS

Nearly all of the farmers who participated in the Traditional Practices Project have a dog; and some have several--up to five animals. There are two practical reasons for having dogs. The first is to protect the farmhouse when nobody is home. The second is to use dogs for hunting wild game. It is the family with several dogs that is most likely involved seriously and frequently in hunting activities.

Dogs are raised with the most casual of practices. They are more tolerated than cherished, more frequently kicked than petted. They receive no special food, have no fixed shelter, are not vaccinated, are not bathed, and when wounded or in ill health are for the most part expected to heal themselves.

During the summer months or periods of greatest heat--day and night--the dog usually lounges in the patio of the farmhouse, in the shade of a fruit-tree, or outside the front door. In the winter, a dog will be found sleeping near the kitchen stove or underneath its owner's bed. At best the animal will have a few old rags upon which to rest, but never does one find a dog house or pen constructed specifically for its use. Dogs are generally fed with kitchen scraps and wet garbage. The quantity of food reserved is often so negligible that the animal would starve to death unless it foraged for itself. Farm dogs have a reputation for eating anything: fresh corn, guineos, plantains, fruit, rodents, lizzards, and birds. Whenever a chicken, pig, or other kind of livestock is butchered, the entrails are thrown to the dog. It is not infrequent that a dog will kill and eat farm poultry simply out of acute hunger.

In only one of the five communities participating in the study--Porongo--did residents go to the trouble of getting their dogs vaccinated against rabies. Elsewhere farmers were ignorant that dogs ever required vaccination. Rabies shots by public health authorities cost 50 pesos (US\$2) per animal in 1981, equivalent to an entire day's wage for farm labor (hardly an inexpensive service). Farm dogs are commonly afflicted with fleas, ticks, and mange. Those animals used for hunting frequently return with scratches, bites, and other wounds. Nonetheless, it is rare for a farmer to use disinfectant on his dogs. In sum, these hardy and mistreated animals--much like their owners--are experts at subsistence, required to take care of themselves as best they can.

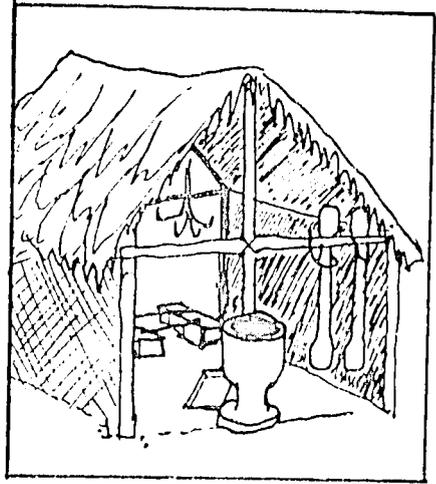
CHAPTER V. FOOD PREPARATION PRACTICES

The diet of rural households in the tropical lowlands is heavily based on two staples--rice and yuca--with corn a distant third. In addition to being the focus of the principal dishes, these products are also used in place of wheat flour to prepare a wide variety of bread and pastries. The dominant theme in the cooking of rural housewives is to minimize food purchases, making do with those commodities produced by the farm as well as seasonal fruit and other tree crops available in forest areas nearby. This simplicity and adaptation to the environment is also reflected in the cooking utensils, stoves, and grinding devices used by rural families.

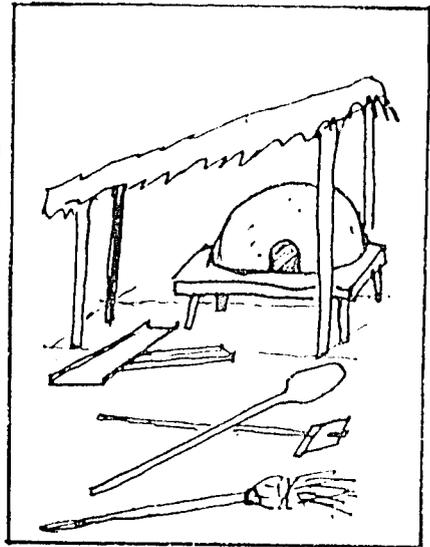
We begin this chapter with an overview of the rural kitchen with its cooking tools and equipment. Next is presented a listing of the most important meals consumed by rural families, listed in order of their importance. We then begin to describe how many of these meals are prepared, their ingredients, and their cost. We start with breakfast--both beverages as well as a wide variety of breads and pastries. The middle section of the chapter is devoted to the preparation of main dishes served at lunch, supper, and sometimes even breakfast during periods of heavy field labor. The chapter concludes with a description of a few special occasion meals and beverages.

THE RURAL KITCHEN

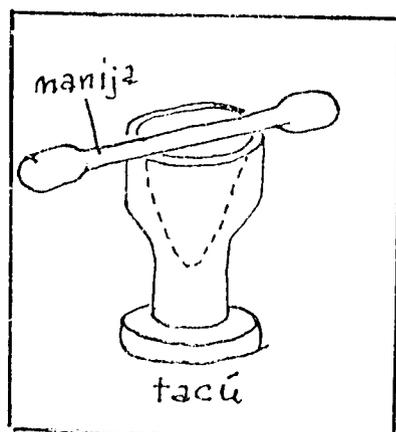
THE KITCHEN SHACK: Most rural families in the tropical lowlands construct a kitchen that is physically separated from the rest of the farmhouse. Typically it is built of rustic local materials: wooden posts and roof beams secured with vines, walls made of woven palm mats, and a roof of motaen palm branches. Often the kitchen is not fully enclosed, to provide better ventilation for smoke and heat to escape. Most commonly, the stove is built on the ground inside the shack. A variety of devices for storing kitchen utensils, plates, cups, and glasses hang from the rafters. Outside the structure rests a large milling mortar carved from a tree trunk--the tacú; it is normally covered with a slab of wood when not in use.



THE OVEN: When the rural household also has an oven, this too is located under the roof of a separate structure. The oven is made of a mixture of clay and green straw. It is dome-shaped, about a meter high, and rests on an adobe floor or a table, beneath which the fire is built. The implements of the baker include a wooden rake to pull the baked goods from the oven, a flat wooden shovel for placing the dough inside the oven, and a broom for sweeping out the floor of the structure prior to each use. Also required are narrow tin baking trays--the width depending on the size of the oven door.

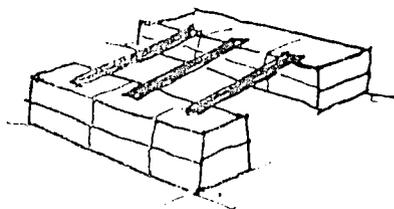


TACU: This is a wooden mortar fashioned from a tree trunk and carved in the shape of a goblet with hand tools. The pounding clubs (pestles) are usually thicker at both ends, and clubs of different weights and thickness are used for different pounding tasks. With her tacú, the rural housewife mashes vegetables, shells grain, makes flour, and softens meat. The tacú is one of the most important implements in the kitchen for it is used practically every day, if not for every meal.



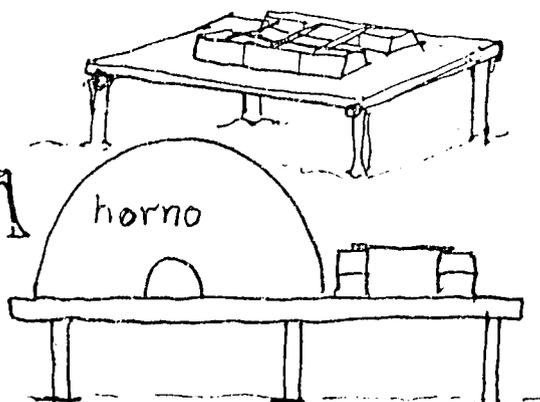
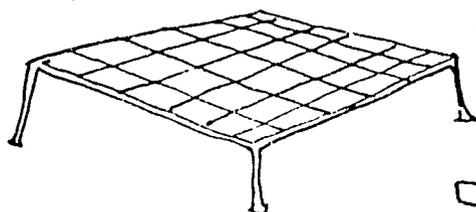
STOVE: In most rural kitchens of the tropical lowlands, stoves are built directly on the ground. The stove itself is usually a simple fireplace, framed on two opposing sides by adobe bricks, and connected by two or more metal bars which create two or more "burners" so that simultaneous cooking tasks can be completed. For a step upwards in efficiency, some households use a fire grill or parrilla. Still further comfort is achieved by placing the fireplace on a ceramic table supported by four legs. The most complete model of elegance in stoves is to combine the stove with an elevated oven. To fan the fire it is customary to use the lid of an aluminum pot or a flag-shaped fan made of woven palm leaves and known as the vaquitú.

hornilla



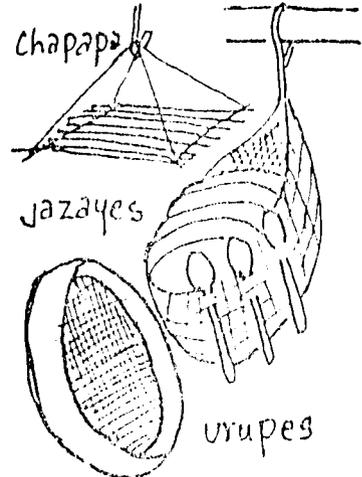
vaquitú

parrilla

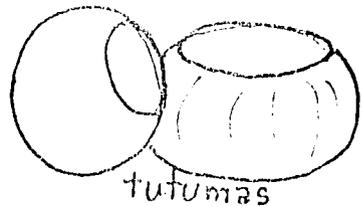


horno

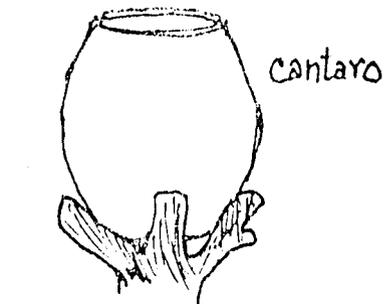
KITCHEN STORAGE DEVICES: Plates and spoons are often stored in a basket hung from a roofbeam. This basket is known as a juzayes and is made from woven palm leaves. The spoons are inserted into the weave of the basket walls. Another device, usually used to store cheese, is a hanging platform made of sticks called a chapapa.



SIEVES: The cerazo is a round sieve with a circumference made from a thin wooden slat and a screen constructed of horsehair. It is used for screening flour and other products that require a fine separation of contents. The implement is also called an urupes.

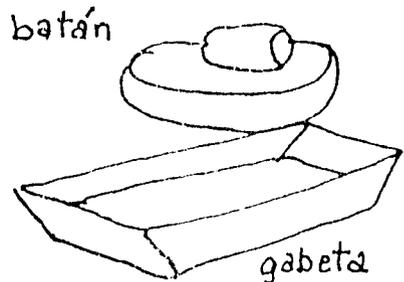


GOURDS: Every kitchen needs gourds of varying sizes. These are used for transferring threshed grain from one gourd to another to separate the chaff. Known as tutumas, these containers are all-purpose vessels for ladling liquids, pitchers for serving beverages, and are also used for drinking instead of cups and glasses.



CISTERN: Most kitchens have a cistern made from a 50-gallon oil drum or a large ceramic jug (cantaro). The latter is often placed on top of a platform constructed from a tree trunk with tripod branching. Traditionally, water is hauled from the nearest stream or well in cantaros, but these vessels are rapidly being replaced by plastic buckets.

GRINDING STONES: For fine grinding of condiments, spicy sauces, etc, every kitchen needs a batán. A few families prefer to grind with wooden hand mills (batán de tronco)



GABETA: This is a carved wooden trough with sides which slant outward. It is a multi-purpose implement used for mixing dough, winnowing grain, for serving kitchen scraps to pigs, and for washing dishes and clothes.

TYPES AND FREQUENCY OF DISHES

Over a twelve-month period, from July 1980 to June 1981, 15 rural housewives in the Traditional Practices Project kept a daily record of the meals their families consumed. It was found that there was little difference between the dishes prepared for mid-day as opposed to the evening meal. For example, a dish cooked for lunch--the principal meal of the day--is often prepared in sufficient quantity so that it can be reheated and served as the evening meal. The only significant difference between lunch and supper fare is that the latter is lighter, in many instances resembling more of a snack than a meal. For example, the fifth most frequent choice of food for supper consists of what would be considered breakfast fare--namely, a hot beverage (coffee, tea, or chocolate) with bread or other pastry. So too, the differences between breakfast and lunch also fade under special circumstances. For example, if there is left-over food from the day before, a family sometimes finishes it off at breakfast. Also, on days of heavy agricultural labor, family and hired laborers are sent into the fields with a heavy soup in their bellies.

Perhaps the most significant differences in food consumption habits were observed not between different meals consumed at different times of the day, but rather differences between one community and another. In the following analysis we will first present the average diet of all the 15 families for whom data was collected. This will be followed by a brief summary of differences in diet patterns between communities.

BREAKFAST

<u>Type of Food</u>	<u>No. of Families</u>	<u>Frequency Per Month</u>
MAIN DISH		
Arroz graneado	7	11
Horneado (bread and pastry)		15
Mazaco de yuca (mashed yuca)	7	6
Sopa de arroz (rice soup)	5	6
Mazaco de platano (mashed plantain)	4	2
Rozcas de maiz (corn rings)	3	4
Fritos de harina (wheat flour pancakes)	3	3
Yuca cocida (boiled yuca)	3	3
Epanadas (meat pies)	2	3
Tamales	1	7

BREAKFAST (cont.)

<u>Type of Food</u>	<u>No. of Families</u>	<u>Frequency Per Month</u>
BEVERAGES		
Coffee	11	14
Avena	3	7
Tea	5	8
Mate de Cedron (cedron tea)	3	5
Milk	5	4

Arroz graneado (fried rice) is only consumed as breakfast food in two of the five communities surveyed: Naranjal and Valle Hermoso, both new colonization areas with pioneers from Cochabamba. These were also the only communities where rice soup was consumed for breakfast. In contrast, mazaco de yuca and mazaco de platano (mashed yuca and plantain, respectively) are only consumed in the older communities of Forestal, Porongo, and Torrente-Las Abritas. Indeed, the only breakfast food consumed in all five communities surveyed was bread (hornado) and even then with much higher frequency in the older settlements, which are also more affluent.

A similar situation exists with regard to breakfast beverages. Coffee consumption was not reported in Valle Hermoso, and for only two households in Naranjal but with a frequency half that of the remaining communities. This once again reflects the fact that coffee consumption is the product of rising farm income, as is bread consumption. In contrast, less affluent households make much more frequent use of mates (teas) made from cedrón and other natural products. Consumption of avena (oatmeal beverage) is also limited only to Naranjal and Valle Hermoso.

MID-DAY AND EVENING MEALS

In the following listing of dishes, meat consumption is under-reported. This is because rural housewives usually describe a soup, whether or not it contains meat, by its principal vegetable or starch ingredient--like rice soup, potato soup, noodle soup. For meals served with a meat sauce accompanying rice, noodles, or yuca, once again the meat may not be mentioned. As a separate check, housewives were asked to record in their journals every time they used meat in any way. In this way it was possible to obtain an independent estimate of meat consumption. Of the 15 households surveyed, only one reported no meat consumed during the entire year. The 14 remaining families consumed meat an average of 15 times per month. However, once again there were large differences in the frequency of meat consumption from one community to another. The least-affluent communities, Valle Hermoso and Naran-

jal, reported monthly average meat consumption frequencies of five and six meals respectively. In the remaining communities, meat consumption increased to 19 meals per month in Forestal, 24 times per month in Porongo, and 30 times per month in Torrente-Las Abritas. Income, then, is a dominant factor influencing the frequency of meat consumption.

With regard to eggs and milk consumption, the inter-community pattern was once again confirmed. Overall, of 14 responding households the average rate of egg consumption was five times per month, with a range of 4 times per month in Valle Hermoso to a high of 7 times per month in both Porongo and Torrente-Las Abritas. As for milk consumption, 12 of 15 families reported use of this product with an overall average of two times per month.

In order of their frequency, the following are the most important dishes consumed for mid-day and evening meals by the households surveyed.

<u>Type of Food</u>	<u>No. of Families</u>	<u>Frequency Per Month</u>
Sopa de arroz (rice soup)	8	20
Sopa de fideos (noodle soup)	12	6
Arroz granado	7	9
Locro de arroz (rice stew)	6	9
Bread or pastry with hot beverage	6	6
Majadito de arroz (boiled rice)	7	4
Mazaco de yuca (mashed yuca)	3	7
Sopa de papalisa	3	7
Arroz con queso (rice con cheese)	2	7
Noodle stew	1	12
Locro de fideo (noodle stew)	3	5
Sopa de trigo (wheat soup)	5	3
Lagua de maiz (corn porridge)	2	6
Rice with meat, potatoes, salad	4	3
Mazaco de platano (mashed plantain)	2	5
Sopa de maní (peanut soup)	5	2
Sopa de avena (oatmeal soup)	2	2
Sopa de maiz (corn soup)	2	4
Tortillas de arroz	3	2
Arroz tostado	2	3
Lagua de trigo (wheat porridge)	3	1
Potato soup	3	1

All other dishes reported were mentioned by one family only.

BREAKFAST BEVERAGES

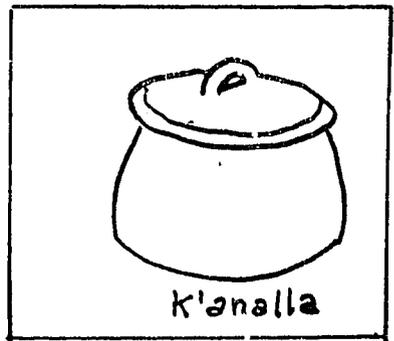
Most rural households in the tropical lowlands simply can not afford to drink coffee or milk as a steady beverage at breakfast. So most families drink matés of many different kinds. The following are but a few among many examples.

MATE DE HOJAS DE NARANJA (ORANGE LEAF TEA)

To boiling water add several leaves of the orange or lime tree, lower the heat, let steep for ten minutes, sweeten with sugar to taste, and serve.

MATE DE MAIZ (CORN TEA)

Take ten grains of corn and toast them in a ceramic oven known as the k'analla until they are brown but not completely cooked. Then place the toasted grain in boiling water until the liquid turns yellow and emits a pleasant smell, which one should find hard to believe that this smell is boiled corn. Once ready, sweeten to taste and serve hot. Ten grains of corn are sufficient to prepare 4 glasses (1.5 liter) of tea. Mate de maiz is supposed to be an excellent beverage for persons suffering from colds and coughs, particularly children.



MATE DE CASCARA DE NARANJA (ORANGE RIND TEA)

Prepare the same as with orange leaves

LECHE CON CANELLA (MILK WITH CINNAMON)

Mix together 5 spoonfuls of dried milk, two pieces of cinnamon, ten spoonfuls of sugar, and four glasses of boiling water. Cook for five minutes and serve hot.

MATE DE ANIS CON VIRAVIRA (ANISE AND VIRAVIRA TEA)

This tea is made with purchased herbs. Both the anise and the viravira each cost about one peso (US\$0.04) for a single preparation that serves four people. This quantity will also require about 1/2 pound of sugar, which costs 6 pesos (US\$0.24).

HIERBA MATE TEA

Four servings of this tea will cost about 9 pesos (US\$36) including 5 pesos worth of sugar and 4 spoonfuls of hierba mate at 4 pesos.

MATE DE HOJAS DE AMBAIBO (AMBAIBO TEA)

The ambaibo tree grows wild so this ingredient does not have to be purchased. It produces an elegant, 7-fingered leaf described in Chapter VI. Only the youngest, most tender leaves should be used. For a single preparation serving four people 1-2 leaves is sufficient. The leaves should be boiled until the water turns greenish, then sweetened to taste.

LECHE CON ANIS (MILK WITH ANISE)

This beverage is prepared with nearly equal parts sugar and powdered dry milk, together with one teaspoonful of anise. When dried milk is used, this is rarely bought by the farm household in the marketplace but rather is obtained as food aid channeled through mothers clubs.

COFFEE

The traditional breakfast beverage remains coffee. Even though many rural households can not afford to purchase it regularly, they do so on occasion to serve to guests or hired laborers (who object to mates as a cheap substitute for coffee). Other families own a few unimproved variety coffee trees which provide them with just enough production for minimal home consumption needs.

TOASTING

Particularly when toasting home-grown coffee, a housewife is not particular about quality: small and even rotten beans get thrown into the toaster. For a family of five, coffee toasting will possibly take place twice a week with about one pound of beans each time. The toasting takes place in a ceramic dish known as a cazuela or tiesto. This is placed on an hornilla (burner or k'oncha and fueled with wood. A strong flame is required. Once the toasting dish is sufficiently hot, the coffee beans are thrown inside and must be stirred constantly, but even so they will begin to burn and emit smoke. Gradually the beans change in color from yellow to dark brown. To calm down the smoke a few spoonfuls of old coffee can be added to the toaster. As the beans darken until nearly black it is necessary to add even more spoonfuls of liquid coffee and to stir even more vigorously. A sample of the beans is withdrawn and inspected to see if they are done. If so, the rest of the coffee is removed and spread out over a tabletop to cool. It is necessary to cool the beans before grinding them.

GRINDING

For virtually all grinding tasks--including coffee--rural families employ the all-purpose tacú, which can be considered one of the most indispensable tools in the farm kitchen. For grinding coffee a more slender and deeper tacú is utilized. The grinding occurs for a period of about ten minutes until the coffee is reduced to a powder. It is normally transferred directly from the tacú to the coffee pot.

CONSUMPTION

If a coffee pot is not used, the coffee powder is usually added to a small quantity of boiling water, mixed thoroughly, and then more boiling hot water added to taste. In addition to breakfast, some families will drink coffee at their mid-day and evening meals. Most coffee drinkers sweeten their beverage with several spoonfuls of sugar per glass.

PAN DE TRIGO
(WHEAT BREAD)

In the Tropical lowlands region most rural households do not make their own wheat bread, although there exist many bread substitutes which are commonly prepared from corn, rice, and yuca. Bread-making has become a fairly specialized activity for many reasons. It is time-consuming and can therefore only be economically prepared in large batches. It is a product that does not store well, thus needing to be consumed fresh or not at all. The raw materials for bread-making--especially wheat flour and lard--are not produced on the farm and are therefore too expensive for most households to purchase on a routine basis. The construction of ovens do not represent cost-effective investments for rural families that do not use them frequently. Furthermore, baking requires large amounts of fuelwood, which is time consuming to gather, dry, chop, and store. For these and other reasons, baking has tended to become a strictly commercial profession, i.e., bread is baked for sale as a primary source of family income. Those who engage in baking are frequently rural families who are near-landless and require a source of cash income in order to subsist. Most rural communities have at least one or two bakers and most farm families--when they do buy bread--buy it within the community, not in the local market town.

The following recipe for making wheat bread comes from Juana León of Porongo who runs her own store and sells her bread there. Juana bakes twice a week, on Mondays and either Friday or Saturday. As is true nearly everywhere in rural Bolivia, the term "bread" refers not to a loaf but to bread rolls. The recipe presented here is enough to produce some 250 rolls, which is Juana's average production every time she bakes.

INGREDIENTS AND QUANTITY	COST (pesos)
Wheat flour: 12.5 pounds	50.00
Lard: 1.5 pounds	30.00
Sugar: 1.5 pounds	15.00
Eggs: 6	12.00
Salt: 2 tablespoons	0.50
Yeast: 1 cup	3.00
Total	110.50
US\$ equivalent.	4.42

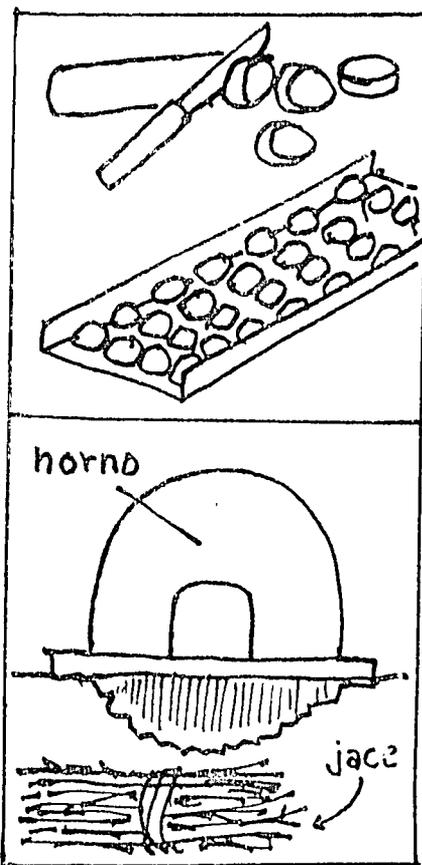
First, Juana Leon weighs the flour before emptying it into a wooden mixing tray or *gabeta*. She mounds the flour in the center, scoops out a crater in the middle, and pours in a liter of warm water along with the cup of yeast. She mixes the flour and water briefly with her hands, covers it with a

seive (urupes) for protection against flies, and lets these ingredients "mature" for 15 minutes. The yeast expands during this time and fills the crater prepared for it within the flour. At this point the seive is removed and the other ingredients are added: sugar, lard, eggs, salt (which is sifted into the flour), and three liters of water. This mixture is then worked into a dough with both hands, a process that requires practically an hour of labor. During this period Juana repeatedly greases her hands with lard to keep the dough from sticking to her fingers and palms. Gradually she forms the dough into a single large oval-shaped ball. This she cuts into 10 smaller oval tubes, each one weighing two pounds. These, in turn, are cut into dough balls somewhat smaller in size than an egg. From each tube she gets 10 dough balls. This process continues until the dough has been used up. Juana's assistant, a young girl named Felicidad, is in charge of separating the dough balls and stacking them in a gabeta. When one layer is completed the balls are lightly brushed with liquid lard to prevent the next row above from sticking.

The next step is to transfer the dough balls to sheets of tin (these have been previously greased), a task called the palmeada. Each dough ball is flattened slightly to give it more of a roll-like appearance. The task continues until all the tin sheets are filled and there are no more dough balls to load. Some sheets will hold up to 25-30 rolls, other sheets half that amount.

Meanwhile the oven is fired using fuelwood brought by Juana's husband, Francisco. For a single baking some three armloads (known as jacs) will be needed. If purchased, each jac costs 10 pesos (US\$0.40). The first load of fuelwood is burned and its hot coals spread evenly about the fireplace to heat uniformly. The second cargada or burning consumes another jac of fuelwood and its coals are spread too. The process is repeated with the third load. At this point the hot oven is swept with a broom made of branches. It is now ready for loading.

The tins bearing the dough balls are now loaded one at a time using a flat shovel made of wood. To give the rolls a shiny appearance, the dough balls can be brushed with liquid lard just before they are placed in the stove.



The horno or oven used by Juana Leon is a dome-shaped structure made of baked clay built over a fire-pit. The oven door is simply covered by a piece of tin.

In early January 1981, when the above recipe was taken, Juana Leon was selling her breadrolls at two pesos apiece (US\$0.08). With a production of 250 rolls, her gross income would be \$500 pesos per batch. From this must be subtracted about \$50 pesos worth of bread that will be consumed by her family, leaving a total cash income of some \$450 pesos. In addition to the cost of her ingredients (\$110.50), Juana pays her assistant \$10 pesos per day plus \$10 pesos worth of bread. Another \$30 pesos of cost should be added for the firewood. These considerations suggest a total production cost of \$160.50 pesos, which yields a net return of \$289.50 for each batch of bread. Assuming it takes Juana three days to produce and sell each batch she bakes, the return for her labor amounts to \$96.50 pesos per day. This amounts to nearly twice the daily wage rate for labor (\$50 pesos) which prevailed in January 1981.

EMPANADAS FRITAS (WHEAT PIES)

With the same ingredients she uses for baking bread, Juana Leon also makes empanadas, which are little pies filled with cheese or a meat sauce. The procedure begins once the dough balls have been made. She takes a dough ball and flattens it into a thick tortilla using a bottle as her rolling pin. In the center of this flattened dough she places chopped onions, grated cheese, or meat. The pancake-sized dough is then folded in half creating a semi-circle, pinching the dough together on the outer circumference to trap the contents of the pie inside. The half-moon empanada is then fried in very hot lard until brown on both sides. It is usually eaten hot either as a pastry snack with coffee or tea in the late afternoon, or as part of the evening meal.

FRITO DE HARINA DE TRIGO CON YUCA
(FRIED WHEAT AND YUCA PANCAKES)

As mentioned previously, few rural families can afford to purchase wheat flour on a routine basis. Logically, they try to base their diet as much as possible around products which they grow on their own farm--principally rice, yuca, and corn. However, in the case of the following recipe, a mixture of wheat flour and yuca are combined to create a hybrid pastry that is easy to make, inexpensive, does not need to be baked, and breaks the monotony of cakes made with rice or yuca.

INGREDIENTS AND QUANTITY	COST (pesos)
Yuca: 3 pounds	6.00
Wheat flour: 1 pound	4.00
Cheese: 4 ounces	6.00
Eggs: 2	6.00
Salt: 1 tablespoon	.50
Sugar: 1 tablespoon	1.00
Total	\$23.50
US\$ equivalent	0.94

The yuca is first peeled and washed. Next, it is grated using a metallic grater that can be purchased in any market town and is known as a rallador. The grated yuca is emptied into a gourd. The wheat flour is now added to the yuca and mixed with a spoon--the first of three mixings or entrevieros. For the second mixing, the cheese must be grated and added to the gourd. For the third mixing the eggs, salt, and sugar are added. The contents are mixed very well for at least ten minutes. The resulting dough is thicker than pancake batter and must be molded into patties with the hands. These are fried in lard using a frying pan and a hot flame. Since rural housewives do not use spatulas, the cakes are turned with either a wooden spoon or simply a pointed stick or punzón. The cakes are cooked until brown on both sides, served hot--usually as breakfast fare. These fritos can be consumed throughout the day, but it is not recommended to store them beyond that period of time since yuca has a tendency to go sour.

TORTILLAS DE ARROZ CON YUCA
(RICE AND YUCA TORTILLAS)

This narrative is based on a recipe of tortillas, and observation of how they are prepared, by Melfy Justiniano of El Torrente. Also presented are the kitchen utensils she uses for every stage in the process.

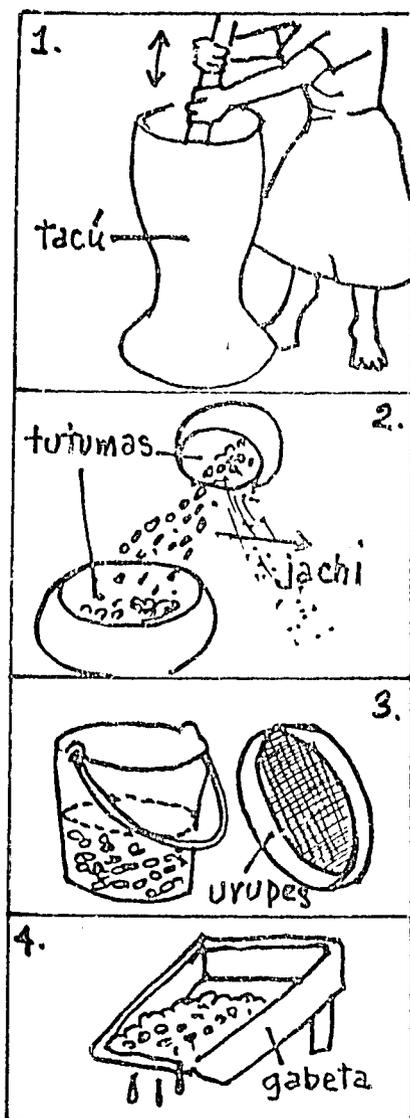
INGREDIENTS	QUANTITY
Rice	2 lbs.
Yuca	2 lbs.
Cheese	1.5 lbs.
Lard	1 lb.
Sugar	2 tblesp.
Salt	2 teasp.

First, the unhusked rice must be pounded in the tacú to remove the husks. This is done with hard blows with the manija. For two pounds of rice, the pounding will last nearly 30 minutes.

Second, the husked rice is winnowed to separate the chaff. This is accomplished using two tutumas (gourds), one medium-sized gourd above and a large gourd below. As the grain is poured vertically from the first gourd to the second, the jachi or chaff is blown to one side.

Third, the clean rice is placed to soak in a plastic bucket with six liters of water for 2.5 hours.

Fourth, the water is drained through a woven round screen known as a urupes. For further drying, the damp grain is placed in a gabeta or slanted siéve. The drier the rice, the easier to pound it into flour.

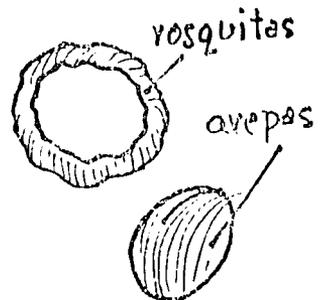
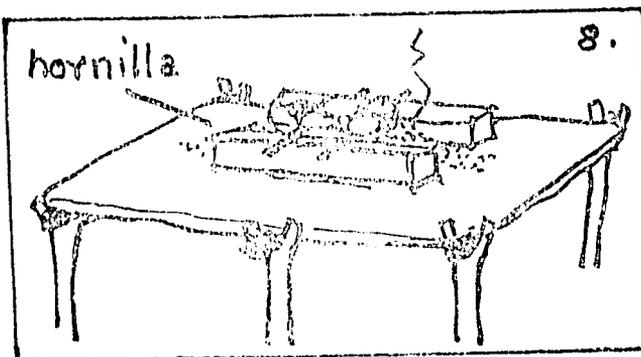
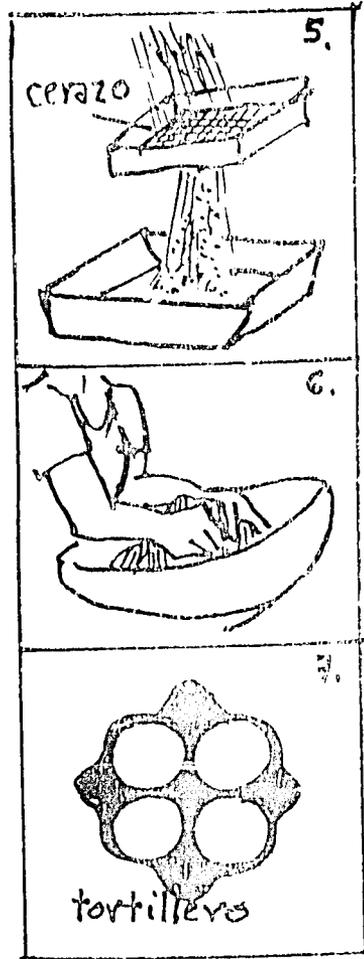


Fifth, the drained rice is returned to the tacú to be pounded and converted into flour. After one turn of pounding, the contents of the tacú are emptied into a cerazo or sieve. The flour passes through and is collected in a wooden trough (gabeta) below. The remaining grains are returned to the tacú and pounded again into flour. The process of pounding and screening continues 4-5 times until virtually all the rice has been made into flour.

Sixth, the rice flour is mixed by hand with the other ingredients--mashed yuca (mazaco), which serves as leavening, water, lard, cheese, sugar, and salt--creating a watery dough to be used as quickly as possible; otherwise it will begin to acquire a bitter taste.

Seventh, a fire is prepared in the baking grill, which is known as the hornilla. A baking dish with round molds for 4 tortillas is placed on top of the grill to heat. It is known as a tortillero and supported by two iron bars. Each mold of the tortillero is first greased with a dab of liquified lard. The tortilla dough--actually a thick batter--is applied to each mold with a spoon. The tortilla is cooked on both sides before it is removed from the baking dish.

Eighth, the same dough if allowed to dry a bit can be used to make other baked products, namely arepas (rice griddle cakes) and rosquitas (pastry rings).



MAKING CHEESE

About one-third of all participating households in the Traditional Practices Project raise dairy cattle. Of these, the majority have 1-2 animals. This is not enough to fill a single 20-liter milk cannister, which is the minimum for commercial sale on a daily pick-up basis by the regional milk processing plant (Planta Industrializadora de Leche, PIL). Furthermore, transportation access routes to and from most rural communities are so inferior, time-consuming, and costly, that daily milk sales are simply not feasible. Faced with these constraints, most milk-producing families use their available supply--about 6-12 liters per day--for making cheese. While some is consumed, most cheese is made for market sale.

The first step in cheese-making is to coagulate the milk. This must be done while the milk is still warm. When milking is done beside the farmhouse there is no problem; but when dairy cattle are milked in the pasture, and the milk head-carried home, it will cool off and require reheating. To heat the milk without overdoing it, the housewife will take only half of her fresh milk, heat it until it begins to steam (but remove before it boils), and then mix the warmed milk with the cool. The resulting average temperature should approximate what it was when the milk left the cow.

The coagulant is a commercial product that comes in the form of a round lozenge or patty. For coagulating 4 liters of milk, 1/10th of the coagulant patty (pastilla) is needed; for 6 liters, 1/4 of the pastilla is used. The coagulant is mixed and dissolved in a spoonful of milk before being added to the milk. There it is mixed well and left to do its work along with a tablespoon of salt. The time required to coagulate is variable and need not be measured precisely. The housewife usually gets the process started, covers the milk container with a cloth, and does not worry about it for a few hours. If the milking occurred in the morning (which is the normal time), the cheese-making will probably take place sometime after lunch or mid-afternoon.

When the milk is sufficiently coagulated, the housewife rolls up her sleeves, puts both hands into the milk container, and pushes all the curds to the bottom. The liquid whey or suero (which has a yellowish or greenish color) gathers at the top. This liquid is poured off. Then the housewife squeezes some more on the curds to separate even more whey, then pours it off too. The curds are left to settle for about 15 minutes. They are then removed, compressed with the hands into a round ball (called bollo), then placed on a wooden platter (gabeta) covered with a cheesecloth, and left alone for several hours--until evening. Some housewives add more salt

prior to squeezing the bollo. Others wait until evening, adding the salt just prior to pressing the bollo into its mold.

To mold the cheese, the housewife places a cheesecloth on the table, then a round mold made of straw which resembles a belt. The bollo of curds are placed inside this mold, squeezed into shape, covered with another cloth, and held in place with a large flat stone. The pressure from this stone causes still more whey to drain from the curds, which are now called a cujada or quesillo (little cheese). The cujada is left until the next day--always with the stone on top.

Twelve liters of milk will produce five pounds of cheese. Each cujada weighs about 1.5 pounds and requires about four liters of milk. Each cujada of this size could be sold for 60 pesos (US\$2.40) in early 1981. Normally the housewife makes 2-3 cheeses per day (depending on the quantity milked, of course), accumulates them during the week, and then sells about 15-20 of them at the Sunday market.

AREPAS DE ARROZ CON YUCA
(RICE AND YUCA GRIDDLE CAKES)

Arepas (griddle cakes) are a common bread substitute in the rural household. They can be made from rice, yuca, or corn--the most common staples available to farm families. The following recipe was provided by Manuela Mejía of El Torrente.

INGREDIENTS AND QUANTITY	COST (pesos)
Rice flour: five pounds	50.00
Yuca: five pounds, peeled and uncooked	9.00
<u>Cuajada</u> (home-made cheese): one pound	17.00
Lard: 1/2 pound	27.50
Salt: three tablespoons	3.00
<u>Caldo de yuca</u> (water in which yuca was boiled) one liter	-
Total	<u>\$106.50</u>
US\$ equivalent (4/23.82)	2.42

PREPARING RICE FLOUR

The rice must first be pounded in the tacú to remove the husks. Then it is soaked for three hours (the water should barely cover the rice), drained, and left to dry for a little while. The damp grain is then returned to the tacú and beaten vigorously until it gradually turns to flour. The contents are poured through a screen to separate the flour from the remaining grains, which are returned to the tacú again to be beaten into flour.

PREPARING THE GRIDDLE CAKES

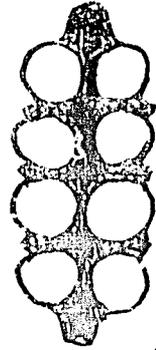
The yuca is harvested--about five large tubers--peeled, and boiled with the salt. Once cooked, the yuca is drained (but saving the water) and placed in the tacú to be beaten into a sticky dough. Into this mixture some yuca water is added to keep the grinding club from sticking to the dough. This process is continued until a thick batter is achieved.

Once the rice flour and yuca batter are ready, the flour is slowly added to the batter while constantly kneading with the hands. When thoroughly mixed, a third ingredient--the home-made cheese--is kneaded into the dough together with salt and the half-pound of lard, which has been warmed and liquified. The housewife next takes out a griddle for arepas known as a tiesto aripero which has a capacity for baking eight arepas at a time. This griddle is extended between both sides of the fireplace. Beside the griddle a pot is placed

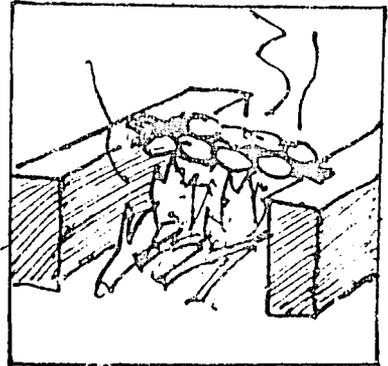
in which to heat the batter. Also within arm's reach is a can containing liquified lard. The lard is applied to each plate of the griddle using a stick to which are attached at one end a series of cloth strips. Once the griddle is greased, the arepa batter is spooned into each griddle mold. The fire is kept burning fairly intensely. When done on one side, each arepa is turned over with a spoon, flattened with the spoon briefly, and then cooked on the other side until golden brown. The first eight cakes are removed and the griddle is loaded for a second batch.

The above recipe would be sufficient to make about 24-30 arepas, enough to feed about ten people over two consecutive meals--usually supper and breakfast.

Doña Manuela explains that the tiesto she uses is borrowed. She thought of making her own, but the griddle requires a special kind of clay. The advantage of the griddle over a common frying pan is that in the former case much less lard is used up. Another term for these griddle cakes, she says, is chorrenda or drippings, because the batter is dripped into the griddle.



tiesto ariperó



PAN DE HARINA DE MAIZ
(CORNMEAL BREAD)

If not their major crop, many farmers of the tropical lowlands grow significant amounts of corn--for their poultry flocks, family consumption, and market sale. In the case of Sabino Arroyaza of Valley Hermoso, he grows corn in corridors separating his rice fields, and a principal use of this crop is for baking purposes. Every month or so he takes an arroba (25 pounds) of shelled yellow corn into the market center of Comando to be milled into cornmeal, and about once a week his wife Anastacia bakes cornmeal bread for her family according to the following recipe.

INGREDIENTS AND QUANTITY	COST (pesos)
Cornmeal: 5 pounds	25.00
Wheat flour: 1 pound	6.00
Oil: 1 cup	10.00
Salt: 2 tablespoons	0.75
Yeast: 3 tablets	5.00
Sugar: 1 tablespoon	1.00
Egg: 1	2.50
Water: 4 glasses	-
Total	\$50.25
US\$ equivalent (1/4/1982)	2.01

The water is warmed on the stove and when ready a little salt is added. The cornmeal and wheat flour are mixed in a plastic washbasin, to which the water and dissolved yeast are slowly added together with the oil, sugar, and an egg. This mixture is kneaded a considerable period of time (30 minutes) with the hands to create a dough. The dough is left in the basin to rise, covered on top with a cloth. Meanwhile, firewood is collected and the oven fired. To make each bread roll, about a teaspoonful of dough is taken in the fingers, rolled into a ball, dabbed with oil, somewhat flattened, and placed on a tin sheet which has also been rubbed with oil. The oven is swept out with a long-handled broom to which a clump of soft branches have been tied at one end. Several tins of rolls are placed inside the oven. The baking is monitored by opening the oven door (a square sheet of tin) every now and then until the rolls are finally done. The above recipe should yield some 45-50 rolls. These are placed in a washbasin to cool and eventually stored in a nylon sack. "Because it is so easy to bake our own", says Anastacia, "we don't know how to buy bread at the local market in Comando."

PAN DE ARROZ
(RICE BREAD)

Rice bread is most commonly consumed as a breakfast food. The following recipe was provided by Blanca Justiniano López of El Torrente.

INGREDIENTS AND QUANTITY	PRICE (pesos)
Rice flour: 6 pounds	45.00
Yuca: 9 pounds	8.00
Cheese: 1 kilo	60.00
Lard: 1/2 pound	12.00
Salt: 1 small bag	1.50
Sugar: 11 tablespoons	3.00
Total	<u>129.00</u>

The day before baking it is necessary to prepare the rice flour, requiring two tacuzadas or tacú loads of husked rice (each load containing four pounds) to produce six pounds of rice flour. The rice is first pounded and winnowed to remove the husks, then left to soak overnight. The next morning the soaked rice is drained, allowed to dry for 15 minutes, and then pounded into flour inside the tacú. The contents of the tacú are emptied and sifted up to five times to separate the flour from the grain, and each successive pounding occupies at least ten minutes. There should be very little residue--known as jachi--that results from this process. Next the yuca is peeled, sliced, boiled, drained, and while still warm pounded in the tacú. To avoid the yuca dough from sticking to the pounding pole or manilla, it is necessary to add two tablespoons of yuca broth (water in which the yuca was boiled). The dough is removed from the tacú with a long aluminum spoon. It is placed in a wash basin and slowly kneaded with the rice flour while adding two glasses of water and the salt. As this operation proceeds any yuca fibers encountered are removed with the fingers. Once the dough has begun to thicken it is mixed with ground cheese and a glass of cold water containing the liquified yuca and the sugar. The dough is taken outside, covered with a thin cloth, and left to rise (mature) in the sunshine for about two hours.

The above recipe is sufficient to make about 250 rolls. Each roll is made by taking a spoonful of dough and placing it on a square of green plantain leaf. These rolls, in turn, are arranged on tin sheets. The sheets are placed in the oven with the help of a long-handled flat shovel. There is no fixed baking time. The rolls are removed when golden brown, by which time their respective plantain-leaf squares have burnt. Inevitably, the first rolls are consumed while still warm. The remainder are stored in a cloth sack for family use or market sale.

TAMAL DE MAIZ CURTIDO
(SKINNED CORN TAMALES)

Skinned corn tamales are considered a special-occasion food or are prepared for market sale in large quantities. This is because the preparation of the cornmeal is a rather labor-intensive process and does not lend itself to daily or weekly frequency. The following recipe was provided by Luz Cabrera of Porongo, prepared for her family's consumption.

INGREDIENTS AND QUANTITY (makes 24 tamales)	COST (pesos)
White corn--Cuban variety: 12.5 pounds	25.00
Ashes: 3 pounds	-
Lard: 1/2 kilo	15.00
Pork meat: 1 kilo	40.00
Cumin: 1 teaspoon	5.00
Salt: 1 small bag	1.00
Onions: 12 heads	<u>10.00</u>
Total	96.00
US\$ equivalent	3.84

SKINNING THE CORN

Water is placed in a pot and heated. To this water the ashes are added from the beginning. These ashes should have been previously strained to remove chunks of carbon and other residues. For 12.5 pounds of corn at least 3-10 liters of water are needed. When the water finally begins to boil the corn is added. The corn itself is in the kernal form, already shelled. The corn is left to boil in the ash-water for 30 minutes and should be stirred repeatedly so that the skinning effect will be uniform. After about 20-25 minutes one should remove a grain or two of corn and test it by squeezing between the fingers. If the skin separates easily this means that the quantity of ash is adequate; if not, then more ash can be added to the water. Another way of knowing is by the color of the corn itself. If its color changes (darkens) after entering the ash-water, this is a sign that the ash solution is adequate.

The corn is then washed and rubbed by hand to remove the skins, not separated in the boiling process. This is followed by repeated rinsings, using a sieve or urupes, to remove all traces of the ash and its taste. The rinsings continue until the rinse water is no longer discolored by its contact with the corn. When clean the corn is deposited in a bucket, covered with clean water, and left to soak three days. To this solution is added a small quantity (glass) of koncho, the sediment remaining at the bottom of an empic.

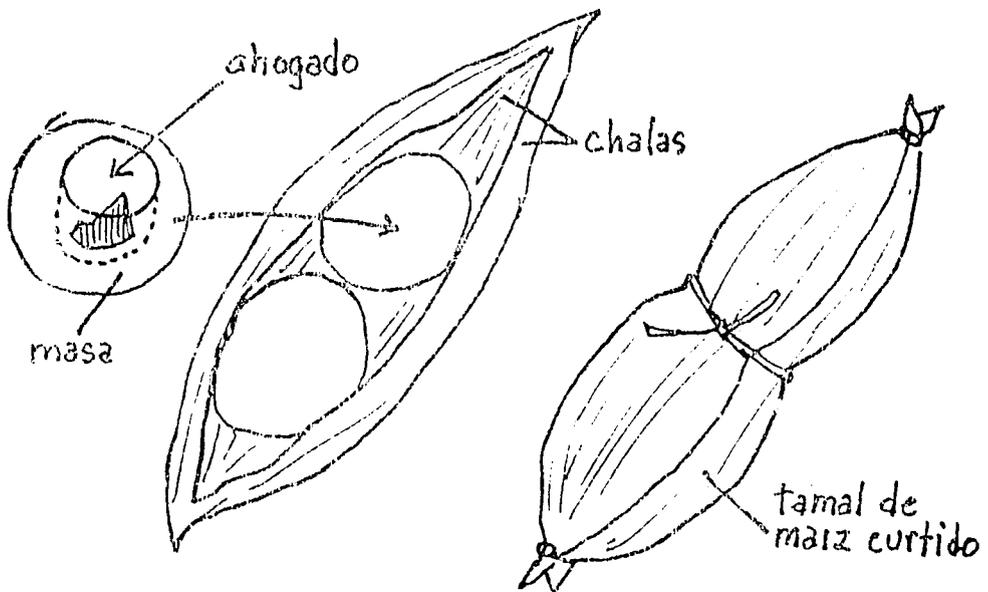
vessel of chicha. This ingredient is supposed to turn the corn very white. During this three-day period the water is not changed. But afterwards it is necessary to wash the corn one last time.

PREPARING THE TAMALES

The skinned and washed corn is drained and then ground on a stone handmill known as the batan. The ground corn is gathered and worked into little dough balls, each about the size of an egg.

Meanwhile, the pork must be fried thoroughly, then cut up into tiny pieces and placed aside. Next, the onions are diced and fried in the lard and cumin and salt to prepare a thick sauce. To this some urucú colorant can be added. This sauce, known as ahogado, is then mixed with the finely cut pork, and both will be used to stuff the tamales.

Each doughball is pushed with the thumb to form a cavity. This is filled with the meat sauce and resealed. Next, one takes corn husks which have previously been soaked in water, one at a time, and arranges them in doubled pairs, one leaf on top of the other. Two doughballs are placed inside each pair of chapas (husks). The husks are then closed, tied in the middle and also tied at each end. One by one the tamales are added to a pot of boiling water and cooked for about 90 minutes, after which they can be eaten immediately steaming hot.

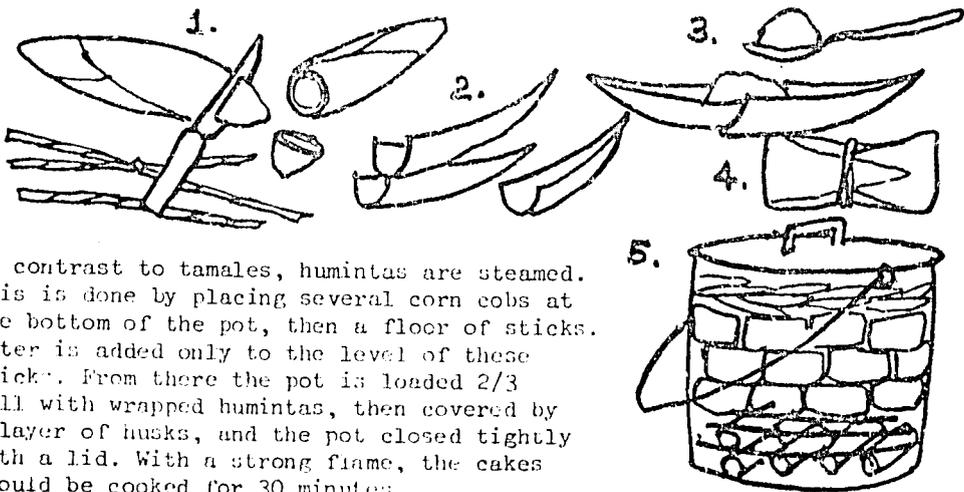


**HUMINTAS EN OLLA
(STEAMED CORN CAKES)**

Humintas are like tamales in that they are made of cornmeal and wrapped in corn husks to be coked. However, they do not contain a meat sauce, nor are they boiled, and they employ tender corn (pearl corn, not fully matured) known as choclos which usually has a limited season. So humintas are considered special-occasion food as well. The following recipe was taken from Calixta de Albaracin of the community of Naranjal.

INGREDIENTS AND QUANTITY	COST (pesos)
<u>Choclos</u> : 50 small ears	25.00
Cinnamon	1.00
Sugar: 1/4 cup	2.00
Salt: 3 tablespoons	0.25
Total	\$28.25
US\$ equivalent	1.13

Doña Calixta's technique for wrapping her humintas is different than the one just described for tamales, and provision must be made at the very beginning when the ears of corn are prepared for grinding. Each ear is cut nearly an inch from its base. This is intended to facilitate the overlapping of husks only at the center of the cake. Moreover, from those husks not used for wrapping, strands are cut to make the strings with which to tie the humintas. Only one string per huminta is used, as illustrated.



In contrast to tamales, humintas are steamed. This is done by placing several corn cobs at the bottom of the pot, then a floor of sticks. Water is added only to the level of these sticks. From there the pot is loaded 2/3 full with wrapped humintas, then covered by a layer of husks, and the pot closed tightly with a lid. With a strong flame, the cakes should be cooked for 30 minutes.

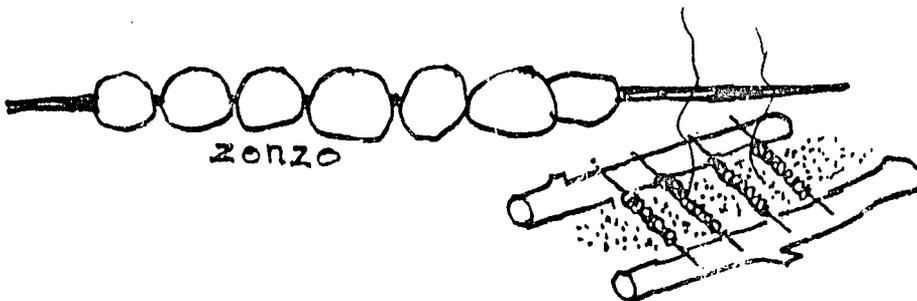
ZONZOS
(SKEWERED YUCA)

Zonzos are bread substitutes prepared with mashed yuca (mazaco) and cheese. Plantain can be used instead of yuca. The following recipe was provided by Edith Mendez of las Abritas.

INGREDIENTS AND QUANTITY (serves six persons)	COST (pesos)
Yuca: 4 pounds	4.00
Cheese: 4 ounces	7.50
Oil: 4 tablespoons	2.00
Salt: 1 tablespoon	<u>0.25</u>
Total	13.75
US\$ equivalent	0.55

The yucas are peeled and boiled, without salt, for about ten minutes. Once cooked, the yucas are placed steaming hot in the tacú and pounded into a sticky dough. The cheese is grated and added to the yuca. Finally the salt and oil are mixed in too. At this point what one has just prepared is mashed yuca or mazaco.

To form the zonzos it is necessary to use a few thin sticks or skewers--the number depending on how many people are to be served. The mazaco dough is worked into little balls or chunks and slid onto the skewer. Once the raw zonzos are prepared, the grill is removed from the cooking fire and a medium-sized branch placed on either side. The zonzos are then laid between and perpendicular to these branches, which allows them to remain just slightly above the coals. These skewers must be rotated by hand so that the zonzos will cook evenly. This pastry is served hot, and is eaten directly off the stick.



ARROZ GRANEADO
(FRIED RICE)

This is one of the most common and simple meals made by the rural housewife. In fact, when she must leave her children unattended any pre-school aged child is capable of preparing this dish for her younger brothers and sisters. In the following recipe, taken from Justina Arauco of Valle Hermoso, the meal is combined with boiled potatoes and a carrot salad.

INGREDIENTS AND QUANTITY (serves six)	COST (pesos)
Rice: 1 pound	10.00
Potatoes: 1 pound	3.00
Carrots: 1 pound	3.00
Cheese: home-made, 1 <u>bola</u>	10.00
Oil: 4 spoonfuls	4.00
Salt: 2 spoonfuls	0.50
Tomatoes: one	1.00
Locoto (hot pepper): one	0.25
Onion: 2 heads	1.00
Total	32.75
US\$ equivalent	1.31

Take a medium sized aluminum pot, fill half-full with water, and place it to heat on the stove. Then take a pound of medium-sized potatoes, peel them, and set them aside in a plate. Clean the frying pan and place it on the second burner, but do not use any oil. The rice is now placed in the frying pan, stirring constantly until it is brown. When the water begins to boil the rice is added together with the salt, then stirred with a wooden spoon, and finally the pot is covered and left to boil. Next, a second pot is filled with water (half as much as the first) in which to boil the potatoes; this pot too is covered. While both pots are cooking, prepare the carrot salad. Chop up the two onions, washing several times to remove their spiciness. Next, chop up the carrots. These two vegetables are then combined with a ball of home-made cheese, all crumbled up, along with the oil and salt. Finally it is necessary to prepare the llajhua or hot sauce. In a stone grinding mill or batán grind up the tomato and hot pepper into a fine hot sauce and salt this mixture; set aside in a separate dish. When the pot with the rice is nearly dry, a little oil is added, the flame is reduced, and the pot covered once again. When the potatoes are ready, remove from the heat and drain. The rice which results from this process should be quite granular, the grains quite separate and dry. The meal is served with a pile of rice on one side of the plate, boiled potatoes on the other, and a small serving of carrot salad. Each person served adds the quantity of hot sauce that suits his or her taste.

MAJADITO DE ARROZ
(BOILED RICE)

This dish is the same as arroz majao described in the section on breakfast foods, the term majadito normally applied by true residents born and bred in the Department of Santa Cruz. The dish is commonly combined with at least yuca, and if family means permit, meat. It is nearly always served with a fried egg on top, and frequently accompanied by strips of plantain. The following recipe, provided by Lucia Mendez Rivera of Las Abritas, is included to describe the more complete meal prepared with meat and plantains.

INGREDIENTS AND QUANTITIES	COST
(Serves five persons)	(pesos)
Rice: 2 pounds	18.00
Yuca: 3 pounds	4.00
Charque: 3/4 pound	20.00
Salt: one tablespoon	0.40
Urucú (achiote), a colorant: one seed	.50
Lard: 4 ounces	10.00
Eggs: five	12.00
Mature plantains: three fruit	3.00
Ground cumin: one teaspoon	0.50
Total	68.40
US\$ equivalent .	2.74

The cooking pot is placed on the fire, filled half full with water, to be brought to a boil. Meat and salt are added before the pot is covered and allowed to boil. A second smaller pot of water is placed on the stove to heat, this one to cook the yucas. These are peeled and washed, then cut up into thick slices. Next the rice is washed and added to the cooking pot. In a wooden spoon a single seed of urucú is mashed, then added as red colorant to the pot. At this point the meat is removed. Then the pot is stirred, covered, and left to cook until the moisture has evaporated. Meanwhile, the meat is placed in the tacú and pounded until soft. This pounding takes place with chopped onion and cumin also added to the tacú. The meat is finally shredded with a knife into tiny pieces, placed in a frying pan with the lard, cooked a while, and then added to the cooking pot where it is vigorously stirred with the other ingredients. The yucas are drained and placed in a separate dish. To finish this meal, the cook peels three plantains; cuts them in strips, and fries them. The five eggs are fried last. The majadito is served in a flat plate, the rice in the center, the fried egg on top, and the plantain strips on the side. The yuca is served separately. The above recipe would serve five adults with two helpings apiece.

SOPA DE ARROZ
(RICE SOUP)

Sopa de arroz is a common meal of rural households in the tropical lowlands, most particularly during periods of heavy agricultural tasks. At such times the housewife may also be needed in the field and therefore will not have time to prepare complicated meals. For the same reason, meals such as rice soup are prepared in double quantities so that it will last for both the mid-day as well as the evening meals. The following recipe comes from Flora Gonzales de Sacaca, of the community of Baranjal.

INGREDIENTS AND QUANTITIES (serves 5 persons)	COST (pesos)
Potatoes: 1.5 kilos	8.00
Rice: 3/4 kilo	13.00
Charque of wild pig: 1/2 pound	10.00
Onion: 2 heads	2.00
Green tomatoes: 2 small fruit	1.00
Lard: 2 tablespoons	1.00
Salt: 3 tablespoons	0.50
Total	35.50
US\$ equivalent	1.42

Doña Flora returned early from the fields, immediately started a fire in her stove (a fireplace built on the ground between two walls of adobe bricks), washed an aluminum pot, and filled it half full with water. Next she peeled the potatoes, all of them quite small, and placed them in a plastic bowl with water. She then took a piece of dried meat, washed it, cut it up, and placed it in the cooking pot. The tomatoes and onions were diced and added to the soup along with the salt and lard, briefly stirring the ingredients with a spoon. Finally, she took the rice, washed it several times, and added the grain to the pot along with the potatoes she had peeled earlier. The soup was left to boil until the potatoes were cooked. To serve the meal she lowered several bowls from a table known as a chapapa, about 2 meters tall, on which all her kitchen utensils are stored. Each participant in this meal ate their soup sitting on the ground in different locations of shade. The hired laborers ate first, then the children, and Doña Flora last. Given the above ingredients, there was enough soup for two helpings apiece. When asked about the meat, Doña Flora explained that she rarely buys meat for her family but relies on her husband's success as a hunter of wild game. If he hunts frequently, the family eats meat frequently; if not, they go without.

SOPA DE TRIGO
(WHEAT SOUP)

This is a somewhat atypical meal because it substitutes for rice, the main staple of the tropical lowlands. Furthermore, the meal is perhaps twice as time consuming as one made with rice, because the wheat has to be husked, dried, winnowed, and cleaned before being used in the soup. In the case of the following recipe, provided by Doña Bacilia (relative of project participant Raquel Correa), the wheat, meat, and broadbeans were brought from the highlands by her husband while visiting his community of origin. If purchased in the local market of Comando, the ingredients would have been much more costly.

INGREDIENTS AND QUANTITIES (serves 5)	COST (pesos)
Husked wheat: 2 kilos	30.00
Charque of goat: 1/2 kilo	25.00
<u>Aba seca</u> (dried broadbeans): 1/2 kilo	10.00
Potatoes: 1 kilo	6.00
Salt: a small bag	0.50
Water: 9 liters	-
Oil: 1 spoonful	0.10
Total	\$71.60
US\$ equivalent	2.86

HUSKING THE WHEAT: The wheat is soaked in water for a half hour. Meanwhile, a goathide is placed on the ground, then a piece of nylon cloth, and on top of this a rectangular stone with its rolling pin known as a k'jona. The grain that has been soaking is drained and then milled damp using small handfuls at a time. Doña Bacilia is able to husk 2 kilos of wheat in about 15-20 minutes. The damp, husked grain is gathered in the nylon cloth and taken to the patio to dry in the sun. About an hour later, when fully dry, the grain is winnowed to separate out the chaff, then washed again prior to its addition to the soup.

PREPARING THE SOUP: A fire is started in the stove and a pot containing ten liters of water is placed on a strong flame to heat. The charque is cut into four pieces and left to soak in a wooden trough. On a separate burner the 1/2 kilo of broadbeans are placed in a different pot to cook. When the wheat is dry and ready to winnow, the charque is placed in the soup pot so that the wooden trough (bañador) can be used for winnowing the wheat. The winnowed and washed wheat is then added to the soup pot, which is covered and left to cook for at least an hour. Meanwhile other ingredients are prepared. The potatoes are peeled, then the habas, and both added to the soup pot along with salt. Salt should not be added prior to this time because it slows down the cooking of the wheat. When the potatoes are cooked the soup is ready.

LAGUA DE HARINA DE SOYA
(SOY FLOUR STEW)

Llaguas are heavy stews, usually prepared for the mid-day meal on days of heavy agricultural labor. The following recipe comes from Hilaria Valles of Valle Hermoso. It is somewhat unusual in that it is made with soy flour rather than wheat, rice, or corn--the more common staples.

INGREDIENTS AND QUANTITIES (serves five persons)	COST (pesos)
Soy flour: 1.5 pounds	15.00
Wheat flour: 1/2 pound	5.00
Potatoes: 3 pounds	6.00
Carrots: 2 units	1.00
Onion: 2 heads	1.00
Tomato: 1	1.00
Condiments (cumin, garlic): 1 teaspoon	0.25
Oil: 4 tablespoons	2.00
Salt: 2 tablespoons	0.50
Water: 8 liters	--
Total	<u>\$31.75</u>
US\$ equivalent	1.27

Hilaria prepares this meal inside her kitchen hut, a structure with walls made of sticks and a roof of motacus palm leaves. Her stove is in the center and consists of two rows of adobe bricks, firewood stored to one side. She lights her stove, fans it into intense flame using the lid of a cooking pot. She places the water in a pot and begins to heat it while she proceeds to peel potatoes. She then cuts up the carrots, onions, and tomatoes and mixes them in a plate. Next, these chopped ingredients are fried with the oil in a frying pan, then added to the cooking pot along with the salt. The soy flour (along with wheat flour) is mixed with some water in an aluminum wash basin to form a dough. This is then fried in the frying pan with a little oil, thinned with cold water, and added to the cooking pot to thicken its contents. At this point she adds the peeled potatoes and continues to cook the meal until these are soft. The meal is then served in bowls, sometimes accompanied on the side with boiled corn or yuca.

LAGUA DE CHOCLO
(CORN STEW)

This is a popular mid-day or evening meal, particularly when the choclo or tender corn season has arrived. The following recipe was provided by Justina Arauco of Valle Hermoso.

INGREDIENTS AND QUANTITIES (serves four persons)	COST (pesos)
<u>Choclo</u> : 4 ears	4.00
Potatoes: 1/2 pound	1.75
Carrots: 3	1.00
Onions: 2 head0	0.50
Tomato: 1	1.50
Oil: 2 tablespoons	1.00
Salt: 1 tablespoon	0.25
Cumin: 1/2 teaspoon	0.50
Total	<u>\$10.50</u>
US\$ equivalent	0.42

Justina first cleans out a medium-sized aluminum pot, fills it half-full with water, and places it on her gas stove to heat. She then peels the potatoes and chops up and mixes the carrots, onions, and tomato. Next she husks the four ears of corn and with a knife scrapes off their kernals into a grinding board which sits on four legs just outside her kitchen. Cutting the potatoes in half, she adds these and the vegetables and condiments to the cooking pot all at once. When the potatoes are cooked she adds the ground corn mush, mixing the ingredients with a spoon. Once the meal begins to boil she continues to mix and cook the lagua for another ten minutes or so. The above recipe is sufficient to serve four adults with two helpings apiece.

SOPA DE FIDEO
(NOODLE SOUP)

September is a month of heavy field labor for land preparation, and for this reason rural housewives prepare more substantial breakfasts for family members and hired laborers--usually a heavy soup. The following recipe for sopa de fideo comes from Justina Arauco of the community of Valle Hermoso.

INGREDIENTS AND QUANTITY (serves six persons)	COST (pesos)
Noodles: 1 pound	15.00
Potatoes: 1 pound	2.00
Cumin: 1 teaspoonful	1.00
Carrots: 3 small one	5.00
Onion: 1 head	2.00
Tomato: 1 medium size	0.25
Chicken broth: 1 cube	0.75
Oil: 2 spoonfuls	1.00
Salt: 2 spoonfuls	0.25
Total	27.20
US\$ equivalent	1.09

First the potatoes are peeled and set aside in a pot of water. Next the carrots, tomato, and onion are prepared--all diced up and mixed together. A pot of water is placed on the stove and brought to a boil. First the condiments are added, then the potatoes (cut into chunks), then the noodles, and finally the cube of chicken broth. The cumin is ground up in a small, wooden pestle, mixed with the oil, and added to the soup together with the salt. The soup is then stirred now and then with a wooden spoon as its contents cook. When ready, the meal is served in bowls and accompanied by a hot beverage such as hierba mate.

Soup dishes prepared for breakfast are often called comiditas (small meals) because they are more substantial than traditional breakfast fare, which is considered more of a snack than a meal. The term comiditas also applies to a broader range of dishes than soups, many of which are described under the section on mid-day and evening meals.

SOPA CON HOJAS DE MASA
(WHEAT LEAF SOUP)

This soup gets its name from the fact that instead of rice it employs crumbled bits of wheat flour that have been rolled into flat leaves (tortillas) and toasted over the coals until crisp. The following recipe, intended to serve six adults and four children, was provided by Edith Mendez of Torrente-Las Abritas

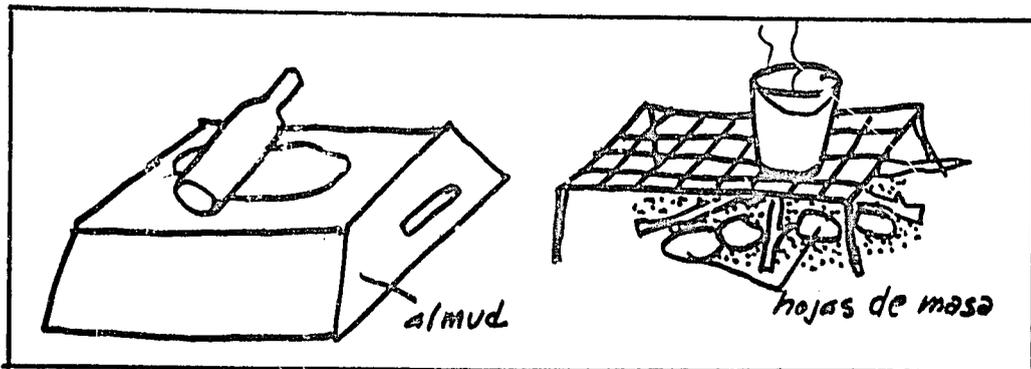
INGREDIENTS AND QUANTITY

Wheat flour--1 kilo
Crushed salt--4 tablespoons
Water--1/2 glass

Total

COST
(pesos)
\$15
0.25
<hr/>
\$15.25
US\$ 0.61

The water (cold) and flour are mixed together in a bowl, then combined with the salt, and then left to ferment about one hour. The dough is then cut into strips, cut again into small squares, and rolled into little balls. These balls are dusted with flour and placed in a bowl. Next, the housewife takes out her almud, a wooden box used for measuring grains equal to 32 pounds, places it upside down on the ground so as to use the flat bottom of the box as a rolling surface. The rolling pin is normally a bottle. Each dough ball is flattened into a tortilla-shaped patie, then placed to toast directly on top of hot coals. If a tortilla happens to burn, the blackened portion should be scraped off with a knife. The above ingredients are sufficient for 15 hojas or tortillas. Once both sides are toasted completely, each tortilla is crumbled with the hands into small pieces and added to any soup in place of rice.



INGREDIENTS AND QUANTITY	COST (pesos)
Wheat flour: 1 pound	10.00
Cheese: 4 ounces	10.00
Eggs: two	6.00
Onion: one head	1.00
Lard: 1/2 pound	8.00
Salt: 3 tablespoons	0.25
Sugar: 2 teaspoons	.10
Water: 4 glasses	-
TOTAL	\$35.35
US\$ Equivalent	1.41

Take the head of onion and dice it. Then, take an aluminum pot, fill with 4 glasses of cold water, add the pound of flour, then the sugar, and finally the salt. Mix this together in a batter. Then shred the piece of cheese and mix this into the batter. Next, start the fire on the stove, place the lard in a frying pan. Each fritter or pancake is fried one at a time and consists of about six spoonfuls of batter. It is fried first on one side, then the other. Continue frying until the batter is finished. This recipe should serve five adults.

MAZACO DE YUCA (MASHED YUCA)

Mazaco de yuca is another substitute for bread. This recipe was provided by Anastacia Castro of Valle Hermoso.

INGREDIENTS AND QUANTITY	COST (pesos)
Yuca--one large 2-pound tuber	3.00
Onion: one head	0.50
Oil: 3 spoonfuls	1.00
Salt: 1 tablespoon	.25
Condiments (garlic, cumin): 1/2 tablespoon	0.10
Water: 4 glasses (equal to 1.5 liters)	-
TOTAL	4.85
US\$ Equivalent	.19

While the water is boiling, peel the yuca and soak in fresh water, then drain and place in boiling water on a hot flame. Dice the onion, fry the condiments, and mix these ingredients with the yuca all mashed together as if making a dough. Serve with a hot tea or other breakfast beverage.

LLAGUA DE HARINA DE TRIGO
(WHEAT PORRIDGE)

This is a dish usually served for breakfast as an alternative to mazacos or mashed dishes. The following recipe, provided by Filiberta de Calvy of the community of Naranjal, is made with the meat of the wild pig which is hunted by her husband Angel Calvy.

INGREDIENTS AND QUANTITY	COST (pesos)
Wheat flour: 1/2 kilo	4.00
Wild pig: 1/4 kilo	9.00
Carrots: 3 units	1.00
Onions: 2 heads	1.00
Salt: 4 tablespoons	0.50
Lard: 1 tablespoon	0.10
<u>Ajinomoto</u> (commercial seasoning): 1/4 teaspoon	1.00
Yuca: 3 pounds	3.00
Water: 5 liters	-
Total	\$19.60
US\$ equivalent	0.78

While her husband is preparing charqui from the wild pig, Doña Filiberta places a pot of water to boil. Meanwhile, she peels the yucas, dices the carrots and onions. Next she fries a few urucu (achiote) to remove its oil which is used for red coloring but removing the seeds. The melted lard in the frying pan has now turned read. To this she adds the diced carrots and onions, and after they have been fried she adds them to the cooking pot. The meat is next added to the cooking pot, then the chunks of peeled yuca. In a second burner (hornilla), Filiberta adds the wheat flour directly to the frying pan so that it will toast briefly and adsorb the remnants of the grease and juice of the fried condiments; the flour is then added to the cooking pot and gradually stirred with a wooden spoon until it thickens into porridge consistency. When ready, the dish is served in bowls.

Formeals of this kind, fresh meat will only be used the first day; there-after it will be replaced by charqui, or not used at all. Once the meat has been used up, the family is unlikely to buy it in the future. Rather, it will wait until an animal dies or go hunting for more wild game.

TUJURE DE ARROZ
(RICE PORRIDGE)

Tujuré de arroz is a porridge made of husked rice, normally prepared as a breakfast dish. The following recipe was provided by Martina Morales de Herrera of the community of Torrente.

INGREDIENTS AND QUANTITY	COST (pesos)
Rice: 1.5 pounds	27.00
Water: 6 liters	-
Ash water: 10 spoonfuls	-

The rice must first be husked in the tacú (wooden pestle) and the chaff separated. The rice itself must then be washed in water and rinsed three or four times, which is done while the pot with the six liters of water is being brought to a boil on the stove. Once the water begins to boil, the rice is slowly added and should be left boiling for 15 minutes. At this point a tablespoon of the half-cooked thickening rice is removed and replaced with 10 spoonfuls of ash water (agua de ceniza) prepared the previous day. This is what gives the dish its special flavor and why it is called tujuré instead of merely boiled rice. As the dish continues to cook it acquires a yellowish color, while the rice itself thickens and softens into a porridge. This porridge is cooked with occasional stirrings until ready to be served. The dish is served in flat plates, and accompanied by a beverage (usually coffee. Some people like to mix their coffee into the porridge, others take a sip of coffee and then a mouthful of tujuré. It is a dish which has an acquired taste that some find it hard to get used to; others like it so much it is their preferred breakfast food.

FRITO DE HARINA DE TRIGO
(WHEAT FLOUR FRITTERS)

Wheat flour fritters are served at breakfast as a substitute for bread or other baked pastry. The following recipe comes from Blanca Justiniano de Herrera of Torrente-Abritas.

MAZACO DE YUCA TOSTADA
(MASHED TOASTED YUCA)

There is a second way to make mashed yuca, this time with toasted rather than boiled tubers. Like other mazacos, this too is used as a bread substitute. First, several fresh yucas must be harvested and then peeled. These are first toasted over a fire until the outside is dry and crisp so that ashes will not stick to it. Next, the yucas are buried in a bed of hot ashes and left to cook for about half an hour. Remove one yuca first to test if it is soft enough, then remove the others if they are ready. The yucas are then mashed in the tacú. To this dough is added one head of diced, fried onion. Sometimes dried meat (charque) is added to the mazaco as well. The taste of mazaco with toasted yuca is completely different and, many say, superior to mazaco made of boiled yuca.

MAZACO DE PLATANO
(MASHED PLANTAIN)

A final bread substitute is mazaco de platano verde (mashed green plantain) which is prepared with the following recipe.

INGREDIENTS AND QUANTITY	COST (pesos)
Green plantains: 20	10.00
Cheese: one ounce	2.00
Salt: one tablespoon	0.50
Lard: 2 tablespoons	2.00
TOTAL	<u>\$14.50</u>
US\$ equivalent	0.58

Peel the plantains, chop into chunks, and boil with a strong flame. When done, the plantains should be mashed up into a dough using the tacú. To this dough add salt, cheese, and the lard melted into liquid form. All these ingredients should be mashed together in the tacú. The mazaco is then taken and placed in a single large dish, from which the entire family serves itself using each his own spoon or fingers.

ARROZ MAJAO
(BOILED RICE)

This is one of the most typical dishes of the region and is more commonly served for lunch or supper. But when served for breakfast (usually meatless) it is often for a special occasion such as feeding family and hired laborers for a heavy day of fieldwork. The following recipe comes from Doña Raquel Correa of the community of Naranjal.

INGREDIENTS AND QUANTITY (serves five persons)	COST (pesos)
Rice: 1 kilo, peeled	27.00
Yuca: 1 pound	1.00
Oil: 4 tablespoons	2.00
Salt: 2 tablespoons	0.40
Eggs: five	15.00
Water: 8 glasses (3 liters)	-
Total	\$45.40
US\$ equivalent	1.82

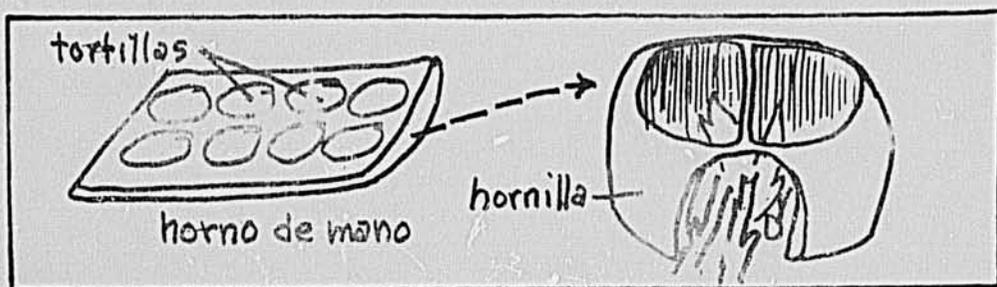
On a two-burner ceramic stove the fire is lit. On one burner a cooking pot is placed for boiling the water, on the other a frying pan. The rice is first placed in the frying pan containing the oil to be browned. This is done while stirring continuously with a wooden spoon. When the water starts to boil the rice is placed in the cooking pot together with peeled yuca, cut into chunks, and the salt. The meal is left to cook until the moisture has evaporated. Meanwhile, on the other burner the five eggs are cooked in the frying pan. When the rice is ready, it is removed with a wooden spoon and mounded on each plate, then a fried egg placed on top. The meal is served with a hot beverage, usually coffee or tea, served in a glass.

TORTILLA DE HARINA DE MAIZ
(CORN FLOUR TORTILLAS)

Francisca Vaca de Banegas, of the community of Forestal, shares her recipe for corn flour tortillas. The flour comes from home-grown produce, either ground at home in the tacú or in a mill at the neighboring market town of El Torno. The ingredients for corn flour tortillas are:

INGREDIENTS AND QUANTITY	COST (pesos)
Dough made from boiled yuca: 1 pound	2.00
Flour from white corn: 1 kilo	8.00
Cuajada (home-made cheese): 1/4 pound	20.00
Ground salt: 1/2 spoonful	1.00
Lard: 1/2 pound	13.00
Suero (liquid from squeezed cheese): 1 glass	-
Water: 1 glass	-
TOTAL	44.00
US\$ equivalent	1.76

The yuca dough, leftover from the previous day's evening meal, is ground into a dough in the tacú, then left overnight in a plastic bowl covered by a clean cloth. This dough is spread on the kitchen table, and to it is added the corn flour, cheese, salt, suero, and water. Caution is taken to make sure this mixture is not too watery; rather, it should be fairly dry so it can be moulded with the hands. Next, dough balls are made and slapped into the shape of tortillas using the palms of both hands and occasionally the fingertips. The finished tortillas are placed on a ceramic hand-oven which in turn is placed on top of the cooking stove or hornilla. Previously, this cooking platter (called horno de mano or urubés) must be greased with lard. The tortillas are cooked over a hot fire. When done on one side they are flipped and toasted on the other. The above recipe serves ten persons represented by four adults and six children.

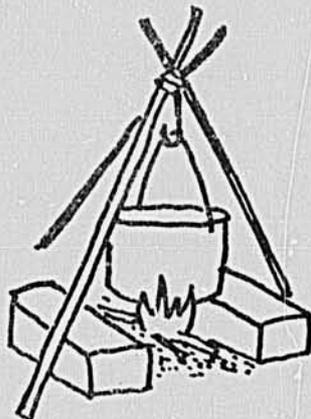


BOILED YUCA WITH CHARQUI

During September 1981 there were heavy rains and flooding in the Tropical Lowlands region which resulted in the death of many cattle. The owners of these animals notified their neighbors and invited them to rescue as much of the meat as possible. The dead cattle were butchered, their hides left to their owners, and the fresh meat distributed among hundreds of rural families. The latter cut the meat into strips and dried it on their barbed wire fences to make charqui (dried beef). The meat was then consumed in a wide variety of dishes over a period of several weeks, and eaten for breakfast, lunch, and dinner. The following recipe describes how it was prepared for breakfast, with baked yuca.

INGREDIENTS AND QUANTITY	COST (pesos)
Yuca: 4 pounds	6.00
Beef charqui: 1 pound	30.00
TOTAL	<u>36.00</u>
US\$ equivalent	1.44

A fire is prepared on the ground in a fireplace bordered by two walls of adobe bricks. Over this fireplace is erected a tripod which is tied together at one end and contains a hook. From this hook a pot of water is hung for boiling the yuca. The yuca are peeled, then washed and cut into chunks and placed in the pot to boil. The yuca is left to boil until completely cooked (30 minutes). At this point the pot is removed, the water drained, and the tripod taken away. The coals of the fireplace are spread out. The charqui is cut into smaller pieces and roasted directly on top of the coals. Once cooked, the charqui is softened by pounding in the tacú and immediately served, together with the boiled yuca, without salt. This meal is eaten and then followed by a breakfast beverage, perhaps a glass of hot tea made of anise and viravira herbs.



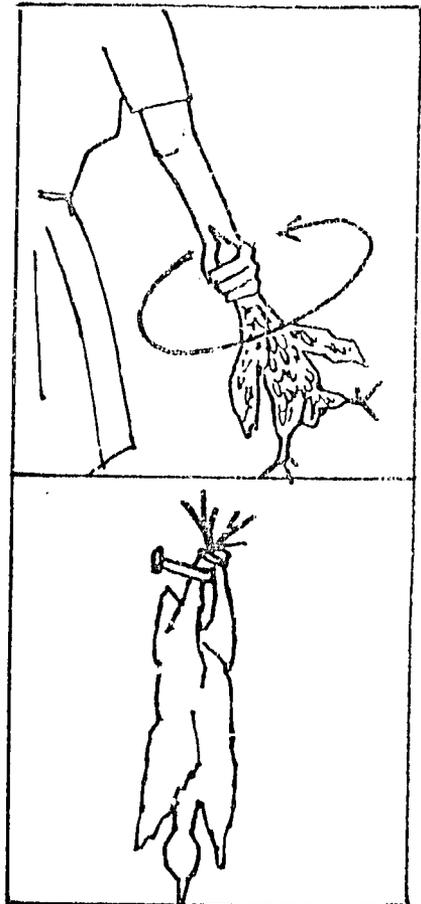
LOCRO DE GALLINA (CHICKEN STEW)

Because it is usually made with chicken or beef, locro is considered a special-occasion meal. Nonetheless, it is a very easy meal to prepare. The cooking technique is quite similar to the preparation of most of the common rice dishes --the only complicating factor being the slaughter and preparation of the chicken.

PREPARING A CHICKEN FOR COOKING

If the bird is taken from her own flock, the rural housewife waits until the feeding hour for her birds. At that time she scatters some corn on the ground nearby and then grabs one of the least wary fowl that are attracted by this ruse. The bird is held firmly by its head, the neck distended. With a sharp flick of her wrist the housewife spins the bird in a circle like a propeller, snapping the neck instantly. Next the dead bird's legs are tied together so the carcass can hang head-downward so that the blood will drain to its neck.

To remove the feathers, the bird is immersed in a pot of boiling water and soaked for about a minute. It is then removed and the flucking of the feathers should begin immediately. Sometimes when the bird is growing new feathers there will be many small quills imbedded in the skin. These can be removed by scrapping with a knife. Another quick soaking of the carcass is conducted to clean the bird. The carcass is then turned about in a flame to burn off any feather residues that remain on the skin, a step known as chamoscar.



Next the bird's throat is cut and the blood drained, Cutting open the breast from the anus, the entrails are removed. The gizzard, heart, and liver are saved while the intestines are thrown to the family dog or cat. Finally, each piece of the chicken is cut off and set aside--legs, wings, thighs, and breasts. All parts are thoroughly washed.

PREPARING THE LOCRO

The following recipe was provided by Juana Leon of the community of Porongo.

INGREDIENTS AND QUANTITY (Serves five persons)	COST (pesos)
Chicken: one	100.00
Rice: 1/2 pound	4.50
Noodles: four ounces	3.25
Potatoes: one pound	3.50
Tomato: one	1.00
Onion: one head	1.00
Green onions: 10 stems	1.00
Green pepper: one	1.00
<u>Aji</u> (chili peppers): five	0.50
Lard: 3 tablespoons	0.50
Salt: 1.5 tablespoons	0.25
Garlic: 2 cloves	0.25
<u>Urucú</u> (achiote); one seed	0.50
Water: 3 liters	-
Total	<u>117.25</u>
US\$ equivalent	4.69

A pot is placed on the stove, filled with three liters of water, and while it comes to a boil the chicken is cleaned and quartered. When the bird is young, some housewives prefer to fry its parts first because this will remove a special smell. The onions, tomato (1/2), and green pepper are chopped up and added to the pot along with whole hot peppers and chopped cloves of garlic. The rice is washed and then fried in a pan containing the lard and several slices of the remaining tomato. Once browned, the rice is also added to the pot together with the pieces of chicken. Next the potatoes are peeled and quartered and added to the pot also. The urucú colorant along with two stems of chopped onions is added at the very end. When the potatoes are cooked the locro is ready to be served. The meal is often complimented by a special drink such as chicha (corn beer) or a fruit beverage.

ROASTED WILD TATU:
AN INTERVIEW WITH JAVIER LAURA AND JULIA VARGAS

Many rural households in the tropical lowlands supplement their diet with wild game. It is common to see male members of the family--and sometimes women--go fishing in small streams adjacent to their farm properties, an activity that occurs perhaps twice a month. Equally common is the hunting of wild pig and a rodent similar to the armadillo known as tatú. In this narrative we present an interview with Javier Laura, the brother-in-law of project participant Julia Vargas de Laura of Naranjal, who is a frequent hunter of tatú. The interview took place April 17, 1982 and was conducted by Aquilina Tucco Vera.

AQUILINA: Don Javier, would you please explain to me how you hunt the tatú?

JAVIER: With pleasure. Last night I left my home at 7 P.M. carrying my shovel, a machete, a lantern, my coca leaves and cigarettes, my two dogs (male and female), and we all ate well before departing. I went to San Jorge, about two kilometers from here, where there are more animals; around here there aren't very many left. I stopped in the home of my cousin, who has a farm there, and we smoked a cigarette together.

I then took the dogs and went out to where he had been clearing land. The dogs began to bark. When that happens you just have to be fearless and run after them in the dark as fast as you can, climbing over trunks and pushing through the brush until you get to the place where the tatú has dug in. Of course, these animals are tricky. Sometimes they don't dig in at all, they just leave a trail then backtrack and flatten down on the ground, and the dogs run right passed them. And then they take off running a second time and stop, and a third, and so on until they reach their cave.

With this one we tracked the tatú to its cave. Then I took the shovel and started digging out the entrance. Just as I thought I was about to reach the tatú it tried to flee out another entrance. But the dogs saw it and pounced and drove it back inside. So I covered over the first entrance with branches and proceeded to dig out the second. Then I heard it trying to escape from the other side, so I blocked the second entrance with branches, returned to the first and started to dig it out again. In this way I closed in on the animal. When I had dug out most of the tunnel and knew I was real close to it I set aside the shovel and finished digging with my hands. At last I snatched the animal. I put it in a sack and started home. It must have been about midnight. I reached home around 2 A.M., left the animal hanging from a tree, and went to bed. In the morning Julia butchered it.

AQUILINA: How do you butcher (carnear) a tatú, Doña Julia?

JULIA: First I boil three liters of water on the stove. This is used to scald the animal so I can remove the hair--just like I do with a pig. Then I scrape off the hair with a knife, all over its body, even the stomach and the legs. After removing the hair I wash the tatú in cold water. Then I remove its shell, again using the knife. After that I cut open the stomach and remove the guts. When that's done it is necessary to wash out the inside very carefully to remove all the dried blood. Finally I cut the carcass into pieces (presas) for cooking--the legs and the ribs.

AQUILINA: And how do you cook the tatú?

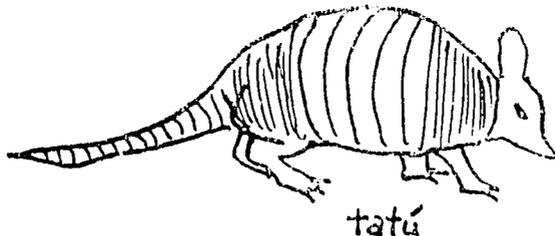
JULIA: With this one, as you can see, I've cooked about four kilos of meat. First I took a pot and filled it with five liters of water and placed it on the stove to cook. Then I cut up four heads of onion and three carrots and added this to the pot along with two tablespoons of salt. All this I left to boil until the meat was cooked. Meanwhile, on the other burner of my stove, I heated another pot with about four liters of water to cook the yuca, of which I peeled and boiled half an arroba (12.5 pounds). The cooking water from the yuca I saved for my pigs. Once the meat was boiled I fried all the pieces in my fueol (frying dish) with plenty of oil. This is done just to brown the meat on both sides. And the meal is ready to eat.

AQUILINA: How often do you prepare tatú, Doña Julia?

JULIA: It depends, sometimes every 3-4 weeks, sometimes every 2-3 months. With this one it's the first time in three months.

AQUILINA: Do you do anything with the tatu's menudencias (organmeats)?

JULIA: Those are for the dogs. They need to get something so they'll want to go hunting. I also give them the head and the paws.



ing, the fish are removed. A raw egg is added to the broth along with the cumin. When the yuca chips are cooked, they are removed from the heat, drained, and placed in a separate dish. The meal is then served in bowls, as a soup, with pieces of fish on the side, and chopped yuca eaten by all from a common dish. Such a meal may be accompanied by a majadito de arroz.

PATAZCA
(PIG HEAD STEW)

This is a meal served on very special occasions and is a great favorite of rural families in the tropical lowlands. The following recipe, provided by Rita Coronado of Porongo, was followed to serve a party of 28 adults who were volunteering their time for a community project.

INGREDIENTS AND QUANTITY	COST (pesos)
Pig head	150.00
Skinned corn (<u>maiz curtido</u> or <u>pelado</u>): 18 pounds	30.00
Tomatoes: 1/2 kilo	10.00
Lard: 1 kilo	35.00
Condiments (salt, cumin, garlic, urucú)	10.00
Total	<u>\$235.00</u>
US\$ equivalent	9.40

The first requirement is to assure an adequate supply of firewood, because the cooking will continue several hours. A large cooking basin known as a fondo or paila is used. This receptacle is filled 3/4 full of water and placed on the fire to heat. The head of the pig is washed carefully, the skin removed, and the head split down the jaw into two equal halves. The pig head is placed in the fondo along with the skinned corn, where it is left to cook for some 3-4 hours. The condiments are diced and prepared in a frying pan, then mixed with the intense red colorant of urucú, and added to the fondo. As the cooking continues, the meal will eventually exude a delicious sauce and the sauce will slowly thicken. The pork meat will be so tender as to fall by itself from the bones. When completely cooked, the patasca is removed from the heat and allowed to cool while plates and eating utensils are readied. On such a special occasion as one which merits patasca, it is also customary to serve a special beverage such as chicha or corn beer.

REFRESCO DE ACHACHAIRU

Achachairú is a wild bush that grows about three meters tall and produces a bitter-sweet fruit popular with rural households for preparing a refreshing beverage during the months of November to January.

The achachairú fruit are harvested by hand. To prepare a batch of beverage about 1/4 kilo is needed or about 30 fruits. Each fruit is squeezed between the fingers, causing the soft husk to open and the seeds to pop out. The seeds are emptied into a plastic juice pitcher. Using a large mixing spoon as a press, the seeds are crushed to remove their juice. About five table-spoons of sugar are added to the juice and pulp mixture, forming a thick syrup. Finally water is added, about two liters, to produce a light-brown beverage. This is further sweetened with a quarter-pound of sugar. The beverage is served with seed residues, which can be swallowed or not at the option of the person drinking.

CHICHA DE MAIZ BLANCO
(CORN BEER)

Chicha is a special occasion beverage which in other regions of Bolivia is preferred as a fermented drink for its intoxicating effects. In the tropical lowlands, however, chicha is most commonly consumed as a refresco or soft drink. It is prepared with sugar, clove, and cinnamon as shown, for example, in the following recipe.

INGREDIENTS AND QUANTITY	COST (pesos)
White corn: 3 pounds	6.00
Clove: 1 unit	2.00
Cinnamon: 1 stick	1.00
Sugar: 1 kilo	17.00
Water: 2 <u>latas</u> (5 galon cans)	-
Total	26.00
US\$ equivalent	1.04

First the corn must be soaked for a couple hours, particularly if it is old corn that has been in storage several months because such corn is even harder than rice. Once soaked the corn is drained through an urupes (sieve). Next, this softened grain is pounded in the tacón (pestle) until it is converted into cornmeal. The pounding process is quite laborious. It takes at least 30 minutes of pounding--and three screenings through the sieve--to obtain one pound of cornmeal. So the three pounds required in the above recipe would require 90 minutes of hand milling. If sprouted corn is used the process goes a little faster, because normally only two screenings per pound are necessary.

Once the cornmeal has been obtained (three pounds), it is mixed in a nine-liter can (lata) which is half-filled with water (media-latada). The contents are stirred vigorously, then strained through a sieve again into a cooking pot. The screened residue is called koncho. A quantity of water equal to two cans (18 liters) is heated to boiling. It is then mixed with the koncho in equal portions; this mixture is divided into two separate cooking pots and boiled for another hour. The cinnamon and clove seasonings are added at the start of the boiling. After an hour the chicha is removed from the stove and left to cool. Sugar is only added when the beverage is ready to be served. If the sugar is added before hand, it turns the mixture sticky and somewhat disagreeable to the taste. For two latadas of chicha a kilo of sugar would be required.

In 1930 a lata of chicha de maiz blanca sold for about 40 pesos (US\$1.60) in local markets of the project area. A lata should yield about 50 glasses of chicha. If consumed only by the household, it would last about three days. However, since chicha is a special-occasion beverage, it is customary for the family that prepares it to send gifts of chicha to their relatives and neighbors. The latter, of course, respond with a similar gesture when it is their turn to make chicha.

CHICHA KOLLA (FERMENTED CHICHA)

The preparation of fermented chicha is well documented in the first two volumes of Our Knowledge and need not be repeated in detail here. The preparation is similar to that of chicha blanca up to the point of its mixing prior to boiling. At that point the beverage for chicha kolla is not boiled yet but left alone so that its sediments will sink to the bottom of the container. This thick residue, known as hupa claro, is removed, mixed with brown sugar, and cooked until it acquires a dark brown syrup consistency--a product known as arropo. This sweetener is then added to the uncooked corn-water liquid and the mixture boiled for about a day. It is then left to cool for a day before being placed in earthen jars. There the beverage is left to ferment for 8-10 days, during which time the mouths of the jars are very tightly closed. It is now ready to be drunk.

AMBROSIA DE LECHE
(MILK AMBROSIA)

Milk ambrosia is a beverage made to pay homage to a very special friend or perhaps an unusual visitor at a rural household. The beverage consists of combining freshly-obtained milk--directly from the udder into a glass--where it is combined with singani (a strong grape brandy, considered the liquor of Bolivia) and a spoonful of sugar. For an ambrosia party it is not uncommon for as many as three cows to be milked. The party takes place in the milking corral. The first animal is led in, her calf is allowed to suckle briefly to get the milk flowing, and then the animal is milked directly--supplying enough milk for the first "round" or two. When the first cow is dry, the next one is led in for milking, and so goes the process for an hour or two. As for the ingredients, they depend on the generosity of the bartender and the productivity of the cows. For example, a three-cow ambrosia party given by Cresencio Cosio of Forestal, in August 1980, cost the host 127.50 pesos without counting the milk itself. Aside from 7.50 pesos in sugar, the balance of the expense was accounted for by four bottles of singani at 30 pesos (US\$1.20) each, or 120 pesos in total (US\$4.80). It was reported that Cresencio saved his best cow for last, and that the party was an unforgettable experience for his guests.

CHAPTER VI: HYGIENE AND HEALTH

We begin this chapter with a brief description of the difficulties involved in assuring a clean water supply for domestic use, and how laborious is the process of washing clothes. The remainder of the chapter is then devoted to illnesses of different kinds and how they are treated. The most common ailment reported by rural housewives is pregnancy and childbirth. For this reason we review pre- and post natal care, breast feeding practices, and post-natal complications.

The middle section of this chapter is devoted to the reproduction of a notebook--kept by Francisco Mejía of Las Abritas--devoted to the study of three dozen plants of the tropical lowlands region, all with practical and mostly medicinal applications.

Next is presented a description of how a variety of home remedies are prepared. These cover peanut oil, macrororo oil (mainly for massage) as well as syrups made from cactus and green gourds. These remedies are supplemented with traditional homemade medicines or recipes for treating snakebite, fever, colds, diarrhea, stomach and intestinal inflammation, and toothache. The chapter concludes with two narratives describing the treatment for "spiritual" disorders requiring the use of incense, burnt offerings, and the help of a traditional healer.

HAULING WATER FOR DOMESTIC USE

All the resident families of the community of Forestal, without exception, draw their water from two streams that bisect their village--the León (Lion) and Botellas (Bottle) rivers. Following a rain these streams get very muddy, so users dig pools on the edges to collect and filter the water. To get truly clean water one must get to the river early in the morning, because by 7 A.M. the river water becomes contaminated from people's bathing and washing of clothes.

The Vargas household is particularly meticulous about clean water. For this reason the entire family--Doña Melva, her husband, and her children--wake up and make their first trips for water at 5 A.M. Only after the water supply has been procured does Doña Melva prepare breakfast. The family must walk down a hill for about 300 meters to reach the León River. Each member takes a different vessel--milk containers, lard cans, pots, gourds--as well as pieces of rag, ropes, and the family wheelbarrow. At the river each vessel is filled using a gourd for lifting and pouring the water. The rags are folded into small cushions and placed on top of the head so that vessels of water can be head-carried. The younger children usually load two cans of water on the wheelbarrow. Then, to get their load back up the slope, one child pushes the wheelbarrow while the other pulls it with the rope. Although Melva's husband will cooperate by hauling one load of water up from the river (the first of the morning), this task is generally the responsibility of women and children.

Melva says she prefers to go for water early because that is when it is the cleanest. To meet her household's water needs some eight trips are necessary in a single day. The first loads (and cleanest water) are used to fill the family water cistern--a 50-liter ceramic pot. The later loads are stored separately and used for washing. The cistern water is used exclusively for drinking and cooking. This vessel's contents are entirely consumed in a single day; indeed, Melva rinses her empty cistern on a daily basis.

WASHING CLOTHES

Based on a sample of 14 households and records kept by housewives, the task of washing clothes is conducted an average of five times per month. Clothes are washed most frequently in Valle Hermoso and Porongo--both with an average of seven times per month--and least frequently in Naranjal (three times per month). Housewives in Forestal and Torrente-Las Abritas wash clothes an average of six and five times per week respectively.

Normally, clothes are taken to a river for washing. However, to allow the clothes to soak it is necessary to select a location with a neck or pool of quiet water. The clothes are carried to the river in a bundle (atadijo). The housewife usually carries one wash basin or gabeta. Women who do not own a basin of their own will often "rent" one for the day from a neighbor, paying for this service by washing, say, four items of clothing for the washbasin's owner. The woman also takes a wooden washboard.

The washing process itself is extremely slow and tedious. First, the bundle of dirty clothes are untied and each piece is placed to soak in the water. Second, taking the washbasin, the woman begins to soap each item of clothing one after another. Each soaped piece is wadded up in a ball and placed on the riverbank. When all the pieces are soaped and wadded they are left on the river bank for 30 minutes in bright sunlight. After half an hour the housewife gathers her wadded clothing, then one by one she beats them against her washboard. After beating, the clothes are placed once again in the water to soak and rinse.

Next comes the second soaping, this time more slowly with the housewife inspecting each item for heavily stained areas needing special attention. Once again the clothes are placed in the sun and spread out along the riverbank, but this time not in wadded balls but rather fully extended. These garments are sprinkled with water from time to time as they bake in the sun to loosen the dirt. Then, once again, the clothes are gathered up and beaten vigorously on the washboard. For reluctant dirt a third soaping and beating is necessary. Then the clothes are soaked again, then hung from the branches of bushes or spread out on the riverbank to dry. While the clothes are drying, the housewife takes a break to bathe herself. When the clothes are dry she gathers them up and carries them back to the farmhouse.

CHILDBIRTH

None of the childbirths reported by women participants of the Traditional Practices Project took place in the hospital. To the contrary, all of them took place at home with the mother attended by a midwife or in some cases her own husband. Giving birth in a hospital is shunned not only for its expense, but because it is considered a place of pain--indeed a form of cruel and unusual punishment. For the most part, rural women in the tropical lowlands take virtually no precautions prior to childbirth, in some cases working in the fields or conducting normal housework right up to the time labor pains begin. The birthing practices themselves are remarkably similar from one household to the next: the llijllada (turning in a blanket) to align the baby, the homemade remedies to quicken the delivery, the massaging of the abdomen with oil, the birth on the floor instead of a bed, the post-partum procedures, the rest and diet of the mother, and so on. Except for complications requiring special treatment and remedies, one birth is very much like the next.

PRE-NATAL PREPARATIONS

For a pregnant rural woman to check in with a doctor periodically for routine pre-natal control is widely recognized as necessary and a good idea, but nobody follows this practice. Even in those cases where women have had a stillborn child because of birth complications, pre-natal medical consultations are rare. The only major concession with their normal domestic routine and responsibilities is for the woman who is considered "delicate" to stay shut in at home, leaving off her agricultural and livestock duties, not lifting anything heavy, and pretty much staying home to cook; but even in this case such a woman runs a great risk of annoying her husband and being considered floja (lazy). So most expectant mothers seem to do just the opposite in the final days of their pregnancy. They do agricultural tasks, take care of their livestock, travel on bouncing trucks to reach the Sunday market, buy and sell produce, attend community meetings, and keep up with their full routine of domestic tasks--as if to prove how strong they are, and not necessarily to their husbands. Quite a number of women have given birth when their husbands were away from home for a few days.

However, once the birthpains begin a midwife is called immediately or, in some cases, a male healer. Virtually the very first task of this midwife or healer is to perform the llijllada or alignment of the baby for birth. This is done by placing the mother in a blanket, her head at one corner and her feet at the other lying diagonally, and her hands at her side. Between two or more helpers the mother is lifted off the floor and then rolled first to one side and then to the other until she has completed three "turns". Next, the mother is given a couple tablets of patate or purgative which is intended to quicken delivery (or induce vomiting). Invariably she is made to drink a hot homemade remedy to further induce relaxation of the muscles and easing of her pain. One drink is known as aguita de trigo, made with annis and orange leaves; another is mate de canela (cinnamon tea) mixed with alcohol; a third is manzanilla tea.

As the moment of birth approaches, the midwife squats behind the mother and--using warmed oil--massages her belly in a downward stroking fashion. The husband or an assistant kneels facing the mother so she can put her arms around his neck and can pull against him; this helps her to raise her pelvis and simultaneously push to expell the baby.

GIVING BIRTH

Most women interviewed report fairly easy and rapid childbirth by this method, which is why--having heard stories of prolonged pain in the prone position--they are so afraid of hospitals. The only problem reported by these women involves the slow evacuation of the afterbirth, which can be delayed from a few minutes to several days, all of this period being so intensely painful that the mother is incapable of eating or sleeping. If the afterbirth has not appeared within a normal period of time, the midwife or sometimes the husband will grease their hand and insert it up the vaginal canal to find and withdraw the placenta.

The placenta is cut about 10 cm from the newborn's belly, usually with a pair of scissors, and then tied off with a piece of thin thread. The wound is sometimes treated with iodine and dusted with talcum powder. The infant is washed in warm water using a mild soap.

POST-NATAL CARE

Once the afterbirth has been evacuated and the placenta cut, the mother can be removed from the floor to her bed, from where she will not be allowed to move for 3-6 days, except to urinate or defecate; and in the case of relieving her waste products the mother will utilize a bedpan which will be emptied for her. As soon as she is able to eat, the new mother is invariably served chicken soup--a diet that will be continued morning, noon, and night for a week. This soup is usually prepared without onions, which are believed

harmful to the stomach so soon after labor. Nor is the mother given any water, only warm teas to slake her thirst. Women with continuing problems of discharging coagulated blood or abdominal pain in general are required to drink oregano tea. For the newborn infant, a tea prepared with annis, oregano, and manzanilla is served with a teaspoon until the baby has begun to nurse. Midwives of the tropical lowlands frequently suggest that mothers save the first defecation of their infant, for this is good for preparing remedies to treat any illness the baby might contract; however, no detailed instructions were provided concerning how this substance was to be used.

A REMEDY TO CLEANSE THE WOMB AFTER CHILDBIRTH

Justina Arauco de Garcia of Valle Hermoso insists that a remedy known as agua de uña de gato (water of cat's claw) is excellent for expelling coagulated blood following childbirth. Cat's claw is a vine that is commonly found growing on trees and fences of the region and has an appearance as illustrated below. The beverage also requires a second ingredient, a sharp-edged grass with three stems known as pasto cortador (cutting grass) which is not shown.

The instructions for preparing this remedy are the following. Cut off a piece of cat's claw stem about 5-6 cms in length. Take a piece of pasto cortador of the same length and combine both plants in a glass (half-bottle) of water, then boil the liquid for 7-8 minutes. Sweeten to taste and drink as hot as possible.

Doña Justina learned of this remedy from her husband Aurelio, who learned about it from Don Gregorio Ortiz of the community of Naranjal. It was explained that the cat's claw serves to scrape the walls of the uterus, while the cutting grass breaks down coagulated blood.



Uña de Gato

BREASTFEEDING AND WEANING

With rather surprising consistency, most mothers report that they breast feed their babies until the age of 15 months or so. There appears to be a slight preference toward allowing females to be weaned later than males. But generally, as soon as the child begins to walk around and is able to feed itself it is taken off the breast.

The weaning process usually begins by introducing the child to a bottle feeding at night. For this feeding most mothers use a solution made with cornmeal (maizena) and sugar or cinnamon rather than milk. Next, if the child sleeps with its parents, it is placed on the outside of the bed on the father's side to eliminate the possibility of its finding and nursing a breast accidentally. When a child persists in wanting to nurse beyond the prescribed age, a common remedy is for the mother to smear her nipples with the juice of a hot pepper--a seemingly cruel but immediately effective way to discourage the child. One mother reported that she was reluctant to sting her child with ají, so she used toothpaste with equally effective results.

Once the child has been discouraged in this fashion, the final weaning is usually achieved through some form of distraction. The child may be given a sweet cookie whenever it tries to return to the breast, or perhaps the child will be left with the father or relatives for a few days, thereby temporarily severing contact between mother and child while a new eating and drinking routine is established.

On Thursday Anastacia continued in pain and Sabino continued to take care of her and the household. He cooked, washed clothes, washed the baby, prepared different herb teas, and looked after the livestock. And so it went for three more days, with no improvement in Anastacia's condition.

On Sunday March 13th Sabino left the baby and his children with a relative so he could take his wife to see a curandera in the neighboring community of El Chore. The name of the healer and midwife was Doña Mercedes, who told the couple the cure would require six days. On the first day in El Chore the healer had Anastacia take a remedy consisting of ground claw of the wild tapir (uña de anta) mixed with manzanilla tea. She also gave Anastacia an abdominal massage, but without any oil. This treatment was continued the second day, together with the continuing diet of chicken soup. Meanwhile Sabino went to the market to buy more food and supplies, then returned to Valle Hermoso to bring chickens from his farm. From the third to the sixth day Anastacia's diet remained unchanged except that now she was taking every morning a hot mate de toronjil (an herb used to cure stomachache). By the end of the six day period Anastacia's condition had not improved, and she continued to suffer from abdominal pain, dizziness, and depression.

At this juncture Doña Mercedes said that it would be necessary to "call the spirit" (llamar al ánimo) of Anastacia, which had been scared out of her body. For this she said she needed a bottle of wine, a bottle of singani (grape brandy, a complete mesa (table, package) for a burnt offering, a pack of cigarettes, and some coca leaves. Sabino went out and bought these items for a total of 130 pesos (US\$ 5.20). As reported by Anastacia, the ritual went like this:

"...Doña Mercedes made me put on a gorra (stocking cap), then a hat, then one of my shoes. She wrapped the ingredients of the burnt offering in a cloth and placed it on my chest, after which she removed it and asked me to expell air forcefully through my mouth three times to bathe the ingredients with my breath. Next she took the offering, the hat, cap, and shoe outside the house and smoked them in the coals of the burnt offering. These items were brought back to me still warm and I put them on again. Doña Mercedes also brought back some warm earth and used it to massage my body, after which I went immediately to sleep. The next morning when I awoke Sabino paid Doña Mercedes 750 pesos (US\$30) for her six-days of treatment and all the meals."

That day the couple returned home. Anastacia remained in bed, and Sabino did the cooking for his wife and children, and the same the following day. It was now March 19th. Sabino left his wife and children that day and went into Comando to buy supplies. At lunchtime, as she was eating with her children, Anastacia suffered a strong dizziness and nausea which frightened her so much that she left word for her husband and took her children to the house of her brother-in-law. There she was treated by her relatives, who

decided to apply a plaster (cataplasma) on the soles of her feet. The contents of the plaster consisted of four spoonfuls of chicken manure, four spoonfuls of grease (beef), and some rosemary (romero)-all this boiled and then applied as a paste to her feet and wrapped with a cloth. The plaster remained this way "sucking" out her illness until the following day. But once again there was no change in Anastacia's condition.

On March 16th Sabino returned to El Choro to consult the curandera Mercedes, who was known to be able to see the future by reading coca leaves. Sabino took some coca with him, and the reading indicated that his wife's situation had been caused by gloria (glory), that she had walked on a place that had been struck by lightning. The illness was curable, but would require the purchase once more of a liter of wine, a liter of singani, a complete mesa (burnt offering), a sheep fetus, incense for gloria, and a dozen candles. Sabino bought all this, left it at the healer's house, and was told to return the curanderas house on Friday night, March 18th, because the healing ceremony was to take place the following day at 4 A.M.

Sabino and Anastacia returned to Doña Mercedes's house that Friday, and the following morning the curing ceremony began exactly on schedule. A fire was lit in the center of Mercedes's patio. The burnt offering was distributed in 12 equal portions and placed on separate plates. Then the sheep fetus was burned, after which the ashes and incense were spilled onto each of the 12 plates, beside which burned a separate candle. All participants prayed for forgiveness on their knees. The offerings of wine and grape brandy were spilled by each participant on the ground of the patio just outside the door to the kitchen. Then everyone went to bed and later that morning the visitors returned to their home.

Beginning that day Anastacia felt better and once more returned to her household duties. She began to prepare meals and even attended a meeting of the Mother's Club, because she didn't want to stay home by herself (since that day her husband was away on a community workday to repair a bridge). On the 20th, both Anastacia and Sabino went into Comando to do their shopping, because Anastacia was afraid of being left alone with her children, for she still was feeling sickly.

On March 21st, while her husband was harvesting rice with two hired laborers, Anastacia took the liberty of consulting a healer who lived close to her home, a Don Clemente, to "read her fortune". Don Clemente did so and reported that her "womb had been frightened". To heal this condition the following ingredients were required: a black-feathered chicken, a liter of alcohol. Anastacia, without consulting her husband, asked a neighbor to buy these ingredients for her. Later, when her husband returned for lunch, she told him about her decision. Sabino got angry. He said he was tired of phony healer cures and threatened to take his wife to the hospital in Comando.

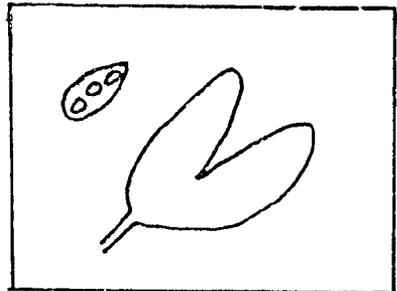
But since the healing ingredients had already been ordered, that afternoon Anastacia returned to the healer's house. The cure was executed as follows: Anastacia was asked to wring the chicken's neck herself, after which the bird was burnt in a fire while the healer and his wife drank and blessed the cremation with alcohol while Anastacia stayed inside the healer's house. She remained there an entire day. In the late afternoon of the following day, hungry and fatigued, Anastacia asked that the healer accompany her to her own home, which he agreed to do. Upon approaching her home, the healer dug up some dirt with his machete and ordered that she drink it in a water solution. A portion of this muddy concoction was placed on a rag and bound to Anastacia's head to be left for a day. Before the healer and his wife had departed they burnt some incense around the farmhouse.

A couple days later, Sabino took his wife to see a Doctor Vasquez in Comando, who gave them several prescriptions, principally vitamins. By taking these pills, Anastacia said she had felt some improvement in her condition, but that the dizziness and feelings of depression persisted.

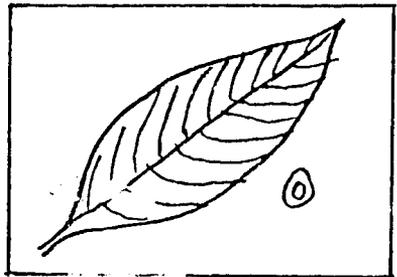
FRANCISCO MEJIA'S COLLECTION OF EDIBLE,
MEDICINAL, AND INDUSTRIAL PLANTS OF THE
TROPICAL LOWLANDS

In June 1981, Francisco Mejía Ribera of the community of Las Abritas completed entirely as his own idea a notebook in which he had collected the leaves and brief descriptions of nearly three dozen plants of the tropical lowlands. He entitled his study Summary of Plants, Shrubs, and Herbs Which Have Their Uses in the Countryside of Santa Cruz de la Sierra, Bolivia. On the first page he modestly dedicated his research with the statement: "Data provided by the Campesino Francisco Mejía Ribera." In the following pages we have attempted to reproduce illustrations of the leaves collected and sewed to each page of Francisco's study, along with the text he provided to describe each plant's physical characteristics and uses.

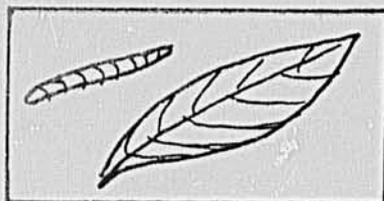
PAQUIO: We have trees like the Paquío, a corpulent tree with a thick, white bark, which yields a white resin used to heal bruises. It grows to 20 meters high, producing a black-colored nut with 2-3 seeds and goat-hoof (cloven) leaves. When mature, these seeds can be eaten and has a sweet pulp. The wood of this tree is very strong and is used to make trapiches (cane mills), tacuses (grinding pestles), and bateas (wooden troughs). The fruit matures between July and September.



PITON: A tree of greyish black color that grows 10 meters high and produces a lancelet shaped leaf. Its fruit is oblong, yellow in color, bitter-sweet with a single seed conserved inside, which matures between December and January. The wood of the Piton is only used for fuel.



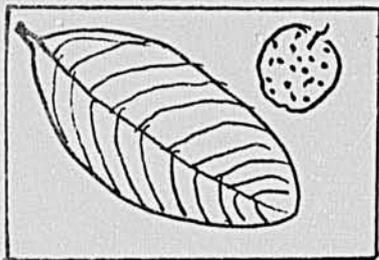
PACAY: Another tree with a whitish bark. It produces a pod about 15 cms. long with a delicate skin and seeds enclosed in a sweet syrup, which after sucking on them they turn from brown to green. Its leaves are lancet shaped up to 10 cm. The fruit matures in December-January. We use this tree only for fuelwood.



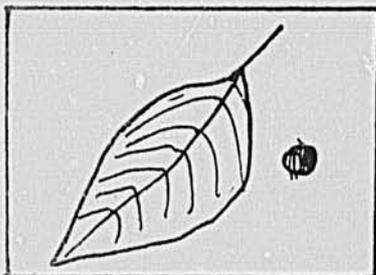
AMBAIBO: Again a white tree which grows 15-20 meters tall, with very few branches, and seven-fingered leaves that are green on their upper surface and grey underneath. The fruit hangs in a cluster, like a glove, is of a yellow color, and is very sweet. One can tell it is mature when the fingers hang downward, leaking a delicious nectar. The seeds have a mustard color and should be eaten in limited quantities or they will cause constipation. The fruit matures in January-February.



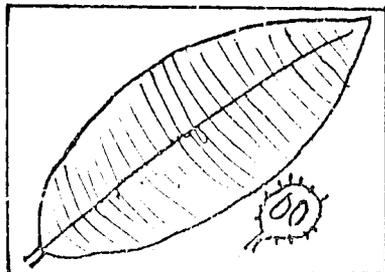
GUAYABA: A yellowish tree which grows about 3 meters tall and produces a fruit which is yellow skinned, when mature, fleshy pink meat on the inside with lots of pink seeds. The whole fruit is eaten. When boiled, guayaba is good for curing cough. The leaves can be boiled and used to clean wounds. Its wood is used to make boxes, arrows, and sling-shots. The guayaba fruit matures in January and February.



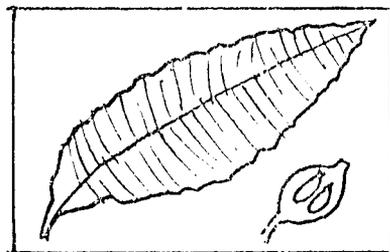
TARUMA: A tree with grey bark, 5-10 meters tall, with oval-shaped leaves. Its fruit, which matures in January-February, has a bitter-sweet taste and is eaten like a grape but throwing away the skin. The bark is medicinal, and when boiled and mixed with toasted cornstarch is a good cure for diarrhea. The wood of the taruma is burnt and its ashes are used instead of lye for making homemade soap.



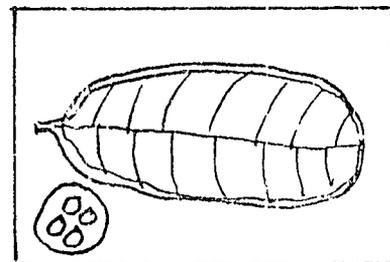
OCORO: A tree with black bark and white spots which grows 20 meters tall and has an elegant silhouette with many evenly spaced branches. It has long, tongue-shaped leaves. Its fruit is yellow, prickly, bitter-sweet, with a husk that is easy to break, and contains two seeds similar to cacao. The resin of this tree permanently stains clothing. When mature in January-February, Ocoro fruit is used to make a refreshing drink. The wood of this tree is only used for fuel.



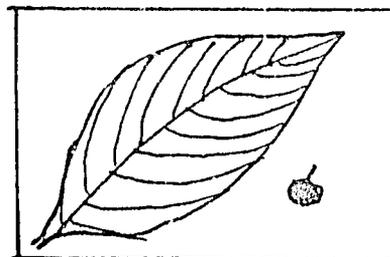
AJHACHAIRU: A tree similar in color to the Ocoró in color and branching, but much shorter because it only reaches a height of 3 meters. The leaves are 10 cm long, and lancelet-shaped. The mature fruit is yellowish with a soft skin, bitter-sweet, used to prepare a refreshing drink during its months of maturity from November to January. Achachairu wood is only used for fuel.



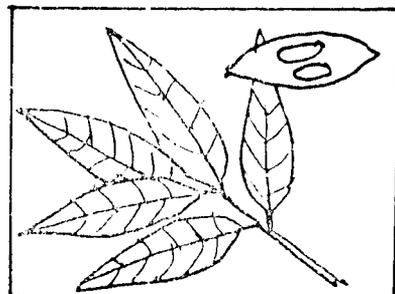
GUAPOMO: Whitish-colored tree, grows 3 meters high, with branches and leaves growing so thick they are impenetrable. The oblong leaves are stiff with a thickening at the outside edge. Its fruit, which matures in December and January, is the size of a billiard ball, has a fleshy husk and contains 3-4 seeds which can be sucked on to extract a sweet nectar. The wood is only used for fuel.



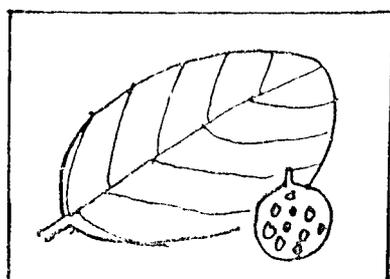
TURERE: A grey-colored tree with rough bark that grows 3 meters tall with lots of even branches. Its tongue-shaped leaves are medicinal. When soaked in oils and placed on the forehead they cure headache. The fruit, which matures in December, is black with only one seed, which can be sucked for its sweetness. The wood is only used for fuel.



ISIGO: A whitish tree that grows 3-4 meters high, its branches growing disorderly and covered with bristles, its flower is black, its fruit green but turning yellow at maturity during December-January and containing two white seeds that are sweet and mint-tasting. The Isigo's leaves grow in clusters of five oblong spikes. The resin of this tree is medicinal and cures muscle spasms and abdominal pain of women. The leaves can also be boiled and applied to the soles of the feet as a plaster to alleviate rheumatism.



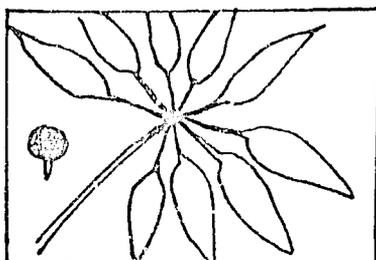
HIGUERÓN: A corpulent yellow-colored tree that grows 20-25 meters high with many branches arranged in an orderly fashion. Its oblong leaves are 15 cm long and very shiny, while the fruit is greyish but turns yellow when mature but is not edible. The resin of the Higuierón is used as a verifuge which, mixed half and half with water, destroys parasitic worms in the intestines. The wood of the Higuierón is used for boards in general construction.



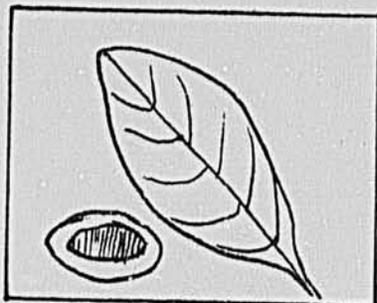
TARAGUITO: A tree that grows 2 meters high, white-colored, with many bristly branches but without thorns. It grows in a twisted fashion, growing many false branches (suckers) that fail to grow. Its leaves are lancelet-shaped and very small. The plant puts out a white flour and a tiny green seed that turns black at maturity, about the size of a pearl on a necklace. The fruit is only eaten by birds, not humans, and the tree's wood is only used for fuel.



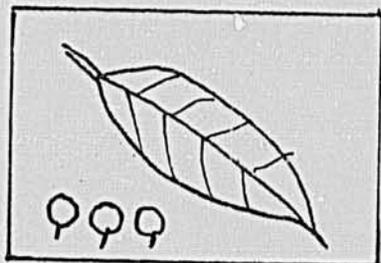
QUITARRERO: A tree with an elegant silhouette and thick panoply, yellowish in color, with leaves clustered in groups of nine fronds that are green above and yellow below. The mature fruit is dark green and is only eaten by birds. The wood of this tree is quite fragile and only used for fuel.



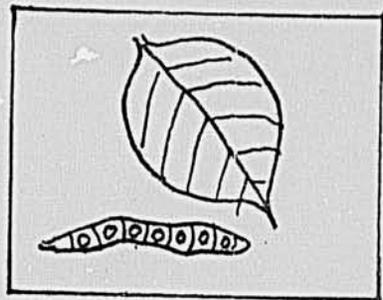
VERDOLAGA: A tree with a thick, blackish trunk that grows 20 meters high in open fields and provides a beautiful shade effect with orderly branches and small oblong leaves. Its flower is yellow, similar to clove, but without any fragrance. Its fruit is the color and size of an olive but is only eaten by birds. The wood of this tree is used in construction (but not for columns or posts) and is preferred for making charcoal.



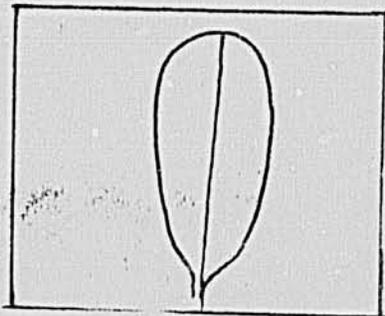
SAPAIMO: This tree grows 3 meters high, has a black trunk, and many branches which grow irregularly creating a thicket. It produces a yellow flower and a fruit which is red when mature but disagreeable to the taste. The wood of this tree has no industrial use and is harvested as fuel only.



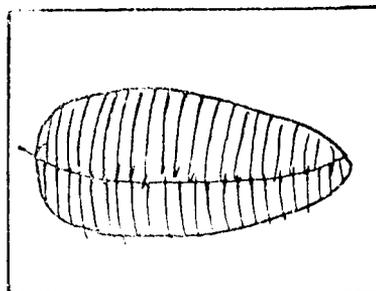
TEJIBO: A corpulent tree with a thick, rough, whitish bark that, when boiled in water and drunk is used to cure hepatitis. The Tejibo has white branches and its almost round leaves are thick. It grows flowers in three colors: white, red, and purple, but not on the same tree. The wood of this tree is considered almost indestructible so it is used for posts, columns, rafters, and other support structures in houses. It is also preferred as a firewood because it gives off very little smoke and a pleasant smell. We use it to warm our homes on cold evenings. The fruit is a legume with a worm-shaped pod but is not edible.



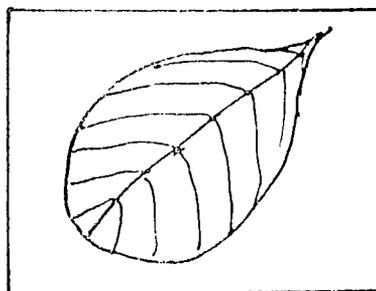
CHIRIGUAN: A white barked tree, both in its trunk and branches, that grows 5 meters high. It produces few branches in a disorderly pattern. Its bark is used to cure dandruff and other skin ailments. The bark is ground up and soaked in water for a day, then used to wash the effected area. It produces no known flower but its fruit, which is green at all times, is the size of an olive and not edible. Its leaves are small, oval-shaped, green on top and white on their undersides. Neither the fruit or the wood is used.



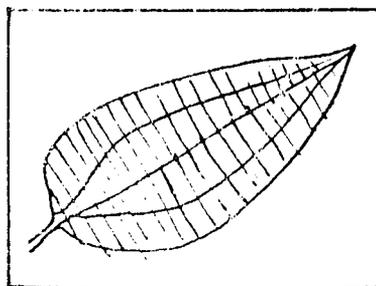
TINTO: A yellowish tree with a rough bark that grows up to 6 meters high in particularly humid locations. It has few branches except in its canopy. Its oval-shaped leaves are bi-colored, green on top and yellow below. Its fruit is contained within a hard shell with two seeds apiece that are not edible. The wood of the Tinto is used for fenceposts and also, when green, is used for making charcoal.



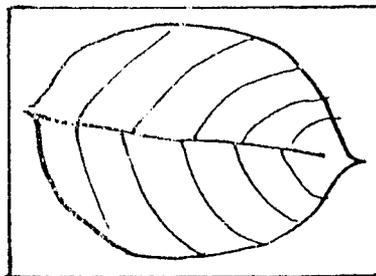
COLORADILLO: A tree with a redish bark and a slender, soft trunk which grows 3-4 meters high with many branches disorderly arranged. Its bark is used to stain leather, wool, and textiles. Its flower is yellow, its fruit green at all times with a single, bitter-tasting seed only eaten by birds. The wood of this tree is excellent for fuel when it has been well dried. The leaf is also bi-colored with green on top and yellow below.



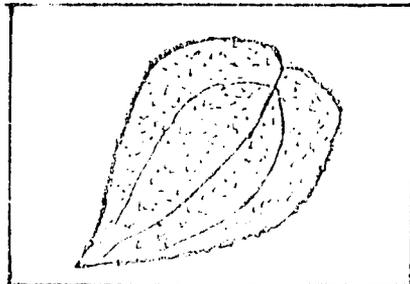
PALOMILLO: A bush that grows about 1.5 meters high with a straight stem and few branches, bi-colored leaves (green and yellow), with a white flower and pleasant tasting fruit which matures in January and February turning a bluish color. The fruit is very popular with pigeons and small children. The stem is used to skewer meat for roasting on the fire.



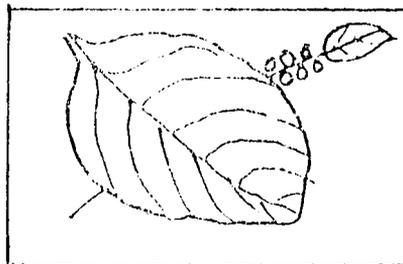
HIERBA MATICO: A tree that grows up to 2.5 meters high with a smooth, whitish bark, few branches. Its leaves are nearly round and are used by housewives as a sheet when baking rice bread and other pastries. The leaves are also used in teas, and some say in taste and odor they are equal to the hierba mate of the Chaco region. The wood of this tree is not even used for fuel because it snuffs out too easily.



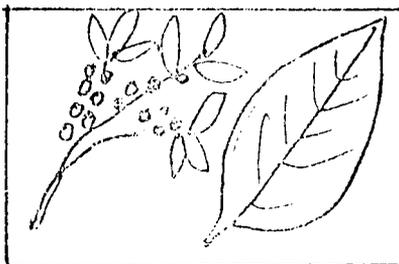
OREJA DE PERRO (DOG'S EAR): A small shrub with grey trunk and stem that grows no higher than 70 cm, with a strong smelling white flower and a fruit (berry) that turns black when mature and contains many tiny seeds. Its broad leaves are soft and fuzzy and used instead of toilet paper by rural families. When ripe in January and February the berries of this plant are popular with birds and small children because of its sweet taste.



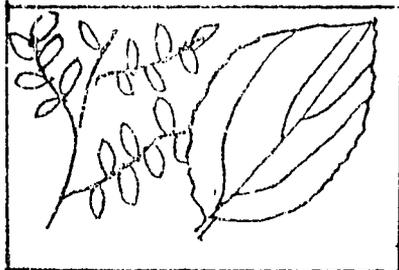
HESTORAQUI: This tree grows 3 meters high. It has a cinnamon-colored bark with a most agreeable smell. Its resin has a medicinal use when boiled, together with onion, to produce an expectorant. Its leaves are also used in religious ceremonies, where they are burnt as incense. The wood of this tree is an excellent fuel, but too delicate for carpentry use. The fruit are very small, only eaten by birds.



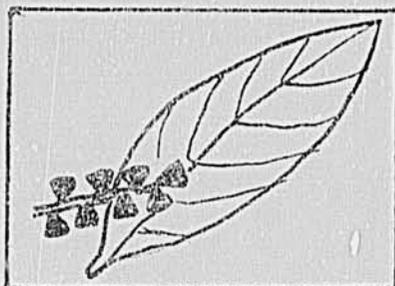
ALISO: A tree which grows 10 meters high with a straight trunk and branches, of whitish color. The wood is used to provide the corner posts and joists in home construction, because it is known to last for 40 years. The skin and fruit of this tree is red and is used as a natural dye. The fruit grows in clusters. The ashes of its wood are also used to make lye for homemade soap. The tree, when dry, makes an excellent fuel, but otherwise the tree has no medicinal or edible uses.



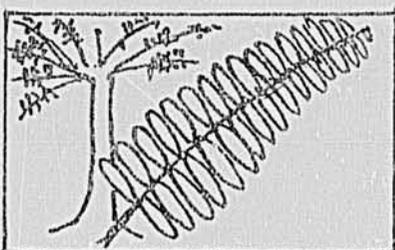
CHICHAPI: A vine plant with many spiny branches that seldom climbs more than 3 meters. Its leaf is boiled in water to prepare a tea used to cure diarrhea.



TROMPILLO: A corpulent, cinnamon-colored tress that grows 20-25 meters high with many branches and an excellent foliage. Its branches are smooth, its leaves green, and its fruit hangs in clumps, each shaped live a small top (*trompillo*) which gives the tree its name. The tree puts out very beautiful flowers. Its wood is used to make serving dishes, grinding pestles, and is also sawed up for boards and furniture. Trompillo is also a good fuelwood.



TASEQUI: A whitish tree that grows 5-6 meters tall with a long trunk and a canopy of frond-like, delicate branches resembling ferns. It produces a lovely purple flower but its fruit is unknown. Its wood is delicate, used (its ashes) instead of lye for homemade soap. The tree grows in low, swampy areas.



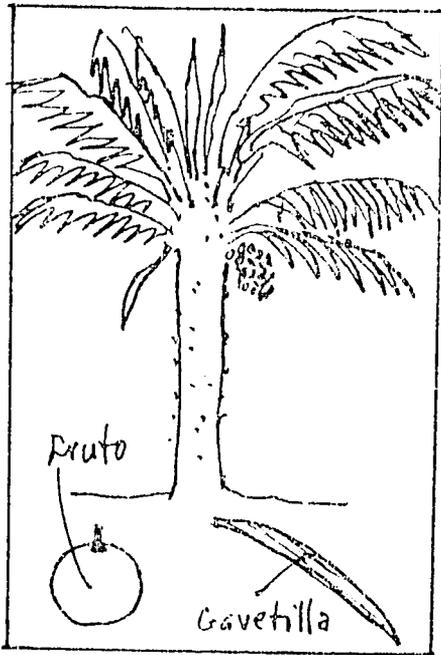
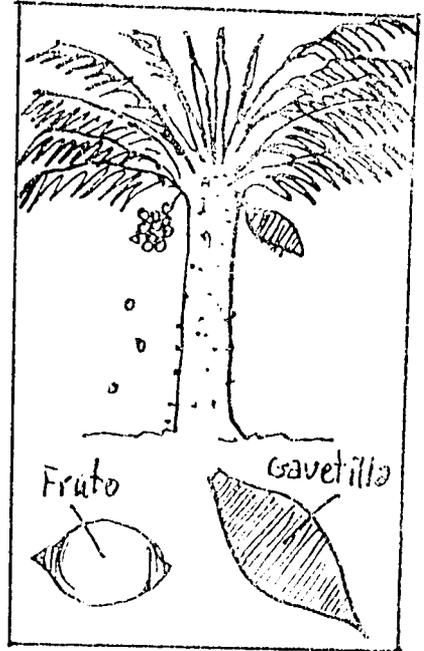
TARCA: This is a blackish tree that grows 4-5 meters high with disorderly, spiny branches. It has a thick, rugged bark which protects a wood that will last 20 years beneath the ground, and for this reason is used for posts in homes, fencing, and boundry markers. The Tarca produces a fruit in the form of an elongated pod but whose seeds are not edible.



ALMENDRO (ALMOND): A greyish colored tree with a long trunk and thick canopy which grows up to 30 meters high. It has oval-shaped leaves and purple and white flowers, producing a dark nut with a fragile husk and white meat that is edible. This nut is also processed for oil which is used to cure headache (with massage) and fever. Its wood is considered indestructible and is therefore used in house construction and is sawed into boards.



MOTACU: This is a palm tree which is very abundant in the northern region of the Department of Santa Cruz. It reaches a height of 20-25 meters, with a rough, prickly trunk that gets smoother the older and higher the tree grows. This is one of the most-utilized trees in rural areas of the region. The branches grow up to 5 meters long and are used to roof homes and sheds. From the tender palm heart can be made delicious salads. Its fruit grows in clumps, each about the size of a chicken egg, and emerge originally from a capsule called the gabetilla that is 70-80 cm long. When mature the fruit of Motacú palm produces an oil which has medicinal uses in curing burns and headache caused by excessive exposure to the sun. This oil is also used as a pomade for hair. It can be drunk as an antidote for poisoning, and also burnt as fuel. The young palm leaves that have still not opened their fronds are used to weave palm mats, baskets, and fans.



TOTAI: Another palm tree of the zone, somewhat smaller than the Motacú because it reaches only 15 meters. It produces similar lancelet shaped leaves. Its flower is a branch that emerges from a capsule some 60 cm long called gabetilla but the fruit is the same as other coconuts except smaller, and both the meat and the seed are edible. This palm also gives us oil for medicinal use or, mixed with perfume, for the hair. During the dry season, we cut down the greenest branches of the Totai to use as fodder for horses. The fruit of this palm matures in August and September.

PREPARING MACRORORO OIL

The marcororó or tartar plant produces clusters of very hard seeds which contain a medicinal oil. These plants are not grown commercially, but they often appear as fast-growing bushes in farmland that has been recently cleared or left to fallow; in less than a year it is old enough to produce fruit. The fruit is hand picked, selecting only the driest nuts and not the green. These are then stored for a month or two in the farmhouse until totally dried, or until the family has time to process them.

The processing begins with sun-drying the tartar nuts for a period of three days. If the fruit is dry enough the heat of the sun causes the hard outer skin to crack open. The seeds are stomped with the feet (sandals are used) to completely separate the skins and seed. The seeds are winnowed to separate them from the shell residues. Next the clean seeds are toasted in a ceramic baking dish and pounded into coarse-grained meal in the tacú. The pounding is quite time-consuming, about two hours for every kilo of seed milled. The crushed seeds are emptied into a can of water and then boiled for two full days. The boiled mixture is emptied into a larger vessel containing cold water. This temperature change causes the oil to separate to the top. The oil is skimmed off the top using a spoon or plate and deposited into a frying pan. This new stage of heating causes the remaining water still in the oil to evaporate, but it requires a very low flame. Once purified of its water the oil is cooled and then bottled.

Tartar oil is used for massaging the body when the patient is chilled as a result of a fever or when he or she feels the beginnings of a cold. The oil is first warmed. The massage begins with the scalp, the neck, down to the fingertips, and slowly over the entire body including the tips of the toes. The patient must refrain from drinking liquids for two hours following this massage and should remain in bed to avoid exposure to any breeze or draft.

The oil is also used as a purgative for intestinal parasites. Once again the oil is first warmed, then mixed with honey. The dosis for an adult is four ounces, whereas children--depending on their age--can take from one to three spoonfuls. The medicine is taken on an empty stomach, in the morning before breakfast. After the purge has been completed, it is recommended that the patient be served thin chicken soup with a little rice. In the evening a tea or mate of avocado leaves with bread or wheatcakes is suggested. The entire day of the purge the patient should refrain from bathing, because the oil is very hot, and the following day as well.

PEANUT OIL COLD REMEDY

Doña Lucia Mendez of Las Abritas prepares peanut oil to treat colds, headache, and toothache. Since her family does not grow peanuts, she is forced to buy the commodity from her neighbors every time the need arises. A single batch requires two pounds of shelled peanuts. The preferred variety is the coloradito, which produces small, round nuts.

After shelling, the peanuts must be toasted. This is done in a ceramic baking dish while stirring the nuts continually. Once baked, the peanuts can be rubbed between the hands to remove the inner skin. The nuts are then placed in a tacú and ground to a powder. The peanut powder is added to a pot of boiling water, where the mixture will cook for half a day or about six hours. The quantity of water used is about five liters. After boiling it is time to separate the oil. This is done by adding a glass of cold water to the pot, which causes the boiling to stop. Once the boiling stops the oil separates and collects at the surface of the liquid. Next, the oil must be skimmed off and placed to cool in a separate receptacle. If the skimmed oil was removed along with water, it is necessary to wait until the water evaporates. The oil is then placed in a bottle. If the bottle is well tapped, the oil will last about three months. Thereafter it grows rancid and can only be used for rubbing and massage. A quantity of two pounds of shelled peanuts will yield about ten tablespoons of oil, equal to about two ounces.

Peanut oil is applied as follows. For children, the dosis is a half-teaspoon of oil three times a day. The lungs should also be rubbed after applying 4-5 drops of the oil. For adults the dosis is a whole tablespoon of the oil three times a day plus a quarter-tablespoon for massaging the lungs. The remedy works best, says Doña Lucia, when it is consumed in the very early stages of a cold; in contrast, when taken late the remedy is nearly a waste of time. The peanut oil treatment should also be combined with other cold-controls. The patient should stay inside the house away from drafts, avoid drinking cold water, and avoid bathing. Finally, when taken internally, it is important that peanut oil be heated first, because its purpose is to warm the body from the inside.

Other uses of peanut oil include the treatment of toothache. The oil is applied directly to the swollen or aching tooth. If no peanut oil is prepared, a mashed peanut can be placed on the area of discomfort, because there is still some oil in the nut and this will provide modest alleviation of the pain. The coloradito variety of peanut is best because it has the most oil.

CACTUS SYRUP
(JARABE DE TUNA)

This medicine is prepared to cure pains in the shoulders, back, and kidneys --problems that are fairly common among men who engage in heavy agricultural tasks and without adequate nutrition. The following recipe was provided by Blanca Justiniano of the community of El Torrente, who serves as a local pharmacist and healer.

INGREDIENTS AND QUANTITIES	COST (pesos)
Cactus stems, chopped: 1 kilo	-
Avocado leaves: 20	-
Cinnamon: 2 portions (sticks)	2.00
Clove	4.00
Sugar: 4 pounds	30.00
Clay: 1/2 kilo	-
Water: 6 bottles	-
Firewood: 1/2 load	-
TOTAL	36.00
US\$ equivalent	\$1.44

The chopped cactus stems and the whole avocado leaves are combined with the clay, cinnamon, and clove to be boiled for four hours. This much boiling is necessary to remove what would otherwise be a disagreeable smell. When the mixture is completely boiled, only then is the sugar added in a ratio of one pound per bottle of syrup. The sweetened mixture is boiled for another hour until a syrupy consistency is achieved. The medicine is allowed to cool and then bottled.

The medicine is consumed three times a day before meals. It is mixed in a glass containing equal parts syrup and water. This dosis is cut in half for children. Jarabe de tuna is also recommended for persons who are pale, because it "refreshes" the stomach.

PREPARATION OF GREEN GOURD SYRUP
(A REMEDY FOR MENSTRUAL CRAMPS)

Blanca Justiniano prepares remedies of different kinds for local clients who request them. On August 25, 1980 she prepared a green gourd syrup for a woman complaining of menstrual irregularity. The ingredients were described by Doña Blanca but without precise measurements. The process goes something like this.

The tutuma or gourd plant is harvested when the fruit is still green. Cutting open the gourd, one finds a white mealy interior with little seeds similar to those of a cucumber. These are placed to boil in a pot of water (liquid quantity unspecified) along with the stalks of a plant known as caracuré verde. The mixture is boiled for two hours. Meanwhile, Blanca prepares additional ingredients in a separate pot--plants with the names sarza, caña agria, pepa de carona, garabatllo, pachui granada, tacuó, melya tapurita, and berro --which upon boiling give off a very pungent odor. When cooked the mixture is rather thick, like a gravy, with a dark brown color similar to coffee. When both sets of liquids are ready, they are mixed together, each poured through a sieve into a common receptacle. To this is added a pound of sugar, some cinnamon, and a clove. After briefly boiling all these ingredients together, the syrup is taken from the stove to cool, then poured into bottles and plugged with a corn cob.

Green gourd syrup is an effective remedy for women whose period (menstruation) --nicknamed la fiesta by these same women--is delayed. Such delays are credited to climatic changes, particularly unseasonably cold weather, or when the women bathe too much in the rivers, or at times of excessive rainfall. The prescribed dosis is one spoonful of syrup in the morning, another at noon, and another in the evening. This procedure is continued until la baja or the beginning of the period is achieved.

Blanca sells a bottle of green gourd syrup for 50 pesos (US\$2) at 1980 prices, often purchased by her clients on the installment plan.

CURE FOR SNAKEBITE

According to Juana León de Terán of Porongo-Ayacucho, there is a very simple cure for snakebite. The medicine consists of 3/4 pound of home-made cheese (cuajada). One takes a knife, cuts a thin slice, and places it for a few moments on the bite. Then a second slice is cut and placed over the bite. This process continues for about two hours. The cheese slowly adsorbs the venom, and by the time the cheese has been used up the patient will be cured.

TREATING FEVER

In Valle Hermoso, fevers are sometimes remedied with a two-stage treatment consisting of the patient's eating whipped eggwhite followed by a bath made with a medicinal grass known as esmlihuacachi. The two remedies must be taken together for the treatment to be effective, and most frequently the beneficiaries are children.

The first part of the treatment is simple enough. One takes an eggwhite, adds sugar, beats it for about ten minutes until it is fairly thick, and serves it to the patient. As for the bath, the ingredients are (for a child's treatment) about 1.5 liters of water and a handful (about 40 stems) of the above-mentioned grass. This clump of grass is taken in both hands, twisted forcefully, and its juices squeezed out into a wash basin filled with the water, which is cold. The water turns a greenish color and becomes somewhat sticky. With this water the patient's body is washed in its entirety. The patient is then wrapped in a sheet or towel and allowed to go to sleep.

If this treatment is conducted early, when the fever has just appeared, it should be immediately effective. It will have little effect if the fever has lasted several days already.

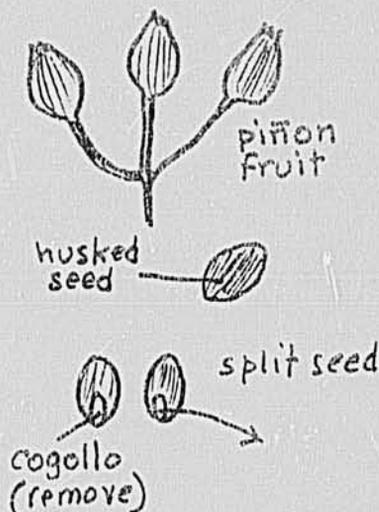
ANOTHER FEVER REMEDY (SALMUERA)

A common remedy for fever practiced in the community of Valle Hermoso is called salmuera. This homemade medicine is prepared with a quarter teaspoon of toasted salt, lemon juice, a few drops of alcohol, a tablet of Alka-Seltzer (novalgina), and about 6-7 tablespoons of water. First, the lemon is baked in the coals of the fire until its skin cracks. Meanwhile, Next, the tablet of alka-seltzer is crushed into a powder and mixed with a quarter-teaspoon of salt. The lemon is then squeezed of its juice and the other ingredients blended with it

After the medicine has been drunk it is customary to "sweat" the patient. This is done by wrapping the patient in a heavy blanket and, if possible, made to sleep. In the case of infants, it is also common to bathe the baby in piñon water; this might be done several times in a single day. A final complimentary practice with salmuera is to incense the child. This is done by placing incense to burn beside the bed or beneath the hammock where the child is sleeping.

PIÑON PURGATIVE

The piñon bush grows seeds that are considered highly medicinal. These seeds are particularly used to cleanse the stomach and intestines. The standard treatment first requires the gathering of 6-8 piñon pods. These are then husked and each seed is split in half. From each pair, the cogollo (growth point, sprout) must be removed, because it is considered to be poisonous. A total of 13 half-seeds are necessary for a single purge dosis, i.e., six pairs of half-seeds plus one. These seed pieces are then toasted in an aluminum pan until well cooked; when ready they should have a flavor similar to toasted peanuts. Next, the seeds are ground into a powder (using the tacú) and mixed with a glass of water, stirring vigorously into a froth. The medicine is then poured through a sieve to remove residues. It should be served to the patient in the early morning on an empty stomach. If after an hour the



remedy has had no effect, the patient should drink a glass of cold water. Once the purge has taken effect, it is necessary to wait another hour before serving the patient a simple chicken soup (containing meat and salt only). Thereafter the patient should continue with light meals until the stomach has become normalized. Also, as an option to chicken soup, many households recommend a flush (lavaje) with water in which the plant malva tapurita has been boiled.

FLUSH WITH MALVA WATER

To prepare this medicine, one needs two malva tapurita plants. These should be pulled from the ground by hand, making sure their root systems are intact. Take the tap roots and cut them off. The roots are then boiled with about two glasses of water for about 15 minutes. Allow the liquid to cool before serving to the patient.

DIARRHEA REMEDY (AGUITA DE ARROZ)

Rufina Santivañez of Valle Hermoso treats diarrhea in her children with a remedy known as aguita de arroz or rice water). For a single dosis the ingredients are:

- 2 tablespoons of husked rice
- 3 sticks of cinnamon
- 2 glasses of water
- 4 tablespoons of sugar

The rice should be toasted in a frying pan until it is browned. It is then placed in a pot of boiling water along with the cinnamon. The rice is boiled until completely cooked. The water itself will have a dirty brown color when the liquid is ready. After cooling and sweetening with sugar, the rice water can be served to the patient. It should be taken 4-5 times a day beginning with breakfast, and it should be used as a replacement for other beverages such as tea and coffee.

TOOTHACHE

Few rural residents practice proper dental hygiene. If the teeth are brushed at all, it is infrequently and not as a routine habit because even a tube of toothpaste is often considered a luxury expenditure. As a result, when toothache occurs it almost certainly indicates an already badly-rotted tooth. Rather than attempt to save it, a tooth which is decayed and causing pain is most likely to be pulled.

In September 1981 Francisca Lazo of Naranjal had a tooth pulled by a dentist in the market town of Comando. He charged her 60 pesos (US\$2.40). Within a few weeks a second tooth began to ache. Francisca's dentist informed her it could not yet be pulled and asked her to wait a week. Such was her pain that she tried a variety of remedies to alleviate her discomfort. First she tried aspirin, then mentizan (an ointment), then Colgate toothpaste, and finally tractor grease. All of these substances were applied directly to the pained tooth. When none of these remedies brought relief, Francisca simply visited another dentist in Comando and finally had the tooth pulled.

CURING FRIGHT

A common ailment among small children is susto or fright. The child suffers from bad dreams, wakes up screaming several times each night, loses his appetite, and generally acts listless. In such a case the so-called "frightened" child is believed to have lost his spirit, or more precisely, his spirit has been scared out of his body. The cure for this malady is to have a curandero or naturista (traditional healer) locate the lost spirit and call it back inside its owner, a treatment called espíritar.

The first step in treatment consists of determining not only how the child became frightened, but more importantly where. The treatment must take place at night, if possible around midnight, when there exists an absolute silence everywhere. A small load of firewood is taken to the place where the fright occurred. There the wood is burnt down to hot coals. These are placed in a dish. The child is now brought by the mother to the place of treatment. She also brings some ground incense wrapped in a piece of paper along with some clothes belonging to the child. The incense is placed on the coals to burn. As the burning proceeds the coals are fanned with the child's clothing, and at the same time the child's name is called. For example, "Jesecito, come here, come here. Where are you hiding, little one. Jesecito, Jesecito, here we are. Come here, come here!" While the spirit is called, the mother--carrying the child--moves in slow circles around the incense burner.

After a few minutes, the mother slowly carries her child back to the house. The healer comes with her, always continuing to call the child's name and carrying the incense burner close by so that its fumes continue to surround the child. Back inside the house a second and larger dose of incense is placed in the burner, increasing the smoke and fumes. The child's name is called for the last time, louder than before. Finally, the child is placed in his own bed, where he can be expected to sleep soundly for the remainder of the evening. Upon awakening he will be cured and his spirit restored.

Don Clemente informed Doña Dionicia that she had cured her daughter in the nick of time. The mother had attempted to treat her daughter with a plaster of egg whites applied to the soles of the feet, and she also tried to get Elenita to eat some egg white. Had she eaten this, said Don Clemente, the child would surely have died, because egg white is poison for a person with fright.

The healer also told her that unless the chullpa was treated Elenita would continue to get sick. A chullpa is an indian grave. Dionicia's husband, Miguel, encountered the grave when he was digging the foundation trench for their home. Miguel had found a pottery fragment in the soil just under one corner of the dwelling. Don Clemente had burned the millu and in its forms had discovered a cemetery. He said that unless this place was treated, somebody from the family would die, or someone who came to visit would die. Miguel agreed to hire the healer to conduct the cure.

Don Clemente sent Miguel to Comando to buy the necessary supplies. The shopping list consisted of a half-bottle of wine, half-bottle of grape brandy, two packs of cigarettes, a half pound of coca leaves, some incense, a black puppy one month old, two candles, and a mesa completa or complete package of ingredients for a burnt offering. The healer arrived at 10 P.M. on a wednesday evening, accompanied by his wife and two children. Once the plate of hot coals had been prepared, the healer took half of the burnt offering package and began to smoke the inside of the house, stopping in each corner and making the sign of the cross.

The healer now placed the brazier on the floor. He then addressed himself to the puppy, saying: "You are the devil, you are going to die at the hands of your master." And with that he struck the puppy three times over the head with a stick. The animal was not yet dead, so the healer handed it to Miguel and instructed him to finish it off, which he did quickly by a quick twist that broke its neck. After the animal died, both men drank some of the grape brandy and chewed some coca leaves. Meanwhile, the healer's wife had made a hole and a shovel out of paper to symbolize the digging of the grave. These were placed in a rag along with the body of the dead dog, the alcohol, wine, grape brandy, coca leaves, and the other half of the burnt offering package. Don Clemente tied up these ingredients in a bundle. He then rubbed the bundle against the owners of the house, Miguel and Dionicia, saying that he was now "changing" them. Finally, he told them to remain inside the house until the next day, because the healer was now (with his family) going to bury the offering ingredients somewhere in the nearby arroyo near where Dionicia washes clothes.

USING A NEW CURANDERO

In the community of Valle Hermoso has appeared a new healer. Don Clemente --who is married, with two children--passes himself off as a curandero. Some local residents say he is very effective, that he really knows his craft; others say he is a fake. But it is observed that even families from other communities come to ask for Don Clemente's treatments.

Doña Dionicia Rios first heard about the new healer from Doña Emeliana. The latter's daughter suffered from lice and rash on her head and was running a fever so high that her veins "stood out" and she appeared flushed "as if somebody was squeezing her from the waist up." Doña Emeliana had decided to take her daughter to the town of Chere for treatment. Even though she didn't have any money she took a rooster with her which she expected to sell to pay for a cure. As she was leaving Valle Hermoso Doña Emeliana met Don Clemente on the road. She told him of her daughter's condition. He took the child's pulse and said she was suffering from fright. The mother asked the curandero to undertake the cure. He sent her into Comando to buy the necessary ingredients, the treatment was conducted successfully, and since then Dionicia's daughter has never been sick again.

Having learned of this experience, Doña Dionicia decided to consult the new healer too when her daughter Elenita came down with a bad fever. After two days and one night of the ailment, Elenita's parents took her to visit Don Clemente at midnight. First, the healer took the child's pulse and determined that she was suffering from gusto (fright). Next he said he would determine where and how the child had been frightened. He placed a mantel on the ground, then spilled a handful of coca leaves. As the leaves fell they formed a pattern which only the healer knew how to interpret. Don Clemente also then burned a piece of millo (a mineral used in burnt offerings) which melted into different figures as it was consumed: a chicken, a pipe, a wooden plank--thus indicating the place where the fright occurred. The healer now proceeded to treat the malady. First he massaged the child's body with a black ointment mixed with mentican, a commercial chest rub pomade. He then prepared a spicy and evil-smelling medicine which he had the mother drink (the child refused it) before breast-feeding her daughter. Afterwards the child slept peacefully. She awoke in good humor, her fever gone.

This treatment cost Dionicia 95 pesos (US\$3.80), of which 85 pesos (US\$3.40) was for the cure itself and 10 pesos (US\$0.40) for the ojo (eye), that is for the reading of the coca leaves.

The healer then departed with his family. From their bed, Miguel and Dionicia heard them talking and talking out by the arroyo. Later they returned, drank some alcohol, and informed their clients that while they had been digging the hole to bury the offering the water in the stream got very choppy, and the wind blew, and a cold wind came up as if to announce the coming of rain. This, said Don Clemente, is what happens with chullpas; they are dangerous to deal with. He advised Dionicia never to wash her clothes again in her old spot. And since that night she has done her washing further down the arroyo.

Dionicia firmly believes in Don Clemente. He cured her home of the chullpa, he cured her daughter, and he cured Emiliana's daughter too. She admits, however, that for such cures to work it is necessary to have complete faith. It is also necessary to buy the ingredients precisely as the healer orders. There are some families, she says, who are tacaña (stingy) about buying ingredients, and this may be the reason why their cures were not as successful.

Meanwhile, the neighbors report that where Don Clemente buried the chullpa, at night one can see a strange glow twice a week, on Tuesdays and Thursdays. Dionicia and Miguel have not gone to see for themselves, however, because Don Clemente warned them the chullpa could follow them back to their home.

CHAPTER VII. MISCELLANEOUS ACTIVITIES

In this concluding chapter are presented a variety of activities which are not routinely performed by the rural household but only conducted at infrequent intervals or by only a few families among many. We include the activities of making ceramic pots, making lye soap, making a wooden pestle or tacú, making an oven, leather working, and constructing the farmhouse and kitchen.

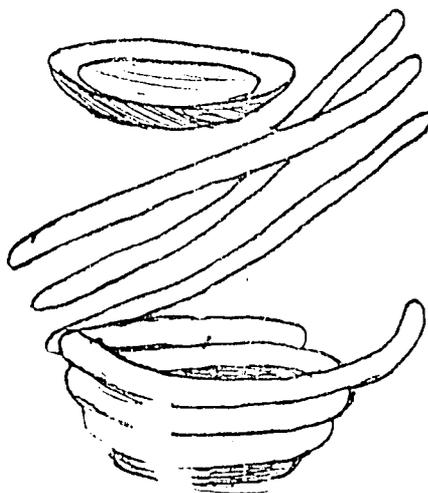
MAKING CERAMIC POTS

Martina Morales de Herrera, of El Torrente-Las Abritas, makes her own earthenware. She learned the craft from her mother when she was a girl. "In those days", she says, "women had to do everything. Today's women are lazy and don't want to be bothered." Even Doña Martina admits she is not as good a potter as she once was.

The process begins with gathering the clay from the Quimorí River. This raw material is brownish-red. Half an almud of clay--about 15-16 pounds--is enough to make 4-5 pots. First the clay must be soaked in water for several days. Martina does this by dividing the clay into three 5-gallon lard cans; she then adds water just sufficient to cover the clay. The clay is soaked this way for three weeks.

Next, the clay is dumped on a cowhide. The material is sprinkled with some more water and then stamped and worked with the feet for several hours until it is bien cocido ("well cooked"). Furthermore, during this process doses of powdered ceramic are added to the mixture. Known as tacubé, the powdered ceramic is made from pieces of broken pottery which have been ground up in a tacú (pestle). When ready, the clay is divided up into 4-5 balls; in turn, each ball is wrapped in a güenbe leaf (which are quite large) to keep the clay moist until ready for use.

To make the pot, the first step is to take a piece of the clay ball and fashion a base which resembles a small dish. The dish is shaped with the fingers on a wooden table. No pottery wheel is used. Next, Martina takes three new pieces of clay and rubs them individually between her palms to create long, round strips that resemble snakes. These are known as rosquitas. One by one she adds these strips to the circumference of the plate, one on top of another. Next, she takes a wet corn cob that was previously singed in the fire and begins to smooth the outer surface of the bowl. Meanwhile, on the inside of the bowl she smooths with a



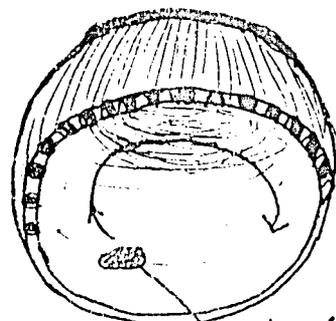
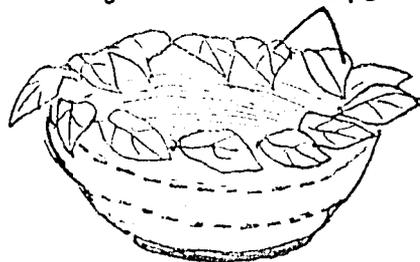
piece of gourd in the shape of a seashell. The top of the bowl is now leveled, then wet with a sponge-like leaf, and the circumference of the rim covered with green macororó leaves to preserve the moisture.

Once the first three strips are in place and smoothed, Martina fashions three more rosquillas. She then removes the leaves from the top of the bowl and one by one presses the new strips into place on top of each other. This process continues for larger pots until the desired height is obtained. At that point the top edge is finally leveled and indented with the thumb to create a fluted effect. The pot is now left to sun-dry. When fully dry the inside of the pot is rubbed with a motacú palm seed to leave the surface smooth and shiny.

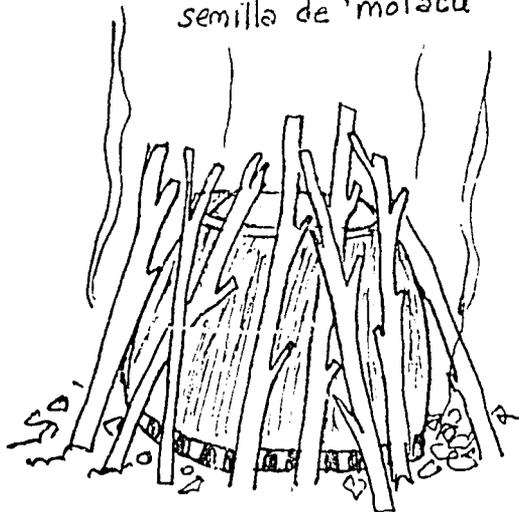
To bake the pot, it is placed mouth down over the coals of a fire built on the ground. Around the outside of the jar a layer of sticks is placed in a slanting but erect fashion to cover the circumference as much as possible. As these sticks catch fire and burn the outside of the pot will become duly baked.

Martina makes two types of ceramics: cazuelas or large serving bowls, and cantaros or water jugs. She does not make these articles for sale, only for use by her family or sometimes as a favor to a neighbor in reply to a special request. But when asked to estimate the value of these earthenware pieces, she says the cazuelas are worth 20 pesos (US\$0.80) a piece, and the cantaros 100 pesos (US\$4) each.

hojas de macororó



semilla de motacú



MAKING LYE SOAP

Doña Blanca Justiniano Lopez, of El Torrente, makes lye soap for her family's use several times a year. She also makes soap for her neighbors on a partnership basis called al partir: the interested family buys the beef fat (the only purchased ingredient), Blanca contributes the ashes and her labor, and the soap yield is split between both families. Lye soap is commonly used by rural households for washing clothes. Those who use it insist it is much more effective than commercial laundry soap or detergents. The only disadvantage of lye soap is its pungent odor, which may be disagreeable to those who are not accustomed to using it. Blanca learned soap making by watching her mother. The most difficult part of the process, she says, is cutting the firewood which will be used to make the ashes, which requires the use of an axe for the larger pieces (trunks) and a machete for stripping branches.

PREPARING THE RAW MATERIALS

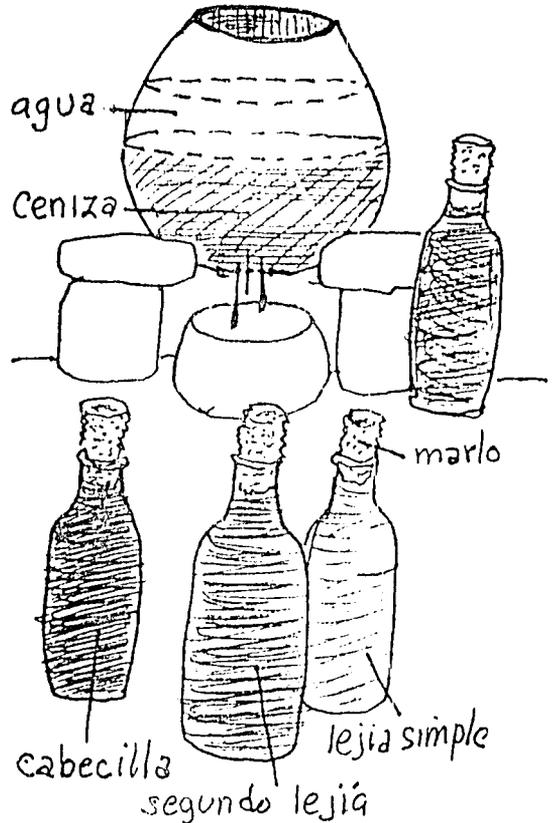
Blanca prefers to use fairly green firewood because it produces ashes which are "stronger". Not any wood will do. She looks for specific trees and bushes which go by the names of taruma, tira, jibió, paichane, alizo, cuta, and tucequi. This wood is cut up and piled in stacks or piñas, the smaller pieces below and inside, the larger ones above. To get the fire started she uses dry motacú palm leaves and some kerosine. The pile collapses in on itself as the burning proceeds. It is necessary to watch the fire continually, making sure that all the firewood burns and does so completely so that enough ashes are created. The ashes are left to cool until the following day and then collected in a ceramic pot--the same in which the ashes are to be soaked. For the soap-making recipe to be described here, 1.5 almudes (about 50 pounds) of ashes are required.

The ashes are then soaked in water over a period of three days. For 50 pounds of ash a total of 10 liters of water are needed. However, the water should not be added all at once, but little by little with 1-2 liters at a time. This causes the ashes to "ferment" more effectively. On the fourth day an enwire half-tin (lata) of 10 liters is added to the ashes all at once. The ceramic pot is porous and filters the mixture drop by drop. This blackish liquid is collected in a receptacle below and then placed in bottles. The first distillation should produce 10 liter bottles of cabecilla, the name given to the richest and strongest lye yielded from this process. Each bottle is immediately

tapped with a plug made of corn cob. Then another 10 liters of water are added to the ashes, which produces a second but weaker distillate known as segundo lejía or "number two lye". Finally, a third addition of water yields the last and weakest distillate known as lejía simple (simple lye) or tercera lejía (number three lye). The entire distillation process to obtain all three classes of lye require about 5-6 hours.

There are two other ingredients for making lye soap. One is beef fat, which in this case about 12-13 pounds would be needed for 30 liters of distilled lye. The fat is normally purchased from a butcher or slaughterhouse for about 2 pesos (US\$0.08) per pound. Otherwise, the fat can be obtained free from a neighbor when a beef animal is slaughtered within the community.

The other ingredient is a plant fruit known as caracuré. The spiny husk is removed, leaving the white meat. For 30 liters of lye one needs 1.5 to 2 kilos of caracuré.



MAKING THE SOAP

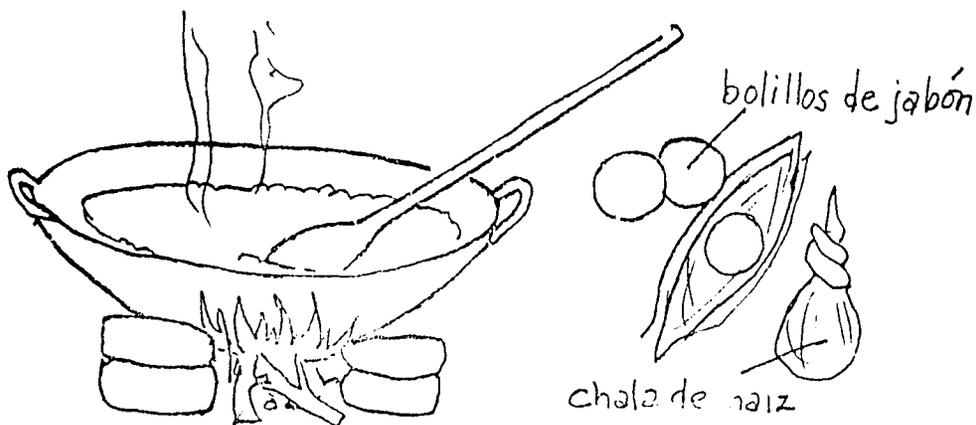
Boiling the ingredients for lye soap takes hours and hours, so the first thing one needs is plenty of firewood. The beef fat (cebo) is placed in a cooking pot or frying dish along with half a tin (10 liters) of water. The fat is boiled for about five hours. As the water evaporates, the 10 liters of lejía simple are added first. After this solution reaches a boil the second class lye is added, first five bottles then another five bottles. The solution is left to boil for another two hours along with the caracuré. After this time the cabecilla or first class lye is added. This produces a froth that grows and threatens to overflow the cooking vessel. The ingredients should be stirred vigorously to prevent the overflow. After about 30 minutes the solution changes to a light tan color, which means it is time to test the solution. A gourd is half-filled with cold water. Next, a few drops of the boiling lye solution are added and beaten into a froth (jatupu).

The froth is then blown from the surface of the liquid. If the water is clear this indicates the soap solution is ready; but if the water is still murky and forms a film on the finger, the solution needs more cabecilla. Four more liters of lye should be added and the solution boiled for another hour.

With the second test the water should be clear, leaving no film. At this point, four more liters of water are added and the solution boiled for two hours or until there is no more visible foam. If the foam continues, add more water (2-3 liters) and boil some more. When no more foam appears, it is still necessary to boil the solution for three more hours to evaporate all the water that has been added and to slowly thicken the lye soap mixture. At some point the mixture loses so much liquid it becomes like a thick batter and begins to brown on the edges. At this stage the mixture should be stirred continually until it is "ready". To determine readiness, Blanca Justiniano takes about a half-teaspoon of lye soap mixture and drops it on a corn husk. If the mixture does not stick to the husk, this means the solution is ready to be removed from the heat. If not, the cooking continues but with frequent tests, because it is easy for the mixture to pass its "point".

The lye soap mixture is now emptied from the cooking pan into a wooden tray or *gabeta* to cool. When cool enough to touch, the mixture--like bread-dough--is molded into soap balls. Each ball is wrapped in a corn husk and stored until used or sold.

From half an arroba (12-13 pounds) of beef fat and 50 pounds of ashes, Doña Blanca can make about 40 soap balls. Were she to sell them, she says she would ask 2.50 pesos (US\$0.10) per ball, but only as a favor to her neighbors and barely covering her costs. Each soap ball weighs about a quarter-pound.



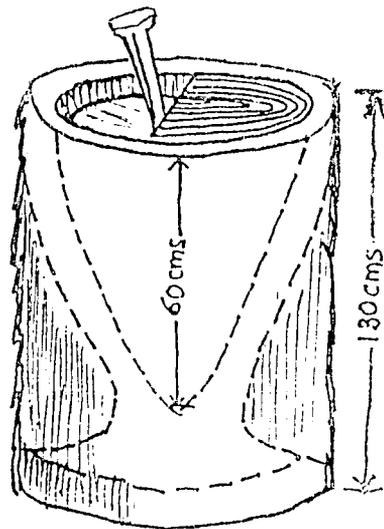
MAKING A TACU

One of the most important implements of the rural kitchen in the tropical lowlands is the tacú. It is a pestle carved out of a tree trunk with, together with a club called the mano (hand) is used for all kinds of grinding tasks. It is used to husk rice, shell corn, beat yuca into dough, soften meat, and many other tasks.

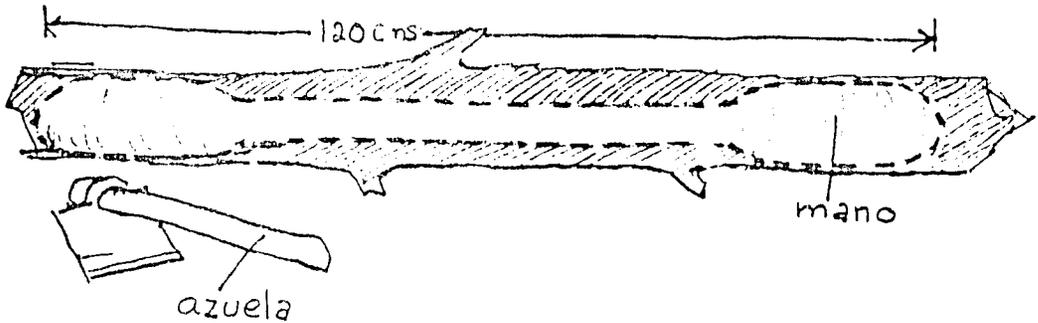
The tacú is carved from hardwoods such as the cuchi, tajibo, and muroré. The segment of tree trunk is usually about one meter long and maybe 40-50 cms. in diameter. The hollowed out cone within the trunk usually has a depth of about 60 cms. The hollowing of the inside of the tacú is completed first. For this task one needs a carpenter's chisel and an axe. The area to be hollowed is delineated with the chisel, forming an inner circle and a center cut to form two half-moons. The cutting deepens by layers, the diameter constantly growing smaller. If the trunk is green, there is less danger of splitting the wood, but on the other hand the hollowing takes longer and must be hand-chiseled the entire way. In contrast, when a dry trunk is used it becomes possible to do some of the hollowing by burning, digging out the carbonized wood, and burning some more. When the desired depth and width has been achieved, the inner surface is smoothed by scraping with the machete or an adze (azucla).

When the inside hollowing is complete, the outside of the tacú is shaped with a machete. The object is to leave a layer of 4-5 cms. between the inner and outer surfaces. A platform is left at the bottom of the trunk so that the implement will have a steady base.

The mano or mortar is carved from a branch of the same tree. This piece is about 120-130 cms., carved so that each end is heavier than the stem and somewhat rounded or even pointed. With continued use both the mortar and the pestle will gradually get smoother and more effective.



It takes at least two days to carve a tacú. Some farmers specialize in tacú-carving, making a dozen or so of these implements each year in their spare time. In mid-1980, a tacú could be sold for 100-150 pesos (US\$4-6).



MAKING A TWO-DOOR OVEN

In September 1980 Lucia Mendez of El Torrente constructed with the help of her 10-year old son an oven with two doors. The new oven was built to replace an earlier one which was damaged when its legs rotted out and it collapsed.

The first stage in building an oven is to build a table out of wood. The wood used for the four legs (horcones) must be a hardwood such as the cuchi so as to withstand without rotting up to five years buried in the ground. The oven built by Lucia Mendez utilized a wooden table with four legs placed about 30 cms. off the ground (buried as well the same distance) and with a rectangular spacing of one meter wide by 1.5 meters long. Over the cross-beams connecting these two sets of legs she constructed a table using ordinary branches (not cuchi) about 5 cms in diameter. These pieces were tied firmly into place with pieces of rawhide that had previously been soaked in water.

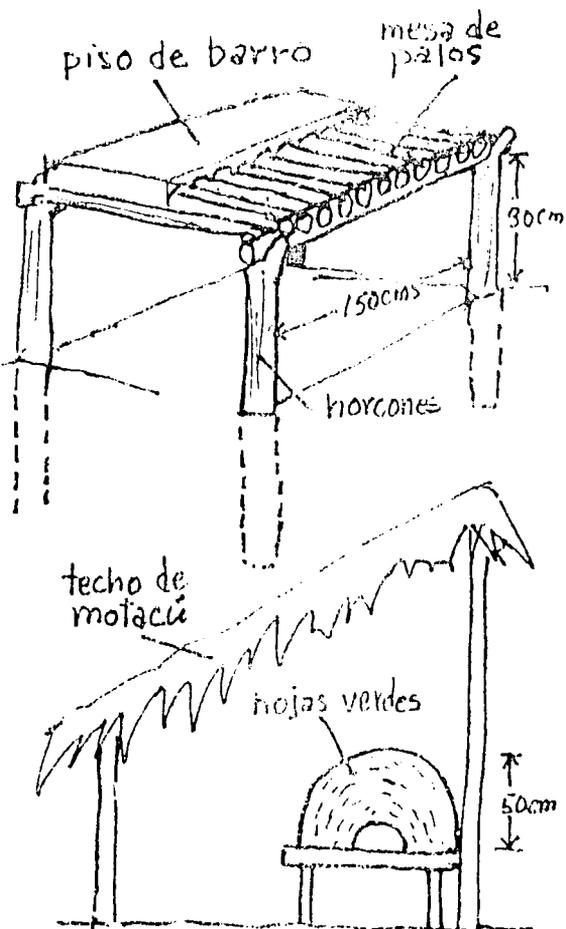
Next, Lucia's son mixed the clay. He first dug a shallow pit in which to do the mixing. The clay itself was gathered from anthills (tierra del hormiguero)--about three almudras or just about 100 pounds of it. The clay was first beaten with a shovel to break up clods, then screened to remove sticks, rocks, and other alien materials. The powdered clay was then placed in the

pit. To this water was added along with green leaves of the motacú palm. This mixture was stomped and worked by Lucia's on for more than an hour until it had the same thick texture and consistency as for making adobe bricks. When the clay was finally ready or "cooked" (cocido), Lucia transferred two 5-gallon tins of the mixture to the wooden table finished previously. The clay was spread over the sticks and smoothed into place to create a floor about 7-8 cms. thick. The floor was left to sun-dry for three days, by which time it was hard enough to support hundreds of pounds of weight.

To construct the oven dome, it was first necessary to heap a large pile of dirt in the center of the new oven floor. This dirt was packed and shaped into a dome about 50 cms. high. Next, Lucia plastered the entire dirt pile with layers of clay--applying the mixture little by little in multiple applications, gradually increasing the thickness to about 8 cms. To complete the dome, she created a watered down clay mixture and plastered the entire outer surface of the oven.

She left the dome dry for two days. On the third day she cut two doors into the dome at floor level. Using a machete and a hoe, she began to remove the dirt from the pile which initially supported the dome--dragging the dirt out through the front door and the back until the inside of the oven was completely empty.

The final stage in constructing her oven was to build a roof to shelter the oven from the rain. The oven hut's roof was erected with two smaller posts with a height of 150 cms. and two taller posts of 250 cms. The slanting roof was built of motacú palm leaves. The highest side of the roof was built over the oven itself--a precaution to keep the oven's heat from burning the thatch.



LEATHER WORKING

Cattle hides are used for a variety of on-farm activities, principally the threshing of grain, drying of coffee, covering of harvested crops to avoid rain damage. A few farmers take the hides, tan them, and work them into leather articles such as belts, cinches, saddles, reins, chair seats, and rawhide ropes for many different farm uses. In the community of El Torrente, the Herrera family has several members (brothers) who are specialized leather craftsmen. Working only in their spare time, they sometimes earn more from selling leather products and related services--including shoe repair--than from all their agricultural activities combined. In the community of Porongo, Octavio Saavedra has an ongoing contract with the municipality to cure hides from animals butchered weekly in the local slaughterhouse. The municipal government subsequently sells the hides to tanners in the neighboring community of San Carlos.

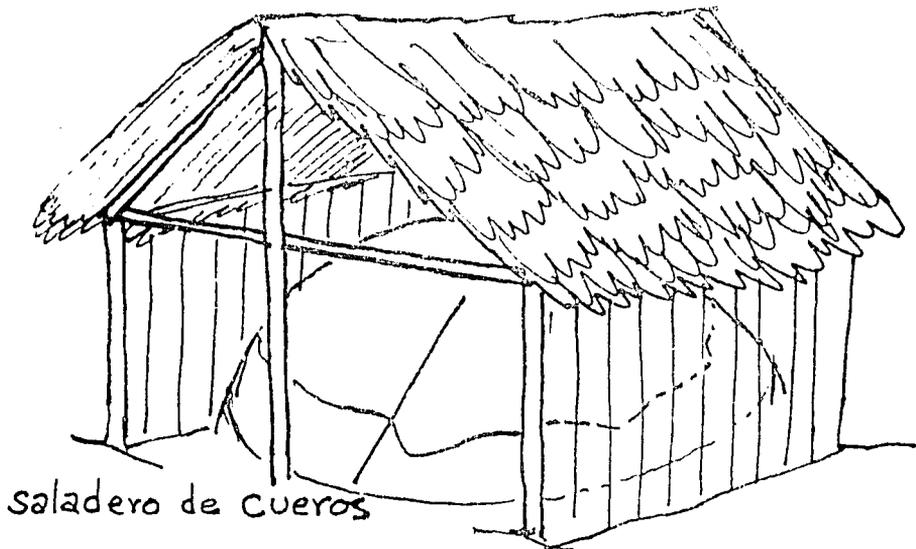
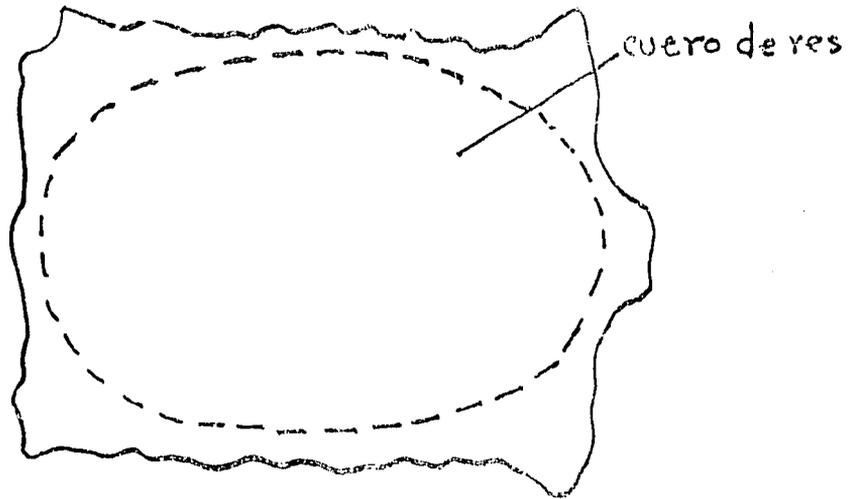
CURING HIDES

When skinning the butchered animal extreme care must be taken not to cut a hole accidentally in the hide, which renders it worthless. The hide is removed with the animal hanging head down by its hind legs. The hind quarters are skinned beginning with an incision above the knee joint, then continuing across the rump to the tail (which is removed) and then to the other leg. The hide is gently pulled away from the muscle to expose the connecting membrane, which is cut, then the hide peeled away some more, the membrane cut, and so on. Since the animal is already gutted, it will have a center cut the length of the belly. This is extended all the way to the throat. By pulling, cutting, and peeling, both sides of the hide gradually come free--almost like removing a vest.

Next, the hide must be scrubbed and washed with plenty of water to remove residues of fat and blood. The hide must then be salted. This requires about six pounds of salt. The salt could be purchased in mid 1980 in small plastic bags of 1 peso apiece, and a single hide required the use of some 18 of these bags.

Finally, the hide is placed inside a well-ventilated hut on top of a mound made of clay. The hide is stretched over this mound, hair down and skin facing upward, which prevents the hide from getting dirty. At this time a little more salt is added. The hide is now left to dry for about a month.

Some hide curers stack a number of hides in this fashion, one on top of another--sometimes as many as 20-30 of them in a single pile. The hides are ultimately used as is (untanned) for various covering and ground cloth purposes, or they are sold to tanners for subsequent processing into leather goods.



TANNING HIDES

The tanner purchases a salted hide and soaks it in water for three days. The softened hide is then scraped of all remaining traces of fat and meat. After scraping, the hide is soaked in a solution of slaked lime, a process known as caleado, which facilitates the easy removal of hair. After removing the hair, the hide is soaked in a tanning solution. This liquid is made from the bark of a tree known as curpao or sumagui, which emits a very strong tanning resin. The hide is soaked amid a solution containing many chunks of this bark for a period of 20 days. After soaking and drying, the hide is completely tanned and becomes known as suela or sole-leather.

LEATHER WORKING;
AN INTERVIEW WITH CARMELO HERRERA

Project Supervisor Jaime Mendoza interviewed Carmelo Herrera of El Torrente on July 18, 1980 on the subject of leather working, which he does with other members of his family.

JAIME: Don Carmelo, could you tell me what you do in this workshop, where I've found you often working with your father, uncle Manuel, and your brothers?

CARMELO: This trade was learned by my father, who was taught by a leather craftsman about 25 years ago, and that is how we came to be talabarteros (beltmakers). But we only work with leather in our spare time, like when it rains or after planting or harvesting our crops. We make a lot of things in leather and other materials purchased in Santa Cruz. We also do leather decorating. My father does the tanning and curing, particularly the hides that come in from the monte (uncleared land, forest). This workshop belongs to my father. He is the craftsman, and we have picked up the trade little by little watching him work.

JAIME: Can you tell me some of the leather products you make here?

CARMELO: Well, we make just about anything people ask for, but to satisfy your curiosity I'll name a few of them. We make leather and rubber sandals, and we also repair shoes, because around here people are very poor and can not afford to buy new ones. We do complete saddle sets, which around here we call monteras. We make reins, stirrups, cinches, halters, harnesses, cargo saddles for pack animals, horse blankets--one or two sided with hair, seat covers, saddlebags, whips, leather strips for plowing instruments, and many other items of talabartería used here in the countryside.

JAIME: For all that number of leathergoods you must make quite a lot of money in this trade.

CARMELO: Well, in that you are quite correct. Some years we make more with leather working than with agriculture, but still we only do it in our spare time. For example, for a pair of stirrups I would charge 300-600 pesos (US\$ 12-24), and the job might only take me 1-2 days, provided I have all the materials I need.

JAIME: What materials do you use to produce the articles you just mentioned? And what tools are needed? Do you use patterns?

CARMELO: Our materials are cattle hides--cured and tanned--urine, huazo, the neck hides of sheep and goats for special ropes or for making saddle pads (pellajo), varnish, alcohol, lacquer, pitch, plastic thread for sewing and adornment, rubber (from tires) for sandals, nails, stamps, seeds tacks, rivets, eyelets, thread, and other hides and pelts that people buy for us to work with.

JAIME: And what kinds of tasks are involved in leather-working?

CARMELO: For most of our jobs we use patterns. Our basic tools are knives, pliers, saws, hammers, leather punches, pinchers, burnishers, edgers, anvils, rivet plates, stamps which we call calcadoras, and "chicken eyes (ojos de pollo). We also employ a lot of skills which are impossible to describe briefly because they take so much practice, for example working in base relief (repujar). But most important of all is our leather, our plantillas (sole-leather), which we score and cut in accordance with the orders we fill.

With regard to the sewing, we do it all by hand with needles, stitching both sides of the leather with waxed thread. We don't use machine stitching because we don't have a machine, and because it seems the people like our work better when it is done by hand. When we work with very thick leather, it is first necessary to punch holes one by one, and this takes a lot of skill as well as patience--but one learns slowly with practice.

JAIME: Don Carmelo, before ending our interview, I wonder if you would tell me how you tan hides and what substances you use for this?

CARMELO: The only one in the family that really knows about treating hides is my father. Nevertheless, I'll tell you what I know based on what I have seen. I believe this is how it's done with the hide of any animal. First, in a big cooking dish or tank you soak the skin--salted or unsalted--for about three days, which softens up the hide. Then you soak the hide in a solution of slaked lime--what we call calcaado--which burns the hair and allows us to scrape off the hair real clean. Then the hide is soaked again

--this time in tanning solution which we make with the jachí (residues) of the bark of the curpao tree. We mix the hide around in this liquid and then leave it to soak for 20 days. When we take it out the hide is tanned, what we call suela. Before working the leather we let it dry out. Of course, certain parts are thicker than others and take longer to dry. We use the thinner sections of the hide for certain items, the thicker parts for other kinds of talabartería.

HOME CONSTRUCTION

In the following pages we wish to visualize for the reader what a typical farmhouse in the tropical lowlands might look like, and how it is constructed. What will be presented is a description of the traditional farmhouse, built almost entirely of local materials, which is the type of dwelling that nearly all colonists build initially. Of course, over time and as part of a continuing process of home improvements, the farmhouse evolves into a structure of more durable materials. In accordance with their growing means, many families elect to construct concrete floors, plastered walls, wooden or metallic framed windows, tile roofs, and other improvements. It is usually the case that the modern farmhouse will compliment, not replace, the traditional farmhouse. In other words, the newer dwelling is built at a separate location while the older structure is left standing to serve as a crop storage hut. These original homes remain as living monuments to the family's struggle as colonists back in the days when they were truly starting from scratch. And to the outsider, such dwellings provide a glimpse of the past as well as a baseline for comparing the family's economic progress with its present situation.

While today's farm homestead may have as many as 4-5 structures, the original farm property usually consisted of two basic structures --the farm house proper, and the kitchen hut.

The traditional farmhouse was (and in many instances remains) a two-story dwelling. The lower floor provides the family's living quarters and serves as both a bedroom and a living room for meeting guests. Most families have constructed a partition to separate their ground floor into two separate rooms--particularly if the dwelling houses more than one nuclear family to include relatives. The second floor or attic--called the chapapa--is used to store farm equipment,

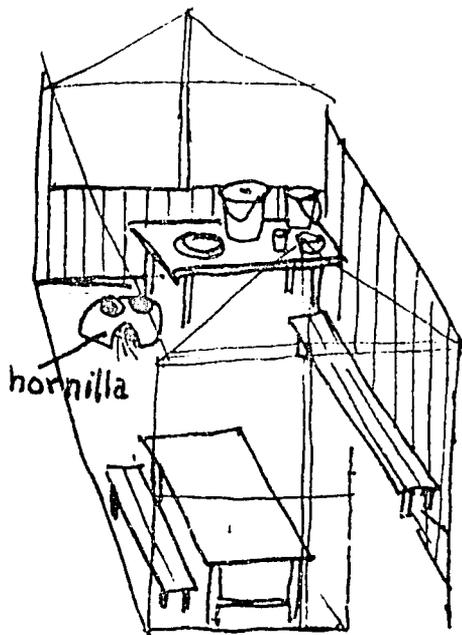
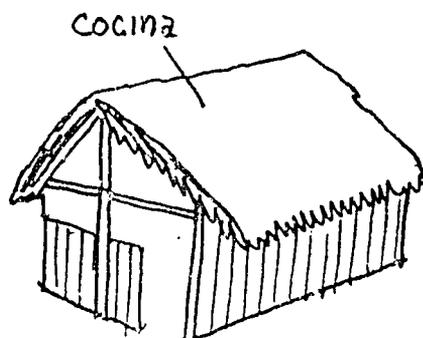
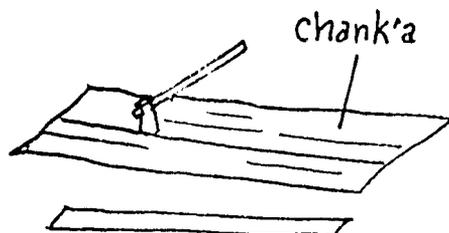


supplies, and harvested crops. In some families the chapapa also serves as a nesting area for poultry; however, most chicken flocks roost at night in the trees surrounding the farm house. When hired laborers are contracted for several days at a time and must sleep on the premises, they are usually housed in the chapapa as well.

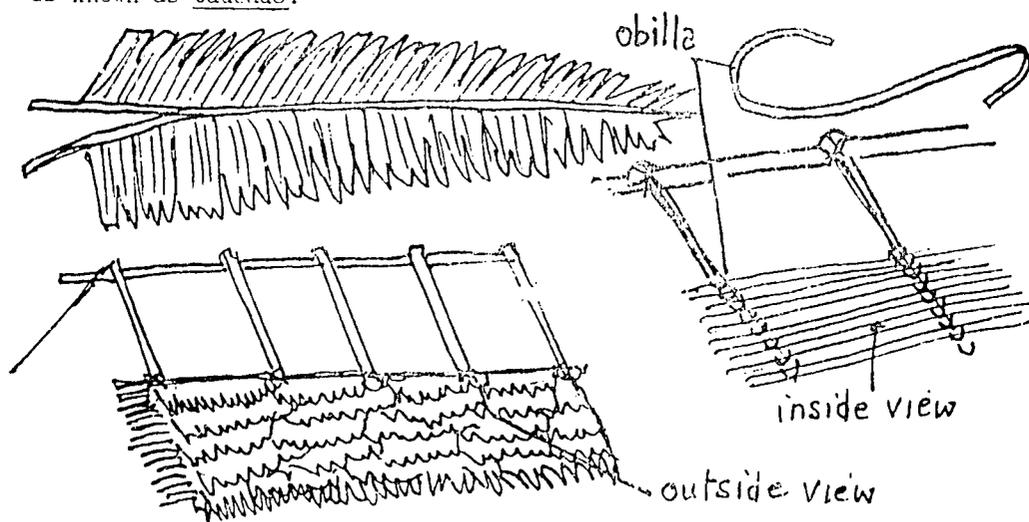
Access to the chapapa is achieved with a rustic ladder. This device is nothing more than a medium-sized tree trunk into which notches have been cut at 20 cms. intervals.

The farmhouse is constructed totally of local materials available around the farm. The most useful source of construction material is the motacú palm. The leaves of this palm (called pachihua) are used to thatch the roof. Its cortex is stripped, dried, and cut into long wooden slats (chank'a) to provide boards for walls as well as the ceiling, which in turn serves as the floor of the chapapa. The corner-posts (paraderos) and roofbeams (tirantes) are cut from any of several hardwoods common in tropical lowlands forests. The posts, beams, and even roof thatching are held in place with strips of bark cut from the ovilla tree.

The design of the house itself is very open, with little concern for theft or lack of privacy. The attic area is normally open at both ends to provide constant ventilation (important for stored grain). The ground floor is normally walled to the ceiling on two sides, but only walled half-way on the other two sides--again a design feature which enhances constant ventilation. For adequate protection from rain, the roof of the dwelling is usually built with an overhang of nearly one meter.



The most complicated aspect of home construction in the tropical lowlands is that of roof construction. If properly executed, a thatched roof made of motacú leaves can last ten years. There are essentially two ways of thatching--the loose layering and the dense layering. With loose layering the palm leaves are left intact. But for a dense layering each leaf is cut in half, which permits the leaf stems to be placed one against another and results in a much stronger roof as well as a denser one. Of course, the split-leaf form of roofing requires nearly double the amount of stitching and tying. Each leaf piece is tied in place with at least two and sometimes three knots of obilla twine. The thatching technique itself is known as taucado.



Furniture inside the rural farmhouse is quite scarce. The only store-bought items are likely to be metal cots or hammocks. Some families have a chair or two for receiving guests, but benches are more common. One almost never finds a wardrobe closet or a dresser. Clothes are usually hung from nails or branches protruding from the walls, or draped over a roofbeam. At harvest time the family's living quarters may be inundated with sacks of grain, baskets of fruit, etcetera. Of course, the typical dwelling has no supply of electricity. At night the principal source of light is a kerosine wick lantern or simply candles, which seldom provides enough illumination to read or conduct a task like classifying fruit or making cheese. For this reason nearly all farm and household tasks end with sunset, with the family retiring shortly thereafter. Similarly, these tasks usually do not begin again until about 30 minutes before sunrise.

The second structure of the farm homestead is the kitchen hut. A single-room, one story shelter, the kitchen hut serves the double purpose of providing a sheltered cooking area and a place for people to eat. The hut is usually built with only two full walls--ground to ceiling--and, at best, two half-walls. Such an open design allows for ample ventilation to carry away smoke and heat, but sufficient protection to protect the fireplace from direct exposure to the wind.

Like the farmhouse, the kitchen hut is built of the same materials: hardwood poles for cornerposts and roofbeams, walls of split chank'a, and roof of pachijua.

The inside of the kitchen hut will display the most spartan of furnishings. The stove will be a fireplace built on the ground. At its simplest, this fireplace will consist of a couple of rocks or bricks capable of supporting one or two cooking pots above a fire pit. A more sophisticated stove would be a ceramic platform with two burners, called an hornilla. Very few families have a gas-powered stove. Also at the stove end of the kitchen will be found a wooden table that serves as a counter area for sundry meal preparation tasks. At the other end of the kitchen, or along one or two walls, will be benches for family members to sit as they eat their meals. The presence of a dining room table is rare, because rural people are accustomed to eating with a plate balanced on their knees. If there is a table in the dining area, there is not likely to be chairs. This is because the family seldom eats together; rather, adult males and hired laborers are served first, then women and children later. In some instances the family does not own enough eating utensils and plates for all members to take their meals at the same time.

GLOSSARY

A

- ACHA: axe
- ACHACHAIRU: a bitter-sweet wild fruit used to prepare a popular rural refreshment.
- ACHIOTE: also known as urucú, a bush that produces spiny round fruit and seeds used for red food coloring.
- AFRECHO: bran; a byproduct of milled rice
- APTOSA: hoof and mouth disease
- AGUA DE UÑA DE GATO: cat's claw water, a medicinal tea used to cleanse the womb after childbirth
- AGUAYO: a small poncho used by women to carry babies and other small loads on their backs.
- AHOGADO: a sauce consisting of chopped vegetables which have been fried and mixed with spices
- ALAMBRADO: fencing; also, a system of raising pigs in a fenced-in corral.
- ALIZO: tree used to make ashes for preparation of lye soap
- ALMENDRO: hardwood tree, its oily fruit used to make massage oil
- AL PARTIR: partnership or shared cost arrangement for any productive effort --crops, livestock, or artisan crafts--where one partner provides capital, the other labor, and the yield or income is split between them.
- AL OJO: estimated, "eye-balled"
- AL OJO DEL BUEN CUBERO: a saying which means "estimated with a cooper's eye".
- ALMUD: unit of bulk measurement, a square wooden box equivalent when full of grain to about 32-34 pounds. The almúd is mainly used to weigh rice, corn, peanuts, and coffee.
- AMARRADO: tied up or staked; a system for raising pigs
- AMBAIBO: a tree with a seven-fingered leaf used to make a medicinal tea.
- AMBROSIA DE LECHE: fresh (warm) milk mixed with sugar and grape brandy.
- ANIS: anise, used to make a tea
- API: a gruel made of cornmeal and sugar
- APORQUE: hilling or piling up dirt around the plant base
- ARRADO DE PALO: ox-drawn wooden plow
- ARRADO DE VERTEDERA: horse-drawn metal walking plow
- AREPA: a corncake, similar to a tortilla in taste but with a fat, oval shape, and sometimes mixed with cheese.
- ARROPE: a dark brown syrup resulting from the addition of cane sugar to the boiled residue from corn beer (chicha) preparation.
- ARROZ: rice
- ARROZ EN CHALA: unhusked rice
- ARROZ GRANEADO: fried rice

ARROBA: unit of measured weight equal to 25 pounds
 ARRANCADA: the pulling of yuca tubers from the ground; yuca harvesting
 ASUNTOL: a disinfectant used for cattle
 AVENA: oatmeal
 AZADON: hoe
 AZAYES: woven palm basket, used for harvesting; inside the farmhouse kitchen, the azayes is used to store plates and other eating utensils.
 AZUELA: adze, used for trimming and smoothing inside and exterior of a taquí (wooden pestle).

B

BACURADA: second burning of residues, the final task of land clearance
 BAJA: the beginning of a woman's period
 BALDE: bucket
 BAÑADOR: wash basin
 BATAN: grinding stone or handmill made of wood
 BOLFO: an insecticide powder used to control fleas in poultry
 BOLILLO: ball
 BOLILLO DE JABON: soap ball, often from homemade lye soap
 BOLLO: a small homemade cheese
 BRAZADA: an armload, a variable unit of volume
 BOTELLA: bottle, a variable unit of volume but usually assumed to be a liter

C

CABECILLA: first quality (first distillation) ash water for lye soap
 CAFE GUINDA: coffee berries that are ripe (red)
 CALDO: the water in which meat or vegetables have been boiled; a broth;
 also, the liquid sugarcane juice boiled into syrup or brown sugar
 CAMIONADA: truckload
 CARACORE: spiny fruit used in the preparation of lye soap
 CANTARO: large jug or cistern for storing water
 CARGADA: a load--of seed, of insecticide in a backpack sprayer, etc.
 CARNEAR: to butcher
 CARCOMA: a worm infection in cattle
 CARPIDA: weeding
 CAÑOTO: stalk segment used as seed--for yuca; for sugarcane
 CASUELA: a mixing bowl
 CASERA: a sure buyer, a steady client
 CARRETON: ox-cart used to transport freight, usually in areas too muddy
 or through water too deep for motorized vehicles.
 CATAPLACMA: plaster
 CAZA DIURNA: daytime hunting

CALEADO: removal of hair from a cattle hide using slaked lime solution
 CALLEJON: alley; row of one crop inter-planted with another crop
 CAÑAVERAL: canefield
 CEBO: beef fat
 CERAZO: seive
 CERRADO: a crop planted in pure stand
 CIENTO: 100 units of a given commodity; a common unit of sale, especially for fruit
 COCIDO: cooked; clay that is sufficiently mixed and ready for use in making ceramics
 COCINA: cook
 COGOLLO: growth point, sprout
 COLORADILLO: a tree native to tropical lowland forests
 CORTE: harvest, picking of fruit
 CORRALADO: corraled; raising pigs in a pen
 COREGEDOR: political authority (government appointed) at the municipal level
 COLLA: person from the highland interior of Bolivia, particularly from Cochabamba
 COSTILLA: rib, rafter of a roof
 COLECTIVO: public transportation, bus or taxi
 COMIDITA: small meal, usually just a soup
 CRIOLLO: local (unimproved) breed
 CRUZADA: a "pass" or crossing of a field by a plow
 CUARTEADOR: an insect that attacks rice
 CUAJADA: homemade cheese
 CUBANO AMARILLO: a variety of corn
 CUCHILLO: knife
 CUARTO: 2,500 M² or a quarter-hectare
 CUCHARADA: spoonful
 CUCHI: hardwood tree, used to make tacús or wooden pestles
 CUERO: hide
 CUERO DE RES: beef hide
 CURABICHERA: an insecticide used for cattle
 CURANDERO: traditional healer
 CUMBRERA: top rafterbeam in a building
 CUTA: tree which, when burnt, yields ashes ideal for making lye soap
 CURPAO: tree with a bark used for tanning

CH

CHAMA: corn husk
 CHAMOSCAR: singeing plucked chicken over a fire to burn feather quills
 CHANK'A: strips of wood cut from the cortex of the motacú palm
 CHAPA'A: platform, attic; bin in which grain is threshed
 CHAQUEADA: the land clearance process: also chaqueo
 CHARQUI: dried meat
 CHICHAPE: a tree with leaves that are used in a medicinal tea to cure diarrhea
 CHIRIGUAN: a tree of the tropical lowlands
 CHICHA: corn beer
 CHIQUERO: small corral separated from main corral, where calves are protected at night and kept from nursing
 CHOCLO: tender corn, pearl corn
 CHORREADA: drippings; another name for griddle cakes
 CHOZA: temporary storage hut
 CHUME: land in fallow, covered with brush
 CHUME ALTO: fallow land with high brush or tree coverage
 CHUZOS: inferior sized or broken corn seed

D

DE CANTO: all together, all at once; selling an entire lot of produce
 DE PUNTA: all at once (same as above)
 DESGRANAR: to shell
 DESPICA: to thresh
 DESTRONCAR: to remove trees and trunks

E

EMPANADA: meat pie
 EMPANIZADO: crystalizing sugarcane juice, which is poured into molds and subsequently dried into blocks of cane sugar
 ENCUEVAR: to scare a wild animal back to its cave, subsequently digging up the cave and ultimately capturing the animal
 ENTREVIEROS: mixings
 ESCALERA: ladder
 ESMILIHUACACHI: medicinal grass for treating fever
 ESPI-DA: night hunting
 ESPIRITAR: to call the spirit back into its owner's body
 ESPEQUE: long handle of a sugarcane mill (trapiche) which is attached to the oxen which move the mill

F

FANEGA: unit of weight equal to 400 pounds or 4 quintales or 16 arrobas
 FAROL: frying dish
 FERIA: market, market day, market town
 FIDEOS: noodles
 FIENNA: slang term for woman's period
 FRASQUITO: a small flask or bottle
 FRITOS: fried goods
 FRUTERO: a berry tree, where wild game comes to eat

G

GABETA: a wooden trough or serving dish
 GANCHO: a wooden hook (made from a tree branch) for holding up grass/weeds
 to be cut by a machete
 GARROPE: club for beating dried grain or pods to thresh the crop
 GLORIA: illness caused by stepping on a place that has been struck by lightning
 GRANILLO: broken grains of rice, used to feed chickens
 GUINEO: a small-sized variety of banana
 GUAYABA: wild fruit tree which has leaves that are good for cleaning wounds,
 and a fruit useful for making a cough syrup
 GUAPOMO: an ordinary fuelwood tree of the tropical lowlands

H

HABAS: broadbeans
 HACENDADO: large landowner
 HESTORAQUI: a tree which yields a resin used in making an expectorant
 HILERA: a row of one crop that has been inter-planted in the midst of another
 HIERBA MATE: a tea popular in the southern cone countries
 HIERBO MATICO: a bush
 HITA: a flea that attacks poultry
 HORNEADO: baked goods in general
 HORQUILLA: pitchfork
 HORTALIZAS: green vegetables
 HOJAS: wheat flakes

HORCONES: wooden poles, legs of a structure
 HORNILLA: fireplace, stove
 HORNO: oven
 HOZ: hand sickle
 HUIRO: corn stalk residue
 HUMINTA: steamed cake

I

INGENIO: rice mill
 INJERTO: grafted seedling
 ISIGO: tree with a medicinal resin that cures muscle spasms and abdominal pain in women

J

JACHI: residue, sediment, chaff
 JACHISINGO: even smaller, finer chaff
 JACES: armload, especially an armload of yuca seed (stalk segments) for transplanting
 JAZAYES: broad, oval basket woven from motacú palm leaves, used for sundry harvesting tasks or eating utensils
 JIBIO: tree which upon burning yields ashes suitable for making lye soap
 JOCHI: a wild animal related to the tapir
 JOZA: hand-sickle

K

K'ANALLA: oven made from a discarded ceramic pot, used for toasting grain
 K'EPI: armload
 K'EPICHANA: groundcloth used for collecting loads of harvested rice
 KONCHO: sediment at the bottom of the pot, a byproduct of fermenting corn beer
 K'JONA: rolling pin

L

LAGUA: porridge
 LATA: tin can of about 5 gallon capacity, used for hauling water or soaking different commodities
 LATADA: a canful
 LEJIA: ash water
 LEJIA SIMPLE: third distillation ash water, used in making lye soap
 LIBRA: pound
 LOCRO: stew

LL

LLAMAR EL ANIMO: calling the spirit, a traditional cure for someone who has suffered a fright
 LLAJHUA: spicy sauce made of tomatoes and chili peppers
 LLIJLLADA: throwing a full-term pregnant mother about in a blanket to align the fetus

M

MACRORORO: tartar plant, used to make massage oil
 MAIZ: corn
 MAIZ EN CHALA: unhusked corn
 MAJADITO de arroz: boiled rice
 MANGO: mango fruit
 MANCHA: small area planted, a stain
 MANO: mortar or club used to grind in a tacú (pestle); also called MANIJA
 MANTEL: tablecloth
 MALOJO: residue, chaff; same as jachi
 MATE: a tea
 MAZACO DE YUCA: mashed yuca
 MAÑAZO: livestock intermediary
 MALVA: a plant which has roots that are used as a medicine for cleansing the stomach
 MAZORCA: ear of corn
 MAIZ CURTIDO, MAIZ PELADO: skinned corn
 MANOJO: handful
 MENUDENCIAS: organ meats
 METRO EN CUADRO: a planting convention with seed holes spaced one meter between plants and between rows

MACHUCADA: chopped
 MANI: peanuts
 MEDIO CUARTO: an area measurement equal to 1,250 M² or 1/8 hectare
 MONTERA: saddle
 MONTE: forest
 MORMEAR: changing cattle from one staked grazing area to another
 MOTERO: motorcycle taxi
 MORDASA: primitive mill for squeezing sugarcane
 MOTACU: palm tree indigenous to tropical lowlands, its leaves are used as roofing material for homes, its trunk for wooden slats
 MILLO: a mineral used in burnt offerings

N

NUDO: eye, sprout

O

OCORO: a fuelwood tree with a fruit used for making refreshments
 OLLA: cooking pot
 ONZA: ounce
 OVILLA: a tree with bark used to cut twine strips for binding material

P

PACAY: a fuelwood tree with an edible fruit
 PACHIHUA: leaves of the motacú palm, used for thatching roofs
 PAICHANE: a tree which produces ashes suitable for lye soap making
 PAILLA: a large cooking pan
 PALA DE CARPIR: a weeding shovel
 PALMEADA: making dough balls
 PAN: bread
 PANADERA: seller of bread
 PALOMILLO: a bush
 PAPA: potato, bulb
 PAQUIO: a hardwood tree
 PARADO: standing, term used to describe purchase of a crop in the field for a given area, without consideration for actual yield
 PARADERO: vertical post
 PASTO: pasture
 PASTO CORTADOR: cutter grass, used in a medicine to cleanse the womb

PASADA: a pass or plowing in one direction; same as cruzada
 PASTILLA: a wafer used to coagulate cheese
 PATASCA: a stew made from the head of a pig
 PARILLA: grill
 PAJERO: a wooden frame for hanging corn to dry in the husk
 PELADORA: mill for husking coffee berries
 PENGA: hand of plantains
 PEPI: a type of wild game
 PELE: worthless
 PELLEJO: hide of an animal, including wool, used as a rug or saddle pad
 PESTE PORCINA: swine fever
 PEPILLA: a blight for rice
 PIE: foot, the base of a grafted seedling
 PILON: counterweight, used on a hanging bar scale
 PINON: a bush which produces a fruit used as a purgative
 PINTON: a red color, the sign of ripe fruit
 PIHUA: a storage pile
 PISO DE BARRO: a clay floor
 PITON: a fuelwood
 PITA: pineapple; also, a clump of ears of corn tied together
 PICADITO DE YUCA: diced yuca dish, usually served with fish
 PLANTA PARADA: to sell a crop in stand, without weighing yield
 PLANTACION: a planted area, an orchard
 PRECIO DE REFUGIO: refuge sale price
 PRESA: piece of poultry or meat
 PLATANO: plantain
 POLLERA: skirt worn by rural women in Bolivia
 PUNZON: planting stick
 PUJANTE: purgative

Q

QUEBRADA: stream
 QUEMADA: burning, a land clearance task
 QUESO: cheese
 QUESILLO: cottage cheese
 QUINTAL: unit of measure equal to 100 pounds or four arrobas
 QUIBORO: a basket used in harvesting coffee; when full of coffee berries
 the quiboro weighs 14-16 pounds
 QUEPICHANA: a harvesting sack

R

RACIMO: clump or stem of bananas or plantains
 RALLADOR: utensil for grating cheese
 RASTREADA: harrowing
 RASTROJO: crop residues, stubble
 REVENDEDOR: intermediary; one who buys commodities for resale at a profit
 RETOÑO: new sprout, shoot
 REDUCCION: a kind of Indian reservation operated by Spanish Jesuits in the
 18th Century
 REPUJAR: working leather in base relief
 ROMANA DE VARILLA: hanging bar scale
 ROMERO: rosemary
 ROSQUITA: pastry ring.; round strip of clay used to make pottery
 ROZADA DEL CHUME: brush cutting, land clearance operation

S

SARANDA: seive, a swinging screen for sifting rice chaff
 SABAYONES: earthworms
 SALMUERA: fever remedy made with Alka-Seltzer, lemon juice, and alcohol
 SALADERO DE CUEROS: a hut where beef hides are salted and dried
 SAPALME: a tree used for fuelwood
 SANTIAGUERO: traditional healer
 SEGUNDA LEJIA: second distillation of ash water used for making lye soap
 SEMBRADORA: mechanical planter
 SIERRA: saw
 SINGANI: grape brandy
 SITIAJE: market tax, charged for space occupied by seller in accordance
 with volume of commodities to be sold at that location
 SOLERA: a beam running the length of a structure
 SOPA: soup
 SUERO: whey
 SUELA: sole leather
 SUR: south, a wind from the south--usually quite cold--same as surazo
 SURAZO: cold wind out of the south
 SURCO: furrow
 SUMAQUI: tree with bark used for tanning hides

T

TABLA: a brace which allows a calf to graze but not nurse
 TACU: a wooden pestle used for grinding tasks by beating with a pole
 TACUZADA: a load to grind in a tacú
 TACHO: milk canister
 TAREA: a unit of land measurement equal to 1000 M²
 TALIBO: hardwood tree used to make taches
 TALABARTERIA: leather goods
 TALABARTERO: leather craftsman
 TASEQUI: a tree from which ashes are taken to make lye soap
 TARCA: a hardwood used for posts sunk in the ground
 TARAGUITO: a tree used for fuelwood
 TATU: a wild animal similar to the armadillo
 TERNERO: calf
 TIEPITO: griddle for making cakes
 TIPA: a tree from which ashes are taken to make lye soap
 TIPINA: a wooden knife used to strip husks from ears of corn
 TIRANTE: a beam which runs lengthwise to sustain the rafters of a structure
 TORTILLERO: a baking dish for making tortillas
 TOTAL: a palm tree which yields fruit that can be processed into medicinal oil, and pods that provide tadder for animals
 TOLDO: seed container on a mechanical planter
 TIERRA DEL HORMIGUERO: clay gathered from an anthill, used in making pottery or ceramic oven
 TROMPILLO: a hardwood tree
 TRONQUERO: a logging truck
 TRAZADO: machete
 TRATO: a contract
 TRAPICHE: a mill for grinding stalks of sugarcane to extract the juice
 TRIGO: wheat
 TRANCA: a wooden post that blocks a road to vehicular traffic
 TUJURE: a porridge, cooked in ash water
 TUMBADA: tree cutting task in land clearance operations
 TUVERE: a tree with leaves that are used to cure headache
 TUNA: a cactus
 TURRIL: a metal cylinder, about 50 gallons in capacity
 TOTUMA: gourd
 TOTUMADA: a gourdful

U

URUPES: round sieve
 URUCU: achiote, used for red food coloring

V

VAQUITU: a flag-shaped mat of woven palm leaves used to fan the fire
VIRAVIRA: an herb used for making tea
VERDOLAGA: a tree preferred for making charcoal

Y

YARAGUA: a cultivated pasture grass
YEMA: bud

Z

ZONZO: skewered yuca dough balls
ZAFRA: sugarcane harvest