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**Agricultural
Sector
Project
Identification
in Bolivia**

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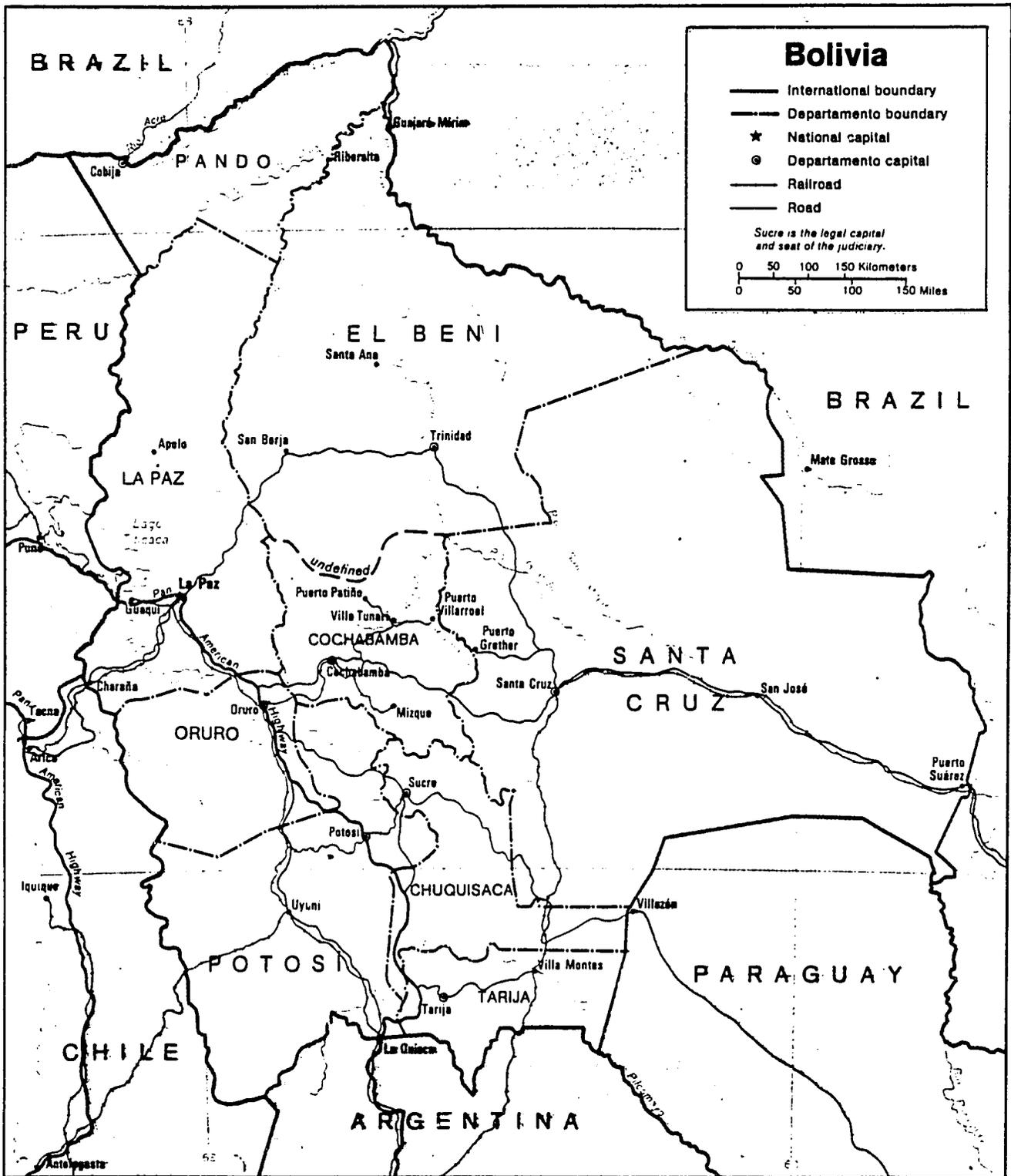
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ACRONYMS

ACLO	Acción Católica Loyola
ADP	Agricultural Development Project (World Bank/Dutch Government)
ADRA	Agencia de Desarrollo y Recursos Asistenciales
AESA	Asesoramiento Empresarial S.A.
AGID	Asociación de Geocientíficos para el Desarrollo Internacional
AIFOR	Asociación Interinstitucional de Forestación
AMIS	Agribusiness Management Information Services
ARTECAMPO	Asociación de Artesanos del Campo
ASOBAN	Asociación de Bancos e Instituciones Financieras de Bolivia
ASOFRUT	Asociación de Horticultores Frutícolas (Santa Cruz)
BBA	Banco Boliviano Americano
BCB	Banco Central de Bolivia
BID/IDB	Banco Interamericano de Desarrollo/Inter-American Development Bank
BTAM	British Tropical Agriculture Mission
CADEX	Cámara de Exportadores de Santa Cruz
CADEXO	Cámara Departamental de Exportadores
CAF	Corporación Andina de Fomento
CARE	Cooperative for American Relief Everywhere
CDs	Certificates of Deposit
CARITAS	Catholic Relief Service
CDC	Centro d Datos de Conservación
CDF	Centro de Desarrollo Forestal
CEDESCO	Centro de Desarrollo Social de Cochabamba
CEDLA	Centro de Estudios para el Desarrollo Laboral y Agropecuario
CEPB	Confederación de Empresarios Privados de Bolivia
CESAT	Centro de Servicio y Asistencia a la Producción Triguera
CIAT	Centro de Investigación Agrícola Tropical
CIC	Cámara de Industria y Comercio (Santa Cruz)
CIDAC	Centro de Investigación, Diseño Artesanal y Comercialización Cooperativa
CIDRE	Centro de Investigación y Desarrollo Regional
CIMAL	Compañía Industrial Maderera Ltda.
CIPCA	Centro de Investigación y Promoción del Campesinado
CNI	Cámara Nacional de Industria
CNS	Consejo Nacional de Semillas
CODETAR	Corporación de Desarrollo de Tarija
CORDECH	Corporación de Desarrollo de Chuquisaca
CORDECO	Corporación de Desarrollo de Cochabamba
CORDECRUZ	Corporación de Desarrollo de Santa Cruz
CORDEPO	Corporación de Desarrollo de Potosí
CORDES	Departmental Development Corporation
COTESU	Cooperación Técnica Suiza

CRDP	Chapare Regional Development Project
CRS	Regional Seed Boards
CUMAT	Centro de Investigación Agrícola Tropical
DAI	Development Alternatives, Inc.
DHV	Dwars, Hederik and Verhey, Consulting engineers
EUROCONSULT	Euroconsult consulting firm
EUREKA	Eureka consulting firm
FAO	Food and Agriculture Organization (United Nations)
FENACRE	Federación Nacional de Cooperativas de Ahorro y Crédito
FINDESA	Financiera de Desarrollo S.A.
FONDESA	Fondo de Desarrollo S.A. (Chuquisaca)
FOTRAMA	Knitting Cooperative (sweaters, ponchos, etc., Cochabamba)
GtZ	Gesellschaft für Technische Zusammenarbeit
HAM	Honorable Alcaldía Municipal
IBCE	Instituto Boliviano de Comercio Exterior
IBTA	Instituto Boliviano de Tecnología Agrícola
IDA	Institute for Development Anthropology
IDEA	Instituto para el Desarrollo de Empresarios y Administradores
IGM	Instituto Geográfico Militar
INBOPIA	Instituto Boliviano de Pequeñas Industrias y Artesanía
INE	Instituto Nacional de Estadística
INPEX	Instituto Nacional de Promoción de Exportaciones
ISNAR	International Service for National Agricultural Research
JUNAC	Junta del Acuerdo de Cartagena
LIDEMA	Liga de Defensa del Medio Ambiente
MACA	Ministerio de Asuntos Campesinos y Agropecuarios
MINPLAN	Ministerio de Planamiento y Coordinación
NGO	Nongovernmental organization
NSC	National Seed Certification
ONUUDI	Organización Naciones Unidas para el Desarrollo Industrial
PDAC	Programa de Desarrollo Alternativo de Cochabamba
PDAI	Programa de Desarrollo Agropecuario Integral
PDAR	Programa de Desarrollo Alternativo Regional
PERTT	Programa Ejecutivo de Rehabilitación de Tierras en el Departamento de Tarija
PL 480	Public Law 480, "Food for Peace" Program
PNUD	Programa de las Naciones Unidas para el Desarrollo
PPI	Programa de Promoción de Inversiones
PROANDES	Proyecto Subregional Andino de Servicios Básicos
PROASSIST	Professional Assistance (consulting firm)
PRODER	Programas de Desarrollo Rural
RONCO	Ronco consulting firm
SBMEP	Small Business and Micro-Enterprise Program
SEARPI	Servicio de Encaucamiento de Aguas y Regularización del Río Piray (Santa Cruz)
SEASA	Servicios de Envasado Aséptico S.A.
SERVIFLOR	Cut flower marketing company (Cochabamba)
SNDC	Servicio Nacional de Desarrollo de la Comunidad

SUBDESAL	Subsecretaría de Desarrollo Alternativo
UCF	Unidad Crediticia y Financiera
UGRM	Universidad Gabriel Rene Moreno (Santa Cruz)
UMSS	Universidad Mayor San Simon (Cochabamba)
UNDP	United Nations Development Program
UNFADAC	United Nations Forum for Drug Abuse Control
UNICEF	United Nations Children's Economic Fund
UPRA	Unidad de Programas Rurales y Agropecuarios
USAID	United States Agency for International Development
WB	The World Bank



SUMMARY REPORT

INTRODUCTION

Bolivia and its development partners seek to eradicate the coca industry in nontraditional areas and to replace it with a diversified economy. The shared vision of the alternative development strategy (ADS) is an economy capable of employing a rapidly growing population and providing it with an improved standard of living. Those attempting to turn vision into reality are aware of the hard lessons learned in past coca-eradication efforts. The ADS builds on these lessons, identifying the level of resources needed to replace an illicit subsector and, as importantly, laying down the strategic guidelines for investment across the major portions of the Bolivian economy.

The U.S. Agency for International Development (USAID) analysis of the ADS indicated the need to sharpen the selection criteria for investments and to identify and prioritize projects responding to the near- and medium-term requirements of the new strategy for income, employment, food production, export earnings, and maintenance of the country's natural resource base. This summary report provides an overview of the agricultural sector projects identified by a Development Alternatives, Inc. study team of five consultants who worked in-country from May to August 1990.

The first section of the report describes briefly the methodology used in the study, gives a condensed presentation of the projects identified, and indicates their intended impact. The second section provides a perspective on the ADS, the keystone of the Government of Bolivia (GOB) and the USAID in their efforts to diversify the economy. Special attention is paid to the issue of internal migration. The third section offers more details on the selected projects. Section four identifies further design investigations needed to fully evaluate project feasibility. Section five discusses the broader issues related to successful agricultural project implementation. The annexes provide more complete discussion of the identification and selection issues and contain full descriptions of each project proposal.

I. METHODOLOGY AND SUMMARY

Purpose

The purpose of the present study is to identify medium- to large-scale agricultural and rural projects and analyze their feasibility for generating employment, improving income, and generating foreign exchange over the next two to five years. The combined effect of the projects is to help create viable, economic poles of development, capable of providing alternatives to migration to the coca leaf production and processing region (the Chapare).

The geographic regions studied encompass virtually all of Bolivia, excepting the lowland Amazonian departments. The study team travelled to the departments of Chuquisaca, Cochabamba, La Paz, Potosí, Santa Cruz, and Tarija, visiting over 150 entities in the private and public sectors.

Strategy for Project Identification

The strategy used for the identification stage was to search for project ideas that could benefit from donor agency assistance and that had reached at least the profile stage, and preferably that of prefeasibility or feasibility. Both private and public sector project sponsors were visited.

Within the private sector, chambers of commerce, trade associations, and banks were visited. In the public sector, the primary contact was with the departmental development corporation (CORDES). Also visited were the offices of Ministries and associated entities. An overwhelming number and variety of project ideas were found, which had clearly identified sponsors and some of which were being implemented. It also became obvious that within private banks substantial amounts of credit funds were available, but are undisbursed.

The team also visited the international donor community in Bolivia (that is, the World Bank [WB], the Inter-American Development Bank [IDB], the Corporación Andina de Fomento [CAF], the Junta del Acuerdo de Cartagena [JUNAC], Cooperación Técnica Suiza [COTESU], Gesellschaft für Technische Zusammenarbeit [GTZ], and so forth). These agencies were interviewed to see what types of projects they would be interested in supporting and to estimate current and future availability of funding for new activities. Nearly all donors indicated that their activities were planned for the next few years and that if anything, they had a shortfall of operating funds to meet their commitments. The notable exception to this was the German Agency for Technical Cooperation, which only recently established itself in Bolivia (having moved from Lima, Peru). This organization had unprogrammed funds for new activities and a substantial balance of previously disbursed credit funds remaining unused within the commercial banking system.

During these visits, over 160 agricultural- and agribusiness-related projects and 90 agricultural infrastructure projects were specifically referred to the team (see listing in Annex 2). When available, copies or abstracts of these projects were obtained and analyzed.

Among the project ideas reviewed, many were discarded because they were:

- Too large, complicated, or delayed for any impact to be noticeable in the short term (that is, large irrigation schemes);
- Too small in size, serving a reduced audience, or too dispersed to be economically justifiable;
- Colonization plans, expanding the agricultural frontier into Amazonia;
- Basically nonagricultural in focus and impact (such as mining and manufacturing);
- Outside the study area (the Chapare was later excluded as the outline of the ADS became clearer);

- Activities already being undertaken by the GOB or by other donor agencies (diversification projects by the Ministerio de Asuntos Campesinos y Agropecuarios [MACA]/WB or trunk roads by IDB); or
- Concerned with exotic products with very doubtful export markets (production of mead, chinchilla skins, cardamom seed).

A sizeable number of potential projects remained for which there is definite interest in implementation by private or public sector individuals and entities. Undoubtedly many others were not brought to the study team's attention. A separate listing of agribusiness projects is presented in Annex 2 and projects illustrating loan demand volume are listed in Annex 3.

The review of projects revealed a variety of constraints intrinsic to the project-implementation environment in Bolivia today. Some constraints were technical in nature, such as the lack of basic information on the land resource base. Others were institutional, revealing the weakness of supporting input supply, commercial services, and public research and extension institutions vital to the sustainability of a restructured agricultural economy. A third set of constraints related to deteriorated transportation, storage, and processing infrastructure. These constraints are challenges to the ADS. They extend beyond the boundaries of an area-specific project. While they can be alleviated for a given project area with high levels of foreign assistance, these localized changes would be unsustainable after external support was removed. Therefore, the study team adopted a programmatic approach to project identification, selecting a set of projects for their potential immediate effect on employment, production, and markets. Also retained were projects which would improve service supply over the medium-term and projects with longer-run impacts (more than five years) central to improving return on development investment in agriculture and sustaining the reoriented agricultural economy targeted by the ADS.

Project Summary

The following table lists the salient characteristics of the 13 project areas selected by the study team, in large part to address the constraints identified above. For presentation purposes, they are grouped according to their primary focus. The more direct linkages with USAID projects are also indicated.

SUMMARY OF AGRICULTURAL AND RURAL PROJECTS IDENTIFIED

<u>Major Focus/ Project Name</u>	<u>Implementing Agency</u>	<u>Geographic Coverage</u>	<u>Linkage with USAID Projects</u>	<u>Planned Duration</u>	<u>Budget (\$000)</u>
RESOURCE MANAGEMENT- SUSTAINABLE AGRICULTURE					
1. Land Use/ Resource Map	CUMAT, IGM CORDES	National	PL-480 Program Alternative Development	5 yr	12,000
2. Agricultural Sector Info.Centers	MACA, Univ. CORDES	National	PL-480 Program Alternative Development	5 yr	2,500
3a. Land-Water Management Program	CORDES	Cochabamba, Chuquisaca, Potosí, Santa Cruz, Tarija Departments	PL-480 Program	5+ yr	30,700
3b. Commercial Crops & Land Management Training	CORDO, CORDECH, and IBTA	Cochabamba, Chuquisaca, and Potosí Departments National	Alternative Development	5+ yr	7,300
3c. Watersheds Conservation & Works Training Upper Parafí River, Cañe and Grande Rivers	CORDECO, CORDES, PERTI-COETAR, SEAORU	Departments of Cochabamba, Chuquisaca, and Potosí	Alternative Development	5+ yr	13,600
AGRICULTURAL DIVERSIFICATION- EXPORT MARKETING					
4. Agribusiness Marketing	CAF, IDEA Cámara, AID	National	Export Promotion Private Agric. Organization Alternative Development	4 yr	65,000
5. Commercial Germplasm Improvement Project	MACA, IBTA CORDES, AID Univ.	Nationwide by Department and Local Department	Export Promotion Private Agric. Organization	5+ yr	9,800

<u>Major Focus/ Project Name</u>	<u>Implementing Agency</u>	<u>Geographic Coverage</u>	<u>Linkage with USAID Projects</u>	<u>Planned Duration</u>	<u>Budget (\$000)</u>
AGRICULTURAL TECHNOLOGY and FARM PRODUCTIVITY					
6a. Seed Grain Prod.	CNS, CRSs FENACRE	Nationwide by Department	PL-480 Program Private Agric. Organization	5 yr	5,900
6b. Seed Certification	CNS, CRSs FENACRE	Nationwide by Department	PL-480 Program Private Agric. Organization	5 yr	6,600
7. Crop Storage	NGOs FENACRE AID Project	Nationwide by Department and Local	Export Promotion PL-480 Program Private Agric. Organization	5 yr	4,200
8. Agri-chemical Program	MACA/IBTA FENACRE AID Project	Nationwide by Department	PL-480 Program Private Agric. Organization	3 yr	4,500
9. Private Consultant Services	Cámaras FENACRE	Nationwide by Department	Export Promotion Private Agric. Organization	5 yr	1,500
10. Small-scale Irrigation	CORDES	Cochabamba, Chuquisaca, Potosí Departments	PL-480 Program Alternative Development	5 yr	9,000
11. La Paz Integrated Rural Development	CORDEPAZ Palca Government (valley)	Local	PL-480 Program Alternative Development	5+ yr	7,500
12. Rural Roads Construction	CORDES SNC	Chuquisaca, Potosí Departments	PL-480 Program Alternative Development Rural Road 3	5+ yr	15,000
EMPLOYMENT GENERATION					
13. Handicraft Industry	NGOs FENACRE	Cochabamba, Chuquisaca, Santa Cruz Departments	Micro-Enterprise Alternative Development	4 yr	1,500

Abbreviations: see List of Acronyms

Implementation priorities would depend on institutional strategy and resource availability, both for the financing entity and for the local implementing agency. The following table gives the team's estimate of the projects' major impacts and the time needed to realize them. The types of impact are classified as Income Generation, Employment Generation, Food Supply, Export Potential, and Natural Resources.

<u>Short-term Impact</u>	<u>Principal Types of Impact</u>				
	<u>Income</u>	<u>Employ- ment</u>	<u>Food</u>	<u>Export</u>	<u>Natural Resources</u>
- Agricultural Storage	XX		XX	X	
- Seed Production	XX	X	XX		
- Small-scale Irrigation	XX	XX	X		X
- Rural Feeder Roads	X	X	X		X
- Handicraft Industry	X	XX			
<u>Medium-term Impact</u>					
- Agribusiness Support	XX	X		XX	
- Agri-chemical Registration	X		X	X	X
- Seed Certification	X	X	X		
- Consultant Services	X	X		X	
- Watershed Conservation	X	X	X		XX
<u>Longer-Term Impact</u>					
- Commercial Germplasm	X			XX	
- Integrated Rural Development	X	XX	X		X
- Land and Water Management	X	X			XX
- Crops-Rangeland Management	X	X	X		XX
- Agricultural Information				X	
- Land Use/Resource Map					X

Short-term Impact

An activity classified as having a short-term impact means that the primary benefit would be felt roughly within one crop cycle (for agricultural activities). A similar element of immediacy would be the case for road construction (the extension and broadening of the marketing season) and for handicrafts (employment generation).

Medium-term Impact

Projects with medium-term impact require more time to develop. Usually these activities are support services to improve agricultural productivity and to protect soil and water resources. This group of five projects focuses on providing an extension or delivery mechanism for the transfer of applied technology, rather than developing technologies per se.

Longer-term Impact

The last group of projects will create the required technology or provide agricultural sector prerequisites for specific subject areas. The fact that tangible impact may take three to five years should not deter these projects' implementation. Their development will provide a solid, proven base of technology, resource information, dissemination services, and trained people to raise sustainably the sector's productivity.

II. THE ALTERNATIVE DEVELOPMENT STRATEGY

The goal of the ADS policy of the GOB is to eliminate the illicit coca industry and its position of primary importance in the society and economy. Bolivia must do two things to achieve this goal: (1) dramatically increase the private returns from alternative economic activity, and (2) rapidly expand its capacity to earn foreign exchange capacity from noncoca sources.

The GOB has targeted nearly 44,000 hectares of coca for eradication. The government estimates that \$386 million are needed to pay the short-term costs of compensating individuals for losses and to provide the medium-term credit needed to finance the investment program to replace coca.¹ About 175,000 new jobs would have to be created to replace those lost from coca eradication.

In very general terms, the ADS seeks to boost productivity through increased investment — public and private, social and economic. This action is intended to generate more employment opportunities, in turn leading to the objectives of increased personal income level and improvement in foreign exchange earnings.

Both the GOB and USAID recognize that implementation of the ADS involves classic development efforts to:

- Improve the level of farm productivity, income, and the sector's capacity to absorb labor;
- Improve and disseminate practices which will enhance natural resource management, sustainable agriculture, and environmental protection;
- Expand programs aimed at agricultural diversification and export marketing;
- Provide more rural roads and other infrastructure needed to support agribusiness and export marketing;
- Target the micro- and small-scale enterprise sector to generate more employment and income; and
- Strengthen the provision and quality of social services.

Implementing Agencies

Achievement of ADS objectives is constrained by several factors. The structural problem of weak implementing agencies is a relatively greater obstacle to attaining a project's objective than are technological constraints.

¹ USAID analysis suggests that this figure overestimates the total financing needs, because of improper base-year selection and double counting of costs in some cases.

Bolivia suffers from difficulties in transportation and communication that have led to the evolution of pronounced regionalism, further magnified by cultural differences and rivalries. Ironically, the Bolivian government's recent efforts to decentralize many of its activities may be fostering even stronger regionalism.

For example, regional development corporations are greatly influenced by regionalism. They generally have strong engineering sections and are important politically because they manage big-budget infrastructure projects that address obvious needs and generate substantial local employment. The development corporations in wealthier departments have accrued large portfolios of development activities in agriculture, industry, and finance. In the richest departments, they have become the major governmental institution involved in the planning and implementation of development projects. In the poorer departments, their activities are much more limited. Further decentralization and increased competition for funding may increase the tendency toward isolation of these corporations from other public agencies.

National-level government agencies, such as the Ministry of Planning, continue to focus on development issues on a national scale, without substantial coordination with other national ministries or major public entities at lower administrative levels. The lack of coordination has frequently resulted in a patchwork quilt of isolated projects, scattering the effort of national institutions and weakening them in the process.

Rather than deal directly with the problem of rebuilding national institutions, funding agencies have tended to step around them to implement projects. Consequently, foreign donor project management units and NGO-managed projects have proliferated. Even when working in the same area, these projects operate independently of one another, function at various administrative and regional levels, and often are only tenuously linked to national institutions. Parallel development institutions, such as Programas de Desarrollo Alternativo Regional (PDARs), are being set up to administer regional projects separately from the most logical local counterparts.

The projects identified by the study team address the weakness of implementing agencies, primarily through training. However, the structural problems of Bolivia's institutional landscape will require that immediate impact projects continue to seek out the most efficient implementing agency links possible, tailored to the specific needs of each project. In some cases this will mean that the project will require independent management. In most cases, however, the project profiles indicate that they should be incorporated into existing programs of institutions to help increase their capacity to respond to Bolivian development needs. Selection of implementing agencies is probably the most important design issue.

The need for some type of PDAR mechanism to coordinate ADS investment still remains, but it is not addressed directly by the projects presented here. (Further discussion of the Bolivian institutional landscape is contained in Annex 6, Local Institutions, Regionalism, and Integrated Development.)

Impact on Migration

The issue of migration is of key importance in the design of an alternative development strategy. Research in Bolivia indicates that migration of highland peoples to other areas within Bolivia, as well as to other countries, is a response to economic necessity, and has been since pre-Incan days. The strength

of cultural and economic tradition should not be underestimated. For many migrants, leaving their place of origin to embark on a series of relocations that may go on throughout a lifetime is an adaptive response to exploiting available resources.

In addition, inequalities in land distribution and natural population increase in the highlands, exacerbated by laws of inheritance that favor all offspring equally, have led to increasing fragmentation of landholdings. Once broken up, the small parcels of land cannot economically sustain the next generation of small farmers. More equitable land distribution and improved production techniques including soil conservation may bring more land into production and should temporarily reduce pressure. However, population will continue to grow, again stressing available arable land and making out-migration of the surplus population a continuing necessity.

Finally, improved education and communication along with greater availability of market goods has dramatically increased the expectations of rural people, especially the young. Many rural youth no longer are interested in remaining on the land, but seek expanded employment opportunities, training, and what is viewed as a better life in the urban areas of Bolivia.

For these reasons, development projects specifically targeted at reducing the flow of labor into the Chapare must be viewed with caution. Even though recent migration to the Chapare has slowed significantly, if coca-control efforts falter, work conditions in the Chapare would again become favorable for in-migration. While strong development projects in the rural highlands may slow the departure of the rural population, labor surpluses in the cities, particularly Cochabamba and Santa Cruz, no doubt would respond to the offer of high wages in the Chapare.

The creation of new development poles in Bolivia, a desired outcome of the ADS, will lead to increases in migration to the new opportunities outside of Chapare. Given population growth rates and the relative lack of family planning, finite land resources, and the changing social processes resulting from modernization, large-scale rural to urban migration is inevitable. The migratory pressure on these cities is now beginning to cause severe social and economic problems. In the long run, the creation of alternate development poles may better absorb the increases in population than massive efforts to subsidize smallholder agriculture in the highlands, given their poor prospects in terms of resource availability and existing population pressure. (Further discussion of this issue is presented in Annex 5, Alternative Development and Migration.)

III. PROJECTS IDENTIFIED

The study team identified a series of constraints that restrain the implementation of many projects. These constraints usually are not project, institution, or region specific. Because they are widespread, a programmatic response is needed to address these needs, rather than continuing to build in self-contained, corrective measures to better ensure the success of a particular project.

Therefore, the overall orientation of this project identification study has become programmatic and longer term in perspective than envisaged in the scope of work. Remedies to the constraints need to be

both self-sustaining and easily replicable. Strong local participation is needed if project results are to be sustainable, rather than dependent on outside programs.

The proposals for 16 projects are meant to be independent in the sense that conceivably they could be funded and implemented separately. (However, several are so strongly interdependent that they are proposed as joint projects, such as those concerned with the seed industry and the private technical assistance services and agribusiness.) But, as pointed out in the individual project descriptions, some of these activities could be incorporated into existing projects in the USAID portfolio.

Categories

The project descriptions are arranged according to a general classification of their probable primary impact area, although more design work is needed to specify the linkage between project activity and impact. Impact is also dependent on other nonproject activities and entities. These areas of impact are:

- Resource management-sustainable agriculture;
- Agricultural diversification-export marketing;
- Agricultural technology-farm productivity; and
- Employment generation.

Projected linkages with on-going USAID/B projects are indicated, and in some cases, an existing related project conceivably could be amended or expanded to accommodate the proposed activity. Full project descriptions are contained in Annex 1.

Geographic Focus

Another important factor is the "implementing agency coverage" referred to in the table presented earlier. This term refers to the level at which the project activities would be carried out:

- **National** in scope, even though there would be variations at the departmental level;
- **Nationwide**, although each project is really a sum of the departmental (and sometimes local) activities — a "trickle-up" structure for most project aspects is included. The implementation characteristics in each participating department probably would be substantially different from each other; and
- **Departmental**, focusing on several departments, mainly to take advantage of existing CORDES administrative capacities and the relative proximity of potential project areas. The same types of activities undoubtedly are necessary in the other areas of Bolivia, but logistical difficulties would make implementation much more prone to failure.

SUMMARIZED PROJECT DESCRIPTIONS

RESOURCE MANAGEMENT-SUSTAINABLE AGRICULTURE:

1. **Land Use/Resource Map:** To develop a national agro-ecological planning system to integrate topographical, soil, vegetation, and crop response information on a computer database. This would permit program design and evaluation based on ecological quantification of land use, soil classification, and projected crop responses. The project results would provide the technical background to facilitate the planning and implementation of activities focused on natural resource management, conservation, and sustainable agriculture practices, and agricultural research for export-oriented diversification. Activities would influence and be influenced by those of the PL-480 Program, and the Alternative Development and Export Promotion projects.
2. **Agricultural Information Centers:** To provide a national documentation network to backstop technicians and others working in agricultural programs. The network would have a multiple use function including instruction, research, and project development. The expected results and interdependencies would be very similar to those under the Land Use/Resource Map proposal.
3. **Sustainable Agriculture and Rangeland Management Program** (with three subprojects):
 - a) **Land and Water Management Research and Training:** To design and test the validity of measures for land rehabilitation and management and land/water conservation in areas of severe degradation. Activities would be implemented to incorporate direct farmer participation, complemented with research on key policy and technical issues in irrigation and drainage use.
 - b) **Commercial Crops and Rangeland Management Research and Training:** To develop agricultural land use, animal husbandry, and conservation practices on less-degraded lands to provide greater economic return and environmental stability.
 - c) **Watershed Conservation Works and Training:** To improve watershed management for capturing water for irrigation infrastructure and potable water uses as well as controlling soil erosion losses and flooding. Activities would include infrastructure construction (low dams, river defenses, and so forth) coupled with training and extension activities in 80 rural communities.

The impact of these subprojects in the departments of Cochabamba, Chuquisaca, Potosí, Santa Cruz, and Tarija would be on agricultural diversification, producer productivity/income and employment, as well as natural resources management. These efforts would be closely associated with activities under the PL-480 Program and the Alternative Development project.

AGRICULTURAL DIVERSIFICATION-EXPORT MARKETING:

4. **Agribusiness Support Services:** To promote medium to large agribusiness ventures through an efficient credit mechanism, coupled directly with technical assistance and training in critical areas not addressed through other programs (such as postharvest handling, packing, and shipping). The national impact would be multiple: agricultural diversification, employment generation, foreign exchange earnings/savings, and producer productivity and income. Related USAID/B projects include Export Promotion, Market Town Capital Formation, Private Agricultural Organizations, and Alternative Development.
5. **Commercial Crop Germplasm Improvement:** To provide nationwide long-term expertise in the development and propagation of new germplasm for commercial crops. The immediate impact within participating departments would be on agricultural diversification for export, and producer productivity/income. This project would have linkages with the Export Promotion, Private Agricultural Organizations, and Alternative Development projects.

AGRICULTURAL TECHNOLOGY-FARM PRODUCTIVITY:

6. **Seed Industry Support Program (with two subprojects):**
 - a) **Grain Seed Production:** To increase the availability of quality grain seed throughout Bolivia, as well as explore its export potential. The impact would improve producer productivity and income, and, secondarily food security and foreign exchange earnings/savings within participating departments.
 - b) **Seed Certification:** To strengthen the existing national certification program to ensure quality seed stocks and related information. The impact concerns producer productivity and income, but also is a prerequisite for the sound development of a national seed industry. This program would share linkages with AID's Export Promotion, PL-480, Private Agricultural Organizations, and Alternative Development projects.
7. **Agricultural Storage:** To improve the efficiency in produce storage throughout the marketing chain: on-farm, market centers, and export shipping points. The impact in participating departments would be on producer and intermediary productivity and income, farm-level consumption, and foreign exchange earnings/savings. Activities would be related to the same projects mentioned under the Grain Seed Program.
8. **Agri-chemical Registration, Information, and Training:** To facilitate the rational and responsible use of quality agri-chemicals by:
 - Registering both product importation and the distributors and retailers;
 - Requiring a minimum level of training for agri-chemical retailers on the provision of technical information and packaging practices, and certifying the training received; and

- Requiring the dissemination of information concerning proper usage and facilitating practical training for technicians, retailers, and user groups.

The impact within participating departments would focus primarily on producer productivity and income, food security and export-oriented produce, and public health. Activities would have linkages with the PL-480 Program and the Private Agricultural Organizations and Alternative Development projects.

9. **Private Agricultural Consultant Services:** To stimulate the formation and technical competency of consulting services for agricultural extension, training, and marketing assistance within the private sector. The impact in participating departments would be focused on agricultural diversification, foreign exchange earnings/savings, and producer productivity and income. Activities would be closely linked to the Export Promotion, Private Agricultural Organizations, and Alternative Development projects.
10. **Small-scale Irrigation Infrastructure:** To implement micro-irrigation, conservation, and small farmer training in approximately 160 areas totalling 8,000 hectares under irrigation. The impact in the departments of Cochabamba, Chuquisaca, and Potosí would be multiple: agricultural diversification, employment generation, and producer productivity and income. This effort would be related to on-going Export Promotion and Alternative Development projects and the PL-480 Program.
11. **Micro-region Integrated Rural Development (La Paz River Valley):** To combine improvement in on-farm productivity and income, soil conservation and watershed management, general rural infrastructure (feeder roads and bridges, micro-irrigation, riverbank containment), and living conditions in a program structure for projects. The regional impact would be multiple: agricultural diversification, employment generation, and producer productivity and income. It would have linkages with the PL-480 Program and the Alternative Development and the (up-coming) Rural Roads III projects.
12. **Rural Feeder Roads Construction:** To provide a denser road network in the region in Chuquisaca-Potosí neighboring the Associated High Valleys project area which, also is usable during most of the year. The impact would be on employment generation and producer productivity and income. Besides its connection with the Rural Roads III project, activities would be related also with the Micro-enterprise and Alternative Development projects and the PL-480 Program.

EMPLOYMENT GENERATION:

13. **Handicraft Industry:** To develop the handicraft industry and facilitate its expansion into nontraditional articles (such as hammocks, embroidery, ceramics), as well as improve productivity in the more common lines, through training of local member groups in technical, business, and marketing skills. The impact in the departments of Cochabamba, Chuquisaca, and Santa Cruz would be on both employment generation and producer productivity and income. Activities would be closely linked to the Micro-enterprise and Alternative Development projects. Additional comments on alpaca and wool production are in Annex 4.

IV. FURTHER INVESTIGATION REQUIRED

Implementing Institutions and Project Design

Each project proposal would require at least two areas of further accomplishment before it could be implemented: (1) a much closer look at potential implementing agencies to determine their capacity and effective interest (the study team was unable to reach this level of detail, given the large number of possible agencies), and (2) an actual project design. This exercise would be carried out along with the proposed executing agency(ies).

NGO Involvement

Apparently, there is a disposition by donor agencies to grant an increasing role for nongovernmental organizations (NGOs)/private voluntary organizations (PVOs) in rural development projects. This mechanism is explicitly mentioned in several of the above proposals as the only available alternative to institutional support and development of governmental agencies. Still, little is known about many of the major NGOs active in rural areas, and assigning some of them an implementation role requires a leap of faith at this time. A careful study of their resources, expertise areas, and possible interest in project execution is a prerequisite. The possibility of supporting an umbrella NGO organization to facilitate a variety of development efforts should be explored as an option to individual agreements with numerous entities. (This would be similar to the USAID program through the NGO-association ASINDES in Guatemala. Experience has shown that substantial upfront capacity-building work is needed before an umbrella institution can undertake substantial project responsibilities.)

Property Tenancy

A second area of study concerns the property rights peculiar to the infrastructure projects. These projects usually result in the revaluation of personal or collective/community properties (or in their loss, in the case of roadway construction). Both property and user rights and responsibilities should be clearly determined before a project targets a particular region, and should not be postponed as a project output for sometime in the future. A serious study (both policy/legislative and implementation) needs to be undertaken concerning property tenancy (personal and community) and titling, and water/land rights. A concomitant element is the examination of the body of law related to the establishment and functioning of a juridical entity for land alienation and eminent domain decisions.

The study team strongly suggests that donor agencies not finance new or expanded projects that include components of medium- to large-scale irrigation infrastructure or primary road systems until the basic issues of property and user rights are resolved. Smaller-scale projects in these areas can be considered since their tenure and access issues probably can be dealt with by local communities.

V. ISSUES RELATED TO AGRICULTURAL PROJECT IMPLEMENTATION

Numerous factors affecting the implementation of development projects are not yet examined within the identified projects. The more important ones are discussed below. They are separated into those that reflect the economy and society in general (structural issues), and those that reflect policy decisions, or lack thereof (policy-related issues). A more extended discussion of constraints is found in the "Agricultural Sector Assessment for Bolivia" (Chemonics: 1988).

STRUCTURAL ISSUES

Centralized Control

A natural tendency for an institution is to centralize its actions, or at least its decision making, to exert authority, and ensure consistency and priorities. Centralization tends to fail in Bolivia because of communication and transportation deficiencies, regionalism, partisan party politics, fear of administrative/financial mismanagement, as well as empire building at the personal and institutional levels.

When a particular activity requires the input or involvement of several institutions, making direct control through centralization impossible, then implementation is frequently undertaken by some form of interinstitutional coordination. The result is often inaction until such time that action becomes unnecessary, irrelevant, or simply forgotten. The alternative is for one of the institutions involved to take the lead, defeating the group action approach, and leading to duplication of services and costs to the public sector.

The lesson is that project implementation should be as simple as possible, with minimal dependency on other institutions. A corollary is that the implementing agent should be as close to the site of the activity or user as is feasible. The responsibility for decision making is an integral part of project implementation and should not be confused with policy making, which is done at a higher level.

Regional versus Departmental Administration

Directly related to the above commentary is the debate concerning the administrative structure (of the development corporations, or CORDES), versus the regional concept embodied by the PDAR. The reason for discordance stems from different viewpoints: each CORDES is tied to its departmental responsibilities, and there can be notable rivalry between neighboring CORDES. The PDAR is a new coordination/quasi-implementing structure of the national government, and still does not have clearly drawn lines of authority.

The study team has seen examples of local institutions making expensive parochial decisions in defense of departmental interests that are detrimental to a more-rational use of resources. Roads,

irrigation systems, and electrification (among other regional or sectoral projects) may need to cross departmental boundaries to optimize the investment impact. An example is where the land and water resource use in one area has a major impact on the long-term feasibility of an irrigation system downstream in a neighboring department. Departmental perspectives tend to distort project decisions in these situations.

Given its regional overview, the PDAR mechanism would serve to determine if a proposed project should be implemented by only one or several institutions (for instance, the CORDES). The PDAR could be invested with such authority by the national Ministry for Planning and Coordination, since all external financing to government entities is approved at this level. This needs to be defined in practical terms to prevent the PDAR from becoming a de facto implementing agency, as happened with its predecessor, the Programa de Desarrollo Alternativo de Cochabamba (PDAC). The actual financing, however, should continue through the CORDES (or other appropriate local institution), both to maintain some element of accountability for the results of related expenditures, and to minimize the opportunity for it to assume the role of implementor.

Communication Between Donor Agencies

With the substantial increase in foreign assistance funds scheduled for Bolivia in the foreseeable future, it is imperative that donor agencies also increase communication between themselves. This would not be coordination in the sense of requesting multi-donor approval, but rather the sharing of relevant information. Ideally, this would pave the way for donor program complementarity and even learning from the difficulties encountered by others. This would be especially useful in regions where many donors are active (Valles Altos in Cochabamba, for instance). Hopefully this would diminish the possibility of targeting the same recipients with repetitive or conflicting activities. It also would minimize the possibility of recipients "playing the grants game" to overfund institutional expenditures (thereby providing extra liquidity for other purposes).

The donors seem to be turning more to using nongovernmental implementing agencies (PVO and NGOs), which traditionally have shown little enthusiasm for sharing information. The temptation to rely on NGOs probably will become more critical as the Instituto Boliviano de Tecnología (IBTA) presence in agricultural extension is diminished in favor of turning its efforts toward research. For many NGOs, outside considerations such as religious or political affiliations and sources of funding or support can significantly focus activities. This situation is compounded by the fact that although an NGO may have substantial expertise and experience in its chosen field, this does not imply its competence in other areas. Also, few NGOs have the resources to expand their coverage to other technical and geographic areas in a coherent fashion. A further complication is that several NGOs may be active in the same region, a situation that could easily promote an unhealthy competition and result in confusion for the recipients.

Without any NGO superstructure or association, there is no vehicle for formal coordination, and any outside attempt to do so probably would be unsuccessful. Presently there are a few nascent specialized groups, about which little is known concerning their capacity to expand (UNITAS in La Paz, ASONGAS for health activities, PROCOSI for NGOs with USAID funding). Thus the responsibility for addressing these factors and trying to ensure adequate communication rests with the donors and local institutions involved (the CORDES and others). The first step would be to actively involve NGOs that are within

a project area to identify activities that are of mutual interest, hopefully leading to closer coordination and greater participation.

Capacity to Expand Activities

Bolivia is a fairly large country in Latin American terms, but has a variety of limitations that represent very real constraints on the amount of expansion, growth, and development that can be accomplished within a few years. New programs can result in funds being misused or not used at all, or in outputs being substantially delayed, all because the implementing agency lacks the technical, administrative, or decision-making capacity to carry out additional activities. This institutional limitation is an intangible factor, usually not appreciated until the shortcomings become evident. The combination of private initiatives, local governmental necessities, and donor agency requirements for action can easily cause institutional gridlock, with little being accomplished because of the overload. This situation is complicated by the lack of communication among entities within a sector, as well as between the different sectors.

Donor agencies, NGOs, and others traditionally have tried to overcome these limitations by building into their projects the necessary skills for implementation, thereby minimizing outside dependencies. However, when the original external funding ends, this self-contained structure often cannot be sustained, and the activity falters. Another way to minimize difficulties has been to limit the activity to a "pilot project" scale. But the assumption that this can later be replicated may be invalid, since the pilot stage usually is adapted to implementation needs by customizing its activities, and this approach would be impractical on a larger scale.

However, there are several other short- to medium-term strategies that could minimize the risk of project stagnation. One strategy mentioned is the need to promote real coordination between donor, government, and other agencies, specifically in reference to preventing an excessive number of activities with the same institutions and in the same geographic and technical areas. Another would be to establish phases or stages of project implementation to allow lagging components to catch up with others if necessary for project development. A variation of this situation would be to design the project with the option to eliminate an out-of-phase component to prevent the entire project from being reduced to the output level of the weakest element. These implementation strategies should be explicitly examined and allowed for in the design of any new projects that are relatively large or require support from other organizations. The longer-term strategy, and the only one with permanent results, is to stress technical training at all levels for Bolivians.

POLICY-RELATED ISSUES

The transformation of the Bolivian agricultural sector from a subsistence level to one of expanding commercial and agribusiness activity is dependent on credit policy, fair competition, tenure security, roads, markets, and so forth. The study team encountered a range of commercial-farming enterprises, especially in the Santa Cruz area but with enclaves elsewhere. A substantial number of roughly similar

projects are under partial implementation or awaiting resolution of specific constraints before they can be initiated.

Some of these constraints are addressed through the activities proposed in this report, but others are broader than can be dealt with under a project-focused approach. Examples of such issues include:

- Import/export procedures and taxes that promote commercial activity without creating subsidies, which generally undermine long-term feasibility;
- Monetary issues of banking system interest rate structure and of currency valuation;
- Enforcement of legal measures to minimize competition from contraband;
- Both infrastructure and other measures to improve the domestic and international freight-carrying capacity (the rural feeder roads project could play a minor role);
- Generalized crop insurance and/or guarantee fund for credit-financed production activities (the grain seed production and agribusiness support services proposals include a limited element in this area); and
- Restructuring the land-tenancy system to facilitate titling of community and personal rural properties (presently a substantial limitation to the potential coverage of credit mechanisms, as well as a permanent cause of instability).

These policy issues need to be resolved to facilitate a stable transformation into commercial agriculture. Otherwise, the insecurity and risk involved will diminish the attractiveness that Bolivia could offer both local and outside investors, as well as noticeably constrain local producers.

Another area of immediate concern relates to the use of natural resources. One aspect of this concern is that of general environmental policies and practices, which is beyond the scope of this report. However, the sound management of soil and water resources definitely should be an integral part of any program related to the provision of rural infrastructure.

A final area of concern is that of governmental issues, such as the need for some type of civil service system and the lack of a functional mechanism for macro-policy analysis. Recognizing these weaknesses, this report minimizes the dependence on GOB entities for implementation as the only appropriate short-term recommendation. The recent sector assessment (Chemonics 1988) states that:

"MACA's ability to conduct planning and policy analysis is beset by the same constraints that affect the Ministry as a whole: instability, political overtones, isolation from both ministries' and farmer concerns, low salaries, employees with inadequate educational background, meager logistical support, and such. Policy analysis and planning require experienced staff who cannot only evaluate the potential impacts of different policy alternatives on the macro economy, but who also can help leaders in the farm and rural sectors identify common goals and define the means to take action. To be effective, planners must have credibility with both the national government and farm community."

Fertilizer Policy

With the exception of a few crops (mainly potatoes), chemical fertilizers are not used in traditional agriculture. Manure, crop rotation (with extended fallow periods), and opening new lands by slash and burn methods substitute for inorganic fertilizer. Even the utility of fertilizer is questioned: at one point the study team was told that with many crops there was "no positive response" to its use. A charitable interpretation implies that the other alternatives are less costly or may be preferred because they do not imply any cash outlay. The concept of opportunity costs (for fallow periods) and resource degradation (through widespread land clearing) seemingly have not been taken into account as additional reasons for reforming the present, albeit implicit, fertilizer "policy."

Fertilizer is marketed through the MACA offices; the quantity of standard fertilizer is determined by the size of the annual donation from the Government of the Netherlands. The sales price only covers the shipping costs from a Pacific port of entry. Consequently, this subsidy (reportedly 32 percent currently) totally distorts the perception of true cost and value of other fertilizer imports and undercuts any potential competition. Since the FAO estimates that the supply covers only two-thirds of the effective demand (at that price), this system creates the need for a parallel resale market and the concomitant corruption needed to stock the market.

The subsidy system also makes it much more difficult for any national production capability or even blending of bulk fertilizers. The one competitive advantage Bolivia would have is the use of natural gas to produce urea, which is being planned for the Santa Cruz area. However, urea is not the appropriate type of fertilizer for the typically acid soils that predominate in the tropical areas of the country. Neighboring regions outside Bolivia need to be investigated for market potential.

A first and necessary step to improve the commercialization of fertilizer would be the reduction or elimination of import duties. It is recommended that longer-term action is needed to support fertilizer trials for major crops in the three geographical areas of Bolivia, with technical assistance to ensure the scientific validity of the results.

Whatever work has been done on fertilizer trials (by location and by crop) has not been distributed to other interested parties. Only the Food and Agricultural Organization (FAO) program has anything close to a national trial system. The lack of a national fertilizer trial system prevents quantification of the problem, including identifying the major types and volumes of fertilizer blends required.

Banking System Constraints

A common theme reported from interviews of governmental officials, potential investors, farmers, businessmen, and even private bankers concerned the inability of the financial system to respond adequately to the many needs for credit. And yet the banking system has a surplus of liquidity estimated at \$200 million. It is important to recognize that these two circumstances are not incompatible, but must be reconciled if the banking sector is to actively participate in economic development efforts. Otherwise, the present tendency will continue for donor funding to seek mechanisms to circumvent the normal operation of the banking system.

When there is a climate of uncertainty and risk aversion, the banking system uses a series of filters to restrict demand for credit. One is outright refusal to consider certain types of loans. The general perception is that agricultural loans are very risky (largely based on the abysmal recovery record the state banks have had). Another less-obvious method is to require a collateral level that mocks the need for credit. The banking system's regulatory body supposedly has set a minimum of two to one, but a common rule is for banks to require three times the loan amount in urban property.

Much of the banks' liquidity comes from the very short-term deposits (90 days) that earn a relatively high rate of interest. Given the recent past history of runaway inflation and devaluation, no bank will commit its own funds to a medium-term loan, but instead will only trade in short-term financial instruments, such as certificates of deposit (CDs). Undoubtedly, banks are not aggressively seeking to increase these deposits, which also build up short-term liabilities. Nor are bank owners building up their equity.

The self-imposed equity ceiling is a constraint on the degree to which commercial banks can finance new activities. The first aspect is the maximum loan size, which cannot exceed 20 percent of a bank's equity. While a healthy, risk-reducing regulation, this limitation makes it nearly impossible for a bank to finance large projects, since its equity base is too narrow. In this case the bank could try joint financing with other banks, but this is rarely done.

A second constraint is the ratio of equity to the total debt a bank can incur (1 to 5). Presently the commercial banks are well under this limit (less than 1 to 3), indicating their reluctance to enter into lending except under the best of circumstances. However, even if banks were to lend to the limit, given their actual equity base they could barely place the \$200 million of excess liquidity mentioned above. New sources of funds (such as the IDB credit lines already scheduled for disbursement) would exceed these limits, and therefore cannot be placed through the commercial system unless substantial new investment in bank equity occurs. This impasse will continue until the confidence in Bolivia's economic health improves enough to induce people to invest in longer-term instruments, such as through bonds, to allow longer-term lending to take place.

The nation's banking system has a role not only as a clearinghouse for people's liquidity and others' demands for funds, but also is an important implementor of macroeconomic fiscal policy. Inflation, devaluation, and interest rates are directly influenced by the operation of the banking system. It is an open question as to the degree to which the central government can continue permitting some financial mechanisms to operate outside the central bank/commercial bank channel, such as the Corporación Andina de Fomento (CAF) and some credit lines in the IDB.

Nevertheless, for the foreseeable future, new donor agency programs will need to circumvent the banking system to be able to finance desired activities. If the results of these programs lead to increased confidence, in turn stimulating more investment in bank equity, then the system will have found a way to break the impasse. Since this is a fairly long-term scenario, a quicker way to stimulate confidence would be to include automatic guarantee funds in donor financing to progressively absorb more of the risk, thereby making feasible longer-term loans in general, and especially for agriculture. In essence, this would be de facto fiscal policy making. Existing laws would not need modification, but the effects on the economy would be felt nonetheless. The donor agencies that rely on substantial credit use for their programs to be successfully implemented will need to assess the GOB's willingness to permit the financial mechanisms that operate outside the traditional banking system.

Natural Resource Management

Reportedly there is nationwide recognition that Bolivia's soil and water resources are seriously misused. Attempts to address this are at best local and limited to specific irrigation projects, and the protection of the more critical roadbeds and small upstream watersheds. The extent of resource degradation urgently requires a focused and concentrated effort on a national scale, or at least departmental scale, to minimize further destruction and to begin the recuperation of these resources. The existing Sub-Secretariat for Natural Resources in MACA has yet to concentrate its efforts on any significant action, other than on IDB-funded projects, which supports the operation of this office.

Applicable technology is available that could be used in most areas. But either this technology is not widely known, or the means for initiating remedial measures are not forthcoming. Ideally, the national government would provide the leadership in designing a program to deal with this situation. But in practice, such an approach has not been applied in concerted policy and action, and therefore the task rests with the departmental authorities. Conceivably, this would be an appropriate area for a PDAR to coordinate actions whenever political boundaries are involved. (An example would be the lack of watershed management in one department having negative consequences on the effective life of a downstream-irrigation system or power-generating dam.)

There are numerous real-life situations where a policy-making body is needed to stem the misuse of resources, such as the watershed management case above. Other relevant examples would include the implications of very large irrigation schemes, of new or expanded colonization areas, of drilling hundreds to thousands of wells in the Chaco region, or of granting extensive logging concessions. Presently, such actions can be undertaken with little if any consideration given to resource management, as long as financing is available.

A type of clearinghouse is needed to bring together and compare the different experiences in resource conservation and management. These experiences have occurred within programs funded by the FAO, COTESU, USAID, and GTZ, and yet the lack of a clearinghouse keeps these technologies at a local, donor, or departmental level. An information mechanism coupled with the power of exercising a veto over local projects that would have significant negative impact on the natural resource base is needed. This would be the indicated role of the Sub-Secretariat for Natural Resources, if it could count on an adequate budget to exercise this responsibility. Another related action of direct interest to donor agencies would be the requirement that future irrigation projects contain an explicit component with financing for watershed management, soil conservation, and reforestation.

ANNEX 1
PROJECT DESCRIPTIONS

PART I
PROJECTS RELATED TO RESOURCE MANAGEMENT
AND SUSTAINABLE AGRICULTURE

SUSTAINABLE AGRICULTURE AND RANGELAND MANAGEMENT

Extensive areas throughout Bolivia suffer to an alarming degree from land degradation. The naturally occurring erosion processes are being accelerated by human activities, the most destructive one being the removal of the groundcover of grasses and small plants through agricultural and animal husbandry practices.

Often the chain begins with trees and bushes being cut down for their wood for construction purposes and for firewood and charcoal. Frequently this same area is used for grazing of domestic animals, which does not allow a natural reforestation process, since the animals eat the buds and shoots of these plants. The animal traffic compacts the earth, reducing the absorption capacity of the soil and leading to even greater water runoff laden with soil particles. The vicious cycle continues with the reduction in revegetation, a diminished carrying capacity, and the resulting overgrazing with the animals (at least the hoofed ones) tearing up the soil to eat the roots. Because the runoff is quicker, the streams and rivers must carry a larger volume, although for a shorter time, causing riverbank and riverbed destruction.

Voluntary and food-for-work programs rarely have much lasting impact in remedying this type of situation. Erosion-control measures will only be effective if a large segment of the rural population feels the obligation to carry out the initial implementation and subsequent upkeep on a permanent basis. The key element is to ensure a visual and positive economic impact for the families involved. The rural population needs to participate in the decision making and implementation aspects of natural resources management. There are too many small watersheds and too many private and community properties to rely upon outside plans for design and implementation. Self-implementation is crucial for this type of activity to prosper.

The study team's proposal considers three separate projects as needed to address the issue of sustainable agriculture and rangeland management. One project involves applied research and training in remedial measures and practices on severely degraded lands. Another project is involved with commercially oriented research and training on fragile but not endangered land. The third project is focused on the implementation of appropriate conservation works in key areas, at first using presently available techniques, and later incorporating newer elements resulting largely from applied research. Each of the three projects could be done independently of the others, although its effectiveness would be reduced. Bolivia needs a very long-term solution that is self-sustaining, and all three elements are required for this to occur. Although the proposed project timeframe for these activities is budgeted for only five years, the long-term nature of applied research in the first two cases would require a substantially longer period of constant activity. The third project proposal is the initiation of permanent application of both the technological practices and the extension training developed under the other two projects.

1. NATIONAL LAND USE/RESOURCE MAP

PROJECT PURPOSE

The project will develop a national land-use resource information system by integrating existing topographic maps, soil and vegetation maps, and crop response information on a computer GIS database. This would allow agricultural and land-use planners to integrate various land- and resource-based information sources to make better decisions on present and future land use, soil classification systems, and projected crop responses.

PROJECT DESCRIPTION

Current Situation

Within Bolivia there are several publications that deal with different aspects of the natural resource base. However, most of these are statistical summaries and do not lend themselves to planning functions. There are maps, air photos, and other geographic information sources, but these have not been integrated, and there is a need to integrate this into a single body of information for use by a larger audience.

If there were a series of maps of the entire country, each showing a different aspect of the actual land use, then rational, integrated planning for several disciplines could be undertaken. A key component for this type of planning is a mapping project based on the integration of satellite imagery, aerial photos, soil and vegetation maps, land-use patterns, and crop-by-environment interactions. This proposed project will develop a centralized land-use mapping program that will pull together several bodies of information.

There are some existing data sources which can be integrated. The Instituto Geográfico Militar (IGM) has prepared topographic maps for all of Bolivia at a scale of 1:50,000 and 1:250,000. These maps, which are based on aerial photos, are excellent for locating existing physical features such as mountains, valleys, rivers, roads and population centers. However they do not provide any indication of the actual land use, nor the quality of agricultural land. In addition, there are three CUMAT projects which have data that can be integrated with the IGM topographic maps: 1) PDAR, with the cooperation of DAI and Stanford University, completed a satellite imagery study of the Mizque-Aiquile region, 2) the departmental MACA in Cochabamba is working with the PDAR to develop a computer database that relates soil types to fertilizer responses, and 3) the FAO has a fertilizer testing program that can provide baseline data for the integration of land use and fertilizer response information.

Main Focus of Work

Central to this effort will be a map of the principal agricultural regions and populated areas of the country based on the IGM maps and updated satellite and/or aerial photos. Ground surveys would be conducted to confirm vegetation and soil types. Current land use would be documented and tied to the

satellite/aerial photos. Existing data relating crop response to agricultural practices would be correlated with soil and climatic units.

IMPLEMENTATION AND ADMINISTRATION

The project would be implemented by the USDA Soil Conservation Service, in cooperation with the IGM. Each department in the country would be assessed separately, and, in cooperation with the Departmental Development Corporation, areas to be mapped would be identified. Particular attention would be given to those areas already extensively used for agriculture, or for those areas that would most likely be developed in the near future.

Activities

The main soil-mapping activities under the project would include: 1) collect satellite and/or aerial photo imagery, and 2) on-the-ground soil studies, 3) land-use capability unit development, 4) soil sample collection and analysis for chemical and physical properties, and 5) soil classification and correlation to soil mapping units.

The principle soil fertility activities under the project would include: 1) a national survey of crop research and soil fertility trials, with emphasis on crops in those areas being mapped, 2) data entry into a computerized database for soil map correlation, and 3) determination of land-use potential in Bolivia.

Important infrastructure activities under the project include: 1) analytical laboratory upgrading or construction, 2) development of a national soil and water computer database (this would be part of the National Agricultural Information Centers Project mentioned elsewhere in this document).

There will be numerous training activities under this project. The strengths of existing Bolivian organizations, such as the IGM, would be used to develop and coordinate all activities. The goal of the training programs would be to develop a cadre of trained experts with "hands-on" experience.

Specialists Needed

Examples of the types of specialists needed in this program and their activities are: 1) aerial photographer to check and coordinate aerial photograph production; 2) photographer and mapping specialist to run the darkroom services for the project and coordinate mapping data as it is collected, plotted and verified; 3) soil classification specialist to map soils; 4) vegetation classification specialist to carry out on-site descriptions and develop a land capability map; 5) research data specialist to correlate data from all existing agricultural, geographic, and botanical data sources and to prepare it for entry into a computer database; and 6) soil/water laboratory specialist to handle soil and water analyses and train technicians in lab operations.

RELATIONSHIP TO USAID COUNTRY STRATEGY

This project would provide Bolivian planners with a potent tool for developing a rational, long-term, land-utilization plan and would give planners an inventory of existing resources. The project would also help identify environmentally sound natural resources projects such as watershed management, erosion control, revegetation programs, and livestock management. The development of cadastral maps would aid significantly in land titling and thereby would be fundamental in any program that relies on rural credit availability.

BENEFICIARIES

The main impact of this project would be to develop the long-term, land-use analysis and planning capability of Bolivia. Some of the specific benefits include: 1) development of research, conservation, and infrastructure programs would be significantly improved; 2) donor projects could be planned and implemented with more certainty of future success; 3) local agricultural officers would have a centralized, computer-based system with which to develop specific cropping and land-use programs; 4) MACA/IBTA officials and private consultants would have access to information vital for providing sound technical advice to the farming community; 5) local land registry offices would have actual maps for defining and legalizing land boundaries; and 6) soil and water laboratories would be upgraded and fully equipped with trained staff.

HOST COUNTRY AND OTHER DONORS

There are, and have been, several programs within Bolivia dealing with land-utilization issues. However, virtually none of them have been coordinated into a single, inter-related program. There have been regional development projects in almost every department of Bolivia, but most of these projects began without a clear idea of the actual resources available. It was only after the project was under way did physical and resource limitations begin to appear.

The CUMAT in La Paz would be a good organization on which to focus resources. They have had successful contracts with USAID, the World Bank, and recently with the PDAR and DAI programs in Cochabamba. They have also developed a land-use capability system for Bolivia that is based on programs developed by the Tropical Science Center in San José, Costa Rica.

MAJOR OUTPUTS

The major outputs from the land use/resource mapping project include:

- National soil classification map;

- National land-use capability map;
- National vegetation map;
- Aerial/satellite photos of the entire country;
- Improved land- and resource-use planning;
- A cadastral system to improve land titling;
- Trained land-use planning technicians;
- A computerized database for crop/fertilizer/land classification;
- A series of experienced soil and water labs; and
- Training in using and maintaining this type of system.

FINANCED INPUTS: \$12,000,000

Short-term Technical Assistance

- USDA Soil Management Support Services planning team (\$450,000): five specialists x 6 months (aerial photography, soil classification, vegetation classification, research data, soil and water analysis labs). Other USDA specialists: four specialists x 6 months (\$350,000).

Long-term Technical Assistance

- USDA/SCS long-term technical team: four specialists x 5 years (\$4,000,000) and personal support (aerial photography, photographer and maps, soil mapping, vegetation mapping); two specialists x 3 years (\$1,000,000), and personal support (agricultural research data, soil and water analysis labs, and training).

Other Expenses

- **Materials and travel (\$200,000), airplane and cameras (\$2,000,000), photographic equipment and supplies chemicals (\$1,000,000), 30 vehicles and maintenance (\$2,000,000), office furniture and maintenance (\$200,000), and six soil and water labs (\$800,000).**

2. NATIONAL AGRICULTURAL INFORMATION CENTERS

PROJECT PURPOSE

The project will provide a national agricultural documentation network to backstop technicians and others working in agricultural development. The documentation network would have a multiple use function including instruction, research, and project development.

PROJECT DESCRIPTION

Current Situation

Agricultural documentation is available throughout Bolivia but it is often difficult to access. Each donor agency, NGO, or governmental office typically has a collection of documents. However, the accessibility and quality of these collections varies greatly among institutions. Many institutions, particularly governmental entities with severe budget constraints, do not allocate funds for acquisition, duplication, cataloguing, or storing of documents. In addition, institutions tend to have collections consisting primarily of their own publications, or those that specifically relate to their own current or past agricultural activities. The end result is that professionals do not have adequate technical information about the results of their work, as well as work conducted in other countries.

Another stated need is for agricultural statistics. Because most individuals working in agriculture do not have ready access to current agricultural research materials, project design and implementation often lack a sound knowledge base. During the reorganization of the Ministry of Agriculture (MACA), a computerized system to provide agronomic data was included in the design. However, this plan was never implemented (Price Waterhouse: 1989).

The central focus of the project would be to set up a series of documentation centers in each of the MACA offices and the departmental development corporations (CORDES) throughout Bolivia with MACA serving as the implementing agency. The Instituto Nacional de Estadística (INE), which collects and analyzes agricultural data, would also participate in the planning and implementation of the documentation project.

Activities

Although data collections would vary from center to center, the catalogue of each documentation library would be accessible through a nationwide computerized network for literature searches. This type of network would be especially important to provide and update agronomic statistics. Although Bolivia does not yet have the technological capacity for direct computer linkages between cities, the database could be stored on disks that could be updated on a regular basis and circulated to participating centers. A main library located in MACA in La Paz would become the national repository for all agricultural documents, whether in original or facsimile format. This central repository would be responsible for the updating of the documents database, dissemination to local centers, and obtaining and disseminating agricultural information abstracts available on disk through subscription to international agricultural abstracting services. An important function of this network would be the collection and storage of the results of agricultural investigation being conducted throughout Bolivia. Finally, it would have the function of locating and requesting through an interlibrary loan system those documents within Bolivia or at other international libraries required by users of this network. Each local library would be provided with the means for reprinting (photocopying) documents for local library or network clientele at a reasonable cost to the user. Technical training would be provided to existing library staff in each departmental MACA and CORDES office as well as to selected INE personnel.

An additional survey of documentation centers to assess their library holdings as well as invite their collaboration would be conducted during the initial stages of the project. Of particular note are centers such as CIDRE (Centro de Investigación y Desarrollo Regional); CEDLA (Centro de Estudios para el Desarrollo Laboral y Agropecuario); CUMAT (Centro de Investigación y Estudio de la Capacidad de Uso Mayor de la Tierra); CIAT (Centro de Investigación Agrícola Tropical, Santa Cruz); CDC (Centro de Datos de Conservación) and INE (Instituto Nacional de Estadística). Finally, there are a number of international agricultural centers with excellent reference libraries whose collaboration and participation in this project would be invaluable, such as CIAT (Centro de Investigación Agrícola Tropical) in Colombia, IICA (Instituto Inter-Americano de Cooperación para la Agricultura) in Costa Rica, and CIMMYT (Centro de Investigación de Maíz y Trigo) in Mexico.

IMPLEMENTATION AND ADMINISTRATION

The project implementing agency would require two elements: a central office in the capital city of La Paz, and a stable, national scope of activities with a strong, technical base. At this stage, the key element is the organization of the activity, and not the provision of the service, which follows afterward. For this reason, the most likely candidate as implementer would be CUMAT, given its solid organization and national focus. CUMAT would channel project resources, technical assistance, and training to the recipient outreach agencies — IBTA offices and the different departmental development corporations.

The project would provide technical assistance for user institution training and set-up of the system, computer hardware, software, copying machines, and other necessary equipment for library maintenance. MACA and participating CORDES would provide personnel and space for housing each library. Once well established and with a sufficient number of technicians trained, the actual operational costs should be modest enough to ensure the activity will continue with local funding.

RELATIONSHIP TO USAID COUNTRY STRATEGY

This system would provide backstopping to efforts in the agricultural sector and would therefore support redefined goals of alternative development on a national scale. Indirect linkages would be obtained with the expanded Chapare Regional Development and the Export Promotion and Diversification Projects.

Since most public sector institutions have suffered frequent turnover of technical personnel, this system would provide for greater "institutional memory" and efficiency. Once the agricultural information system is established, it could then be extended to other related areas of interest to form a national information network. Private sector entities and individuals would have access to information necessary for realistic decision making, based on current data.

BENEFICIARIES

Principal beneficiaries would be agricultural technicians, planners, and associated MACA and development corporation personnel as well as those in training for careers in agriculture, such as university students. Other beneficiaries would include all those individuals and agencies working in the field of agricultural development in Bolivia in both the private and public sectors.

HOST COUNTRY AND OTHER DONORS

MACA and the development corporations would provide personnel and space. There are other donor agencies such as the United Nations, the Dutch government, and several church-related organizations that are already supporting documentation projects. These organizations could assist in the planning of this type of activity, and eventually be encouraged to contribute with funding, particularly on a long-term basis once the prototype system is established and operational.

MAJOR OUTPUTS

The major outputs from the National Agricultural Information Centers include:

- National agricultural library network;
- Departmental research libraries (at MACA headquarters in La Paz and at each MACA and regional development corporation departmental center);
- Training of library personnel at user institutions, upgrading of existing agricultural documentation libraries, and the establishment of new documentation centers where previously absent;

- Reprinting services at the national repository and at each regional center;
- Dissemination of library database through MACA to local centers; and
- Computerized access to national and regional agricultural libraries.

FINANCIAL INPUTS: \$2,500,000

- One full-time expatriate database library system advisor based at CUMAT in La Paz — 3 years (\$450,000); two MLS-degree, or comparably experienced, librarians with background in setting up computerized database library systems to work in each department to set up local systems — 3 years (\$900,000); one TCN computer technician with library experience — 5 years (\$600,000).

Training and Equipment

- Local training programs (2-week courses) in library database systems primarily for MACA and CORDES personnel — 50 people x 3 years (\$300,000); computer hardware and software — 1 national and 9 departmental centers (\$150,000); travel and operating expenses — 5 years (\$100,000).

3A. LAND AND WATER MANAGEMENT RESEARCH AND TRAINING

PROJECT PURPOSE

This project will design and verify appropriate techniques in rural community and farm settings in the areas of land management and rehabilitation, water conservation, and irrigation and drainage design. The focus of these techniques will be to contain severe resource degradation, while increasing the net rural family income. This project also has a training component for participating farmers and personnel in related projects.

PROJECT DESCRIPTION

Current Situation

Large parts of the valley regions have rainfall between 300 and 500 mm annually, concentrated in heavy showers during three to four months. Soils in many eroded places are now very thin and thus have low rainfall absorption and plant nutrient carrying capacities. Both of these factors exacerbate soil degradation through sheet, splash, gully, and riverbank erosion, and these also lead to unwanted sediment deposits. Despite the ever present and striking visual evidence of erosion, efforts to control this process are largely limited to affected lands near or in urban areas: La Paz, Santa Cruz, Cochabamba, and Tarija. Watershed management (as opposed to erosion control) is infrequently seen.

Water resources in the altiplano and valleys are scarce during the dry season and sometimes also during the rainy season. They can be categorized in the following:

- Pumped ground water, which especially on the altiplano, often is saline;
- Free flowing groundwater, normally fresh, but sometimes salty in case of thermal springs;
- Surface and subsurface water, available until shortly after the end of the rainy season; and
- Water derived from annual storage reservoirs.

Pumped water can only be used with economic management systems that are sufficiently monetized to be able to pay the cash requirements of a pumping operation. The cash may come from the agricultural part of the system or from other sources of income.

The general degradation of landcover causes a decrement of free flowing groundwater and subsurface water. Large-scale recovery of the lost landcover will be a very difficult and slow process. Since it would be difficult to prove the associated increment of water available for irrigation, the recovery of landcover has to be defended on its financial short-term merits derivable from its directly harvestable produce.

During recent years there has been a large effort to construct reservoir dams for storage of irrigation water, especially in the valleys of Cochabamba. This effort is important once economic and social problems related to rapid increase of irrigation are solved. One of the main problems is the tremendous change of land values once permanent irrigation water becomes available. Since a property's value may easily triple or quadruple in this way, the probability of disputes also is multiplied.

In part because of legal difficulties in the land titling process and in part because of extensive communal lands, it is far from clear in what fashion landholders will benefit from irrigation systems. Some holders would have increased access to water resources, while others would need to sacrifice at least some area to reservoir flooding and other infrastructure. Formal legal rules are inadequate and of the few rules in existence, the levels of enforcement are negligible. Therefore adequate legal procedures are needed at an early stage to ensure the targeted rural population (rather than just a chosen few) actually receives the intended benefits to socially justify the required investments.

Developing irrigation is a secure but costly means of increasing agricultural production. In many cases land and water management systems plus extension can be cheaper on a per hectare basis, and possibly even on a production volume basis. Just as irrigation alone is not a sufficient condition for successful agriculture, neither is its lack a definitive limitation. This approach has the advantage that it by-passes the legal and social considerations mentioned above.

Trial Areas and Baseline Studies

A first step in implementing this project would be to design a methodology for the selection of trial areas and the use of baseline studies. A primary factor is the willingness of local rural population to participate in the planning and execution. Other criteria include the grade of degradation, rainfall level, and the location within the valley region. Baseline studies are especially important in trial areas that will receive intensive attention. This effort would include determining plant population species and density in correlation with soil quality and accessibility to grazing. Full enclosures have to be established in order to facilitate germinating and growth of dormant seed.

Another aspect of baseline studies is to determine the attitude of the population toward conservation practices and land and water management. This has to be done also in communities that will not be exposed to direct contact with project workers, to better appreciate the probable impact of extension programs by informal communication methods between participants and nonparticipants, as well as mass media exposure.

Trial areas should preferably be composed of entire watersheds of 250-1,000 square kilometers surface area. Such size areas will be occupied by multiple communities, facilitating differentiated treatment at the community level. One such element will be the presence or absence of irrigation potential within the community. In the section below on irrigated land and water management, some indications are presented on integrating irrigation perimeters into dryland and water management.

If the project focus would be primarily on Cochabamba, northern Potosí, and northern Chuquisaca, three study areas may be selected. The study team suggests one in a relatively drier area, such as near Aiquile or Mizque in Cochabamba. A second could be in a more humid area, similar to Totora or Ayopaya. A third one could be located in a high mountain area of northern Potosí to explicitly include other social aspects of land and water management in the traditional altiplano environment.

Rainfed Land and Water Management Topics

1. In addition to the usual resource management issues by this component two other aspects should be interwoven. The first is a gradual introduction of agricultural inputs which presently have little use. These would include improved seed, fertilizer and other agri-chemicals, farm implements, produce storage, and credit to have access to these inputs. The second is to be attentive to the use of "appropriate technology," especially in reference to farm implements. Examples include the steel-pointed wooden plow, Persian threshing machine, and portable grainmills. The important element is to use accessible technology with low capital cost to increase labor productivity, permitting both on-farm income and spare time to increase and in this way permitting the adoption of labor-intensive conservation measures.

2. Many physical modifications of soil surface have been developed in Bolivia and elsewhere, and adaptive research and extension would permit their implementation in specific situations of soil types and rainfall. These modifications are mainly related to the following techniques:
 - Contour plowing and ridging;
 - Terrace building (level, forward and backward sloping);
 - Living terrace walls (Acacia caven, Prosopis sps, Opuntia sps, maguey, various thorny bushes, Viviter grasses), some also used as living fences;
 - Infiltration ditches plus the use of deep-rooting leguminous species to promote vertical percolation;
 - Retention ridges (called "media lunas");
 - Variations of plant densities for soil conservation purposes, in comparison to normal production practices; and
 - Depth of tillage and low or zero tillage.
3. Animal husbandry practices require modification to minimize soil compacting during the rainy season and overgrazing in general. With live fencing and limited or no grazing recently revegetated areas can be protected. This would require corral feeding, irrigated pastures, and silage production. A secondary benefit would be the increased capture of manure for fertilization.
4. A key element is the control of further waterway erosion. This includes gully and riverbank protection and restoration with stone-filled cages and living barriers and reinforcements. Ideally, this could lead to regaining some lands for agriculture and roadways.
5. The most critical theme to investigate is the relation of the above physical and technical measures to community and farmer implemented and controlled management. Only in this fashion can there be both maintenance of improved areas and local initiatives to increase the areas covered. The problem of soil and water conservation is too widespread to depend on government-sponsored remedies except as catalytic or complementary measures.

Several key factors are involved in this investigation. A principal one is the registration of private, communal, and public property to provide long-term stability. This would also facilitate both individual farmer and community loans, with their respective responsibility. Another factor is to evaluate the social, technical, and financial feasibility of the conservation and reconstruction measures developed. An in-depth sociological investigation is needed to determine the role of different family members in their own economy, as well as how this relates to the community. An example would be the custom of children functioning as shepherds, which obviously impacts on the schooling and literacy programs. The adoption of corral feeding could make the option of schooling more feasible for the rural family and provide a needed background for acceptance of conservation measures.

Irrigated Land and Water Management Topics

1. Irrigation development can imply more than having new options for crops, extending the growing season, or lessening risks on irrigated land. It also can modify the management of dryland farming. An example would be the shifting of pastures from dryland grazing to irrigated forage production used in corral feeding, thus freeing the nonirrigated land for crops not feasible when foraging animals are loose. This change would affect both irrigated and rainfed land use. Other aspects of irrigation studies and extension would be the introduction of new technology, such as the limited use of sprinkler and drip systems and the need for improved drainage to reduce the problem of increasing salinity.
2. Irrigation problems are not limited to the availability of water. Other areas of concern would include the relationship of community construction of irrigation facilities with the distribution of water, the size of properties to be irrigated, and the determination of the proper share of labor to be provided in terms of the future access of the individual to water supplies. Training also is important, since farmers probably would not know about optimum quantities of irrigation water, times to irrigate, size of flows, rates of infiltration, flow rates in relation to erosion, soil types/depths/slopes. These questions are important in ensure an optimum use of limited water supplies.
3. As no adequate water law exists, the project could serve as a pilot effort to provide guidelines for future regulations. A technical bureau could be established in collaboration with MACA and the departmental development corporation to handle the overall planning and settle disputes, thereby serving as a laboratory for the enactment of a national water law. This also would help reinforce the operations of water user associations.
4. In several places, especially in the Cochabamba watershed with its complex series of reservoirs and aquifers, a well-directed water resources study is needed for several subjects, such as:
 - Potential transfers of the Chapare side of the Tunari to Tiraque mountain range;
 - Possibilities of reservoir construction in mountains;
 - Estimates of additional surface water supply during the dry season and of aquifer recharge if vegetative cover were better established;

Another general area for applied study would be sociological in nature, covering the role of women in irrigated agriculture and produce marketing.

IMPLEMENTATION AND ADMINISTRATION

At the present time there is no one entity which would be in a position to manage a nationwide applied research program such as the one proposed. However, if the project's range is initially limited to the areas of Cochabamba, northern Chuquisaca, and northern Potosí, the Natural Resources Division within CORDECO would be the most appropriate choice. Once a trial subdirectoriate is created as forerunner of a national agency for water resources, then a partial shift of project responsibilities would

take place. The present division would need to make administrative arrangements and coordinate technical decisions with corresponding offices in the other development corporations (CORDECH and CORDEPO). Another entity that should have a role in this activity is the university system, since participation by students and faculty in applied research methods and training exercises would permit a much greater impact. However, the primary implementation relationship is between the implementing agency (development corporation) and the rural communities.

RELATIONSHIP TO USAID COUNTRY STRATEGY

Sustainable agriculture involving the normal rural community and natural resources management are cornerstones of a long-term development strategy. Given the widespread erosion in urban and rural areas throughout Bolivia, substantial effort would be required to develop methods that contain this damage and begin to reconstruct land areas wherever possible. At the same time water resources would be better used for domestic, agricultural, and industrial purposes. These issues are consonant with the Title III components of agricultural and resource management, food security, and rural health, as well as the expanded alternative development program efforts.

BENEFICIARIES

The impact from this research and training program is of a long-term nature, primarily in the area of environmental improvement, and, secondarily, for the generation of additional employment and income resulting from the application of practices developed under the project.

Immediate beneficiaries would be the participating technicians, students and teachers, and others trained through the project. These people in turn would transfer this technology to farmers and landholders, thereby resulting in improvements in productivity (and income) and resource stability.

A less obvious beneficiary would be the downstream rural or urban dweller, since well-implemented upper watershed management should make downstream conditions less critical. With improved water supply control, both irrigation and domestic uses would benefit, and downstream irrigation and hydroelectric infrastructure would last longer.

HOST COUNTRY AND OTHER DONORS

All the CORDES in the proposed project region are actively trying to expand their land and water management activities, although rarely including any research and training. In Cochabamba CORDECO does have some investigation efforts with COTESU, and the Cochabamba University has a small project with the Dutch Wageningen Agricultural University. In Tarija the FAO-sponsored PERTT project has organized a number of rural communities for some aspects of land and water management practices. SEARPI in Santa Cruz is implementing a watershed management project, mainly in response to the erosion problems in the downstream city of Santa Cruz.

The GOB has indicated that the "use, management, recuperation, and conservation of natural resources" is part of the alternative development strategy "to preserve the ecological equilibrium and its sustained utilization." The Supreme Decree No. 22407 (January 1990) echoes this intention, although the wording reflects an ecological interpretation instead of resource management.

The Swiss government with its COTESU program is working with agricultural university graduates on farm extension programs. This project is also tied to the on-farm soil conservation program.

MAJOR OUTPUTS

The outputs of this project reflect the research and extension orientation of its activities, that is, different types of applied investigation, numbers of participating farmers and technicians trained. However, the desired future application of these outputs are really the justification for the project, and these are more elusive to quantify. During the project, certain outputs can be expected:

- In the trial areas the soil loss should be reduced, and farm family employment and income should increase where the erosion process has been halted because of the adoption of more appropriate agricultural and animal husbandry practices;
- Formal and informal training materials and techniques will be developed to be applicable at all user levels and in local languages; and
- Students and technicians will obtain practical experience in natural resource management, as well as extension techniques in imparting this knowledge.

FINANCIAL INPUTS (first five years): \$11,000,000

- Project orientation studies: baseline studies year 1, and impact studies years 3 and 5 (\$250,000);
- Long-term technical assistance (5 years each): hydrologist/design engineer, geo-hydrologist, land/water management specialist, agricultural systems engineer, sociologist/economist, and animal husbandry specialist (\$4,500,000);
- Short-term technical assistance (12 person-months) (\$900,000); and local specialists, student assistants, other staff (\$1,500,000); and
- Commodities and support: office and warehouse construction; office and laboratory equipment; transport vehicles; tractors, earth-moving equipment; office operations, teaching, extension materials; transport vehicle operations; tractor, etc. operations; soil/water analyses, test drilling; machine and labor costs for gully shaping, riverbed controls; and experimental agricultural operations (\$3,850,000).

3B. COMMERCIAL CROPS AND RANGELAND MANAGEMENT RESEARCH AND TRAINING

PROJECT PURPOSE

This project will provide the applied research and subsequent extension-oriented training needed to complement soil and water conservation efforts. The focus will be on land-use patterns and practices for commercially viable crops and animal husbandry activities adapted to the specific geographic area.

PROJECT DESCRIPTION

Current Situation

It is valid to say that nearly all of the available land in the valley is in use. Lands that are not too rocky and somewhat flat or moderately sloped are used for agriculture. Very steep or rocky lands should have natural vegetation of at least shrubs, grasses, and other small plants. However, it is this vegetation that is overgrazed and otherwise gathered up. The resulting lack of groundcover speeds the soil-degradation process, to the point where in many places the infertile substratum is exposed by erosion. This process is difficult to halt and nearly impossible to reverse.

Like the Land and Water Management project mentioned previously, this proposal addresses issues of natural resources use and conservation. The main difference is that this proposal is focused on the management of land that is not as severely degraded and permits a more intensive use. In practice, a farmer with erosion problems probably would have to deal with both types at the same time.

The research program should be designed around the production/processing/marketing activities that result in a higher sustainable return to family labor coupled with environmental stability. A relevant objective in choosing crop types and varieties may not maximize production or even income on a per-hectare basis. Often land is not the limiting factor of production, and therefore the option exists to have access to enough land to optimize a scarcer resource such as labor or water. To be self-replicating and sustaining by the rural population, these activities must demonstrate their clear superiority to traditional ones in income generation without increased risks.

The above statement is especially valid when considering traditional animal husbandry. Animal herds (mainly sheep, goats, and llamas) serve at least three functions:

- Production of meat, fibers, and skins as income source or for family consumption;
- Production of manure to fertilize staple food production (probably worth more than other animal products); and
- Relatively secure form of savings.

The farm production system almost requires the maintenance of this form of animal raising because of these multiple functions. The only certain way to reduce overgrazing of rainfed lands is to provide an alternative source of animal feed, coupled with full or partial stabling and corral feeding. Usually this can be accomplished only through the use of irrigated pastures. The effectiveness of irrigation can be dramatic: it has been estimated that 20 hectares of rainfed grazing lands in Tarija could be replaced by just 0.5 hectare of irrigated alfalfa. Another benefit from fallow lands seeded with grazing crops (usually leguminous) is that these leave a large quantity of rootmass to improve infiltration and moisture-holding capability, helpful for following agricultural crops.

The project also must produce the agricultural materials needed to carry out the production and conservation activities. This could include the establishment of nurseries for:

- Drought-resistant fruit and nut trees;
- Grafting materials and local trunkstocks;
- Rapid-growth trees for firewood and construction timber;
- Appropriate crops for short-term intercropping to provide some income while slower-growing trees come into production;
- Apiary materials;
- Berry bushes;
- Cactus for fruit (tunas), colorants (cochineal/carmine), or emergency fodder;
- Fibrous plants such as maguey;
- Oilseed plants, such as castor bean and jojoba; and
- Specialized pastures (drought resistant, nitrogen fixers, C4 types) and low palatability grasses for waterways and terrace walls.

The training component is focused on participating farmers and families and the technicians related to the project. To expand the impact, universities should be encouraged to build into the agriculture curriculum specific formal training and field work in conservation, and this project would be the best vehicle for this type of activity.

IMPLEMENTATION AND ADMINISTRATION

As in the case of the Land and Water Management project, there is no entity that presently could implement a nationwide activity of the type proposed. If the geographic range is limited to the valley regions in the departments of Cochabamba, Chuquisaca, and Potosí, CORDECO's Agricultural Production Division would be the first choice for the primary implementing agency. Undoubtedly,

certain aspects could be implemented through agreements with existing experiment stations operated by IBTA and by CORDECH. However, a balance would be needed between the commercial and the conservation focuses, as well as communication with other activities with a strictly commercial orientation, such as by a few producer organizations. This would certainly be the case if the project proposal for commercial crop germplasm improvement were implemented, since substantial specialized short-term technical assistance is involved and could be shared to some degree.

Methodology

Applied research and training would be conducted at two different levels. One would focus on individual crops and pastures under controlled conditions in an experimental station environment in three distinct resource and climatic situations. The other level would be on participating farmer-managed land areas to test practices in a realistic manner. Three different research stations should be contemplated: one would have relatively good soils and rainfall levels (although with definite erosion problems); another with valley bottom land conditions, possibly with some irrigation possibilities; the third having poorer soil and water resources. Examples of these locations would be (1) the Lambate River Valley in La Paz; (2) Punata, Cochabamba; and (3) Aquile, Cochabamba, or Sucre. Other possibilities would include Tarija and the upper parts of the Río Grande and Río Piraí in Santa Cruz. Test plots, nurseries, and seed multiplication facilities would be established in these areas.

As in the case of the land and water management proposal, a thorough baseline study is required in the different project areas. Initial conditions would be documented concerning natural vegetation, agricultural and animal production, types and degrees of erosion, social aspects (population densities, literacy rates and health indices, and access to public services), and other development activities in the vicinity. If both project proposals were implemented simultaneously, some overlap could be taken advantage of for these studies. Local NGOs and the National Community Development Service (SNDC) could be contracted to carry out these studies.

RELATIONSHIP TO USAID COUNTRY STRATEGY

This project would combine efforts in natural resource management, sustainable agriculture and conservation, while facilitating the transition to commercial agriculture. These elements are also part of existing activities under the Alternative Development Project and the Title III Program. Depending upon the particular crops involved, some impact would be seen on export or import substitution activities. Improvement in health and nutrition aspects would be consistent with the objectives of the present Maternal and Child Health Project.

BENEFICIARIES

Immediate beneficiaries would be the participating technicians, students and teachers, and others trained through the project. These people in turn would transfer this technology to farmers and landholders, thereby resulting in improvements in productivity (and income) and resource stability.

Another group of beneficiaries would be those farmers who utilize the plant stock produced in project nurseries, although this impact might take years before being felt.

HOST COUNTRY AND OTHER DONORS

If CORDECO becomes the primary implementing agency, its two divisions for natural resources and agricultural production would need to collaborate. Coordination would be necessary with other probable participants, such as MACA/IBTA, CORDECH and CORDEPO, local universities, and agricultural producer organizations.

MAJOR OUTPUTS

The project has three focal points for both research and training activities, each with its own nursery and seed multiplication capacity and a number of participating individual and community properties. In addition to nursery and seed activities, the project will promote the following activities:

- In the trial areas appropriate land use and conservation practices should be evident, as well as increased farm family employment and income from the introduction of new or improved varieties;
- Communities will be trained in the operation and maintenance of local nurseries for their own use;
- Formal and informal training materials and techniques will be developed to be applicable at all user levels and in local languages; and
- Students and technicians will obtain practical experience in natural resource management, as well as extension techniques in imparting this knowledge.

FINANCIAL INPUTS (first five years): \$7,300,000

- Project orientation studies: baseline studies — year 1 (\$100,000); impact studies — years 3 and 5 (\$150,000);
- Personnel: long-term technical assistance — 5 years (\$3,000,000) in fruit and nut production, pastures and forage crops, agricultural systems, and extension technology;
- Short-term technical assistance: 12 person-months/year (\$900,000);
- Local specialists, student assistants, other staff (\$1,000,000); and

- Commodities and support (\$2,150,000): office and warehouse construction, laboratory, training equipment, vehicles, office operations, teaching and extension materials, vehicle maintenance, soil and water analyses, species determinations, nursery construction (3), genetic stock, seed multiplication, and experimental agriculture operations.

3C. WATERSHED CONSERVATION WORKS AND TRAINING

PROJECT PURPOSE

The project will improve the quality and carrying capacity of individual and community lands for economically viable and sustainable activities in agriculture, animal husbandry, and forestry in upper watershed regions. Also, it will improve the long-term viability of downstream irrigation and reservoir infrastructure and reduce erosion.

PROJECT DESCRIPTION

The present proposal would develop a series of conservation infrastructure works in three key regions using known technology. At the same time activities in related projects will be coordinated with those of this proposal. The suggested areas are the central valley in Tarija, the upper part of the Paraf River in Santa Cruz, and the region on both sides of the Cafne and Grande Rivers in the departments of Cochabamba, Chuquisaca, and Potosí. The first two areas would contain approximately 10 communities each, whereas the third would have around 60.

The key element for implementing a large number of small, discrete project activities is the functional decentralization of decision making. Technical assistance and other support services can be centralized, but the full identification with project objectives and participation in their implementation must come from the beneficiaries. Otherwise the geographic coverage and impact would never extend past the project area, and Bolivia's natural resource management problems go far beyond what outside funding can remedy. For this reason, strong consideration should be given to the use of food aid and paying wages for community work only as a last resort. Otherwise, this form of payment could rapidly become a quid pro quo for community activities. Therefore, no food aid or community labor wages are contemplated in this proposal, as they would only serve to establish a dependency not conducive to sustainable rural infrastructure development designed and implemented by the rural communities themselves.

The different activities can be grouped according to major impact, whether in the community's or the individual's interest. In general terms, the community benefits from the following actions, although obviously so do individuals:

- Tree nurseries for transplant materials destined for firewood, timber, and conservation uses, plus some grafting and trunk stock for fruit production;

- Gulley containment;
- Low water-level reservoirs or dams (multiple purposes such as irrigation, domestic and possibly potable water uses, also can include personal property as well as community improvements);
- General training and demonstrations of construction and conservation methods (also serving implicitly to assist in community organization for these activities); and
- Seed production for pastures, terracing and waterway uses.

Other activities that directly impact on individual properties and would be financed in part with medium-term credits:

- Terrace construction, either retaining walls or with living materials for walls and irrigation waterways;
- Agricultural inputs, including contour land restructuring;
- Apiary materials for more effective pollinization and added income and employment generation;
- Housing and farm building improvements to improve both living conditions and animal security and containment; and
- Health-related improvements, such as latrines and domestic water supply.

IMPLEMENTATION AND ADMINISTRATION

The Natural Resources Division of CORDECO has the administrative infrastructure and proven experience to manage a long-term and relatively dispersed series of activities. Project activities can be grouped according to general function: those involved with the actual construction (relatively short-term commitment) and those dealing with the utilization of this infrastructure (longer term). At first glance, the CORDES for Cochabamba, Chuquisaca, and Potosí, PERTT-CODETAR in Tarija, and SEARPI in Santa Cruz would be appropriate for the first function. The activities concerned with modifying agricultural practices and training might better be carried out utilizing the existing NGO community for implementation.

RELATIONSHIP TO USAID COUNTRY STRATEGY

This project would relate to the Title III Program objectives of sustainable agriculture, natural resource management, food security, and rural health. Furthermore, the activities would be complementary to and supportive of the expanded Chapare Regional Development Amendment.

BENEFICIARIES

The impact of conservation works would be first seen in the generation of sustained employment and increased labor productivity and family income. The long-term aspect would add the element of an improved environmental use of natural resources. These practices would also result in a more stable food supply for the farm family and aid in improving the general health standards.

HOST COUNTRY AND OTHER DONORS

Major efforts in the application of some aspects of watershed management have been implemented in a number of areas through tie-in with the respective governmental agency. In Tarija PERTT has been active in general conservation and reforestation, linked directly to community participation. CODETAR is beginning a program of small water impoundments using CARE technical assistance. Activities include low-cost flood retention, small-scale irrigation, sediment entrapment, and fish and duck cultivation. Upper watershed management is being focused on in Cochabamba by CORDECO and COTESU, by SEARPI in Santa Cruz, but more to develop programs to minimize downstream water damage in the urban areas, rather for its own sake.

MAJOR OUTPUTS (during initial five-year period)

- 80 communities with approximately 3,300 families receiving direct impact from project;
- Increased coverage of existing Aiquile radio programs in extension topics;
- 100,000 participant-days in training and demonstration events;
- 80 community tree nurseries established, each with 20,000 trees produced and 400 person-days of labor annually;
- Gully control in 400 locations;
- 800 low-water reservoir dams constructed;
- Terracing constructed (live and stone walls) for 4,000 hectares;
- Contour technology implemented in 8,000 hectares; and
- Implementation of activities in agricultural implement use, honey production, and housing improvement by 3,300 families.

FINANCIAL INPUTS: \$13,600,000

Community-focused Activities

- Demonstration and training: expansion of Aiquile radio operations (\$100,000), direct training — 250 course days with 500 people per year (\$900,000); seed production processing facilities, land, and seed distribution (\$1,700,000); tree nurseries — 80 x 20,000 trees/yr (\$500,000); gully control — 400 gulleys stone cage dams (\$2,000,000); low-water earth dams — 800 (\$1,600,000); and
- Individual property-focused activities: Terracing for 1,600 hectares protected with constructed walls and 2,400 hectares with living walls — partially financed with seed production materials — (\$1,000,000).

General Project Activities

- Long-term technical assistance (5 years): agricultural engineer, nursery and seed technician, training officer (\$2,250,000);
- Local personnel: 100 village-level workers, 15 trainers and supervisors, 25 managerial and administrative staff (\$1,200,000);
- Equipment purchase, operational support: 5 light trucks, 8 pick-ups, training equipment, office equipment, vehicle maintenance, administrative materials, and support (\$1,150,000); and
- Medium-term credit requirements: agricultural implements and contour labor by 3,300 participating families (\$400,000); apiary production equipment for 90 installations (\$300,000); and housing improvements, etc. for 3,300 families (\$500,000).

PART II

PROJECTS RELATED TO AGRICULTURAL DIVERSIFICATION AND EXPORT MARKETING

4. AGRIBUSINESS SUPPORT SERVICES

PROJECT PURPOSE

The project will increase foreign exchange earnings and increase both employment and income opportunities by promoting nontraditional agricultural exports. This will be accomplished through the use of an efficient credit mechanism directly and strongly supported by marketing-related services.

PROJECT DESCRIPTION

Current Situation

Bolivia has been for years a mining- and hydrocarbon-oriented economy. In 1980 exports of traditional products such as minerals and hydrocarbons were valued at \$886.2 million. The nontraditional commodities, mainly coffee, timber, and sugar, represented exports of \$146.8 million.

In the 1980s the foreign exchange income dropped given the fall of world prices of minerals and natural gas sold to Argentina. The value of traditional exports fell by 39 percent, down to \$538.9 million in 1989. Fortunately, the nontraditional product exports increased by 40.9 percent to \$206.8 million by 1989 to compensate somewhat the loss of foreign exchange mentioned above. Exports of soybeans and related subproducts (up from \$6.9 million to \$51.6 million) accounted for most of the increase.

The main nontraditional products exported in 1989 were soybeans and subproducts, coffee, timber, sugar, bovine leather, natural rubber, live cattle, cocoa, and brazil nuts. These products represented \$150.9 million of the total exports and were marketed abroad as raw material with little value added. To have a greater impact on employment generation and increased foreign exchange, these materials could be transformed in-country into either intermediate or final products, as long as they maintained a competitive position.

Agriculture could be an important source of export expansion and income growth in the near future. The expansion of nontraditional agricultural exports could cushion against the decline in export earnings from minerals and hydrocarbons. However, the country's capacity to respond to these agribusiness opportunities is severely limited by financial and technological constraints.

The existing marketing structure for nontraditional agricultural products does not have enough institutional support. Research and extension services have been insufficient in level of effort and quality.

The local capacity is weak to be able to formulate projects, to provide technical assistance in postharvest handling, packaging and storage techniques, and to keep abreast of new technologies. Local consulting firms need intensive training in those areas. Finally, the marketing information system is inadequate, lacking updated information on prices, demand, competition, potential buyers, and quality requirements for different markets.

To a large degree, financial resources are only available through the Central Bank/commercial banking system. The lack of mechanisms in the banking system for evaluating, inspecting, and monitoring loans, discourage the commercial banks to finance production projects, especially in agriculture-related enterprises. The risk involved in medium and long-term maturity loans also discourages commercial banks to grant investment loans. Furthermore, commercial banks require high levels of collateral. In some cases the commercial banks request a guarantee of 3 to 1 of urban properties and at the bank's appraised value. This clearly works in disadvantage to any rural-based enterprise. Those who finally can meet all loan conditions usually have also incurred substantial transaction costs represented by the delays in credit approval and disbursement (often six months or more).

The other complementary aspect is that the existing marketing structure for nontraditional agricultural products does not have enough institutional support. Research and extension services have been insufficient in level of effort and quality. The local capacity to formulate projects, to provide technical assistance in postharvest handling, packaging, and storage techniques, and to keep abreast of new technologies is weak. Local technicians and consulting firms need intensive training in those areas. The marketing information system is inadequate, lacking up-dated information on prices, demand, competition, potential buyers, and quality requirements for different markets. Finally, a pre-clearance system is required to check the phytosanitary conditions and possible chemical residues in agricultural produce at the beginning of the export process. As Bolivia does not have experience in these matters, the risks and costs of incompliance are much greater.

In response to this situation the project will create an efficient credit mechanism to finance medium-to large-scale agribusiness activities aimed at the export of nontraditional products. The project also will support and strengthen the variety of related technical assistance and marketing services required to ensure the adequate use of the credit funds.

Credit Mechanism

In virtually all the interviews held by the study team with private sector entities and individuals, the issue of limited credit access was considered as critical. The element of production and processing scale is important for most proposed investment activities, since the requirements for both volume and quality are greater than what can be accomplished through a slowly phased in approach with minimal use of third-party funding. This is especially true in the case of competing in established foreign markets.

Over 160 agribusiness-related projects were presented to the team, and in many cases the basic documentation was reviewed or the interested parties interviewed. This number is not meant to imply that all 160 would be feasible. Often, key information was not made available or was either incomplete, outdated, or otherwise dubious enough to prevent even preliminary analysis. However, the important point is that each of these project ideas is identified with a sponsor who had financed at least the initial

project profile and frequently further studies, and each had the initial feasibility approval of a financial or related institution. Several are even being partially implemented with private funds.

Of these 160, 80 (50 percent) have completed the technical and financial feasibility study, the others closely divided between prefeasibility and profile stages. Seventy-seven projects estimated their credit requirements to be \$86,688,000. Their distribution can be broken down into the following arbitrary categories:

- 34 — (44 percent) under \$250,000;
- 21 — (27 percent) from \$250,000 up to \$1,000,000;
- 22 — (29 percent) from \$1,000,000 and above; and
- The median or mid-point credit requirement is \$304,000.

The present proposal is not intended to replace the current banking system's loan mechanisms. It is meant to inject credit into foreign exchange generating activities that represent a relatively large impact and, if possible, have substantial forward and backward linkages. Projects were not included which would require significant modification of existing human and physical infrastructure.

For these reasons, a grant-funded "off-shore" line of credit is suggested, operated in the name of the Bolivian government or Central Bank through an outside trust fund for medium to large credit projects. By having this fund in the GOB's name a separate legislature approval or guarantee is not needed. Also, to the degree these funds are used to acquire foreign goods and services, their impact on domestic monetary supply is limited to the local reflows from sales. The exclusion of smaller projects would simplify considerably the administrative structure required to analyze loan proposals and to control and supervise credit use. Furthermore, this system would leave ample room for the commercial banking sector to continue and expand operations using existing structures such as the CORDES-UCF offices. The following details different aspects of this credit mechanism:

Lending Procedures

1. The local investor would request a loan from the trust fund entity ("Fund"). The Fund would assess the project based on its technical and financial feasibility and on the impact on foreign exchange, income generation and employment.
2. The Fund would disburse the loan directly to the borrower. If the loan includes on-lending for agricultural production by small farmers, the agribusiness would be responsible for the disbursement of the money or the delivery of inputs as needed.
3. The control and supervision of the uses of loans fund would be done by a local consulting firm, which would collect a negotiated spread no higher than one and .5 percent to cover its annual costs and profits.
4. The loan recovery would be through the Bolivian banking system, which would collect a spread no higher than 1.5 percent to cover its annual costs and profits.

5. Normally, the Fund itself would collect a spread no higher than 2 percent to cover its costs and profits. However, the minimum annual income per loan outstanding that the Fund would receive would be \$10,000 a year. This is recommended is to encourage the financing of loans in the \$250,000 to \$499,000 range. The difference of interest market rate to be charged to the project and the spreads to be paid would be used to create a guarantee fund for future projects and if possible, another fund to finance very specific research and development of new technologies and markets. These funds should be managed also by the Fund.

<u>RANGE OF LOAN</u>	<u>SPREAD/INCOME</u>
\$250,000-499,000	\$10,000/year
\$500,000 and over	Maximum 2%/year

Loan Policies

1. Size of loan: A range for loans can be from \$250,000 to a maximum of \$7 million.
2. Loan term:
 - For capital investment a maximum of 10 years, including 5 years of grace period; and
 - For working capital a credit line could be opened one time for a 4-year period. The borrowers should present every year a cash flow of their needs. The working capital could include operation costs, as well as the acquisition of agricultural raw materials.
3. Interest rate and spreads:
 - The interest rate should be equal to the interest rate charged by the Central Bank; and
 - The spread can be divided as follows:
 - The Fund, maximum 2 percent/year, as above
 - Supervision of loan, maximum 1.5 percent/year
 - Cash control by commercial banks, maximum 1.5 percent/year
 - Guarantee/research funds with the difference.
4. Guarantees:
 - Primarily the equipment to be purchased under the project;
 - Any assets to be purchased by the borrower's own contribution or any other source of financing; and

- Personal guarantees.

5. Beneficiaries:

- For the agribusiness enterprise: any individual, private company, or cooperative/association legally established in Bolivia; and
- For the agricultural production: any association of producers or cooperatives that would source the related agribusiness project.

Technical Assistance and Marketing Services

A short paragraph from the draft Agribusiness Management Information Services (AMIS) Project report on marketing systems can be generalized to summarize the current state of agricultural marketing:

"The current marketing system ... is characterized by a lack of specialist marketing infrastructure (e.g. post-harvest treatments, packaging, modified transport) or well defined linkages between different participants in the marketing system. Participants at all levels of the system lack confidence in the ability of subsequent stages to provide secure markets for their goods (i.e. producer/transporter/ wholesaler/processor/packager/shipper). As a result, few participants are willing to invest in specialist infrastructure, fearing that payback is uncertain and difficult." (AMIS: pg. ii)

An agribusiness marketing system is integrated by several subsectors and attended by supporting services which make possible the long, yet hopefully profitable, chain for agricultural marketing (especially for export products). The following services need to be available for the system to function, either provided by the participants themselves or hired from outside: production related (applied research and extension), postharvest handling, packaging and storage, agroindustrial transformation (if required), transport infrastructure, marketing information, and financial operations.

Given the need for these services, and their general absence at this time, the present proposal provides a structure for developing these technical capacities as a totally integral part of the service industry required to support the credit mechanism. In general, technical assistance would be provided to both bridge the operational gap to facilitate exports and to train local technicians in the necessary skills to continue thereafter.

Research

There are several international donor-assisted programs being implemented to develop a mechanism to investigate and generate new technologies in different fields. However, these are limited to certain geographical areas or crop types and may not be able to include many of the nontraditional commercial products potentially in demand by the private sector.

Rather than set up another project specifically for this purpose, it is recommended that the primary research entities (CIAT and IBTA) be encouraged to dedicate part of their time to create and develop new

technologies of nontraditional products. These entities would present their plans on the type, timing, and outreach of the applied research on nontraditional agricultural products. USAID would provide the technical assistance needed through the existing contracts and provide any relevant additional equipment.

Extension

A separate project proposal concerns the establishing a structure to develop commercially oriented extension services through existing private consulting firms and technicians. To better ensure quality services, this structure would focus specific training to upgrade the professional capacity of the technicians and certify the type and level of training received. To the degree possible, both IBTA and CIAT (plus others) would be utilized for training participating extensionists. USAID would finance the costs of preparing and presenting training programs under that proposal.

Training

The transfer of marketing technology is an important feature of the support services to ensure a full and lasting impact from the use of credit funds and other activities under this proposal. A local institution would be needed to channel the training efforts to potential users, such that this would become a periodic activity — repetition is essential to ensure maximum coverage. Training would be financed by USAID in the areas of postharvest handling, pesticide usage and applied integrated pest management, packaging and storage, export marketing skills, and general agricultural project formulation.

One option is that USAID would encourage CIAT and IBTA to prepare and present courses to private consulting firms. Part of these courses would include field trips to observe CIAT and IBTA experimental stations. However, given the urgency, this could be complemented with other sources for training during the first years of the project.

Technical Assistance

Specialized assistance should be available on a short-term basis to help diagnose both general and specific problem areas for which there is no local expertise readily available. This could be required in any of the agribusiness marketing system subsectors mentioned previously (that is, handling and storage, processing infrastructure). This assistance would have the dual purpose of addressing the particular problem area and providing training in specific problem solving to local technicians. As this activity could be assumed under existing USAID projects or could form part of the proposed private consulting services proposal, an estimate is provided of the incremental funding necessary.

The present Export Promotion Project could be modified to assist in setting up a marketing information system to develop products and markets, as well as in helping to create an entity to promote foreign investment. This last item might entail opening offices abroad to attract investors and to provide on-site assistance for Bolivian exports in the U.S. markets.

Site Visits

As a complement to other technical assistance projects funded by USAID, site visits should be directly coordinated and funded under the proposed project. Groups of Bolivian exporters would be invited to visit other countries to learn about new technologies in the market. Others would visit the United States to understand the process an imported product should follow before it arrives to the final consumer. These site visits would also serve to broaden the contacts with potential buyers and investors.

Pre-clearance Program

Given the absence of widespread local experience in produce quality control, it is suggested that a program including infrastructure (laboratory and cold storage for samples) be instituted in Santa Cruz (the major point of export for produce) charged with both phytosanitary and chemical residue inspections. Another part of this activity would be to inspect actual and potential sites for cultivation of export crops. The facility and staff would have the capacity to provide specialized soil, water and bacteriological analyses and different types of quality controls and phytosanitary and residue certification.

By certifying produce according to U.S. standards, it would have import clearance priority and often could pass almost directly to the importer/broker, thereby reducing clearance time by two days or more. This time differential could help overcome other disadvantages inherent in Bolivian produce export, such as higher input and transport costs. At a later stage, this activity could develop into a quality labelling program for volume products to check and certify according to size, maturity, and other factors besides phytosanitary and residue clearance. The program also would serve as an information source for the proposed private consulting service and the agricultural input regulation projects.

IMPLEMENTATION AND ADMINISTRATION

Because of its diverse nature, this project would have several implementing agencies. The credit mechanism activity would best be assumed by the Andean Development Corporation (known by its Spanish acronym CAF), since it has experience in direct financing of private sector investments in Bolivia and has the technical expertise required for investment analysis. Furthermore, currently it is managing a \$37 million international agricultural development trust fund (FIDA) and another smaller one \$1 million for prefeasibility studies (from the Venezuelan government). As the proposed trust fund would deal with a modest number of medium- and large-sized loans, CAF already should have the institutional capacity to handle this with minimal adjustment. The more time-consuming tasks of loan control, supervision, and recovery would be contracted to local consulting firms and commercial banks. CAF also would be in the position to require credit projects to allow for contracting of technical assistance wherever needed as a further assurance of feasibility.

As mentioned previously, the different technical assistance aspects of this proposal could be added to existing USAID project agreements. There is substantial linkage with other projects proposed by the study team which would need to be taken into account if implemented, either as part of USAID/Bolivia's overall program or in conjunction with other donor agencies.

The following organizations would be involved in the various aspects of this project: credit trust fund — CAF; applied research and extension — IBTA and CIAT; training — IDEA Export Promotion Project; technical assistance — Export Promotion and Private Agricultural Organizations Projects; site visits — USAID/Bolivia; and pre-clearance program — Export Promotion Project, CAO).

RELATIONSHIP TO USAID COUNTRY STRATEGY

Key aspects of USAID's alternative development strategy are to diversify the agricultural economy through export development, generate more rural employment possibilities, and increase rural family income. This proposal focuses on all three aspects of alternative development, with a minimal reliance on GOB support. The utilization of on-going USAID projects in addition to the experienced CAF would permit a relatively smooth implementation period. By stressing training and organizational development of local institutions, the long-term activities should become self-sustaining by the end of the project period, estimated at four years at full implementation activity level.

BENEFICIARIES

The primary beneficiaries would include both the private sector investors and entrepreneurs and the rural producers involved in the agribusiness activities. Both the increase in diversified exports and the value added to agricultural raw materials would have a noticeable impact on foreign exchange earnings, and in some cases, savings. Benefits also would accrue to a substantial number of secondary agricultural and possibly industrial sectors because of the forward and backward linkages along the marketing chain. Given the strong element of technology transfer through training and technical assistance, agricultural productivity in other, nonrelated activities should benefit as well.

The agribusiness projects included are to some degree illustrative, since several are already under partial implementation. However, it is important to note that with an estimated total investment of \$29.1 million (\$25.3 in loans) in six projects presented by individuals, roughly \$144 million of foreign exchange would be generated using 12,000 hectares of land, approximately \$2,400/hectare of foreign exchange during the proposed life of each project. Because of limitations in the data presented, further comparison is not possible.

HOST COUNTRY AND OTHER DONORS

The Regional Andean Pact Secretariat (JUNAC) has been active in assisting Bolivia to develop a strategy to promote exports. In 1988 JUNAC financed the preparation of 45 prefeasibility studies, primarily in agribusiness-related areas, to generate interest in outside investment. JUNAC is also financing two pilot projects to produce and export horticultural products. Both projects will provide the credit and technical assistance for inputs and infrastructure up through the export process. Tentatively the promotion and local implementation would be done through a growers association in Santa Cruz and another near Cochabamba.

The United Nations Industrial Development Corporation started the Investment Promotion Program (PPI) in 1988 to collect and analyze private sector projects that could be promoted in foreign countries. Presently there are PPI offices in France and Germany, and the portfolio of qualifying projects includes 56 at the moment. Recently the GOB signed an agreement with the Bolivian Private Enterprise Confederation to assume the program management.

The United Nations Fund for Drug Abuse Control (UNFDAC) is funding a program to develop agribusiness activities in the Chapare and Yungas areas. Eleven agro-industrial project studies and five profiles have been prepared and will be turned over to the PPI for promotion or implemented through another program with local entities.

The Inter-American Development Bank (IDB) is implementing a new loan program totalling \$52 million for investment activities in the general agriculture sector. These funds would be disbursed through the Central and commercial banking system.

The World Bank's International Development Assistance program (IDA) is completing the preparation of a comprehensive agricultural diversification project, which will focus on the full production and marketing system support but only for a few different crops or products, supposedly later expanding to cover new activities. The present proposal by the identification study team is roughly similar, except in that the proposal focuses on the support services rather than the products.

The Andean Development Corporation (CAF) has plans to directly finance with loans for selected agribusiness investments, as well as a grant fund to partially cover pre and feasibility studies. These activities are analyzed and monitored from the La Paz office. The CAF is managing two trust funds, one for \$37 million from the International Agricultural Development Fund (FIDA) and another from Venezuelan sources totalling \$1 million also for prefeasibility studies.

MAJOR OUTPUTS

- An efficient credit mechanism to finance larger, mid- to long-term agribusiness projects in place and operating;
- No less than 20 new medium to large agribusiness will have been financed;
- Applied investigation and research services in place — 48 person-months of related short-term technical assistance provided;
- Training courses designed by experienced entities and presented through the Instituto para el Desarrollo de Empresarios y Administradores (IDEA):
 - A total of 500 technicians or people working for local consulting firms trained in export product development and marketing
 - A total of 500 technicians or people working for local consulting firms trained in export project formulation and management

- A total of 500 technicians or people working for local consulting firms trained on providing extension services with new technologies in conjunction with CIAT and IBTA
- A total of 200 technicians or people working for local consulting firms trained in postharvest handling techniques
- A total of 200 technicians or people working for local organizations trained in packaging and storage techniques
- A total of 200 technicians or people working for local organizations trained in pesticide usage and crop-specific integrated pest management
- Short-term technical assistance provided through existing projects to strengthen the Bolivian private sector:
 - Twenty-four person-months of short-term technical assistance to help at least 20 exporters and train about 200 people working for local consulting firms in postharvest handling techniques
 - Twenty-four person-months of short-term technical assistance to help at least 20 exporters and train about 200 technicians or people working for local consulting firms in packaging and storage techniques
 - Twelve person-months of short-term technical assistance to help at least 20 exporters and train about 200 technicians or people working for local consulting firms in agro-industrial processing equipment and plant layout
 - Twelve person-months of short-term technical assistance to help at least 20 exporters and train about 200 technicians or people working for local consulting firms in pesticide usage and crop-specific integrated pest management
- Site visits to other countries:
 - A total of 100 exporters visit other countries to learn about new processing technologies
 - A total of 100 exporters visit United States to learn the marketing procedures for nontraditional products imported from developing countries
- Pre-clearance program:
 - A laboratory facility established, equipped, and staffed in Santa Cruz to carry out phytosanitary and chemical residue inspections for U.S.-destined produce, according to U.S. standards
 - A total of six person-years of long-term technical assistance to set up facility and to train local technicians in its operations (1 person, 2 years), and to implement certified procedures for inspection and pre-clearance (1 person, 4 years)

- A total of 24 person-months of short-term technical assistance from EPA/USDA personnel in specific pre-clearance procedures for new produce items
- Key staff would receive extensive training in U.S.-based FDA or other laboratory facilities.

FINANCIAL INPUTS: Total \$87,000,000

- Credit trust fund (\$56,000,000);
- Marketing support services: research and extension — 48 person-months (\$800,000); and equipment and operations (\$900,000);
- Training: extension service — 500 trainees; postharvest handling — 200 trainees; packaging and storage — 200 trainees; pesticides and pest management — 200 trainees; project formulation — 500 trainees; and export marketing development — 500 trainees (\$2,100,000); and
- Short-term technical assistance in postharvest handling — 24 person-months; processing plant design — 12 person-months; packaging and storage — 24 person-months; pesticides and pest management — 12 person-months (\$1,200,000).

Marketing Site Visits

- Neighboring countries — 100 participants; U.S. markets — 100 participants. Total (\$500,000).

Pre-clearance Program

- Technical assistance (2 technicians, 6 years) (\$900,000); short-term assistance 24 person-months (\$400,000); local staffing (10 technicians, 4 years) (\$1,000,000); equipment, laboratory and office supplies, operations (4 years); specialized laboratory training (U.S.) (\$1,200,000).

TOTAL PROPOSED FINANCING	\$65,000
Internal Project Management ¹	800
Local Contribution by Owners ²	17,900
Outside Investors (third party) ³	<u>3,500</u>
TOTAL PROJECT RELATED FUNDS	\$87,200

Notes:

1. An estimate of the additional costs to the donor agency for project management (one person, 4 years) and outside audits and limited evaluations, using local sources.
2. Reported in projects chosen to illustrate local demand level.
3. Corresponds to "Institutional Support" in UNFDAC Program 412 and to foreign investment sought in chosen projects in PPI.

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5. COMMERCIAL CROP GERMPLASM IMPROVEMENT

PROJECT PURPOSE

The project will provide long-term technical expertise to develop and test new germplasm for agricultural research programs for fruit, citrus and horticulture; form a series of private and public nurseries; and train scientists in applied research.

PROJECT DESCRIPTION

Current Situation

The Bolivian government, in particular those in the agricultural sector, has begun to stress programs to improve national crop production and increase exports of certain commodities.

Bolivian farmers have a long tradition of producing citrus, certain fruits and nuts, and selected horticultural crops. Virtually all of this production has been for the domestic market. In recent years these traditional crops have had to compete against imported products from neighboring countries. While some of these imported products may be subsidized by government support programs, it is still noteworthy that they are sold in great volume in all cities in Bolivia. Apples are sold year round and the price does not vary significantly. Pears, peaches, and apricots tend to be more seasonal but are always more expensive than local produce. Imported nuts, mostly walnuts, are sold widely throughout the country.

The fruit produced in Bolivia has a loyal national clientele, and while it may possess unique "criollo" flavors and textures, it is generally of inferior quality. During the harvest seasons there is a glut of locally produced fruit on the market, and because of its perishable nature, is sold by volume rather than on a weight or unit basis. In addition, the fruit is smaller in size, and is usually blemished, bruised or insect damaged.

Under the present level of technology, it is unlikely that Bolivian farmers will ever compete on a quality basis with imported fruits from Chile, Argentina, or Brazil. The only way Bolivian farmers can compete with foreign imports is to produce the same (or better) varieties at a lower cost inside the country.

Activities

This project is proposed for an initial start-up period of five years to improve the level of technology in the commercially oriented fruit, citrus, and nut tree industry, and to improve research and technology in horticulture crops. However, a realistic timeframe for this type of project would require a much longer commitment.

IMPLEMENTATION AND ADMINISTRATION

National production of traditional varieties can be greatly improved. The same can be said for improving the quality of indigenous varieties. However by just improving the quality and quantity, will not insure the farmers an unlimited demand for their products. To insure themselves of a place in the market they will have to compete against imports.

In the normal decision-making hierarchy, farmers are most likely to try new technology on their traditional varieties first. If they are convinced of its applicability and profitability they may be willing to try even newer technologies. Once they began to seek information, then it is possible to get them to change varieties. It is rarely successful to ask a farmer to change both his technology and variety at the same time.

Research programs must be developed that are both commodity and farmer oriented. Too much emphasis is placed on research station-generated information, and too much research is developed using traditional varieties and technology. The research efforts must be two pronged: one directed at improving the agronomic practices used in growing traditional crops, and second, to introduce new varieties from other countries.

Experts will be brought in to evaluate the current research programs, and state of production at the farmer level. These experts will come from university research programs, and from private industry. Extension specialists and crop advisory service will be used to develop a long term, farmer-oriented crop improvement program.

The crops to be specifically dealt with will be:

CITRUS: Oranges, grapefruit, mandarines, lemons (also avocados)

FRUITS: Apples, pears, peaches, apricots, nectarines

NUTS: Walnuts, pecans, almonds, pistachio, filberts (also peanuts)

HORTICULTURE: Garlic, spices

MACA will serve as the umbrella implementing agency, given that the number of potential participating entities is too large to deal with individually. However, the actual applied research and extension programs will be carried out by a variety of entities: IBTA, special programs by different CORDES, universities with existing or recent research programs, private companies, crop associations, NGOs, on-going or proposed USAID projects, and other donor programs. Requests for a package of technical and financial assistance from these institutions would be reviewed by MACA and the resident team of experts. It is important that this project not be perceived as institutional strengthening of MACA/IBTA, but rather as fortifying discrete research activities.

Marketing specialists will be brought in from commercial firms in North America, Europe, and Asia. These experts will indicate those factors which will influence the purchase of Bolivian products in the

international marketplace. Without this sort of input, both the research and extension service may develop the wrong technology.

To ensure that farmers will have access to planting stock as well as technology, a series of public and private nurseries will be established throughout the country. These nurseries will have large amounts of the proven varieties in various stages of growth to ensure availability of stock over long periods of time. These nurseries may have to be subsidized for some time until the farmers begin to adapt them to their farming systems.

Training will be provided by long term technicians in nursery management and tree care for relevant staff in participating institutions.

RELATIONSHIP TO USAID COUNTRY STRATEGY

USAID is investing a great amount of time and effort in evaluating the export potential of a wide range of traditional and exotic crops in the coca-producing regions of Bolivia through the Export Promotion and Diversification and the Chapare Regional Development Projects. In addition, several programs with Title III funding are aimed at improving the amount of production of traditional crops so as to improve on-farm incomes in noncoca producing areas. However very little effort is being spent on applied research activities and on the introduction of improved citrus, fruit, and horticultural crops.

BENEFICIARIES

The impact of this type of activity is usually long term and would be export oriented (or perhaps also focused on import substitution) with a secondary impact on producer income levels, stemming from the adoption of more commercial varieties. The primary beneficiaries will be small- and medium-scale farmers in the temperate areas where fruit and nut trees are more adaptable. Small, medium and large farmers will benefit in the tropical regions where citrus is more likely to grow. Horticultural crops will probably benefit mostly small farming operations.

The MACA and other public and private entities will have a corps of production-oriented research staff. These experts will look upon their work as a direct service to the farmer, rather than just to generate more research information. A corollary benefit would be the avoidance of duplication of similar activities under the variety of agriculture sector projects.

HOST COUNTRY AND OTHER DONORS

The MACA and the IBTA/CIAT programs are conducting research on a large number of crops, and much of this work is tied to the research stations. There needs to be an infusion of technical assistance to get the results of research out of the stations and on to the farmer's fields.

The Swiss government through the COTESU program is working with agricultural university graduates on farm extension programs. This project is also tied to their small farm tool program and on-farm soil conservation projects.

The World Bank is going to assist Santa Cruz Department and the CIAT program with a long-term extension program. The Bank is also proposing an eight-year plan in the highlands related to plant breeding in potatoes, corn, quinoa, wheat, legumes, forages, and in animals. However nothing is suggested for the long-growing tree crops. Under the Bank's ADP project design, parts of IBTA would be funded to concentrate on those few products identified as having export priority, which possibly would limit activities in other areas.

The only related program that might have an effect on Bolivia is a proposed Andean Fruit Research Center to be funded by the Andean Pact with an initial budget of \$60 million. It is to produce genetic material for the Andean countries "of the necessary quality for the international market."

The horticultural program should be developed in cooperation with the International Vegetable Center in Taiwan. In addition, commercial vegetable growers from the United States should be contracted to advise the program on export standards for the United States and Europe.

Commercial fruit processors and canneries in the United States and Europe should be hired to advise local companies on techniques and marketing.

MAJOR OUTPUTS

- Improved genetic stock of existing varieties;
- Introduction of varieties with greater marketability;
- Nurseries providing plants;
- Trained cadre of extension-oriented researchers; and
- Increased commercial crop production and quality.

FINANCED INPUTS: \$9,800,000

- Technical assistance (\$5,250,000): research administration expert, citrus expert, fruit/nut expert, horticulture expert, training officer (for short courses), extension expert, and a nursery construction and management expert;
- Training (short courses) (\$550,000) in citrus — 100 technicians, fruits and nuts — 100 technicians, horticulture — 100 technicians, nursery — 50 technicians, extension — 200 technicians;

- Nurseries (27: 3 per department): construction (\$800,000); genetic stock (\$1,300,000); partial operating costs (\$800,000); and
- Commodities and support, office support, operations (for 3 regional offices) (\$600,000); and vehicles and maintenance (for advisors) (\$500,000).

PART III

PROJECTS RELATED TO AGRICULTURAL TECHNOLOGY AND FARM PRODUCTIVITY

SEED INDUSTRY SUPPORT PROJECTS

The seed industry in Bolivia is in an "adolescent" stage of development. In the early 1970s USAID funded the construction a series of seed conditioning facilities in several departments, most of which were overdesigned, and subsequently underutilized. From 1979 to 1986 USAID funded a seed industry project as part of a contract with Chemonics International Inc. of Washington D.C. At that time there was virtually no formal seed production in the country. By 1986, a Regional Seed Board (Consejo Regional de Semillas [CRS]) was organized in Tarija, Chuquisaca, and Santa Cruz departments.

A National Seed Board (Consejo Nacional de Semillas [CNS]) was organized and was located within the Ministerio de Asuntos Campesinos y Agropecuario (MACA). The CNS acts as the coordinating body for the nine CRSs (by 1989 each department in Bolivia had a CRS). The CNS has since come to look upon itself as the coordinating body for several aspects of the seed industry, some of which are outside the area of its expertise, or control.

There are three functions related to the seed industry in Bolivia, and they need definition and responsibility assigned to each:

- Research on various crops is the responsibility of IBTA/CIAT, and whenever possible the private sector;
- Actual seed production and marketing is the role of the private sector and certain parastatal organizations; and
- Seed inspection and certification to ensure compliance with national standards, is the legal and legitimate role of the CNS and CRS;

The future role of the CNS needs better definition so that limited financial and human resources can be most effectively utilized. The two seed projects presented here propose to separate the inspection and certification functions of the CNS (and the nine CRSs), from the production and marketing functions of the seed industry.

In the natural evolution of a seed industry, seed production and seed inspection have to be separated, otherwise conflicts of interest will arise. At the time of this division of responsibilities, the seed inspection aspects are undertaken by an independent government agency. Financing is through the national and/or departmental governments and is usually subsidized to maintain the impartiality of the inspectors.

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Seed production is a specialized cropping exercise undertaken by public and private seed companies through contracts with farmers. The selection of growers and writing of contracts is a function of the seed company. The seed certification service is only called in to inspect the field during the growing season in ensure that proper isolation, roguing, and harvesting procedures are being carried out to avoid contamination of the seed field.

The two projects proposed here are linked to each other by virtue of their interdependency, but administratively they serve two functions. The Seed Certification Project is to strengthen the CNS and CRS program as an independent inspection agency through the provision of training, upgraded equipment, and additional educational opportunities. It is not intended to enlarge the size or influence of the CNS and CRSs, but to make them more efficient and useful to the seed producers and consumers.

The Seed Production Project, however, is directed toward helping the seed companies, and seed producers with the technical aspects of the their operations. Direct technical assistance will be provided by advisors (expatriate and local) in the areas of seed company organization and management, advice on equipment purchase, installation and operation, field production techniques, and seed harvest and conditioning.

The expatriate staff will work with both projects. However, since the CNS and CRS programs are already organized, the decision has been made to place only one expatriate staff within the Seed Certification portion of the project. When expertise is needed by the Seed Certification Project, the expatriate staff within the Seed Production Program will assist them, or short-term technical assistance will be called in.

6A. GRAIN SEED PRODUCTION PROGRAM

PROJECT PURPOSE

The project will increase grain seed production in all departments of the country through a five-year technical assistance program.

PROJECT DESCRIPTION

Current Situation

Improved seed is one input that farmers can utilize without upsetting their normal cropping schedules. If improved crop seeds were used by greater numbers of farmers, yields could be increased per unit area. The national seed certification council has reported that the percentage increases in yield through the use of certified seed is approximately: maize (126), wheat (71), rice (154), potato (57), barley (29), garlic (30), pastures (30), and soybeans (68) (CNS Proposal, Table 5).

Traditional farmers in Bolivia do not use as much improved seed as they should for a number of reasons. First, the yield advantages have not been demonstrated well enough to convince them that it is worth the price differential to buy improved seed. Second, agronomic attributes (pest resistance and plant characteristics) are not usually taken into account when farmers keep seed from their own crops. And last, even if they are convinced of the advantages of improved seed, they are usually not able to find it in the marketplace.

The need to increase the production of essential grain seeds is apparent when one realizes that less than 2 percent of the cropped area in Bolivia (not including the areas under soya) is planted with improved seed. Production of improved (certified) seed in Bolivia has increased from 501 MT in 1982, to 12,516 MT in 1989, and has increased at an average rate of 2,000 MT per year. Upon further study, the statistics show that in the 1989/90 growing season, 11,195 MT (89 percent) of the grain seed produced was soya. The balance of the production (1321 MT) was distributed between maize (425 MT or 3 percent), rice (270 MT or 2 percent), wheat (605 MT or 5 percent), and field beans (21 MT or less than 1 percent).

During this period, over 20,000 hectares were devoted to seed production, of which 18,500 (about 92 percent) were in Santa Cruz. These data show that the grain seed industry in Bolivia is skewed toward soya seed production in Santa Cruz Department.

This project will be for a five-year period with three years of direct technical assistance provided by expatriate experts. The last two years of technical assistance will be provided by short-term technical assistance visits to the project. Bolivia has enough experience in seed production and inspection to be able to maintain its own momentum. This project will reinforce the present seed organizations and provide extra technical assistance to move it to a mature and self-sufficient industry.

Technical Assistance

1. The long-term expatriate technical assistance to be provided will also be used for the Seed Certification Project. Overall seed company management and marketing activities will be stressed.
2. Long-term expertise will be provided in the areas of field production practices, and seed plant operation. Short-term expertise for specific crops will be provided as needed.
3. Special attention will be paid to assisting crop or farmer associations and/or companies wishing to purchase and/or operate seed harvesting or conditioning equipment. The program does not intend to purchase seed equipment for the project, but will provide on-site technical advice on the purchase, installation, operation, and maintenance of equipment.
4. The production and purity maintenance of parent seed will be part of the field production expert's role. This phase will be coordinated with IBTA and other research programs that are developing new varieties. The actual production of parent seed may be handled by each CRS.

Training

1. Advice on business organization, contracting, and marketing techniques will be provided by the full-time expatriate staff.
2. Training in seed field selection and management will be provided in Bolivia by experts brought in for each crop and at critical production phases.
3. Training will also be conducted in other countries growing the same crops under similar conditions and using the same types of equipment.
4. Bolivians already part of the national seed programs will be selected to work as counterparts to the principal expatriates.
5. Equipment training will be conducted in Bolivia by either the manufacturers and/or the contractors. External assistance may be called in for specific crops or situations.
6. As many as 15 Bolivians will be trained to the M.Sc. level in seed technology in the United States. At least two (2) M.Sc.-level technicians will be working at any one time in each department in cooperation with the CRS office. (These individuals will be in addition to the 15 trained under the Seed Certification Project.)

Information

1. Intensive campaigns will be undertaken to develop an awareness at all levels in the agricultural community on the advantages of improved seed.
2. A set of seed production "handbooks" will be published on all crops, for each environment in Bolivia.
3. Manuals for all equipment used in the seed production process will be published in Spanish.
4. A nationwide information system will be organized to keep the agricultural community informed on the best performing varieties in each environment, and the availability and prices of seed.

Equipment

1. The project does not envision the purchase of seed harvesting and processing equipment; however a long-term on-site expert will be available for training in the installation, maintenance, and operation.
2. The project will attempt to obtain the most appropriate equipment suitable to Bolivian crops and conditions.

3. Seed is a perishable crop and needs to be stored under controlled temperature and humidity conditions. This project will provide funding for 20 cold storage units throughout the country.

IMPLEMENTATION AND ADMINISTRATION

This project will be in coordination with the CNS and CRS programs, but conducted as a distinct program to assist crop associations, private seed companies, and independent contract growers.

USAID, through the PL-480 Program, has financing available through a loan program for the agricultural sector. The program is divided into loans for small businesses, and for micro-enterprises. The Small Business loans will be administered through the credit unions approved by FENACRE. At present the loan program will have a limit of \$20,000. This money could be used in two ways: equipment purchases, or for purchasing the seed crop from contract growers.

The micro-enterprise program could be used by small contract seed growers to purchase the needed inputs to insure a successful crop. The current limit on these types of loans is \$2,000.

As a major stimulus for farmers to participate in a grain seed program, there should be some provision for limited crop insurance. Farmers under contract for seed production are going to purchase inputs to ensure a good crop. The Seed Certification Service is also going to charge them for inspection fees. If they have a successful crop, they will have an assured market. If the crop is struck by natural disasters like flood, drought, hail, or uncontrollable diseases and pests, farmers should be allowed to recover their input costs through an insurance program financed by FENACRE. This will allow them to cover the cost of their crop loan. If a \$1 million initial insurance fund were available, a rough estimate of the area planted to grain seed covered under this plan would be 3,300 hectares (at \$300 cash outlay on inputs per hectare). This is only 2,000 ha. more than the 1989 area, and such expansion should be quite possible within the duration of this project. A levy on sales of grain seed by producers would need to be instituted to continue covering an estimated average of 20-25 percent annual losses (a probable complete crop loss for seed purposes every 4 to 5 years).

The only direct USAID financial commitment would be for expatriate technical assistance, training, commodities used by the technical assistance team, and the initial insurance fund.

RELATIONSHIP TO USAID COUNTRY STRATEGY

USAID supported a seed equipment program in the 1970s, and subsequently the Seed Program as a component of the Chemonics contract from 1979 to 1986. This project proposal would be a logical extension of these earlier USAID efforts, and complimentary to the Seed Certification Project proposed in this document.

The previous seed program under the Chemonics contract was estimated to have generated about \$10 million in foreign exchange savings for seed purchases and \$5 million in export earnings from

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soybean product sales. Substantial savings and earnings would also be realized from increased seed production and import substitutions for cereal grains.

As indicated earlier, this project would have linkage with the Title III Program and the Micro-enterprise Project, and less directly with the Chapare Regional Development Project.

BENEFICIARIES

Bolivian farmers at all economic levels would benefit through substantially improved crop production levels with reduced risk, and therefore farm income, by having an increased availability of good seed at lower prices. The commercial processors would benefit by having greater amounts of locally produced grain of better quality at lower costs, and saving foreign exchange. Another major impact would be the availability of foodstuffs made possible by greater physical productivity. A secondary level of impact importance would include the employment generated because of larger volumes, the possibility of exporting certain seed stocks, and improvement in rural nutrition.

HOST AND OTHER DONORS

Bolivia has in place a countrywide system of Regional Seed Boards whose primary function is to ensure compliance with seed certification standards. (See the Seed Certification Project proposal elsewhere in this document for a more complete description.)

The Government of Holland has undertaken a 10-year program (PROSEMPA) to increase the quantity and quality of seed potatoes. The program will focus initially on three departments, Cochabamba, Chuquisaca, and Potosi. The Swiss government has entered into a long-term potato research program (PROINPA) at Torolapa Research Station in Cochabamba to compliment the Dutch project. The Government of Japan, through the JICA program, has undertaken a long-term horticultural seed production program in Cochabamba.

MAJOR OUTPUTS FOR THE GRAIN SEED PRODUCTION PROGRAM

- Increased seed production of maize, wheat, barley, rice, rye, oats, and forages. Field beans (frijol) will also be included, primarily for export;
- Reduced financial risk through a self-sustaining seed crop insurance program (on a pilot basis);
- Improved techniques in seed field management, harvesting, conditioning, and storage;
- Better marketing information, distribution, and sales;

- Trained production and marketing specialists;
- Lower seed prices in a market-oriented, rather than a production-oriented, seed industry;
- Technical advice for obtaining the proper equipment at the best prices and follow-up training in equipment operation and maintenance;
- Separation, but close coordination between the production and inspection functions in the seed industry;
- Increased awareness of the benefits of improved seed by the agricultural industry; and
- 15 M.Sc.-degree holders in seed technology.

FINANCIAL INPUTS FOR GRAIN SEED PRODUCTION PROJECT: \$5,900,000

- Long-term technical assistance (4 expatriates x 3 years): seed company management expert, field production expert, seed plant operation expert, and marketing expert (\$1,900,000);
- Short-term expatriate technical assistance (40 person-months): seed company management, field production, seed plant and warehouse operation, marketing and contracting, crop insurance plan management (\$600,000);
- In-country training (25 participants x 2 weeks x 2 years for each subject area) in: seed company management and finances; seed field contracts, selection, inspection and management; seed machinery operation and maintenance; seed marketing; and crop insurance plan management (\$500,000);
- Foreign training: Short courses and study tours (25 participants x 4 weeks each year x 2 yr) (\$500,000); M.Sc. training (15 students x 2 years) (\$800,000);
- Operations: office operations and equipment purchase for 5 offices for TA team and CNS in La Paz (\$150,000); and vehicle purchase and operation (5) for TA team, counterpart staff and HQ (\$450,000);
- Crop insurance initial funding (\$1,000,000); and
- Estimated credit demand for infrastructure, 20 seed storage units (2 per department) (\$2,000,000).

6B. NATIONAL SEED CERTIFICATION PROGRAM

PROJECT PURPOSE

The project will strengthen the national and regional-level seed certification boards to ensure compliance with technical standards for certified seed, as well as helping them to achieve their financial self-sufficiency based on services rendered.

PROJECT DESCRIPTION

Current Situation

In 1979, USAID began support of a national seed improvement program as part of a consultant contract through 1986 with Chemonics International, Inc. of Wash. D.C. The program was very successful in organizing a National Seed Certification (NSC) Program. This program was replicated at the departmental level in Santa Cruz, Tarija, and Chuquisaca. In 1984, the NSC changed its name to the National Seed Board (Consejo Nacional de Semillas [CNS]). The program has progressed since that time with the formation of Regional Seed Boards (CRS) in all nine departments in the country.

The CRS in each department is to act as a seed inspection service to insure compliance with minimal quality standards as prescribed for each crop. The CRS is not involved in the actual seed production activities, nor in the marketing of seed. However, in the absence of technical expertise, the CNS and each CRS has provided significant amounts of advice on seed production-related subjects to farmers throughout the country. In spite of these efforts, the growth of seed production and attendant services (outside of Santa Cruz) has not been as great as had been hoped.

The national seed certification program was designed to become self-sufficient and self-financing, but this never occurred. Among the problems facing the CNS and CRS are:

- The service fee structure is inadequate to cover administrative overhead and vehicle costs; it does however cover the actual costs of inspection, certification, and quality control;
- PL-480 has provided funds to support two CNS staff positions in La Paz, but not enough to cover other salaried positions and administrative costs;
- Almost all of the equipment (laboratory, conditioning plants, vehicles) provided under the Chemonics project needs to be repaired or replaced;
- There is insufficient budget to develop or disseminate information to the agricultural community at large;
- Technical training programs and advanced degree work are lacking;

- There is not enough integration between seed production and research programs within the country to reach the target population; and
- There is very little marketing information (and experience) when dealing with the *campesino* population.

The project is to strengthen the national seed certification efforts of the National Seed Board and the Regional Seed Boards. It will provide technical assistance and training for existing technicians; develop and distribute more, and better, information to the agricultural community; and repair and/or replace existing equipment. The categories presented below detail the program needs:

Technical Assistance

1. Access to the four (4) full-time expatriate seed advisors assigned to the Seed Production Project.
2. Organize a foundation seed (prebasic, basic) program that would be funded through each CRS program.

Training

1. Bring in experts to provide "up-grading" training programs (in Spanish) for all existing CNS and CRS staff.
2. Develop an in-country training program that can present courses in all aspects of seed field selection, contracting, inspection, and certification procedures for MACA, IBTA, seed companies, and contract seed producers.
3. Select a suitable training facility in the USA where intensive short course training can be carried out (in Spanish). Alternatively, international institutions, under contract to USAID could conduct training courses in other countries, or hold courses in Bolivia.
4. Select at least 15 technically qualified people from within Bolivia, to be trained to the M.Sc. level in seed technology and other specialist areas. At least two (2) M.Sc.-level technicians will be working at any one time in each CRS office, and two at the national offices. (These candidates would be in addition to the 15 selected under the Seed Production Project.)

Equipment/Vehicles

1. Each CRS office should have a separate and refurbished seed lab to check the level of seed purity and germination rate.
2. Office equipment (principally computers) should be replaced.

3. All vehicles should be replaced with heavy-duty, long-wheel based, 4-wheel drive, Japanese vehicles since U.S. models are unable to stand up to local field conditions. Provision must be made for one vehicle for every field inspector, and plan for additional vehicles as the program expands, plus adequate replacement parts and maintenance.
4. Those seed plants already owned or operated by the CRS should be upgraded and the most appropriate, modern equipment purchased. These facilities would be used to condition and store parent seed stocks.
5. Construct a series of strategically located cold storage facilities within each department to preserve prebasic and basic seed supplies. (These units will be in conjunction with the facilities funded under the Grain Seed Production Program.)

Information Service

1. A national policy to promote the use of improved seed must be formulated.
2. Develop brochures and bulletins to provide technical information for all sectors of the agricultural community.
3. Organize seminars and short courses to promote and demonstrate the advantages of improved seed.
4. Develop television and radio shows to discuss the advantages to improved seed.

IMPLEMENTATION AND ADMINISTRATION

Implementation of this project would be through the existing CNS and CRS programs. Funding would be directly to these organizations and not through the MACA/IBTA (or CIAT in Santa Cruz) to ensure sufficient independence from other institutions and interests.

External technical assistance would be shared with the Seed Production Project, and would be under a long-term contract (at least five years) with a consulting firm or American university.

RELATIONSHIP TO USAID COUNTRY STRATEGY

Improvement of the agricultural sector is one of the fundamental elements in bolstering Bolivia's economy. One factor that can improve the situation of the farming community is to provide improved seed in a timely fashion and at reasonable prices. Furthermore, this is one activity which offers a visible and usually permanent technological change in a relatively short time. USAID funded a seed improvement program from 1979-1986, which was highly successful but needs another infusion of technical assistance. This project is nationwide and will benefit the farmers in every department.

BENEFICIARIES

The importance of this project is more related to its function as a precondition to the development of a grain seed industry, rather than its specific impact. The primary beneficiary would be the National Seed Board (CNS) and each of the Regional Seed Boards (CRS). The seed producers would benefit immediately through the provision of better service and information from the CRS offices. In the medium and long term, the entire farming community would benefit through the provision of improved seed.

HOST COUNTRY AND OTHER DONORS

The Consejo Nacional de Semillas (CNS-La Paz) acts as the coordinating body for each of the Consejo Regional de Semillas (CRS). It has a headquarters staff of three administrators. It is responsible for developing an annual National Plan. It also tries to provide uniform salary levels and benefits for its employees. Certification, inspection, and fiscal procedures are reviewed annually and made uniform throughout the country.

Each of the Consejo Regional de Semillas (CRS) offices develops its own budget and fee structure. They also operate their own laboratory equipment, conduct their own inspection and sampling programs, and maintain their vehicles.

The Dutch have reentered the picture (September 1989) and are now working out of Cochabamba on potato seed production. They will work for two years just setting up a program, then four more in execution, an extension of four years is possible, for a total of 10 years under this project. The Swiss have taken over the potato research efforts of the National Potato Research Station at Torolapa. They will fund the effort for 10 years. The Japanese through the JICA program have undertaken a major vegetable and horticultural seed project (outside of Cochabamba).

MAJOR OUTPUTS FOR THE SEED CERTIFICATION PROGRAM

- Upgraded seed certification service;
- Improved seed quality;
- 15 M.Sc.-level seed technologists;
- Computerized systems in each CRS office;
- New field inspection vehicles;
- New seed laboratory equipment;

- Basic seed storage units in each department; and
- Seed purchasers receiving better information

FINANCIAL INPUTS FOR SEED CERTIFICATION PROGRAM: \$6,600,000

- Long-term technical assistance: seed inspection/certification specialist (3 years) (\$450,000);
- Short-term technical assistance: seed inspection and certification (2 visits x 2 months each x 2 years) (\$150,000);
- In-country training: seed inspection and certification (25 participants x 1 month each x 2 years) (\$200,000);
- Foreign training: short courses (25 participants x 4 weeks each x 2 years) (\$500,000); and M.Sc. degree work (15 candidates x 2 years) (\$750,000);
- Operational support: office equipment purchase and partial support (10 offices) (\$100,000); TA team and CRS (one for each department); vehicle purchase and partial support (37 vehicles); TA team and CRS offices (9 office X 4 vehicles) (\$1,200,000); and
- Commodities: seed laboratories (9 — one for each CRS) (\$250,000); and seed conditioning plant equipment (6 sets) (\$3,000,000).

7. NATIONAL AGRICULTURAL STORAGE PROGRAM

PROJECT PURPOSE

The project will provide technical assistance and training aimed at increasing on-farm and intermediary income and productivity by improving the efficiency in produce storage throughout the marketing chain.

PROJECT DESCRIPTION

Current Situation

One of the major production-marketing constraints in Bolivia is the lack of agricultural storage facilities. This lack of storage begins at the farm level and continues through the entire marketing chain.

There is virtually no storage at the market-town level, in the regional centers, or at potential export points.

Crop storage at the farm level is necessary to avoid the 20-30 percent of postharvest losses that occur annually at the farm level. Farmers (either small or intermediate-sized) are unable to store their produce and wait for favorable market prices, as a result they are at the mercy of itinerant merchants who purchase produce at the farm gate. With fragile or perishable crops, the farmer invariably takes a discount on the price because the quality will continue to deteriorate below perceived market standards.

There are very few bulk grain storage facilities in the country. The largest and best organized are those controlled by the wheat flour millers. The national breweries also maintain storage for barley. However, there are no grain and oilseed storage facilities outside the major industrial centers. Grain storage facilities are needed in the rural areas so that crop surpluses can be held for later distribution, or for resale when market conditions are more favorable. These could be administered by the departmental authorities such as the development corporations, or the various crop associations, or perhaps the area Cámara Agropecuaria.

Some areas are traditional centers for certain crops (such as fruits, flowers, garlic, and so forth). In these areas large volumes of the same crop are bulked for sale in the Bolivian market, or for export. Dry/cool and cold storage, as well as grading, sorting, and packing facilities are needed to maintain quality. Produce could be held for long periods of time and sold at better prices. They could also be held for long-distance shipping.

Several products that are being promoted for export (flowers, fresh fruit, and vegetables) are going to require better preshipment storage conditions. At all of the major airports provision must be made to handle and store large volumes of produce. These facilities must be mechanized, and palletizing and containerizing systems used to efficiently handle bulk shipments.

The project will help organize and construct storage facilities at the farm level, grain and oilseed silos, dry/cold storage for perishable and export goods, and possibly storage at farmer market centers. Technical assistance will be available to determine the appropriate infrastructure required and its construction and operation. Training in related areas will complement the above infrastructure.

IMPLEMENTATION AND ADMINISTRATION

Implementation of this project would have to be addressed through several entities, each dealing with the specific type of storage needed. Unfortunately, there is no ready candidate as implementing agent for any one part of this activity, much less all three components. It is suggested that the necessary preliminary studies be carried out through existing USAID project mechanisms, although funding for this activity is allocated within this proposal. Depending on the level of real interest and the complexity of a new project activity, existing USAID projects might be expanded through amendment for implementation with local entities.

On-farm storage systems experience in several other countries in Latin America and Africa can be drawn upon for the most appropriate designs for Bolivian crops and conditions. Many international

organizations as well as NGOs have developed locally adapted systems. Among these are OXFAM (in East Africa); CARE (in West Africa); Appropriate Technology, the Italian Technical Mission; and USAID. Numerous other organizations have a long history of rural development efforts and have a broad base of support, such as CARITAS, CEDEAGRO (in Misque), ACLO (Potosí and Chuquisaca), and the Mennonite Center (in Santa Cruz).

The most likely implementers of this type of project would be the NGOs. With USAID funding for materials, the NGOs closely associated with their respective community would mount programs at the local level. Initial technology could be developed by bringing in short-term consultants with experience in Africa and elsewhere in Latin America. Several Peace Corps projects have dealt with this subject and could be part of the new Peace Corps program in Bolivia.

If simple and inexpensive methodologies could be developed, small farmers could finance storage themselves, or through community action groups such as the sindicatos, cooperatives, or a local Club de Madres. Individual farmer storage should not need the support of a credit mechanism. However, larger group or community facilities would need access to FENACRE credit programs for financing.

A major weakness in this approach is the present lack of an obvious lead implementing agency. NGOs tend to be very focused on the local perspective. Often a national-level NGO sponsors programs that are really a collection of local activities with no linkage to other areas. Still, the NGO community represents an extension-type structure that offers clear advantages for spreading such a broad-based, low technology package. The first step in determining the feasibility of an on-farm storage project would be to assess the institutional strengths and weaknesses and the geographic coverage of major NGOs. Given the lack of a functioning second-tier association, project support would need to be channelled through a reduced number of NGOs showing interest in developing this activity.

Market centers (which can be defined in a number of ways) need storage to hold large amounts of produce near the point of production. These facilities become economically feasible when the agribusiness base expands to where intermediate shipment centers are required, instead of operating on the basis of truckloads. Such centers could also serve as sorting, grading and packing operations, which would add value to the produce. Focus on improving the marketing system should be directed at productivity increases. The Chemonics sector assessment stated bluntly that "Infrastructure should not precede development of institutions and improvements in the distribution channels." (pg. 135)

The experience in several other countries has shown that a fairly sophisticated marketing system is needed to appreciate the gain in efficiency and thereby be able to pay for this type of service. A careful analysis of each marketing area (or crop) will be necessary before undertaking this segment of the project. A survey of actually perceived crop storage needs and realistic marketing margins and seasonal variations would be required to determine the feasibility and financial benefits of this activity. The study would also identify organizations interested in investing in and managing these facilities.

Export shipping points need sophisticated storage facilities if the government desires for increased exports are to be realized. These should be highly mechanized to reduce handling and to expedite loading of airplanes, boxcars and trucks. Management of these facilities could be by private owners, crop associations, or shipping companies. Another alternative would be joint investment by different associations or groups of individual producers or trading companies.

Because of the advanced level of technology required, these types of facilities should be constructed under contract to professional (international) firms. Management of these facilities could be through private owners, or farmer/crop organizations. Since these facilities would be attached to organized marketing operations, normal commercial financing would be used. Alternatively, the FENACRE credit program could be used as it is in the high valleys of Cochabamba with the flower producers. Programs through registered coops and associations could take advantage of the FENACRE credit programs for purchase of the necessary infrastructure. Regardless of ownership of the facilities, qualified technicians would have to be present to maintain the systems in good working order.

RELATIONSHIP TO USAID COUNTRY STRATEGY

By providing several types of storage programs to meet the specific needs of the different sectors, there will be an increase in quality goods for the domestic market and for export. The project supports the overall aim of improving the farming sector's income by preserving the amount of consumable food, or increasing the amount and quality of marketable produce. There would be linkages to the Title III Program, and the Export Promotion and the Maternal-Child Health Projects, plus general applicability to alternative development efforts.

BENEFICIARIES

The impact of this project would focus strongly on export activities, increased producer income, and domestic food supply or availability (these last two items would increase by approximately 20 percent). Several sectors of the agricultural community are served by this project: first the small, subsistence farmer by the on-farm storage component; the intermediate-sized commercial farmer, growers associations, and exporters through the market centers and shipping point facilities. Millions of dollars a year at all levels would be saved by increasing the amount of marketable goods previously lost through deterioration, as well as through increasing the unit value of produce by maintaining better quality. The impact of this project activity would be evident within the first year of implementation.

HOST COUNTRY AND OTHER DONORS

There have been USAID-financed grain storage programs in Santa Cruz through the FOCAS Project. The new World Bank project in the eastern lowlands, will include storage for the anticipated increase in production of soybeans and wheat. In the late 1980s, the Ministry of Commerce agreed to finance a series of silos in Cochabamba to store wheat from the high valleys; unfortunately, the project never met expectations.

Virtually no host country donors currently are involved in developing a regional or national storage program. The departmental development corporations in Tarija and Chuquisaca have recognized the need for storage facilities in their plans but have not estimated the total volume required nor calculated the cost of them. Most storage (particularly grain and seed) has been constructed by private companies or

growers' associations for their own needs. In other developing countries the Canadian (CIDA) and the British (ODA) assistance programs have built several grain-storage complexes.

MAJOR OUTPUTS

- Two nationwide studies on NGO institutional capacity and geographic coverage, and on crop storage needs and marketing margins;
- 5,000 on-farm storage units;
- 50 market-town cold storage units;
- 50 produce sorting and grading sites;
- 15 major airport/rail storage facilities;
- 15 mechanized loading facilities;
- Training for 600 participants and infrastructure staff in specific produce handling, machinery installation and operation (participants); and
- General training in facility construction and operations (4,000 participants).

FINANCIAL REQUIREMENTS: \$4,200,000 + \$11,000,000

- Pre-implementation nationwide study on NGO implementation capacity and interest (3 person-months) (\$50,000); and crop storage survey and marketing margins (6 person-months) (\$100,000);
- Long-term technical assistance (3 expatriates x 5 years): on-farm storage, market center grading, and refrigeration and construction (\$2,250,000);
- Short-term technical assistance and training (3 courses x 20 participants x 2 two-week courses per year): food preservation, produce grading, and refrigeration operation (\$600,000);
- General training courses (200 participants in one-week courses x years): (\$800,000);
- Operational support: office equipment purchase and operations, and vehicle purchase and operations (3 advisors) (\$400,000); and
- Estimated credit demand for storage infrastructure: on-farm storage materials (1,000/year x \$500 each) (\$2,500,000); market town storage and grading (50 x \$200,000) (\$1,000,000); and export site facilities (15 x \$500,000) (\$7,500,000).

8. AGRI-CHEMICAL REGISTRATION, INFORMATION AND TRAINING

PROJECT PURPOSE

The project will help the small- and medium-sized farming operations in rural areas secure adequate supplies of agricultural inputs on a timely basis at a reasonable cost, and provide technical information on their proper use.

PROJECT DESCRIPTION

Current Situation

The supply of agricultural inputs in Bolivia to potential users outside of the major cities is extremely limited. To a large extent, the supply of agricultural inputs (particularly chemicals) are controlled by the larger importers located in La Paz, Cochabamba, and Santa Cruz. With the exception of Santa Cruz where the agro-industry is more market oriented, very few agricultural input distribution centers exist. Further, current input use by campesinos and/or their organizations is low because they do not have enough information on what and how to use them and there are not adequate supplies of the appropriate farm chemicals when needed.

Bolivia is promoting export programs for a number of crops. If these programs are to have any measure of success, a strong program of chemical use and monitoring will be necessary. At present, too many chemicals are being used indiscriminately. International awareness and standards for contaminants are such that Bolivian products would not be allowed into most foreign markets. In addition, without the availability of many agri-chemicals, particularly fertilizers, it is unlikely that Bolivia could produce quality products in sufficient quantities.

In many cases, campesinos are not aware of the danger involved in using agri-chemicals, many of which are toxic or lethal and have detrimental effects on the environment. The problem is exacerbated because most intermediary suppliers break down bulk supplies and repackage them in containers without any accompanying warning labels or description of the chemical's properties. Instructions on proper preparation and application are almost never present. As a result, untrained shopkeepers sell chemicals to the farmers without any real knowledge of the products. Neither the national and regional research services (IBTA/CIAT) nor the extension service (MACA) have developed an information delivery system to advise campesinos on the use of agri-chemicals.

This project will assist in the development of mechanisms to ensure the proper chemicals are used in the correct way. The project will work with the MACA/IBTA offices and the Cámara Agropecuaria within each department. These offices in turn will work with NGOs, farmer organizations, and private suppliers to achieve the overall objectives.

11

Product Registration

At present the major suppliers of agri-chemicals are the import firms located in La Paz, Cochabamba, and Santa Cruz. A large, but unquantifiable, amount of materials come into the country illegally from the neighboring countries. The types of chemicals brought in are not always the most suitable for Bolivian conditions; rather, international availability and price dictate what is imported. Both of these considerations lead to market distortions. Prices are dictated by the availability of products, and the lack of a competitive market.

The government should require that all chemicals brought into the country be registered by the MACA. International inspection certification services should be provided to ensure that minimum standards and fair pricing is being applied. All international suppliers must be required to supply MACA with research and trial information to justify the use of their respective chemicals on crops under Bolivian conditions. (This is not to imply that on-site testing and certification of chemicals be undertaken. Bolivia does not have the technical nor administrative capacity for this effort.) The Pre-clearance Program proposed in the Agribusiness Support Services Project could be the appropriate source for continually updated information on permitted agri-chemical products.

Retailer Registration

The current practices of breaking down bulk supplies and not supplying technical information should be addressed. Further, the sale of chemicals, especially liquids, in containers provided by customers should be discouraged. There are too many instances of accidental poisonings of humans and livestock to allow this practice to continue. The question is, how to prevent this practice? One possible way would be to require agri-chemical retailers to be registered with MACA and attend a training course. (A similar program is now in force by the Consejo Nacional de Semillas.) Another is to use the "Dirección Federal de Rentas" to enforce shopkeepers following regulations regarding the provision of technical information with all sales, and the use of proper packaging.

For the most part agri-chemicals are sold through small shops that handle all sorts of commercial items, including foodstuffs. To facilitate adequate availability, a series of farm-supply shops would be organized and managed at the community level by farmer-run organizations. They would receive credit to finance their initial inventories, and thereafter function as a normal commercial venture. As with existing retailers, they would be obligated to participate in specific training programs related to agri-chemical handling and use. Small business training would be handled through other programs such as the USAID-sponsored IDEA project, and through FENACRE.

Information

Most of the information on the restrictions, preparation and use of the chemicals is available in Spanish. However, large numbers of chemicals come from the United States, Europe, and Brazil so the information is in a foreign language. It should be a requirement that imported agri-chemicals contain all technical information in Spanish. Every major, reputable agricultural supply company in the world has extensive promotional and technical literature (in Spanish) on their respective products. MACA and

IBTA, as well as local distributors, can obtain adequate supplies of this literature by writing directly to the suppliers.

The linguistic situation in Bolivia is such that the primary clientele for agri-chemicals speak Aymara or Quechua as a first language rather than Spanish. It is necessary for information and instructions to be available in Aymara and Quechua at the retail level. There are several church-related organizations and other NGOs throughout the country that could provide translation services for this purpose. The project would provide support for the preparation and publication of related media materials.

This type of information could be made available through the Departmental Consulting Services Project (DCS) proposed elsewhere in this document. There are many professionals in the agricultural community who would be able to assist in short-course training provided through donor-financed projects throughout the country.

Training

Professional training in the agricultural sciences in Bolivia generally does not provide for hands-on experience in the practical handling and use of pesticides and other agri-chemicals. The MACA/IBTA personnel plus agronomists working in export-oriented enterprises, as well as others involved in extension activities (such as some NGOs), must be trained in the proper preparation and use of the recommended chemicals in their regions. They must also be aware of the precautions and dangers of other available, but not recommended, chemicals. They should also be trained to recognize the symptoms of human poisoning and toxic reactions to plants.

The responsibility of the newly trained GOB personnel would then be to hold meetings with the retailers and endusers of these products to ensure their safe and proper use, and the NGOs would do the same with the people they work with. The agronomists involved with agribusiness operations would ensure that their products meet international standards for pesticide use and residuals, thereby protecting Bolivia's export product reputation. Very specific information would be provided through the Pre-clearance Program under the Agribusiness Support Services Project. As above, the Departmental Consulting Services Project (DCS) could be used as a vehicle for dissemination, as well as to certify the attendance and adequate subject content of refresher courses. The above Agribusiness Project proposes substantial training related to agri-chemical use and would need to be coordinated with complementary activities under the present proposal. Other sources of expertise could be the chemical firms and their distributors, or the International Fertilizer Development Center in Alabama, USA.

IMPLEMENTATION AND ADMINISTRATION

The regulatory part of this project would be administered through MACA/IBTA at the national and departmental level and would be directed at the aspects of registration and information, with the required legislative changes being the responsibility of the Ministry. Registration of agri-chemical products would define the scope of information which should be made available. The registration of retailers would aid in ensuring that information would be made available and hopefully that appropriate retailing practices

were followed. As the user public became more aware of proper practices and the dangers involved, the incidence of illegal imports and unmarked products should become less frequent.

The part concerned with training would require establishing a vehicle which presently does not exist (given the lack of a national extension service). A relatively short-term project could be structured to use the proposed network of "Departmental Consulting Services" presented elsewhere in this report. Conceivably, this type of project could be added to an amended version of the existing Private Agricultural Producer Organizations Project (511-0589), if the DCS project were implemented in the same fashion. The project would provide appropriate training and refresher courses to interested agricultural technicians and consulting firms. These then would be licensed through the DCS's to give courses required of all retailers and extension agents for a modest fee, which in turn would tie in with the above regulatory function of MACA/IBTA. Another aspect would be the preparation and translation of materials for use by the media and in conjunction with training. To extend the coverage of agri-chemical retailing to be more accessible to users, credit lines for cooperatives and small businesses would be available under the existing Small Business and Micro-enterprise Project administered through the FENACRE credit union programs.

RELATIONSHIP TO USAID COUNTRY STRATEGY

USAID is trying to promote agricultural production of local crops to increase farmer income and develop export-oriented crops. This project would improve the accessibility to agri-chemicals for farmers, coupled with measures to provide ample information and training. Through proper use, crop yields would improve, while reducing the actual amounts of chemicals used and avoiding unnecessary environmental contamination, also ensuring compliance with international regulations concerning pesticide use. There would be direct linkage with the implementation agencies under the Export Promotion and Diversification Project. Also there would be a secondary, but critical, side benefit -- the reduced risk to human health through training and information transfer.

BENEFICIARIES

The principal beneficiaries would be the rural farming community, as improved agri-chemical practices show improved productivity and incomes. This would be especially noticeable to the degree that the use of proper inorganic fertilizer would become available, since yields should increase substantially. Other types of impact probably would not be felt in the short-term. Agribusiness firms (especially export oriented) would be benefitted by being assured of a sufficient quantity of adequate quality produce with a lowered risk of misuse. However, an integrated program that would control the type of chemicals coming into the country, provide appropriate technical information, and train people how to use them, would benefit the entire agricultural sector, as well as consumers.

HOST COUNTRY AND OTHER DONORS

Agricultural Input Centers have been successfully organized in the Santa Cruz department through the Camara Agropecuaria de Oriente (CAO). This program has received funding through PL-480. In addition, the ASOFRUT in Santa Cruz provides inputs (tools and chemicals) through a program that had its beginnings with a \$500,000 loan from the IDB. The Cooperativa Integral of Cochabamba has received loans from FENACRE for the same purposes. Several other regional Cámaras Agropecuarias have tried to set up similar systems but have not been very successful, mainly because of inadequate business skills.

MACA and IBTA/CIAT ostensibly have research and extension functions. Both of the programs need strengthening in order to implement the information and training components. The PROCIPLA project currently funded through the PDAR/DAI Associated High Valleys Project has developed a significant body of literature dealing with Integrated Pest Management (IPM) and would be a good source of experience. Several NGOs are involved with "small farmer" projects at the departmental level. These groups, along with church-sponsored programs could be used to assist and/or implement the information transfer function. Credit and financing for the retailers will be provided through local credit unions meeting the FENACRE criteria. This will keep the loans smaller and under local control.

MAJOR OUTPUTS

- National survey on the types, amounts and uses of agricultural chemicals;
- New import legislation for chemicals;
- Registration of imported chemicals;
- Product description and use information in Spanish, Aymara, Quechua;
- Literature on crop/animal diseases and pests in local languages;
- Short-term training in agri-chemical management for interested technicians/licensed trainers;
- Retailer certification and training available in agri- chemicals and business skills;
- Improved pest management practices and reduced risk of inadequate pesticide use;
- Local farm supply centers selling equipment, fertilizer, seed, chemicals, veterinary supplies;
- Better agri-chemical preparation and utilization by farmers; and
- Improved environment by reducing health hazards to humans and animals.

FINANCIAL INPUTS: \$4,500,000

- Long-term technical assistance (4 persons x 3 years): agricultural legislation, pesticide management, coop organization and operation, and small business management (\$1,800,000);
- Short-term technical assistance: training (18 person-months), agricultural communications (preparing media materials and translations — 48 person-months) (\$900,000); and
- Commodities and support: local courses in agri-chemical application (300 trainees), and small business/coop management (150 train.) (\$450,000); vehicles (4) and operations (\$200,000); office equipment, operations (\$150,000); and publications and other media materials (\$1,000,000).

9. PRIVATE AGRICULTURAL CONSULTANT SERVICES**PROJECT PURPOSE**

The project will support the formation of trained and certified private sector agricultural extension services within the different departments of Bolivia.

PROJECT DESCRIPTION**Current Situation**

Public agricultural consulting expertise is almost nonexistent in Bolivia. The governmental agencies responsible for these services, MACA/IBTA, are extremely understaffed and underbudgeted. Morale at most MACA offices is very low. Staff are poorly and irregularly paid, there is a lack of vehicles or funds to operate them, and very little linkage exists between government research efforts and systems to deliver existing information to the farmers. The foregone conclusion of the agriculture sector (and the donor community) is that the Bolivian government extension service is unable to meet its obligations.

In 1988, the World Bank asked the ISNAR to undertake a study of the MACA/IBTA research and extension programs (as well as the Technology Transfer Department of CIAT in Santa Cruz) and make a series of recommendations to restructure MACA. Many of these suggestions are unlikely to be implemented for some time since the MACA has been under restructuring for nearly 10 years and still has not organized itself administratively. While ISNAR's proposed ITTA (Investigación y Transferencia Tecnología Agropecuaria) program is laudable, it does not square with the political, administrative, and financial realities of Bolivia. The ITTA program only reiterates what a good research and extension services should do anyway, regardless of what name the program or institution is given.

Almost all externally funded technical assistance programs now budget for extension and training efforts within the projects themselves. This circumvents the role of the MACA and further weakens the morale of its extension staff. Externally funded projects also offer higher salaries and perquisites to attract the best technical assistance. This reduces the level of governmental services as the better staff members are continually hired away. However, as long as the central government is not able or willing, to pay and support its extension service staff adequately, it will never have a sustained presence and impact in Bolivia.

The World Bank states in its ADP Plan (1990) that, "In the long term the World Bank and the Bolivian government may be able to strengthen the generation and transfer of agricultural technology, transport infrastructure (rural roads), marketing infrastructure and irrigation." If this plan is carried out, then the availability of extension workers will be further reduced, at least in the short and mid term, and direct technical assistance to the small-scale farming sector will be delayed.

Funding of Extension

In most developed countries, federal and state taxes are used to help finance extension efforts. In addition, specific levies are made on agricultural products, or paid by producers and manufacturers to help conduct specific crop research and to provide technical assistance. The private sector (especially seed and agricultural firms) spend millions of dollars on product research, education and advertising. While Bolivia does not have the tax base, nor the private sector involvement, it could afford to pay for agricultural consulting services. The farming organizations or rural unions (sindicatos) need to organize themselves around their specific commodity concerns. They could then search out specific expertise to address their problems.

It is recognized in Bolivia that the best functioning extension efforts are those of CIAT in Santa Cruz Department. (The programs are fortunate to have had the backup of the British Technical Mission for over 14 years. The World Bank is soon to undertake the Natural Resource Management and Agricultural Production Project in the eastern lowlands in cooperation with CIAT.) Meanwhile, the Santa Cruz commercial agriculture sector has been very supportive of the extension service and has provided it with financial support through levies imposed on themselves by the various crop and commercial organizations. They have come to recognize that it is in their own interest to have the best technical expertise available. This is demonstrated by the fact that CORDECRUZ pays for over 90 percent of research and extension budget.

For over five years, the IBTA/Chapare program has been funded by USAID through a contract with Experience Incorporated. The project has been screening new crops in the Chapare region of Cochabamba and successfully demonstrating alternative farming systems to coca production. However, IBTA has now been instructed not to carry out further extension efforts under this program.

It is highly unlikely that the Bolivian extension service will ever find the necessary resources (internally or externally) to completely meet the financial needs to function as an independent service organization. Perhaps it would be better to recognize the failure of the government to support the extension service, and develop an alternative system to assist the agricultural sector.

IMPLEMENTATION AND ADMINISTRATION

This proposed project is to assist in organizing a series of Departmental Consulting Services (DCS). Each DCS would coordinate the provision of extension information, or provide training in specialized areas, and offer other support services, but on a fee basis.

The USAID project would not actually organize the DCSs, since this would depend upon local initiative, nor would it fund or monitor them directly. USAID would finance organizational assistance, as well as technical expertise provided through the many professional agricultural societies in the United States. Alternatively, USAID could use the IDEA project already in place, or the Bolivian private sector's PRODEM program. A Small Business and Micro-Enterprise Program (SBMEP) is already in place with the USAID/PL-480, and could provide funding to each DCS as it organizes itself as a for-profit business. The SBMEP has set up a Small Business Loan category that will loan up to US \$20,000 through the national credit union program administered by FENACRE. The DCSs could have an important role in the implementation of related activities proposed in the Agri-Chemical and Agribusiness Project proposals, since no organization or network presently exists.

The expatriate technical expert would not have a single counterpart. Rather this expert would establish contacts with the Cámara Agropecuaria in each Department or major city in the country, and the DCSs probably would be organized over a period of time, rather than as a group near the project's initiation. The expert would work through this organization, and other technical assistance projects being planned, funded, or financed at the local level. These organizations would include banking, credit unions, United Nations, NGOs, and bilateral assistance projects. The expert would also use existing programs within USAID whenever possible. The project envisions the need for a full-time expert in computer-based data management to also work with the Cámaras Agropecuarias and their DCS to systematize available information and organize instruments gather and distribute data.

Contracting mechanisms as short-term technical assistance (STTA) within long-term projects or a local indefinite quantity contracts (IQCs) would be used to provide specific technical expertise as needed. This assistance would update the technical competence of the consultants, thereby making them more responsive to new needs created by an active agribusiness sector.

Each departmental office would be staffed by an administrator (with an agricultural background), a secretary, and minimal support personnel. Each departmental Cámara Agropecuaria would be called upon to identify likely candidates to run the DCS.

It is not the intention of this project to promote the DCS as a consulting service. The DCS is to act as a facilitator and clearing house between private consultants and potential clients. Fee schedules for DCS services would be worked out for different classes of services it would offer.

The consultants placed on the rosters would not be DCS employees, but would be professionals "on call." They could be university staff, government workers, employees of private concerns, or private free lance consultants, or private companies that offer technical expertise from their own staff.

The following are some of the organizational steps each DCS would have to take:

- The administrative staff selected and hired;
- A survey would be made of all the professionals (individuals and organizations) available to the agricultural sector within Bolivia;
- Consultant rosters would be developed according to areas of specialization;
- Professional qualifications would be set to insure minimums of technical competence are met by individuals or companies;
- A computer database would be made available nationwide of each DCS professional roster. A continual updating would be maintained, including available information by the clients evaluating the level of performance; and
- Each DCS office would advertise its services aggressively on radio, television, and newspaper. There would also be a program of countryside visits and presentations to ensure that the agricultural community was aware of the services.

Self-sufficiency

Within 3-5 years, each DCS should be able to support its own administration costs through a service-for-a-fee program. Each professional associate would pay an annual membership fee to maintain his certification and current registry. A percentage of each consultancy fee would also revert to the DCS. Upon legal recognition, the DCS would become eligible for a loan sufficient to purchase the equipment required to set up the local office and to cover the operational costs for a period long enough become established.

The clientele, initially, would probably be medium to large-scale farming operations, since they would recognize the value of professional assistance and are attuned to commercial operations. They could approach the PL-480 financed FENACRE Coop Credit program for short-term loans to pay for technical assistance.

Small landholders would go through the micro-enterprise channel for loans to pay for technical assistance, since they would not be required to collateralize their loans. This Micro-Enterprise Loan project functions in conjunction with the PL-480 program and has been working for the last three years in La Paz Department. Over 40,000 loans with an average value of \$220 have been made to over 11,000 clients. The basis of the loans is a "solidarity group" formed by 5-10 associates. The group does not have to put up any collateral, and the loan is approved and money dispersed within 48 hours. The default rate for all these loans has only been 0.3 percent. This program is to be enlarged in La Paz Department, and two new programs will begin in Santa Cruz and Cochabamba in FY 91.

Another type of clientele could be those requesting agribusiness or production loans, for which the related bank might feel the need for a technical evaluation of the proposed project.

Public projects, or internationally funded projects desiring the services of Bolivian nationals or companies, would be able to use the services of the DCSs to locate local expertise. Alternatively, the

DCS services could be used to vouch for the competence and experience of individuals or companies seeking consulting contracts. This would be analogous to the registries of individuals kept by the various professional societies, or the Better Business Bureau in the United States.

RELATIONSHIP TO USAID COUNTRY STRATEGY

For the agricultural sector (particularly the small and intermediate sized operations) to improve its productive capacity it must have access to better technical information. The current MACA extension service is not helping enough farmers in Bolivia. If the existing professional expertise currently available is to assist the agricultural sector, alternative methods will have to be developed to take advantage of it. The proposed project would also lend support to a self-sustaining mechanism to provide these services after the international donor-funded activity ceases.

There would be linkages with the Export Promotion and the Micro-enterprise projects and should provide substantial assistance to an expanded alternative development program.

BENEFICIARIES

The agricultural community at large, particularly the farm production sector, would benefit from access to current technical information, available from sources that can be held responsible for their performance. Although the impact of extension services tends to be diffuse, it would be more noticeable in greater farmer income and employment related to the production of export-oriented crops. Agribusiness firms would have an option to maintaining an extension staff. The agriculturist profession would be stimulated by having a greater variety of employment opportunities which implicitly recognize individual competence. Furthermore, a functional network for extension services is practically a prerequisite to ensure an environmentally sound use of agri-chemicals.

HOST COUNTRY AND OTHER PROGRAMS

The Bolivian government is financing an extension service which is currently understaffed and underbudgeted. The cost of maintaining the service is not justified since virtually no assistance is being afforded the farming sector. The World Bank estimates that there are only 146 active extension service personnel in the country and that they are only reaching two percent of the farmers in the country.

The CIAT of Santa Cruz department is the counterpart to the national IBTA program. (IBTA does not function in Santa Cruz.) CIAT has its own extension service which is supported by the British Technical Mission, and is called the Technology Transfer Department. The World Bank/IDA will soon undertake a multi-year, \$3.2 million assistance program for CIAT extension activities in Santa Cruz. If successful, this program could be a useful model for other Departments.

The Regional Seed Boards maintain their own technical field staff to ensure quality control throughout the chain of seed production activities and the Dutch-supported potato seed project (PROSEMPA) has hired its own extension staff to meet its internal needs.

Each international donor program maintains its own expatriate staff as well as hiring and training local counterpart staff. This is to insure that program objectives are met, personnel are adequately compensated to maintain their loyalty to the project, and to obtain the best talent available.

There is one organization of professional consultants within Bolivia, the Asociación Nacional de Empresas Consultores (ANEC). Its membership consists of over 100 affiliated firms and independent consultants, however only six companies may be of sufficient size to field multi-disciplinary teams of technicians. The local office of the Andean Pact Organization has a roster of 140 consultants in areas related to agriculture and industrial development. ANEC has expressed concern over the fact that its affiliates are not being considered by USAID as a source of expertise in project identification, design, or implementation.

This project would complement the National Agricultural Information Service project, the Agricultural Input Centers project, and the Crop Research project proposed elsewhere in this document. The DCS would be able to access these services as would individuals, but would use the information to keep up with the latest developments in the agricultural sector. There would be close cooperation with existing government, NGO, and external assistance programs since all of these entities could draw upon the DCS expertise.

MAJOR OUTPUTS

- 8 Departmental Consulting Services established;
- A national roster of certified consultants;
- Five annual meetings of consultants;
- Improved technical information for farmers; and
- 20 seminars on topics of general professional interest.

FINANCIAL INPUTS: \$1,500,000 + \$1,100,000

- Technical assistance and related support: organizational (expatriate x 5 years) (\$750,000); computer specialist (national x 5 years) (\$100,000); office equipment and operations (\$150,000); vehicle purchase (2) and operations (\$150,000); national meetings, seminars, publications (\$350,000); and

- Estimated credit needs for DCS operations (1 in each department during 3 years): office administrator, secretary/computer operator, driver/messenger, computer systems purchase, office equipment purchase, office/vehicle operations (\$1,100,000).

10. SMALL-SCALE IRRIGATION INFRASTRUCTURE

PROJECT PURPOSE

This project will increase the sustainable level of agricultural production from irrigated lands, thereby improving both the amount of agricultural employment on a year-round basis and the rural family income from on- and off-farm sources. Given the small-scale focus, the project will improve the food supply for rural and urban consumption, as well as provide the raw materials for agroindustries and export activities.

PROJECT DESCRIPTION

Current Situation

Agriculture in Bolivia is carried out on approximately one million hectares from a total of nearly three million hectares classified as apt for agriculture. Irrigated agriculture accounts for small portion of the total, estimates ranging from 60-100,000 hectares.

Obviously, a large part of the rural population depends on rainfed agriculture for its subsistence. Typically, the daily diet for subsistence-level families is 60-70 percent of the recommended minimum. The lack of cash income prevents the use of needed inputs such as fertilizers, leaving irrigation water as the nearly the only noncash input available except for manure. The use of irrigation has a rapid impact, increasing harvests and lowering risks, which increases family income and allows for the purchase of other needed inputs to boost production, as well as improving the family's dietary situation. An example of the magnitude of impact of irrigation would be the replacement of 20 hectares of rainfed pastures by .5 hectare of irrigated alfalfa to be harvested and not grazed.

This program proposes to intensify small-scale irrigation development because of its general favorable results. In the design of the new program it is possible to reduce flaws that have been experienced during the planning, design, and construction of existing systems. Training in proper irrigation technology and maintenance, plus instruction in soil and water conservation practices would be an important aspect of project implementation.

Given appropriate priority, the expansion of small-scale irrigated agriculture could add another 50,000 hectare during a 10-year period. However, microirrigation has to be planned, designed, implemented, and initially managed at a program level. Even though no clear definition of

microirrigation (or small scale) projects is being handled generally, it is taken to mean in this proposal an irrigated area of a maximum of 100 hectare per system, involving a maximum of 100 participating families, and with an investment of \$50,000 per system. Programs might run from \$500,000 to several millions, according to the implementation and financial capacity of the responsible agencies, and their duration initially should not be below five or six years.

It is common that project proposals pretend to irrigate relatively large areas per family, that is 10 hectare each. The amount of labor absorbed per hectare of irrigated land usually is two to three times that for the same dryland crop. Therefore it is unfeasible for the capital-poor intensive agriculture practiced by small- and medium-sized landholders, unless large numbers of seasonal laborers are hired. The large projects are strictly commercial operations and usually cost much more per unit of irrigated area. Implementation of such projects should explicitly include funding for concomitant, large-scale conservation and watershed management activities to minimize the social costs of the project (that usually are not allocated, even though they definitely occur, both at the site and downstream).

In many areas irrigation is recently being introduced, thus farmers as well as technicians often need long lead times before they master the basic techniques. Otherwise, building projects in a hurry, irrigation will do more harm than good, especially because of the caused erosion that is inherent with poorly designed and managed irrigation. Training of farmers in on farm irrigation, especially erosion prevention, irrigated agriculture, agronomic aspects and associated animal husbandry is to play an important role in the projects, in order to secure and maximize income generation. However within the infrastructure program importance also has to be given to local research. Social and cultural as well as technical research needs to be executed by the same community of beneficiaries, guided by project personnel to detect future bottlenecks and offer remedial measures.

Description of Irrigation Systems

The study team was presented 60 irrigation projects in the profile and prefeasibility stage, 25 of which were termed small scale. A number of these projects actually could be called geographic programs, since they comprise a fair number of individual works within a particular region. MACA's hydraulic resources plan (August 1990) also lists 50 similar projects (there are repeats of some in the other list) which need financing to begin construction. Of all these, some are virtually ready to be included in microirrigation proposals after a visual and technical inspection. However, many would require extensive modification to be categorized as small to medium scale.

Projects normally will be improvements of existing systems. That includes the improvement of intakes, lining of canals, introduction of service reservoirs, and terracing. In such cases the matter of extension and training of irrigation techniques becomes much easier. However, wherever irrigation is being introduced, a special extension and training package should be applied for irrigation, watershed management and conservation. Experience has shown that these skills need to be transferred as part of the total package for both technicians and farmers.

IMPLEMENTATION AND ADMINISTRATION

Ideally, some form of national or regional water resources and conservation bureau would be organized under MACA to deal with irrigation and related matters. However, this does not seem probable within the foreseeable future, and therefore this type of project will need to be implemented by the only technically capable institution available — the departmental development corporation (DDC).

This proposal is limited primarily to the tri-state area where Potosí, Chuquisaca, and Cochabamba join together, plus lesser areas in Tarija and Santa Cruz. Therefore, the main implementing agency in each department or state would be the respective DDC.

The first step in implementation would be to start the studies to preselect the probable irrigation site areas and then to further refine the selection criteria to begin final choices. Since this is a long and detailed process, it is preferable that actual implementation be started after about 20 percent of the estimated budget and outputs can be assigned, rather than waiting until the entire range of possibilities is investigated. Part of the planning task is to detail the contribution of different agencies and of beneficiaries, as well as to analyze the variety of aspects involved (social, cultural, legal, agro-technical, engineering, ecological, and financial) and compare these with the actual situation of no action taken (making projections from a baseline study).

Other entities possibly involved in small-scale irrigation project implementation would include area NGOs which could be interested in the social and technical extension aspects of the program. Some need for medium-term credit is foreseen, probably requiring the use of credit cooperatives or some other mechanism to provide loans for other than production purposes.

Outside technical assistance is not contemplated for this project alone. Rather, the long and short-term assistance included in other proposed programs related to irrigation could be called upon whenever needed. This program is not meant to develop new technologies, but instead implement existing ones in a coherent fashion, integrating irrigated agriculture with watershed management, conservation practices, and reforestation.

RELATIONSHIP TO USAID COUNTRY STRATEGY

The project outputs would be focused on major USAID development strategies: rural employment generation, improvement of rural family income, improvement of foodstuffs available for local consumption, and increased capacity to produce export-oriented and agribusiness-related raw materials. There would be direct links with activities under the Chapare Regional Development Project and also would impact on the Maternal-Child Health Project.

BENEFICIARIES

The principal beneficiaries would be the rural farm families, as long as adequate legal provision is made to offer some form of land titling and water user rights. If the technology used is purposely kept accessible, irrigated agriculture will quickly generate higher levels of rural employment and family income and help to stabilize the food supply. To help ensure immediate interest by this population, it is strongly suggested that modest amounts of credit funds be made available for personal and community property improvements (housing, domestic water supply, schools). By improving the supply of foodstuffs for the local markets, urban as well as rural consumers would benefit. Through appropriate watershed management, the list of beneficiaries literally would stretch downstream from the irrigation works as well. It is expected that by building into the project a prominent component of watershed management and conservation practices, plus irrigation techniques, the negative environmental effects of land reshaping can be minimized.

HOST COUNTRY AND OTHER DONORS

The different DDCs have generated a substantial number of irrigation projects in the last decade which still could be considered for implementation. However, many would require large dams and water networks and could be too expensive and risky to warrant further investment of time for analysis. The recent drought situation has generated a response by the DDCs to carry out predesign work for small-scale systems, well-drilling, and other water supply proposals. As these become available, they could be considered in the future.

A number of NGOs have become involved in the implementation of irrigation and other agricultural-development activities. CARE is active in Tarija in such a program, which also includes a variety of extension-related actions. PROAGRO in Sucre is stressing the renovation of agricultural and animal husbandry activities. UNTAS in La Paz is a loose organization of NGOs that are active in rural development. Given the focus and methodology of this proposed project, many local NGOs could become interested in participating because of the complementarity with the NGOs' more traditional action.

MAJOR OUTPUTS

- Approximately 8,000 hectares served by rehabilitated or new irrigation infrastructure in 160 project sites (30 percent in Cochabamba, 30 percent in North Potosí, 25 percent in North Chuquisaca, and the rest divided among Tarija and Santa Cruz): 800 kilometers main canals, 200 kilometers canals lined, 1,000 smaller main canals, 160 intakes and service reservoirs;
- 1,000 hectares with constructed terrace walls and 1,000 hectares with living terrace walls;
- 8,000 participating rural farm families with improvements in: income level, more stable employment, productive capital or wealth, diet and other health-related aspects;

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- Improvements in community and/or personal property; and
- Participating families trained in practical application of irrigation, soil-water conservation, and reforestation practices, which should be easily maintained and replicable.

FINANCIAL INPUTS: \$9,000,000 + \$1,300,000

- Area preselection studies (16,000 hectares) and predesign and baseline for 8,000 hectares at 160 sites (\$1,000,000);
- Demonstration, training operations, materials (\$900,000);
- Irrigation works construction materials (\$2,600,000); terrace construction (800,000 m³ of walls (\$1,000,000); program equipment purchase (5 light trucks, 5 small dump trucks, 5 pickups, 20 motorbikes, pneumatic and construction equipment, training and office facilities and equipment (\$800,000);
- Program personnel, administration and operational support: 100 village-level workers/promoters, 20 trainers/supervisors 20 construction technicians, 30 administration, transportation and administration support costs (\$2,700,000); and
- Medium-term credit requirements: materials for 1,000 hectares living terrace walls (\$300,000); social infrastructure — housing improvements, domestic water supply, schools, community buildings (\$1,000,000).

**11. MICRO-REGION INTEGRATED RURAL
DEVELOPMENT LA PAZ RIVER VALLEY**

PROJECT PURPOSE

The project will combine a variety of project elements to strengthen existing agricultural activities in the valley area at the base of Mount Illimani to support a sustainable agricultural economy to provide La Paz City with healthier produce. By improving general living and employment conditions and family incomes, this area will productively support a growing population base. Infrastructure works will combine spreading irrigated agriculture with river control, land reclamation, and conservation practices.

PROJECT DESCRIPTION

Current Situation

The project area is a well-defined geographic area of significant importance for nearby La Paz as a year-round supplier of fruit and vegetable products. However, it also represents a potential health hazard, since the waters used for irrigation and for produce washing are untreated, contaminated effluents from the La Paz urban and industrial area. This valley provides an unusual opportunity in the sense that no need appears to exist for any large or complex single project, with the exception of riverbed erosion control. This situation would permit a series of activities to be implemented by different agencies with a clear view of results obtained.

This micro-region has largely unused water resources from snowfed runoffs which could serve for both irrigation and domestic purposes (for produce washing). Presently, much of the area's agriculture is rainfed, thereby limited to only one growing season for annual crops. Other parts do have irrigation, but exclusively from the La Paz River. Utilization of mountain runoff water sources would be a relatively low-cost alternative, with the advantage of being much more sanitary. The construction of irrigation canals could include terracing as well, ensuring greater land stability plus expanding somewhat its area.

This region has several distinct microclimates that permit cultivation of a wide range of fruits and vegetables. To take better advantage of its proximity to the La Paz urban market, a limited amount of feeder road and bridge construction is needed to provide access year-round and substantially reduce travel time. This region also would benefit from the use of cobblestone paving, at least in the any places where streams must be forded.

Another type of infrastructure urgently needed is for riverbed control, probably based on semi-submerged stone-filled cages and erosion-resistant dikes. This activity would be expensive, depending on location of appropriate rock deposits, the cost of rock production, and the availability of heavy dump trucks and other mining/construction equipment. However, this could have an important collateral benefit of stimulating some land reclaiming. An initial, rough estimate is that between 500 to 1,000 hectares of land could be recovered in the lower valley at an additional cost of from \$1-2 million. Given its location, such land might well be worth the investment in terms of income and employment generation.

The proposed types of investment in irrigation and transport infrastructure should be complemented by a program to upgrade present agricultural practices and introduce more commercially oriented crops or varieties. To some degree this could be an offshoot from other proposed projects suggested by the study team. However given the La Paz market focus for this area, specific applied research and extension efforts would differ from those for other areas. To the degree possible, the cultivation of ground-level fruits and vegetables should be shifted to locations with cleaner water and be replaced by crops not as subject to contamination. Attention should also be given to extension efforts in water and soil conservation practices, which should accompany irrigation construction. These activities will require a limited research facility and demonstration parcels.

The last general activity area concerns the provision of social infrastructure, such as public health and education facilities and community training centers. The demand for these should be user-generated, i.e. representing both a user-felt need and a user responsibility to maintain and operate the facility. In practical terms, these works serve to strengthen the ties of the population to the area, just as individual irrigation does. If the population has not only sustainable agricultural income and employment but also improved living conditions, the attraction of nearby La Paz City for migration will lessen.

IMPLEMENTATION AND ADMINISTRATION

The primary implementing agency for a regional activity would need to be the departmental development corporation, CORDEPAZ. It is the only institution with the administrative capacity and experience in a wide range of projects to manage an integrated development program. However, even though it would be the "umbrella institution," many of the individual activities would be carried out by other entities, loosely coordinated through the CORDEPAZ structure. These include the Palca local government (municipalidad) and local NGOs, depending on their interests and technical capabilities. The participation of the communities in selecting activities and sites would be a necessary element, even though they might not provide all the labor required. An example of outside labor required would be the need for trained construction workers and equipment operators, since the technical level required is high. A first step in implementing this proposal would be the preliminary definition of activities and of the level of interest and capacity of agencies responsible for specific implementation tasks.

It is considered that the different technologies required for the variety of activities are relatively well-known and experimented. Also, other proposed projects would provide crop-specific and other information without needing to be built into this program. However, some aspects of implementation would be aided by a limited amount of outside technical assistance:

- **Agricultural technology:** assistance in the selection and implementation of priority applied research activities in crop and variety selection, plus assistance in the operation of farmer-operated demonstration plots (2 years); and
- **River control and conservation:** assistance in the design, analysis, and construction of river control devices, and methods related to land reclamation and soil-water conservation (2 years).

RELATIONSHIP TO USAID COUNTRY STRATEGY

This project proposal targets the La Paz River region in an integrated program in a form which would address specific problems and implement activities directed at resolving these problems. The linkage would be clear, and the activities would serve as experiences for future program development in the region and may be replicated elsewhere. Linkages to the existing portfolio would include the Title III Program and the Alternative Development Project.

The impact on agricultural employment would be substantial: typically the amount of labor used is two to three times that of rainfed agriculture for the same crop. Family income would rise, although

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not necessarily in the same proportion as employment. Both income and employment would tend to be more nearly year round, rather than seasonal, which would help reduce the migrational pull out of the area and to the cities. Since these activities would take place in a relatively reduced area, it would be feasible to monitor the different components and ensure appropriate and environmentally sound construction techniques are being utilized.

BENEFICIARIES

The principal beneficiaries would be the rural population in the La Paz River valley. Consumers in La Paz also would benefit, as produce sent to the La Paz market would be noticeably more sanitary if grown and washed in other than river water. Valley landholders would benefit in the sense that the reduction in the effects of erosion would provide greater security to make land improvements to increase productivity. Lastly, the impact of having a highly visible, relatively self-contained agricultural system in which development activities can be centered (research, irrigation and conservation practices, land reclamation, low technology roadways, and so forth) should make similar programs easier to find local and international support, as well as serve as trials.

HOST COUNTRY AND OTHER DONORS

Given the near proximity of this river valley to the city of La Paz, the development corporation (CORDEPAZ) probably would have special interest in an "in-house" implementation of most of the wide variety of activities required by a rural development project. Seemingly, this region has not received much attention in the past, except for local government and NGO programs. There should be direct linkage between this project and activities being implemented elsewhere through specialized projects. A good example of this would be experience in river control techniques carried out by other development corporations with donor funding. The La Paz River valley would provide the location for a working model of varied programs which often are not combined (e.g., river control, irrigation, road construction). At the same time, the near laboratory situation would permit trials which later could be implemented in other places as well.

MAJOR OUTPUTS (during first five years of implementation):

- Baseline study and implementation design study at project start-up, upon which to measure impacts of later completed activities;
- Irrigation infrastructure renovation and construction;
- Feeder roads construction (5-10 kilometers) and selective paving with cobblestones, construction of two bridges;
- Initial river control infrastructure (100,000 m³);

- Applied research and extension activities; and
- Social infrastructure construction.

FINANCIAL INPUTS (Illustrative): \$7,500,000

- Technical assistance (4 person-years) (\$600,000); special small-scale construction equipment (\$350,000); equipment rental and operational costs (\$1,500,000); equipment repair fund (\$300,000); construction and training materials (\$3,000,000); specialized construction, training personnel (\$1,000,000); baseline and design studies (\$250,000); and research and demonstration plots operations (\$500,000).

12. RURAL FEEDER ROADS CONSTRUCTION

PROJECT PURPOSE

This project will provide a denser road network in the Chuquisaca-Potosí region neighboring the existing USAID project area in Cochabamba. The network would facilitate motorized transport during most of the year to carry people, consumption items, agricultural inputs, and produce throughout the region.

PROJECT DESCRIPTION

Current Situation

This project focuses on the development of a series of through-roads to connect existing secondary and tertiary roads. More permanently accessible roads are required for general transport, especially through areas with no internal all-weather vehicle travel, such as in north Potosí and west Chuquisaca. The route San Pedro-Puente Arce in this area is especially important to support proposed new PDAR project activities of agricultural production, land and water management, and range and forest management. If the PDAR/Cochabamba attention will be on the areas of the Department of Cochabamba, North Potosí, and North Chuquisaca, it is imperative that this route be developed. The present proposal focuses on this area and would be complementary to currently planned road construction by Bolivian and international agencies.

The choice of this area on which to focus the project does not mean that other areas lack proposals for road construction. An example is the Chuquisaca development corporation's pending program for tertiary roads including more than 600 kilometers with an estimated cost of \$14.5 million. Unfortunately,

the program does provide basic details of traffic intensities nor characteristics of the rural and urban areas to be served. Substantial preselection study would be necessary to evaluate such proposals.

The existence of adequate road infrastructure permits the development of a series of complementary activities. One obvious effect is the expansion of the road network with new penetration roads to previously isolated areas. Another effect is that a major (although tertiary) road stimulates the expansion of rural development and public service activities, which in turn justify the initial road construction. It should be kept in mind that basic services of education and public health usually are absent from areas without easy access. Examples of this are INE data (probably for 1976) showing rural Potosí infant mortality to be 38 percent higher than the national average, just as rural illiteracy was 28 percent greater, while the figures for urban Potosí were much less.

The present proposal focuses on the construction of two major connecting roads in North Potosí (one north-south and the other east-west) and another in Chuquisaca between Azurduy and Santa Elena. It is expected that one result of this would be the opening of short feeder roads from nearby villages, either as new roads or as upgrades of existing trails. The area served lies mainly within the boundaries established by: Uncía, Acasio, Anzaldo and Toco to the northwest; Toco, Tintín, Mizque, Puente Arce, Sucre and Aiquile to the northeast and east; and Sucre, Colquechaca and Uncía to the southwest.

This region covers approximately 17,000 square kilometers with an estimated 170,000 inhabitants. Access to this area would be achieved by dividing it with two roads into four sections. The first road would be between Huaylloma (on the Uncía-Cochabamba road)-San Pedro-Micani-Estancia Kollpa-Huaylloma (a different one)-Poroma-Río Chico-Puente Arce. This road presently is 165 kilometers long, 36 kilometers of which are being upgraded under the CORDEPO-UNDP project. The second road would be between Colquechaca-Chairapata-Guadalupe-Comuro-Carasi-Huaychapampa-Tintín.

Currently, access to this zone is from mid-May until mid-October, during the dry season. A provisional solution would be the construction of two stretches of road along the Chayanta River, with the necessary fords. One part would be from Saucini to Estancia Kollpa and the other from Comuro. This would allow traffic from mid-April until mid-January, although the vehicles would need to be trucks or four-wheel drive units. Instead of eight haphazard river crossings, three constructed fords would allow passage with minimal delays across the Chayanta and Chico Rivers. Other fords would be established at Huerta Sausal, Estancia Huaycha Pampa and La Viña, Saucini and Estancia Viru Viru. These constructions would extend the transitable period from five to nine months. In addition, road repairs would be needed on the existing road Potosí-Tinguipaya-Ocurf-Colquechaca.

Paving tertiary roads with cobblestones is often seen as a productive use of normally excess labor supply to improve roads. Although this is true, benefits and costs need to be evaluated and compared with alternative forms of investment and temporary job creation. It seems that the relatively low traffic intensity expected for the proposed roads does not justify incurring costs beyond the basic construction and periodic maintenance. Available funds and unemployed people might better be used in land conservation works, terracing, forestation, gully control, and the like. One place where hand-placed pavement is justifiable is the road along the La Paz River (Río Abajo), where traffic intensity is much higher, especially with trucks hauling perishables for the La Paz city market.

Environment

There are two main environmental problems that will likely come from road construction that should be addressed in the project design. Drainage problems and subsequent erosion may show up because of poor road design and/or construction, and improved roads will likely result in wood cutting and charcoal production, thereby depleting more rapidly forest resources of these regions. The project designs should include funds for an external technical office to oversee compliance with construction standards and forest use regulations.

IMPLEMENTATION AND ADMINISTRATION

The agency with primary responsibility for proposed road construction would be the Potosí development corporation, CORDEPO. CORDEPO would not be the primary implementing agency, however, since the national road service (SNC) already has a strong presence in the region and is better equipped in every way to carry out the actual construction. The SNC has an equipment pool in Uncfá, and a local project implementation office could be established in nearby Colquechaca, where the bulk of operations would be centered.

The national community development service (SNDC) and/or local NGOs also could be contracted to carry out the preliminary socio-economic studies and also assist with mobilizing and supervising community labor. The role of CORDEPO would be that of carrying out the preliminary studies and the overall planning of routes, plus exercising expenditure controls. As previously mentioned, the financing agency (e.g., USAID) should station a local project supervisory office, with a civil engineer experienced in roads plus an administrator.

Project Initiation

To begin implementation of this proposal further preparation is needed at the organizational, technical, and socio-economic level. The organizational level would concern coordination between the donor agency, MIPLAN, CORDEPO and CORDECH to specify the terms, obligations, and responsibilities of each entity. MIPLAN would need to ensure that there is no duplication with other national, departmental, or donor agency program.

Technical preparation is required to select the routes and road technical specifications. Depending on the population and the actual and probable production from the area, an estimate of traffic volume should be made. The socio-economic studies will need to be made at the same time to complement the technical considerations. New aerial and satellite photos (the French SPOT system) will be needed to define physical characteristics for the baseline study (including presence of erosion, agriculture and grazing areas), as well as social evaluations (population concentrations) and design purposes (road alignment, horizontal and vertical layout).

The last aspect to be studied at this stage is the probable environmental impact of road construction and use, which would need to take into account the results of the previous investigations. The estimated total cost for the preinvestment stage is \$500,000, to be completed at the beginning of the project.

RELATIONSHIP TO USAID COUNTRY STRATEGY

This project would be complementary with existing and planned USAID projects, primarily because it focuses on a specific geographic area critical to the implementation of an expanded alternative development program. By opening up through-transport in that region, the activities in other projects will be facilitated as well (Title III, Export Promotion, Maternal and Child Health). Furthermore, this project will permit the proposed Rural Roads III Project to respond to a prioritized list of national needs, rather than be partially diverted in support of other USAID-funded activities contained in this well-defined area. To ensure the construction of roads and bridges would result in a minimal amount of environmental damage, the project contemplates both an extensive impact study and the on-site technical officer.

BENEFICIARIES

The project would have an impact within the short-term on the employment level and rural family income for the approximately 170,000 people living in that area. This would be a direct result of having access to neighboring markets during at least nine months of the year (instead of the usual five). Likewise, area residents would enjoy improved and extended access to education and public health services. With better road surfaces, transportation costs are lower, which permits greater market penetration for goods both entering and leaving the area. To the degree that this road infrastructure assists with the implementation of other projects, the range of secondary benefits will extend beyond the immediate region (that is, new marketing activities, the expanded alternative development program).

HOST COUNTRY AND OTHER DONORS

The United Nations Development Program is initiating road improvements with CORDECO and CORDEPO, as well as continuing existing plans with the National Road Service (SNC) throughout the country. The Inter-American Development Bank has a project also with SNC but limited to major thoroughfares. The Japanese technical/financial mission JICA has provided substantial amounts of heavy road machinery to CORDECO. CARE is actively participating in road construction in parts of Chuquisaca.

MAJOR OUTPUTS

- Construction of approximately 310 kilometers of mainly all-weather roads or connecting portions, plus three major bridges and other smaller bridges and fords;
- Two major connection roads in North Potosí and another connection in Chuquisaca, significantly improving access to 17,000 kilometers; and

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- Stimulating the local construction and/or improvement of short feeder roads branching off from connecting roads.

FINANCIAL INPUTS

The proposal is estimated to have a five-year initial duration. The first and second years the program might cost approximately \$4.5 million each, because of initial studies, equipment procurement, and bridge construction contracts. The third through fifth years are estimated to cost \$3.0, 1.5 and 1.5 million, respectively. Care should be taken that excess funds (because of slow implementation or lower than expected costs) not be converted into additional equipment purchases, the usual practice. This would give the wrong signal to local implementing agencies for future programs.

ILLUSTRATIVE FINANCIAL INPUTS: \$15,000,000

- Preinvestment studies (\$300,000); environmental impact study (\$200,000);
- Administrative, design, and logistical support (\$1,500,000);
- Technical assistance in laboratory analyses, photo-interpretation, and specialized engineering assistance (\$500,000);
- Independent technical office with road engineer and administrator (\$500,000);
- Heavy equipment (\$1,000,000); equipment repair (\$500,000); and
- Construction costs: bridges and reinforced fords — across Río Grande, Río Chico, Río Chacantaya, other to be determined (\$2,700,000); roadcuts in hard rock faces (50 kilometers) (\$2,500,000); roads along riverbanks with stone-filled cage defenses (40 kilometers) (\$2,000,000); roads in earth and soft rock (220 kilometers) (\$3,300,000).

PART IV

PROJECT RELATED TO EMPLOYMENT GENERATION

13. HANDICRAFT INDUSTRY

PROJECT PURPOSE

The project will develop new handicraft industries as well as strengthen, improve, and expand existing production efforts at the local or regional level. Also, regional- and national-level linkages for internal and export markets will be forged.

PROJECT DESCRIPTION

Current Situation

During the last two decades, Bolivia has witnessed an expansion of the handicrafts industry for the touristic, national, and export market. The Instituto Boliviano de Pequeña Industria y Artesanía (INBOPIA) has registered 1,252 handicraft artisans in the Cochabamba Valley alone, and estimates that as much as 60-70 percent of the rural population of Bolivia is involved on a partial or full-time basis in the artisan handicraft industry (INBOPIA: 1990). Just one local manufacturer of woven goods employs between 250 and 350 part-time weavers and offered an opinion that perhaps 3,000 families in the Cochabamba area participate in this general industry.

The production of handicrafts for the tourist and export market has increased significantly in the highlands, particularly in the realm of knitted woolen garments (sheep, llama, and alpaca wool) such as sweaters and ponchos. There is a lack of local production of dyed alpaca wool which must be imported from Peru (see attached project description for alpaca animal production and wool dyeing). Even the natural colored wools are poorly processed, and therefore the resulting finished products are not of export quality. Lately, there has been a growing interest in the production and sale of traditional loom-woven articles such as ponchos, shawls, and skirt pieces produced in the Departments of Chuquisaca and Potosi (in the towns of Tarabuco, Candelaria, Potolo, Presto, and so forth). While these items are being produced as indigenous articles of clothing, they are also being successfully marketed as collection pieces or as wall hangings.

Handicraft programs are in place in Sucre, under the auspices of ASUR (Asociación de Antropólogos del Sur-Andino) which is funded in part by the Swiss through COTESU and in several areas of the rest of Bolivia where ASAR (Asociación de Servicios Artesanales Rurales) is active. This latter organization has also received funding from COTESU as well as from OXFAM America and the Inter-American Development Bank. ASAR, a broadbased peasant assistance program, has an admirable record of working with other NGOs as well as with regional and national institutions. These two

organizations along with other cooperatively run handicraft enterprises would be excellent candidates for participating in an expanded handicrafts program.

INBOPIA, as part of the Ministerio de Industria y Comercio, has also become very active in the development and expansion of a number of small industries, including handicrafts. The Cochabamba office, for example, is particularly aggressive and has developed a number of handicraft-related proposals which merit review by funding agencies. In July-August 1990, INBOPIA sponsored the first nationwide exposition of small industry and handicrafts in La Paz which attracted more than 270 exhibitors, an indication not only of the growth in interest in this type of activity but also in the actual expansion of the number of commercially active artisans.

Until recently, the Bolivian lowlands have presented less potential for the development of handicrafts programs because of the different nature of handicraft activity there (no woolen articles, the largest market in Bolivian handicrafts developed to date), and fewer tourists to encourage the local expansion of existing crafts. As a result, the lowlands are still in an incipient stage of handicrafts development. Nonetheless, the phenomenal growth of the city of Santa Cruz and a concurrently expanding tourist trade has given impetus to the production of local handicrafts. At least one organization, CIDAC (Centro de Investigación, Diseño Artesanal y Comercialización Cooperativa) through its sponsored ARTECAMPO (Asociación de Artesanos del Campo), has had significant success in advancing the handicraft industry in Santa Cruz. Through a central outlet in the city of Santa Cruz and several in smaller towns nearby, articles such as Guarayo cotton hammocks, embroidery, Panama hats from Buenavista, clay sculpture, ceramics, and traditional indigenous crafts are being marketed. The quality of these products far surpasses anything available in the more typical tourist shops of the city, resulting in a rapid turnover of inventory. This cooperative is presently working with 350 families in 22 communities in the Department of Santa Cruz. What is unusual about this cooperative is its involvement with both mestizo and lowland indigenous communities.

Like similar groups in the highlands, CIDAC concentrates on the training, both artesanal and administrative, of local participants as well as on the marketing features of the handicrafts industry. To date, as with highland projects, most of the participants are women. CIDAC has received start-up funding from the Inter-American Foundation, but is now seeking to expand its efforts and will need additional sources of funding (see project folder). Some of the areas they anticipate expanding into include several facets of woodworking, both for the manufacture of tourist items (carvings, bowls, and so forth) as well as furniture making (from nonendangered species of trees) which could tap export as well as national markets. It is also conceivable that handicraft use could be made from the wood of demolished buildings since much of this wood was derived from tropical species that are now endangered or extinct. This type of craft expansion would offer additional employment opportunities for men as well as women from several regions and population sectors of Bolivia, providing an important source of additional family income.

Pottery, metal working (silver, gold, pewter) and the weaving of natural vegetable fibers (cotton, tropical tree fibers) are yet other handicrafts that could be commercially profitable in lowland as well as highland regions.

Many of these organizations noted above as well as the hundreds of small cooperatives or individual private enterprises involved in the handicraft industry could obtain additional sources of funding through the USAID-funded small business loan program successfully operated in cooperation with

PRODEM and shortly with FENACRE. Credit assistance might also be linked with marketing seminars and those in the management of small businesses, as is presently done by CIDAC. However, for these groups and individuals to be aware of these financial and other services, a public relations campaign will need to be initiated.

An additional role for donor agencies, perhaps through NGOs, would be in the provision of technical assistance and training centers for artisans. During interviews conducted with several handicraft organizations, it became evident that the greatest need at present is in the training of artisans and in the development of skills to meet higher market standards, particularly for export. It is also incumbent that technical assistance be provided on a long-term basis so that groups are able to fully develop the skills necessary for successful implementation of their goals.

Initiatives already have been made by the above mentioned sponsoring institutions to prepare projects in search for outside funding. CIDAC/ARTECAMPO is requesting \$214,000 for projects related to extended training in artisan and micro-business skills, and for investment in equipment and operating capital to be able to incorporate many more people in handicraft production and marketing. INBOPIA/Cochabamba is promoting an ambitious project to build and equip installations for training in production skills and to serve as a marketing outlet for both handicrafts and micro-industrial products. According to this project, the total cost for buildings/equipment and operating capital would reach \$1,160,000 over a several-year period. The above examples are meant to demonstrate existing proposals to expand the scale of operations of this sector, which definitely has grown to a point capable of having a noticeable impact on family employment and income. With the availability of funds for expansion, undoubtedly many more proposals would be presented.

IMPLEMENTATION AND ADMINISTRATION

Since presently little is known about this sector, the first stage in developing a project would be to carry out a short study concerning the organizations within the sector. This would focus more on analyzing institutional strengths and weaknesses of both artisan associations and potential NGO implementing agencies for the project. This study would indicate the feasibility of beginning a project for the handicraft industry and channelling it through a cooperative agreement with an appropriate NGO.

If this first stage indicated project feasibility, an agreement would be reached with an implementing NGO (preferably U.S.-based) with strong experience in institutional organization. The primary responsibilities would be to identify sound local handicraft associations, quantify and prioritize training needs, arrange for organizational and business training of the associations' directors and staff, serve as a channel for outside technical assistance in the areas of handicraft techniques for trainers within the associations, and manage the project grant funds for local-level training programs and limited operational capital.

Through its private enterprise program, USAID would develop a strategy to provide credit to handicraft artisan groups or individuals through programs such as PRODEM or the FENACRE system of cooperatives. This would involve an aggressive program to disseminate information about existing opportunities. Credit would be used to establish and equip training and marketing centers and provide short-term production loans to local artisan associations. In addition, funding would be provided via the

above NGO to existing handicraft organizations such as ASAR-ASUR-ARTECAMPO for technical advisors in appropriate handicraft sectors on a long- or short-term basis in cooperation with other technical assistance agencies, such as COTESU and NGOs. It is important that an implementing organization be limited to facilitating support services to the artisans and associations, rather than entering directly into either production or marketing. Past experiences clearly demonstrate the institutional dangers in attempting to control the entire production chain up through export marketing, in essence displacing the artisan and his local organization.

RELATIONSHIP TO USAID COUNTRY STRATEGY

An expanded handicrafts industry would provide additional family income and offer meaningful employment opportunities, especially for women. In several areas, however, such as woodworking, furniture manufacture, metal working, and pottery, men also would be included in this program. With regard to the making of Panama hats, it is interesting to note that this industry was originally the domain of men. But with increasing demands for external sources of family income through male wage labor leading to migration, the craft was turned over to women. Should an active export market in the weaving of hats and other palm fiber articles be developed, conceivably men as well as women would be attracted to this activity.

Growth of the handicrafts industry would provide alternative sources of income to rural as well as urban families, reducing pressures to migrate and creating new poles of development. This project would have a primary linkage with the Micro-Enterprise Project and possibly with the Export Promotion Project to the degree handicraft articles penetrate foreign markets.

BENEFICIARIES

The primary beneficiaries of the handicrafts program would be rural women with greater numbers of men being incorporated into the program as other handicraft industries are developed. Many crafts could also benefit urban people, not only at the manufacturing stage but also at the administration and marketing level. The provision of raw materials for a handicrafts industry would have a multiplying effect economically: the production of greater numbers of alpacas for wool and the spinning and dyeing of this wool, cotton thread production (all hammock thread is currently imported from Brazil) for hammocks and other lowland woven articles, the gathering of vegetable fibers and their preparation, clay production, cutting and transport of wood for furniture, tool manufacture, etc.).

HOST COUNTRY AND OTHER DONORS

USAID-funded projects would provide the linkages between credit organizations and local handicraft groups as well as technical assistance and funding for training centers. This would be done in concert with NGOs and other donor agencies (e.g., COTESU) working in the handicraft industry and also with the various state institutions such as INBOPI. Recognizing that the World Bank-sponsored

Alternative Development Program (ADP) is targeting the alpaca-llama sector as a priority, no specific activity is suggested at this time. However, a separate project activity idea for alpaca wool production is annexed as a necessary complement to the present profile in case this were not developed under the ADP.

MAJOR OUTPUTS

General

- Upgrading of existing handicraft industry techniques;
- Introduction of new and/or expansion of existing handicraft activities;
- Expansion of existing credit opportunities for small industry in Bolivia through FENACRE and PRODEM;
- Establishment and equipping of local or regional training centers for artisans;
- Training programs in administration and marketing for artisans and others involved in the handicraft industry through IDEA or other appropriate agencies; and
- Expansion of the production of raw materials for the handicraft industry.

Specific (Illustrative) ¹

- Initial study of handicraft sector organizations and identification of NGO linkages and to identify subsequent project feasibility;
- Training of 30 technicians and 30 association staff from 3 areas in basic business organization and controls under IDEA program;
- On-site training of artisans by 30 technicians during 4 years in 3 areas in handicraft techniques and basic business organization and controls;
- Approximately 1,500 more families in 3 areas working in handicraft production;
- Construction and equipment for 6 local production and sales outlets in 3 areas;
- Technical assistance during 4 years in trade association organization and management and project subgrant management;
- Technical assistance by Andean handicraft specialists totalling 6 person-years in long- and short-term contracts; and

- Approximately 90 person-trips to observe production and marketing techniques in neighboring countries.

FINANCIAL INPUTS (Illustrative): \$1,500,000

- Initial feasibility study (6 person-months) (\$100,000);
- Operational grants for training activities (4 years) and initial operating costs for associations in Santa Cruz, Cochabamba, and Sucre² (\$600,000);
- Observational trips to Andean countries with developed artisan industries (6 trips x 15 people) (\$100,000);
- Long-term coordinating NGO advisor (4 years) (\$400,000); and
- Long- and short-term technical assistance (3 years) (\$300,000).

Estimated investment and operating capital credits required for establishing regional artisan training centers linked to existing handicraft cooperatives or industries and for equipping local production groups (through existing small business credit programs)³ (\$650,000).

Notes:

- ¹ Extrapolated for 3 areas and 4 years based on CIDAC/ARTECAMPO project outputs contained in proposals.
- ² Extrapolated for 3 areas and 4 years from CIDAC/ARTECAMPO requests totalling \$ 99,000 for 2-year training program plus rotating fund
- ³ Extrapolated for 3 areas and 4 years from CIDAC/ARTECAMPO requests totalling \$77,000 for 2-year program plus one-time construction cost of \$38,000 and land cost of \$24,000.

ANNEX 2
AGRIBUSINESS-RELATED PROJECT IDEAS

AGRIBUSINESS-RELATED PROJECT IDEAS

PROJECT	CREDIT	SPONSOR	STATUS	DATE	REGION	\$ 000s
achiote in seed		Fund.Chile	pre-feas.	1988	Subtropical area-Tarija	
achiote/bixina		PPI/ONUDI	feasibil.	1989	Santa Cruz	304
achiote/bixina		JUNAC	feasibil.	1989	Tarija Dept.	1,000
achiote/tumeric		UCF/Tarija	profile		Chaco-Tarija	
agribusiness		UCF/La Paz	feasibil.		La Paz-La Paz	
agribusiness		UCF/La Paz	feasibil.		Viacha-La Paz	
agribusiness		UCF/La Paz	feasibil.		Viacha-La Paz	
agribusiness		UCF/La Paz	feasibil.		La Paz-La Paz	
alfalfa meal		UCF/Cocha	profile		Cochabamba Dept.	61
alfalfa processing		CORDEOR	feasibil.		Oruro	724
alpaca/llama knittings		PPI/ONUDI	feasibil.	1989		169
angora rabbit wool		JUNAC	pre-feas.	1989	La Paz Dept.	145
angora wool		WB/PDA	feasibil.	1990	Oruro/Potosi	
animal husbandry		UCF/La Paz	feasibil.		Achocalla-La Paz	
animal husbandry		UCF/La Paz	feasibil.		Luribay-La Paz	
animal husbandry/processing		UCF/La Paz	feasibil.		Coroico-La Paz	
apples (domestic market)		Fund.Chile	pre-feas.	1988	Culpina Valley-Chuquisaca	
asparagus		UCF/Tarija	profile		Central Valley-Tarija	
asparagus processing		JUNAC	pre-feas.	1989	Cochabamba/La Paz	620
beef cattle		UCF/Sucre	feasibil.		Chuquisaca Dept.	
beef cattle		UCF/Sucre	feasibil.		Chuquisaca Dept.	
beef cattle fattening		UCF/Sucre	feasibil.		Chuquisaca Dept.	
beef cattle fattening		UCF/Sucre	feasibil.		Chuquisaca	30
bee-keeping/honey production		UCF/Cocha	profile		Cochabamba Dept.	19
bee-keeping/honey production		UCF/Cocha	profile		Cochabamba Dept.	69
bee-keeping/honey production		UCF/Tarija	profile		Central Valley-Tarija	
bee-keeping/honey production		UCF/Cocha	profile		Cochabamba Dept.	23
bee-keeping/honey production		UCF/Cocha	profile		Cochabamba Dept.	19
bee-keeping/honey production		UCF/Cocha	profile		Cochabamba Dept.	7
bee-keeping/honey production		JUNAC	feasibil.	1989	Coch./Tarija/Sta.Cruz/La Paz	306
bell pepper/mango preserves		MACA/UNPD	profile	1988	Chapare-Cochabamba	
brazil nut processing		JUNAC	pre-feas.	1989	Pando	374
brazil nuts		WB/PDA	feasibil.	1990	Beni/Pando	
cacao processing		PPI/ONUDI	feasibil.	1989		924
cacao production		JUNAC	pre-feas.	1989		1,827
cardboard boxes		JUNAC	pre-feas.	1989	Cochabamba	598
cashew		JUNAC	pre-feas.	1989	Tarija/Chuqui/Pando/Sta.Cruz	120
cashew processing		CORDEPANDO	feasibil.		Pando	1,892
castor bean production/process.		JUNAC	pre-feas.	1989	Santa Cruz	405
castor oil production/process.		PPI/ONUDI	feasibil.	1989	Chaco-Santa Cruz/Tarija	1,648
cattle breeding by embryo		PPI/ONUDI	feasibil.	1989	Beni	253
cattle raising		UCF/Sucre	feasibil.		Chuquisaca	11
cattle raising		UCF/Sucre	feasibil.		Chuquisaca	11
citric acid production		PPI/ONUDI	feasibil.	1988		1,823
citrus processing		individual	feasibil.	1990	Cochabamba	
citrus/passion fruit concent.		MACA/UNPD	profile	1988	Chapare-Cochabamba	
cochineal		UCF/Tarija	profile		Central Valley-Tarija	
cochineal		WB/PDA	feasibil.	1990	Cochabamba	
cochineal		JUNAC	pre-feas.	1989		405
cochineal/carmine processing		individual	pre-feas.	1990	Valley area-Santa Cruz	3,250
coconut production		PPI/ONUDI	feasibil.	1989	Santa Cruz	459
coffee processing		JUNAC	feasibil.	1989	La Paz	200
coffee production for Argentina		UCF/Tarija	profile		South zone-Tarija	
coffee production		UCF/La Paz	feasibil.		Puente Villa-La Paz	
corn processing/industrializ.		PPI/ONUDI	feasibil.	1989		463
dairy cattle		UCF/Potosi	feasibil.		Potosi Dept.	
dairy production		UCF/Cocha	profile		Cochabamba Dept.	7
dried ornamental plants		Fund.Chile	pre-feas.	1988	High Valley-Cochabamba	
flowers		UCF/Tarija	profile		Central Valley-Tarija	
food processing		UCF/Potosi	feasibil.		Turuchipa, Potosi	25
food processing		PPI/ONUDI	feasibil.	1989	Cochabamba	1,226
freesia plants		Fund.Chile	pre-feas.	1988	Sucre-Chuquisaca	
fried plantain slices		MACA/UNPD	profile	1988	Chapare-Cochabamba	
fruit production		UCF/Potosi	feasibil.		Potosi Dept.	
garlic		UCF/Potosi	feasibil.		Potosi Dept.	
garlic		UCF/Tarija	profile		High zone-Tarija	
garlic		WB/PDA	feasibil.	1990	Chuquisaca/Tarija	

PROJECT	CREDIT	SPONSOR	STATUS	DATE	REGION	\$ 000s
garlic processing		JUNAC	pre-feas.	1989	Tarija	500
general agriculture		UCF/La Paz	feasibil.		Calamarca-La Paz	
general agriculture		UCF/La Paz	feasibil.		Chonchocoro-La Paz	
ginger processing		JUNAC	pre-feas.	1989	Pando/Santa Cruz	155
grapefruit/mandarin processing		MACA/UNPD	profile	1988	Chapare-Cochabamba	
grapes and peaches		UCF/Potosi	feasibil.		Potosi Dept.	
grapes/raisins (domestic mkt.)		Fund.Chile	pre-feas.	1988	Central Valley-Tarija	
grazing pastures		UCF/Tarija	profile		Chaco-Tarija	
guar seed		Fund.Chile	pre-feas.	1988	Chaco-Tarija	
handicrafts production		UCF/La Paz	feasibil.		El Alto-La Paz	
handicrafts production		UCF/La Paz	feasibil.		La Paz-La Paz	
hot pepper processing		JUNAC	pre-feas.	1989	Coch/Chuqui/Sta.Cruz/La Paz	114
hybrid corn		UCF/Tarija	profile		Central zone-Tarija	
jojoba oil		JUNAC	pre-feas.	1989	Tarija	1,070
jojoba oil extraction		PPI/ONUDI	feasibil.	1989	Omereque-Cochabamba	2,043
jojoba oil (crude)		PPI/ONUDI	feasibil.	1989	Chaco-Santa Cruz	1,584
jojoba production		CORDECH	feasibil.		Chaco-Chuquisaca	3,175
jute processing		JUNAC	pre-feas.	1989	Cochabamba/Santa Cruz	3,057
leather goods		WB/PDA	feasibil.	1990	La Paz/Coch./Santa Cruz	
lemon oil processing		JUNAC	pre-feas.	1989	Santa Cruz/Chuquisaca	175
llama wool		WB/PDA	feasibil.	1990	Oruro/Potosi	
mandarin/grapefruit processing		Fund.Chile	pre-feas.	1988	Subtropical area-Tarija	
mango pulp processing		JUNAC	pre-feas.	1989	Santa Cruz	730
mango/tomate/chile processing		MACA/UNPD	profile	1988	Chapare-Cochabamba	
marigold		UCF/Tarija	profile		Central Valley-Tarija	
marigold processing		Fund.Chile	pre-feas.	1988	Central Valley-Tarija	
milk cattle		UCF/La Paz	feasibil.		Tambillo-La Paz	
milk cattle		UCF/Sucre	feasibil.		Chuquisaca Dept.	
milk cattle		UCF/Sucre	feasibil.		Chuquisaca	157
milk processing		CORDEBENI	pre-feas.		Beni	163
mint		individual	feasibil.	1990	Santa Cruz	
mint		JUNAC	feasibil.	1989		131
mushroom production		UCF/La Paz	feasibil.		El Alto-La Paz	
palm hearts industry		PPI/ONUDI	feasibil.	1990		174
papaina		JUNAC	pre-feas.	1989	La Paz Dept.	150
paper pulp		individual	profile	1988	La Paz	7,304
paper pulp		JUNAC	pre-feas.	1989	Tarija	1,000
paprika processing		Fund.Chile	pre-feas.	1988	High Valley-Cochabamba	
paprika processing		JUNAC	pre-feas.	1989	Tarija/Coch/Chuquisaca/StaCru	172
passion fruit processing		JUNAC	pre-feas.	1989	Sta.Cruz/Tarija/La Paz/Pando	1,515
peanuts		UCF/Tarija	profile		Central zone-Tarija	
peanuts		Fund.Chile	pre-feas.	1988	Tomina Valley-Chuquisaca	
peanuts		JUNAC	pre-feas.	1989	Chuquisaca	650
pineapple		JUNAC	pre-feas.	1989	Santa Cruz Dept.	412
pork production		UCF/Potosi	feasibil.		Llocaya, Potosi	
pork production		UCF/Tarija	profile		Central zone-Tarija	
pork production		UCF/La Paz	feasibil.		Sanbuenaventura-La Paz	
pork production		UCF/Potosi	feasibil.		Potosi Dept.	19
pork production		UCF/Potosi	feasibil.		Betanzos, Potosi	25
pork production		UCF/Potosi	feasibil.		Potosi Dept.	
pork production		UCF/La Paz	feasibil.		El Alto-La Paz	
potato seed		UCF/Potosi	feasibil.		Potosi Dept.	
potato seed and silos		UCF/Potosi	feasibil.		Potosi Dept.	
poultry feed production		UCF/Cocha.	feasibil.		Cochabamba Dept.	97
poultry industry		PPI/ONUDI	feasibil.	1989		4,737
poultry production		UCF/Potosi	feasibil.		Potosi Dept.	
poultry production		UCF/Cocha	profile		Cochabamba Dept.	72
poultry production		UCF/Cocha	profile		Cochabamba Dept.	15
poultry raising		UCF/La Paz	feasibil.		Achocalla-La Paz	
poultry raising/processing		UCF/La Paz	feasibil.		Coroico-La Paz	
pyrethum		UCF/Tarija	profile		High zone-Tarija	
quinua		WB/PDA	feasibil.	1990	La Paz/Potosi	
rabbit fur		UCF/Tarija	profile		Central Valley-Tarija	
rabbit meat		UCF/Potosi	feasibil.		Potosi Dept.	
ramie fiber		individual	feasibil.	1990	Cochabamba/Santa Cruz	
rasberry		individual	profile	1990	La Paz	
rasberry		UCF/Tarija	profile		Central Valley-Tarija	
refrigerated slaughterhouse		CORDECH	feasibil.		Chaco-Chuquisaca	1,710

PROJECT	CREDIT	SPONSOR	STATUS	DATE	REGION	\$ 000s
refrigerated transport		JUNAC	pre-feas.	1989	Tarija/La Paz	1,016
roses		WB/PDA	feasibil.	1990	Cochabamba	
roses		JUNAC	pre-feas.	1989	Cochabamba	300
rubber		JUNAC	pre-feas.	1989	Pando	1,800
rubber processing		individual	pre-feas.	1990	Guayaramerin-Beni	2,800
safflower		UCF/Tarija	profile		Southeast zone-Tarija	
sheep and camelid skins		JUNAC	feasibil.	1989	Oruro	289
silk		individual	profile	1990	Yapacani-Santa Cruz	21,375
silk & essential oils		WB/PDA	feasibil.	1990		
slaughterhouse		UCF/La Paz	feasibil.		Viacha-La Paz	
soybean processing		JUNAC	pre-feas.	1989	Santa Cruz	984
soybeans		UCF/Tarija	profile		Southeast zone-Tarija	
strawberry		UCF/Tarija	profile		Central Valley-Tarija	
tannery		UCF/La Paz	feasibil.		La Paz-La Paz	
tarhui		UCF/Tarija	profile		High zone-Tarija	
tarhui processing		JUNAC	pre-feas.	1989	Cochabamba	55
tropical herbs (essential oils)		JUNAC	pre-feas.	1989	Santa Cruz/Pando/Beni	99
tropical sheep raising		JUNAC	pre-feas.	1989	Tarija/La Paz/Sta.Cruz/Pando	289
tumeric		JUNAC	pre-feas.	1989	Tarija/Chuqui/Pando/Sta.Cruz	160
turkey production		PPI/ONUDI	feasibil.	1989		6,053
winter wheat		UCF/Tarija	profile		Southeast zone-Tarija	
wood particle board industry		PPI/ONUDI	feasibil.	1988		702
wool/alpaca knittings		PPI/ONUDI	feasibil.	1989		75
yuca processing		JUNAC	feasibil.	1989	Santa Cruz/Pando/Beni	168
PARTIAL TOTAL FOR AGRIBUSINESS PROJECTS						86,688

AGRICULTURE INFRASTRUCTURE-RELATED PROJECT IDEAS						
PROJECT	CREDIT	SPONSOR	STATUS	DATE	REGION	\$ 000s
cisterns in 35 communities		CORDECH	profile	1990	Chaco-Chuquisaca	260
improvements of dam		CORDECO	profile	1990	Achocalla-Cochabamba	157
integrated irrigation/agribus.		CORDEPO	feasibil.	1989	La Lava-Potosi	4,210
irrigation		CODETAR	profile	1990	Bermejo-Tarija	12,908
irrigation		CORDECO	profile	1990	Apillapampa-Cochabamba	9
irrigation and forestry		CORDECH	profile	1989	Corma River-Chuquisaca	1,614
irrigation and wells:45 sub-pr.		CODETAR	profile	1990	Tarija Dept.	885
irrigation ditches (atajos)		CORDECO	profile	1990	Cochabamba Dept.	128
irrigation in 35 watersheds		CORDECH	profile	1989	North Chuquisaca Dept.	41,730
irrigation inlets/channels		CORDECO	profile	1990	Cochabamba Dept.	1,125
irrigation intake canals		CORDECO	profile	1990	Cochabamba Dept.	1,890
irrigation with canal		MACA-IICA	profile	1989	Suches-A: Camacho-La Paz	
irrigation with canal		MACA	pre-feas.	1989	Punata: Villarroel-Cochabamba	
irrigation with canal		MACA-IICA	profile	1989	Huacareta: H.Siles-Chuquisaca	
irrigation with canal		MACA-IICA	profile	1989	Mizque: Mizque-Cochabamba	
irrigation with canal		MACA-IICA	profile	1989	Urmiri-pazna: Poopo-Oruro	
irrigation with canal		MACA-IICA	profile	1989	Escoma-A: Camacho-La Paz	
irrigation with canal		MACA-IICA	profile	1989	Entre Rios: Entre Rios-Tarija	
irrigation with canal		MACA-IICA	profile	1989	Tomoyo-potolo: Chayanta-Potosi	
irrigation with canal		MACA-IICA	profile	1989	Potolo-tomoyo: Oropeza-Chuquis.	
irrigation with dam		MACA	pre-feas.	1989	La Angostura: Florida-Sta Cruz	
irrigation with dam		MACA-IICA	profile	1989	Condoriri: Cercado-Oruro	
irrigation with dam		MACA	profile	1989	Micro-riego La Paz: Aroma-LPaz	
irrigation with dam		MACA	pre-feas.	1989	Higuerayo: Sud-cinti-Chuquisac	
irrigation with dam		MACA	pre-feas.	1989	Padcoyo: Nor-cinti-Chuquisaca	
irrigation with dam		MACA	pre-feas.	1989	Macha: Chayanta-Potosi	
irrigation with dam		MACA	pre-feas.	1989	San Lucas: Nor-cinti-Chuquis.	
irrigation with dam		MACA	pre-feas.	1989	Marcoma: Oropeza-Chuquisaca	
irrigation with dam		MACA	pre-feas.	1989	Villa Charcas: Nor-cinti-Chuq.	
irrigation with dam		MACA-IICA	profile	1989	Valle C. Tarija: Cercado-Tari.	
irrigation with dam		MACA-IICA	profile	1989	San Lucas: Nor-Cinti-Chuquis.	
irrigation with pump		MACA-IICA	profile	1989	Culpina: Sud-Cinti-Chuquisaca	
irrigation with pump		MACA-IICA	profile	1989	Taraco: Ingavi-La Paz	
irrigation/integrated devel.		CORDECH	feasibil.	1990	Near Sucre area-Chuquisaca	5,996
irrigation/potable water		CORDECO	profile	1990	Santo Domingo-Cochabamba	70
land recovery/water control		CORDECH	profile	1989	East Chuquisaca Dept.	733
land recovery/water control		CORDECH	profile	1989	North Chuquisaca Dept.	4,948
land recovery/water cont.(5-yr)		CORDECH	profile	1989	Central Chuquisaca Dept.	640
land recovery: 11 sub-projects		CODETAR	profile	1990	Tarija Dept.	198
micro-irrigation		CORDECO	profile	1990	Khuluyu-Cochabamba	20
micro-irrigation		CORDEPO	pre-feas.	1984	Khea Khea-Potosi	94
micro-irrigation		CORDECO	profile	1990	Esmeralda Baja-Cochabamba	108
micro-irrigation		CORDECO	profile	1990	Esmeralda Alta/El Abra-Cbba	101
micro-irrigation		CORDEPO	pre-feas.	1984	Charca Mekani-Potosi	129
micro-irrigation		CORDECO	profile	1990	Molle Molle-Cochabamba	16
micro-irrigation		CORDECO	profile	1990	Via Rancho-Cochabamba	55
micro-irrigation		CORDEPO	pre-feas.	1984	Sorocoto-Potosi	275
micro-irrigation		CORDEPO	pre-feas.	1984	Muni Palca-Potosi	100
micro-irrigation		CORDEPO	pre-feas.	1984	Sauce Mayu	110
micro-irrigation in 18 areas		CORDECH	profile	1989	Sourth Chuquisaca Dept.	34,694
micro-irrigation with canal		MACA	pre-feas.	1989	Rancho Naranjo: Tomina-Chuqui.	
micro-irrigation with canal		MACA	profile	1989	Taca: Murillo-La Paz	
micro-irrigation with canal		MACA	profile	1989	Calamaya: Omasuyos-La Paz	
micro-irrigation with canal		MACA	pre-feas.	1989	Mojotorillo: Tomina-Chuquis.	
micro-irrigation with dam		MACA	profile	1989	Kellhuiri: Aroma-La Paz	
micro-irrigation with dam		MACA	pre-feas.	1989	Casa Viejas: Cordillera-SCruz	
micro-irrigation with pump		MACA	profile	1989	Mojona: Murillo-La Paz	
micro-irrigation with pump		MACA	profile	1989	Huaylloroco: Aroma-La Paz	
micro-irrigation with wells		MACA	profile	1989	Berenguela: Pacajes-La Paz	
micro-irrigation with wells		MACA	profile	1989	Bamburuta: Pacajes-La Paz	
micro-irrigation (5 year plan)		CORDECH	profile	1989	Central Chuquisaca Dept.	2,010
micro-irrigation/potable water		CORDECH	feasibil.	1987	Padilla area-Chuquisaca	5,308
micro-irrigation/potable water		CORDECH	feasibil.	1990	Tikipata area-Chuquisaca	331
micro-irrigation: 5 projects		CODETAR	profile	1990	Tarija Dept.	270

PROJECT	CREDIT	SPONSOR	STATUS	DATE	REGION	\$ 000s
potable water supply		CORDECH	profile	1990	Chaco-Chuquisaca	290
reforestation		CODETAR	profile	1990	Tucumana Area-Tarija	336
reforestation		CODETAR	pre-feas.	1988	Tolomosa River-Tarija	1,123
reforestation		CODETAR	profile	1990	San Jacinto-Tarija	2,500
reforestation (5 year plan)		CORDECH	profile	1989	Central Chuquisaca Dept.	4,032
reforestation: 10 sub-projects		CODETAR	profile	1990	Tarija Dept.	410
reforestation: 9 sub-projects		PERTT	pre-feas.	1989	Guadalquivir River-Tarija	4,991
reforest/micro-irrig. subproj.		PERTT	pre-feas.	1989	Obrajes (Guad.River)-Tarija	1,188
reforest/micro-irrig. subproj.		PERTT	pre-feas.	1989	Tucumilla (Guad.River)-Tarija	476
reforest/watershed management		CORDECH	pre-feas.	1990	Chaco-Chuquisaca	3,385
river defenses/dikes (tajamar)		CORDECO	profile	1990	Cochabamba Dept.	252
river defenses: 10 sub-proj.		CODETAR	profile	1990	Tarija Dept.	500
rural electrification		CORDEPO	profile	1984	Potosi Dept.	110
rural electrification:16 sub-pr.		CODETAR	profile	1990	Tarija Dept.	824
rural roads		CORDEPO	profile	1984	Potosi Dept.	1,362
rural roads/bridges (5 yr plan)		CORDECH	profile	1989	Central Chuquisaca Dept.	7,806
rural roads: 83 sub-projects		CODETAR	profile	1990	Tarija Dept.	2,349
studies to improve small dams		CORDECO	profile	1990	Valle Central-Cochabamba	231
water storage plan (yr.1 of 5)		CORDECH	profile	1990	Chaco-Chuquisaca	543
water supply, multiple uses		CORDECH	profile	1990	Chaco-Chuquisaca	3,650
well construction (yr.1 of 5)		CORDECH	profile	1990	Chaco-Chuquisaca	1,945
well perforation/rehabilitat.		CORDECO	profile	1990	Cochabamba Dept.	1,650
wells		CODETAR	profile	1990	Chaco-Tarija	1,554
wells		CORDECO	profile	1990	Cochabamba Dept.	264
wells for micro-irrigation		CORDECO	profile	1990	Cochabamba Dept.	875
wells for potable water/irrig.		CORDECO	profile	1989	Cochabamba Dept.	725
wells with cisterns		CORDECO	profile	1990	Cochabamba Dept.	954
PARTIAL TOTAL FOR INFRASTRUCTURE PROJECTS						165,447
PARTIAL TOTAL FOR ALL PROJECTS						252,135

ANNEX 3

**PROJECTS SELECTED TO ILLUSTRATE
APPARENT LOAN DEMAND VOLUME**

**PROJECTS SELECTED TO ILLUSTRATE
APPARENT LOAN DEMAND VOLUME**

Summary Table
(in \$ 000s)

<u>Sponsor and Numb. of Proj.</u>	<u>Total Investment</u>	<u>Loan Demand</u>	<u>Local Contrib.</u>	<u>Instit. Support</u>	<u>Foreign Investors</u>
JUNAC: 22	20,306	13,777	6,530	0	0
Individual: 7	39,497	32,621	6,876	0	0
UN Prg.412: 6	10,000	7,284	2,000	716	0
P.P.I.: 4	8,358	3,017	2,507	0	2,834
TOTAL	78,161	56,699	17,913	716	2,834

JUNAC: Selected Projects
(in \$ 000s)

<u>Product Name</u>	<u>Total Investment</u>	<u>Credit Required</u>	<u>Local Contribution</u>
Cocoa	2,572	1,827	745
Jojoba oil	1,639	1,070	569
Lemon grass	465	372	93
Castor bean oil	706	405	301
Mint	164	131	33
Garlic	788	500	288
Ginger	539	431	108
Cochineal/carmine	1,000	405	595
Hot chile	218	175	44
Paprika	291	233	58
Turmeric	897	718	179
Achiote	1,785	1,000	785
Passion fruit	1,828	1,462	366
Mango	950	760	190
Pineapple	902	412	490
Papaya extract	234	150	84
Asparagus	1,309	1,047	262
Cassava	150	120	30
Paper pulp	1,676	1,000	676
Cashew	390	312	78
Cardboard	854	598	256
Peanuts	950	650	300
TOTAL	20,306	13,777	6,530

Note: Does not include agricultural production investment.

INDIVIDUALS: Selected Projects
(in \$ 000s)

Product Name	Investment	Total Required	Credit Contribution	Local Department
Achiote	650	300	350	Santa Cruz
Cochineal/carmine	3,250	2,550	700	Santa Cruz
Mint	117	101	16	Santa Cruz
Ramie fiber	1,000	800	200	Cochabamba
Silk	23,750	21,375	2,375	Santa Cruz, La Paz
Raspberry	296	191	105	La Paz
Paper pulp	10,434	7,309	3,130	La Paz
TOTAL	39,497	32,621	6,876	

UNITED NATION PROGRAM 412: Selected Projects
(in \$ 000s)

Product Name	Invest.	Total Requir.	Contrib.	Credit Support	Local Instit. Department
Tropical Fruit	7,000	5,600	1,400	0	Cochabamba
Mango and other pulps	398	201	80	118	Cochabamba
Grapefruit and tangerine	345	276	69	0	Cochabamba
Pickled vegetables	427	254	85	88	Cochabamba
Plantain chips	716	573	143	0	Cochabamba
Juice concentrates	1,115	381	223	511	Cochabamba
TOTAL	10,000	7,284	2,000	716	

Note: Does not include agricultural production investment.

INVESTMENT PROMOTION PROGRAM (PPI): Selected Projects
(in \$ 000s)

Product Name	Invest.	Total Requir.	Contrib.	Credit Investor	Local Outside Department
Jjoba oil produc.	2,371	857	787	727	Santa Cruz
Castor oil extrac.	2,300	1,135	652	513	Santa Cruz
Cocoa industry	1,407	200	483	724	Cochabamba
Veg/fruit process.	2,280	825	585	870	Cochabamba
TOTAL	8,358	3,017	2,507	2,834	

ANNEX 4

ALPACA ANIMAL PRODUCTION AND WOOL DYING

ALPACA ANIMAL PRODUCTION AND WOOL DYING

The demand for dyed alpaca wool (spun yarn) in Bolivia is presently being met almost entirely through the importation of this product from Peru. Managers of such companies as FOTRAMA and CASA FISHER, which produce export-quality knitted goods from dyed alpaca wool, estimate that approximately 40,000 kilos of dyed wool are imported each year to meet the needs of these and other large and medium manufacturers. Locally produced alpaca wool is considered of low quality primarily as the result of improper shearing techniques, poor cleaning and improper carding, uneven spinning, and the lack of bulk dyeing of alpaca wool. The growing world market for export-quality dyed, or even natural, alpaca yarn sold in skeins is not being tapped by Bolivia. As a consequence, alpaca wool production in Bolivia supplies the local traditional knitting market only, with the wool often mixed with that of sheep. The resulting product is typically of inferior quality and makes use of traditional designs using the natural colors of the undyed wool. These products tend to be limited to an undiscerning tourist market as well as the national market for lower-cost clothing. Thus, a ready market exists for the production of high quality, dyed alpaca wool for use in the national industry as well as for export to the United States, Europe, and Asia.

A program to meet this need would have to consider two very different but related goals:

1. Increase the numbers of alpaca in Bolivia to supply the wool needed, and provide technical assistance in proper shearing and packing techniques for processing; and
2. Establish bulk wool processing and dyeing centers with both the appropriate infrastructure and technical assistance to produce export-quality yarns.

With regard to the first need, the numbers of alpaca in Bolivia, estimated by one source at up to 350,000 animals (quoted in JUNAC, "Feasibility Study: Sheep and Camelid Skins," Table 1.1, 1989; presented below), are not adequate to meet the wool requirements of a commercial export industry and would have to be increased significantly. However, given the numbers of sheep and llamas on the altiplano, careful study of the carrying capacity of this region would have to be made. It is possible that the altiplano, at least in many areas, has already reached the limit of its carrying capacity in terms of grazing animals. Thus, simply expanding the numbers of alpacas in this region could result in severe overgrazing. In some instances, the numbers of sheep and llamas would have to be reduced, something difficult to do given the cultural (as well as productive and economic) value placed on these animals. Then too, llamas are also used as beasts of burden and as sources of meat. If alpacas were to economically eclipse the llama, there is no doubt that the numbers of llamas would drop. However, the value of the llama as a food source should be given careful consideration in any replacement program, particularly since increased family income does not necessarily mean that cash will be spent on meat or other protein sources.

Thus, the first stage in a program concentrating on augmenting the alpaca national herd size would be to study the physical constraints that exist for increasing numbers of alpaca. Given the balance between the different types of agricultural and animal husbandry activities in which the altiplano communities usually exist, it is quite possible that a natural equilibrium already is in place. The same study would examine the cultural issues concerning the importance of the alpaca vs. the llama as perceived by the farm families, and their interest in placing more effort on raising alpaca for wool. It

is expected that this study would focus on improving both the grazing pastures and the breeding stock, and perhaps on establishing breeding stations to ensure closer genetic control and the appropriate husbandry practices.

The long-term feasibility of the above also would depend on the financial benefits the farm family would receive from raising alpacas for wool. Presently the majority of Bolivian wool is used in lower quality clothing and weavings, and undoubtedly this need and demand would continue. However, as noted previously, virtually all export-quality alpaca wool products are made from imported yarns. The second program goal mentioned above would address this need through technical assistance to processors to reach the quality standards required, probably including enough basic management and marketing skills to facilitate open competition with the imported materials. The manufacturers of higher-quality alpaca items will turn to local suppliers only if the latter can offer a level of dependability in supply volume/timing and quality to match that of the imported stocks. Only if this condition can be fulfilled will the element of price differences between domestic and imported yarns become relevant. This in turn will be strongly influenced by the degree of success the program will have had in the farmer's adaptation of improved animal breeds, pastures for grazing, and other husbandry practices.

It is expected that the extension-type activity necessary to effect these changes at the producer level could be effected directly by the raw wool purchaser/processor, especially if the producers have some type of group organization. An alternative would be to enlist the assistance of NGOs that have direct contact with producer communities, which would count on technical support from the interested processors to disseminate the necessary technology.

TABLE 4-1'

**INDUSTRIALIZATION OF SHEEP AND CAMELID SKINS:
DIAGNOSTIC OF POPULATION AND DISTRIBUTION OF
LLAMAS, ALPACAS, AND SHEEP NATIONWIDE**

Population: Number of Animals (000s)						
Department	%	Llamas	%	Alpacas	%	Sheep
-----	----	-----	----	-----	----	-----
La Paz	20.8	446.0	72.5	244.1	32.4	2,733.4
Oruro	36.0	774.5	26.7	90.1	25.1	2,119.0
Potosí	39.9	857.4	0.8	2.7	26.0	2,194.9
Others	3.3	70.7	--	--	16.5	1,379.8
-----	----	-----	----	-----	----	-----
Total	100.0	2,148.6	100.0	336.8	100.0	8,427.1

Source: JUNAC, "Feasibility Study: Sheep and Camelid Skins," Table 1.1, 1989; translated by consultants.

ANNEX 5
ALTERNATIVE DEVELOPMENT AND MIGRATION

ALTERNATIVE DEVELOPMENT AND MIGRATION

The concept of "alternative development" emerged as an integrated development strategy to assist in multinational efforts to eradicate coca destined for the illegal cocaine market. This strategy attempts to confront the drug trade on two fronts: direct intervention and interdiction efforts in the Chapare region to impede the narcotic trade; and the planning and implementation of economic assistance programs to provide alternative sources of income to those segments of the Bolivian population engaged in this activity. Departing from earlier efforts which focused on coca eradication and crop substitution in the Chapare region alone, this new strategy attempts to address the problem on a national level. In particular, it targets those economically depressed areas of Bolivia that traditionally supply labor to the Chapare through out-migration, both permanent and seasonal. Thus, patterns of migration in Bolivia and how they affect and are affected by conditions in the Chapare have been topics of importance in the evolution of alternative development strategies and proposals (PDAC: 1990).

Migration issues relating to the Chapare Regional Development Project, and later, to the Associated High Valleys Project in Cochabamba, have been addressed in detail in the works of Michael Painter and Roger Rasnake (Painter: 1987; Painter: 1990; Painter and Rasnake: 1989; Rasnake and Painter: 1989; Dickinson, et al.: 1988). The purpose of this review is to reiterate some of the essential points outlined by Painter and Rasnake in previous reports, and as the result of additional information gathered in the field through interviews and documentation, to expand on the ideas expressed in their work.

Demographic and social research in Bolivia indicates that migration of highland peoples to other areas within Bolivia as well as to the exterior is a response to economic necessity. However, Andean America has a long tradition of institutionalized population movement to meet labor needs that predates even the European Conquest. Pre-Inca and Inca state society developed the *mita*, or a labor tax, and the *mitimaes*, the displacement of whole villages for the purpose of state security. Both systems resulted in the continual, forced movement of people throughout the realm. In addition, the practice of exploiting numerous ecological niches at various altitudes through the use of village *archipelagos* also contributed to the movement of segments of the population both on a seasonal and permanent basis. With the arrival of the Spanish, many of these systems, particularly the *mita*, were left intact, fitting well with the European desire to exploit labor for the mines and fostering the successful transfer of the European feudal system in the New World.

During the colonial and republican periods, economic need often required smallholders to seek off-farm employment in urban areas or other regions of the country. Often finding conditions favorable for social and economic betterment, these migrants did not always return to their points of origin, contributing to the establishment of new settlements in the uplands as well as the tropics. While economic necessity may be the driving force in terms of many past and current patterns of migration, the underlying cultural traditions of population movement should not be underestimated. For many migrants, leaving the place of origin to embark on a series of relocations that may go on throughout a lifetime may not be seen as undesirable or pathological but as a logical adaptive response to exploiting available resources.

At the same time, however, events leading to and following the 1952 Social Revolution fundamentally changed the nature of much of the population movement in Bolivia. Prior to that time,

migration was primarily an extended family or community-based production strategy in free-holding areas or was linked to labor contracts negotiated through the hacienda in regions where debt peonage was in place. With the advent of the 1952 Revolution and the Agrarian Reform a year later, these structures gradually gave way to a much more individualized form of wage labor with greater freedom of movement. In addition, the Agrarian Reform opened up many traditional areas of agriculture to market involvement, access to and desire for consumer goods, and a growing awareness of marginalization and isolation among many sectors of the population. The result of these various processes was an increase in migration out of areas of economic stagnation toward those poles where jobs or other opportunities were available. This situation was further exacerbated following the revolution in that economic policy focussed on sustaining mining interests and opening the tropical eastern lowlands for development, leaving the highland regions virtually ignored. As the Santa Cruz region began to gain economic and political prominence in the 1960s as the result of enormous capital infusions from international lending agencies, it is conceivable that development of the Bolivian highlands was actually bypassed in order to ensure a source of labor for the newly emerging commercial agricultural enterprises in the Oriente based on labor-intensive crops such as sugarcane and cotton.

In addition, inequalities in land distribution and natural population increase in the highlands exacerbated by laws of inheritance that favor all offspring equally have led to increasing fragmentation of landholdings, which, in this reduced state, cannot economically sustain those who farm them. More equitable land distribution and improved production techniques including soil conservation may bring more land into production and no doubt temporarily mitigate the situation. However, population increases will continue to place stresses on available arable land, making out-migration of the surplus population a continuing reality. And finally, improved education and communication along with greater availability of market goods has dramatically altered the expectations of rural people, especially the young. Many rural youth no longer are interested in remaining on the land, but seek expanded employment opportunities, training, and what is viewed as a better life in the cities of Bolivia.

Therefore, development projects specifically targeted at reducing the flow of labor into the Chapare must be viewed with caution. As noted by Painter (1987: 1), "This will depend on the success of efforts in the Chapare to decrease the profitability of coca production and heighten the risks associated with it through interdiction efforts...." At present (July 1990), according to interviews with individuals cognizant of current trends, interdiction has successfully, if temporarily, depressed the local coca leaf market. These efforts have raised the cost of living in the Chapare, lowered wages, and have made the processing and transport of drugs highly risky. As a consequence, migration into the area appears to have slowed significantly. Nonetheless, as has happened in the past, should this situation be altered, once again making work conditions in the Chapare favorable for migration, competition from any legal labor market becomes highly problematical. While strong development projects in the rural highlands may deter large segments of the rural population from leaving their points of origin, labor surpluses in the cities, particularly Cochabamba and Santa Cruz, no doubt would respond to the offer of high wages in the Chapare.

Very little is known about Chapare migrants and their patterns of movement once they leave their points of origin. Because of the illicit nature of economic activities in the Chapare and the highly charged atmosphere that exists there, it is virtually impossible to conduct social research in the area or to gather dependable data (see Durana et al.: 1987; Rivera: 1990 for comments on this problem). However, past knowledge of migration patterns and trends as well as anecdotal and observational information give some clues to the processes at work.

One of the problems with recent research efforts to understand the population dynamics of the region is the tendency to deal with settled residents, or *colonos*, who are easier to interview and more accessible when conducting survey research than the temporary (*flotante*) labor population. The *colono* population may have come directly from a rural situation in the high valley or altiplano areas to settle in the Chapare (although data on specific points of origin are not available), or as is more common now, have gone through intermediate stages of migration to urban areas in Bolivia such as the city of Cochabamba (Ledo: 1990).

The production and harvesting cycle of coca as well as many of the dominant highland crops allow the typical *colono* in the Chapare to work the land on a seasonal basis in conjunction with enterprises elsewhere (Ledo: 1990). The high value of coca and its ability to produce adequate returns on even marginal land has led to population densities that cannot be economically sustained by legitimate substitute crops on existing holdings. A severe environmental threat exists should solutions to this problem be sought through the allocation of additional land in primary forest.

Therefore, a major concern of alternative development is the relocation of substantial portions of the settled *colono* population of the Chapare into other regions of Bolivia. With increased emphasis on the social and economic development of traditional areas of expulsion, the likelihood exists that some of these *colonos* would elect to return to their points of origin, particularly if they have family members and land rights in these areas. However, it must be assumed that many will chose to move permanently to urban areas, especially the cities of Cochabamba and Santa Cruz. This increased migration will place enormous stresses on these cities, which are already suffering from the burden of having to provide jobs, housing, and social services to a burgeoning population.

The temporal, *flotante* population in the Chapare presents a somewhat more complicated picture in that it constantly fluctuates and presumably draws on diverse regions and sectors of the nation. The very instability of this population in response to the Chapare labor market makes this group virtually inaccessible as a study population particularly given the research constraints mentioned above. However, sources familiar with seasonal migration indicate that virtually every department contributes labor to the *flotante* labor pool, although Cochabamba, Potosi, Oruro, and Chuquisaca appear to contribute a substantially larger portion. Santa Cruz as well is an important part of this process, and the issue is confused by the fact that migrants in the Chapare may report their point of origin as a highland department when they have actually been in Santa Cruz previous to their Chapare migration.

Throughout the agricultural colonies of northern Santa Cruz, colonists commonly select the Chapare as a point of destination for seasonal off-farm labor when conditions are appropriate. Many observers also feel that the city of Santa Cruz, which is experiencing a period of recession, may provide temporal labor to the Chapare. These are primarily highland people who have established work networks in the Chapare through friends and relatives involved in coca production. Projects targeted to become "labor sinks," such as massive public works programs in road building, terracing, or other infrastructural construction, will provide temporary employment to migrant labor that may have been destined for the Chapare. However, given the huge labor surpluses in Bolivia, it is unlikely that this type of approach offers any real solution to the problem, particularly should the labor market in the Chapare begin to improve. This is particularly true if these projects compensate labor with food products instead of salaries. The exchange of food for work, or for that matter, for almost any activity, has become so commonplace in Bolivia that these products are now taken for granted. While food products may be some incentive to work, they alone will not prove a sufficient attractant.

Unfortunately, there is now renewed interest in colonization as a possible solution to both problems of migratory labor to the Chapare and surplus labor in general, the latter usually expressed as a "migration" issue. The history of colonization projects not only in Bolivia but throughout tropical Latin America does not support further efforts of this kind. Not only are large areas of rainforest destroyed in the process, but the system has served only to advance the frontiers of poverty as a short-term solution to pressures elsewhere. In the long run, many of these areas, such as the Yapacaní, are converted into degraded pastures, or if capital is available for agribusiness investment, the land is temporarily planted to crops such as soybeans, as has occurred in the Chane-Piraf region. In the latter case, the colonist has served only as a cheap land-clearing device for the agricultural elite who take over these lands when the colonist can no longer survive economically and must abandon his land to move elsewhere. In addition, the conversion of frontier land to crops such as soybeans, whose production is highly mechanized and therefore requires minimal labor, further exacerbates surplus labor problems.

Finally, it is unrealistic to consider migration as a social pathology which must be "cured." In the developed world, such movement is considered a normal response to changing economic circumstances. By creating new development poles in Bolivia, a goal of alternative development strategies, migration is likely to increase, albeit not to the Chapare (see also Painter 1987: 39). In the long term, migration itself should not be a primary concern in program development. Rather, a strategy for integrated, nationwide development, an often cited but seldom seriously addressed problem, should be implemented. To some degree a vicious cycle in development planning has occurred: because Bolivia is considered an "agricultural" nation, most development effort is targeted at rural areas although nearly 50 percent of the population is now urban (INE:1987). Moreover, many rural migrants going to the Chapare or elsewhere will ultimately end up in Bolivia's cities. Given population growth and relative lack of family planning, finite land resources, and the changing social processes resulting from modernization, large-scale rural to urban migration is inevitable. The migratory pressure on these cities is now beginning to cause severe social and economic problems. Alternative development strategies such as those currently in place in Mizque and Aiquile (Cochabamba) to stimulate new growth in selected areas hold great promise in terms of relieving these types of pressures on urban centers. In the long run, the creation of alternate development poles may have a more positive effect on current population dynamics than massive efforts to breathe new life into many regions of traditional population expulsion given their poor prospects in terms of resource availability and existing population pressure.

Unfortunately, many of the trends outlined above are not being considered in development strategies that tend to focus on particular regions as "problem areas." As Painter has indicated, "the Chapare is simply the most recent migratory target in this long-standing process. While it has acquired particular notoriety because of narcotics production, the Chapare remains one among a number of important migratory destinations for the rural population" (Painter: 1987).

ANNEX 6

**LOCAL INSTITUTIONS, REGIONALISM,
AND INTEGRATED DEVELOPMENT**

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LOCAL INSTITUTIONS, REGIONALISM, AND INTEGRATED DEVELOPMENT

As a country of great geographical barriers, Bolivia has always suffered from difficulties in communication which in turn have led to the evolution of pronounced regionalism. This problem has been magnified by cultural differences between highland and lowland people, or the distinction made between lowland "Cambas" and highland "Kollas." This sense of regionalism in many instances goes beyond mere casual rivalry to become manifested in open expressions of prejudice and hostility.

Ironically, in its recent efforts to decentralize many of its activities, the Bolivian government actually may be fomenting an even stronger backlash of regionalism given long-imbedded traditions of regional autonomy. In the past, strong centralization of power in La Paz contributed to regional efforts to offset unequal access to economic and political benefits with their own strategies for development. With the emergence of regional development corporations, individual departments were able to access local revenues as well as those available from outside funding agencies. Although there is great disparity among the various corporations in terms of the quantity and quality of their activities, a factor primarily of wealth differentials, each has become the major governmental institution involved in the planning and implementation of development projects in their respective departments. As noted earlier, decentralization may increase the tendency toward institutional isolation of these corporations as more governmental decisions become the domain of departmental politics.

At the same time, however, national-level government agencies, such as the Ministry of Planning, continue to focus on development issues on a national scale without fully integrating their efforts with other ministries or with regional institutions, particularly the development corporations. This results not only in a sense of alienation on the part of the regional institutions, but also creates a situation where competition for funding and the duplication of efforts are inevitable. Because of this overall lack of coordination between the national and regional institutions, development in Bolivia has to a large extent progressed as a patchwork quilt of isolated projects.

The lack of an integrated national policy for development and the increasing fragmentation of government agencies charged with development initiatives has encouraged the bypassing of these institutions by many external funding sources. Chemonics International notes in a recent document that "One of the frustrations of central planners and decision makers in the agricultural sector in Bolivia is the fact that many donors bypass MACA Central and reach directly out to local organizations and target groups to implement projects. Not only does the ministry fail to participate in any meaningful way in the decision making process over these resources, it often cannot manage the detailed information about the projects in order to coordinate among them" (Chemonics 1988: 189).

Government entities, both national and regional, are often characterized by donor agencies as "chaotic" or "unworkable." Rather than deal directly with the problem of rebuilding national institutions, funding agencies prefer to work along other pathways in both the public and private sectors. As a result, NGO projects and other foreign government efforts have proliferated, frequently operate independently of each other, function at various administrative and regional levels, and often have only tenuous links to national institutions. Parallel development institutions such as the PDARs are being set up to administer regional projects separately from what would be the most logical local counterparts, the regional development corporations. Granted, this is a function of the donor's desire to have funded

activities show tangible results in a relatively short period of time. In the long run, however, this end-running of local institutions will only serve to undercut their potential to evolve into effective planning and/or implementing agencies.

In many departments, such as Santa Cruz, regional development corporations carry a good deal of political and economic weight within their local spheres of influence. By excluding them from development initiatives at the pan-regional or national level, regionalism becomes even more deeply imbedded in local political decisions. As a result, regional development corporations have no incentive whatsoever to consider any priorities other than those within their own department; and the more powerful corporations are often quite effective at gaining their own advantage to the detriment of other regions. Many failed projects in the smaller, less affluent departments might have had a greater chance for success if their efforts had been coordinated with departments contiguous to them.

Finally, regionalism in the form of regional chauvinism and overinflated views of the quality of regional products often make product improvement initiatives extremely difficult to encourage among local institutions. Myths about the superior quality of local products (as opposed to those from other departments or countries) are repeated without introspection and have become a litany of many Bolivian development personnel. For example, agricultural extension is typically geared toward improving the volume of production of a local crop variety without questioning the quality of that variety. As a result, a product of inferior quality is produced in increasing amounts, a product that will have little chance of being successfully marketed nationally or internationally.

Integrated development in Bolivia will continue to encounter serious obstacles until meaningful efforts are undertaken to reduce regionalism in all of its manifestations. This will mean a commitment on the part of donor agencies, such as USAID, to begin institutional strengthening of existing national and regional agencies rather than the creating parallel ones; to include regional institutions as co-implementors of broader programs; and to undertake serious efforts to coordinate regional development activities at the national level.

ANNEX 7

BIBLIOGRAPHY OF MATERIALS COLLECTED
(Located at DAI/Cochabamba)

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BIBLIOGRAPHY OF MATERIALS COLLECTED
(Located at DAI/Cochabamba)

- ACLO (Acción Católica Loyola). "Diagnósticos Micro Regionales. Mayutambo, Vila Vila, Korpa." Potosí. 1990.
- ACLO. "Informe de Actividades. Gestión Julio 1988-Junio 1989." Sucre. 1989.
- ADRA (Agencia de Desarrollo y Recursos Asistenciales). "Estudio Socio-económico de Caminos Vecinales. Curihuati-La Plazuela y Ventilla-Arcopongo." P.C.A. Ingenieros Consultores S.A. Con Anexos. La Paz. Noviembre, 1989.
- AGID (Asociación de Geocientíficos para el Desarrollo Internacional)/GTZ (Gesellschaft für Technische Zusammenarbeit). El Riego en Cochabamba. 1986. Trabajos presentados en la Mesa Redonda sobre Riego en Cochabamba realizada en diciembre 1985. Editores: Victor Ricaldi and Rudolph Cleveringa. Cochabamba. 1986.
- A.I.F.O.R. (Asociación Interinstitucional de Forestación). "Reunión de Coordinación Técnica e Institucional." II Jornadas Forestales del Área Andina Boliviana, Grupo Altiplano. La Paz. 26-28 de junio, 1989.
- A.M.I.S. (ed. Aidan Gulliver). "Estudio de Legislación y Normas"; Bolivia Agroindustrial Marketing Systems Study, Associated Reports. PDAC-USAID-Proyecto AMIS. La Paz, Bolivia. Marzo 1990.
- Note: A discussion (in Spanish) of the the regulations and laws that govern the import and export of agricultural products.
- A.M.I.S. "Bolivia Agroindustrial Marketing Systems Study." (Draft). USAID/AMIS (Richard Abbott et al.). May 1990.
- A.M.I.S. "Bolivia Agroindustrial Marketing Systems Study." Associated Reports. Estudio de Instalaciones y Equipos. PDAC/USAID/Proyecto AMIS. Marzo. 1990.
- Asociación Gremial Agroindustrial de Productores de Papa del Departamento de Potosí "AGAPPO". "Mejoramiento de la Productividad Producción y Comercialización de Papa". (Proyecto de Factibilidad). Potosí, Bolivia. 1989.
- Asociación San Jacinto. "Estudio de Factibilidad del Proyecto Múltiple 'San Jacinto.' Resumen Ejecutivo." Ingenieros Consultores SOFRELEC y CONSA, S.R.L. Tarija. 1980.
- Barber, R.G. and Diaz O. "Effects of deep tillage and and fertilization on soya yields in a compacted Ustochrept during seven cropping seasons at Saavedra, Santa Cruz, Bolivia". C.I.A.T. Work Report No. 57. Santa Cruz, Bolivia. Jan. 1990.

BOLFER (Empresa Boliviana de Fertilizantes). "Presentación." Santa Cruz, Bolivia. 1990 (?).

Bojanic, A. y S.J. Maxwell. "Maiz: Descripción de las Prácticas Culturales y sus Costos de Producción en las áreas de Colonización en el Norte de Depto. de Santa Cruz, Bolivia". C.I.A.T. Documento de trabajo No. 23. Santa Cruz, Bolivia. Enero 1982.

Bolivia. Departamento Económico y de Planificación. Propuestas Para Una Estrategia de Desarrollo Rural de Base Campesina. Informe de la Misión Especial de Programación a la República de Bolivia. Vols. I and II. Informe No. 0006-BO. FIDA/CEDLA. La Paz. Diciembre 1985.

Bolivia. Gaceta Oficial de Bolivia. Año XXII, No. 1522. La Paz. 25 Julio 1987.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Informe dirigido a Jaime Paz Zamora, Presidente de la República. Reestructuración del Instituto Boliviano de Tecnología Agropecuaria "IBTA." La Paz. N.D.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Mecanismo Interno de Coordinación de la Reestructuración Orgánica del MACA. "Manual de Organización y Funciones." La Paz. Febrero, 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Mecanismo Interno de Coordinación de la Reestructuración Orgánica del MACA. "Estatuto Orgánico del MACA." La Paz. Junio, 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Centro Desarrollo Forestal. FAO/PNUD. "Plan de Acción para el Desarrollo Forestal. Bolivia." Anexo I: Perfiles de Proyecto. La Paz. N.D.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Consejo Nacional de Semillas (CNS). Two documents without titles: a description of the CNS institution and program, and a description of a seed production project. La Paz, 1990.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Consejo Regional de Semillas, Servicio de Certificación de Semillas. "Informe Anual, 1989" Santa Cruz, Bolivia. 1989.

Note: A report (in Spanish) of the 1989 activities of the Santa Cruz Regional Seed Board. It also outlines its 1990 activities.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Consejo Regional de Semillas, Servicio de Certificación de Semillas. "Informe Anual, 1989" Sucre, Bolivia. 1989.

Note: A report (in Spanish) of the 1989 activities of the Chuquisaca Regional Seed Board. It also outlines its 1990 activities.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Consejo Regional de Semillas, Servicio de Certificación de Semillas. "Informe Anual, 1989" Cochabamba, Bolivia. 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Departamento de Semillas. "Informe Anual, 1989". Santa Cruz, Bolivia. 1989.

Note: A report (in Spanish) of the activities of the Servicio Reg. de Certificación de Semillas in each of the Departments. The proposed plans for 1990 are also presented.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Departamento Nacional de Suelos y Riegos. "Proyectos de Riego y Conservación de Suelos a Nivel Nacional." La Paz. 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios, Dirección Departamental. "Plan Operativo Anual, Gestión 1990". Tarija. Bolivia. Dec. 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Subsecretaría de Desarrollo Agropecuario. "Plan de Acción Sequía y Recursos Hídricos." La Paz. Abril, 1990.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. SUBDESAL (Subsecretaría de Desarrollo Alternativo y Sustitución de Cultivos de Coca). Dirección Nacional de Reconversión Agrícola "DIRECO". "Informe Anual de Actividades 1989. La Paz. 1990.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. SUBDESAL. Programa de la Naciones Unidas para el Desarrollo PNUD/OPS. Proyecto de Desarrollo Alternativo del Trópico Cochabamba AD/BOL/88/412. "Proyecto de Cinco Pequeñas Agroindustrias en al Chapare." Cochabamba. Noviembre, 1989.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. SUBDESAL/PDAR. "Proyecto IBTA/Chapare. Fertilización y Encalado de Cultivos en el Subtrópico Húmedo Cochabambino." Seminario Nacional Sobre Fertilidad de Suelos y Uso de Fertilizantes en Bolivia. Santa Cruz. 6-9 febrero, 1990.

Bolivia. Ministerio de Asuntos Campesinos y Agropecuarios. Subsecretaría de Recursos Naturales y Medio Ambiente. Plan de Acción para el Desarrollo Forestal. 1990-1995. Centro de Desarrollo Forestal, et al. La Paz. Abril, 1989.

Bolivia. Ministerio de Planamiento y Coordinación. Subsecretaría de Inversión Pública, Coordinación y Cooperación Internacional. "Programa de Fortalecimiento de la Gestión Económica del Sector Público." La Paz. N.D.

Bolivia. Ministerio de Planamiento y Coordinación. Subsecretaría de Inversión Pública y Cooperación Internacional. Sistema de Información Sobre Inversiones (SISIN). "Annex I: Programa Básico de Inversión Pública 1990-1992. "Annex II: Programa Complementario de Inversión Pública 1990-1992." La Paz. 1990.

Bolivia. Presidencia. "Estrategia Nacional de Desarrollo Alternativo. 1990." La Paz. N.D.

Bolivia. Senado. Ley General de Aguas. P.L. 040/87-88.

Brockmann, C.E. (ed.) Perfil Ambiental de Bolivia. Instituto Internacional para el Desarrollo y Medio Ambiente/Agencia de los Estados Unidos para el Desarrollo Internacional (USAID). La Paz. Julio 1986.

Bunch, Roland. Two Ears of Corn. A Guide to People-Centered Agricultural Improvement. World Neighbors. Oklahoma City. 1985.

CARE/Bolivia. "Child Survival and Rural Sanitation Program: A Final Evaluation of the USAID-Financed Project." Andrew W. Karp. et al. La Paz. Draft. April 1990.

Centro de Investigación Agrícola Tropical (CIAT) Documento de Trabajo 68. "Estudio de la Transferencia de Tecnología Agropecuaria en el Departamento de Santa Cruz." Vols. I and II, Anexos. Cooperación de la Misión Británica en Agricultura Tropical. Santa Cruz. 1988.

Centro de Investigación Agrícola Tropical (CIAT). "El Proyecto Criollo de Santa Cruz, Bolivia". Santa Cruz, Bolivia. 1989.

Centro de Investigación Agrícola Tropical (CIAT) "Research and Development of Agroforest Systems in the Mesothermic Valleys and the Colonisation Zone." Santa Cruz. CIAT. January, 1989.

Centro Investigación, Diseño Artesanal y Comercialización Cooperativa. "Proyecto Educación Popular y Capacitación". Santa Cruz, Bolivia. 1990.

Note: This is a cooperative organized to teach and preserve artesanal skills to (basically women) in the lowland areas of Bolivia. They have been in operation about three years and have funding (US\$ 99,000) through February 1991.

Chapare Regional Development Project. Associated High Valleys Component. "Plan for Implementation of the PADC 1989 Operating Plan." Development Alternatives, Inc. Washington, D.C. May 9, 1989.

Chemonics International Consulting Division. "Final Activity Report of the Agriculture Sector II Project". Washington D.C. Dec. 1986.

Note: The final report of the Chemonics technical assistance project for the years 1979-1986. It covers projects on land clearing, soil conservation, cotton production, institutional building, information systems, and seed production. An excellent description of the successes and problems encountered over a seven year period.

CIDRE (Centro de Investigación y Desarrollo Regional). Monografía del Tropico: Departamento de Cochabamba. Cochabamba. 1989.

Cloutier, J. "Counter-Narcotics Strategy for Bolivia: New Project Descriptions". USAID La Paz, Bolivia. Dec. 1989.

Note: An unclassified document sent to Wash D.C. outlining eight (8) new project descriptions: (1) Lowlands Colonization, (2) FY 90 Balance of Payments Assistance, (3) Rural Electrification III, (4) Rural Roads Development III Project, (5) Narcotics Awareness, (6) Export Promotion Project Amendment, (7) Micro and Small Enterprise Development, (8) Chapare Regional Development Project Amendment.

CNS/EUROCONSULT. "PROSEMPA" Cochabamba, 1989

Note: A description of the Dutch funded seed potato program.

CODETAR.(Corporación Regional de Desarrollo de Tarija). Boletín Informativo. Semestre Agosto 1989-Enero 1990. Tarija. 1990.

CODETAR. "Estadísticas Demográficas." Plan Regional de Desarrollo Económico y Social, 1979-83. Tarija. N.D.

CODETAR. "Perfiles de Proyectos." Tarija, Bolivia. 1990.

Note: Profiles of 25 priority projects developed by CODETAR. Each one is 3-5 pages long.

CODETAR. "Programa Ejecutivo de Rehabilitación de Tierras en el Departamento de Tarija. PERTT/FAO." Proyecto de Restauración Forestal y Rehabilitación de Tierras en La Alta Cuenca del Río Guadalquivir. Tarija. Diciembre, 1989.

Comité Central Menonita. "La Huerta Familiar" (Parte 1 a 11). Santa Cruz, Bolivia. N.D.

Comité Departamental de Planificación. "Informe Semestral ACLO Chuquisaca Julio a Diciembre 1989." Sucre. Marzo, 1990.

Consorcio Agroindustrial Boliviano Ltd. "Informe Proyecto Múltiple Chapare." Cochabamba Agosto 2, 1990.

CORDECH (Corporación de Desarrollo de Chuquisaca). "Detalle de Proyectos que Requieren Financiamiento." Sucre. 1990. Also: "Subprograma de Desarrollo Agrícola de las Microáreas de Sucre." Sucre. 1990.

CORDECH. "Perfil de Proyecto Perforación de Pozos Provincia Luis Calvo." Sucre. Junio, 1990.

CORDCH. "Perfil-Programa Vial Construcción de Caminos Vecinales." Sucre. Junio, 1990.

CORDECH. "Plan de Desarrollo Subregional Chuquisaca Centro" (Perfil de Programa, Subsector Agrícola). Sucre, Bolivia. Agosto 1989.

Note: The agricultural sector plan for the provinces of Azurday, B. Boeto, and Tomina.

CORDECH. "Plan de Emergencia para la Sequía del Departamento de Chuquisaca. 1990." Sucre. Mayo, 1990.

CORDECH. "Plan Regional de Desarrollo de Chuquisaca Visión Prospectiva al Año 2010". Tomo I, Análisis Global; Anexos Tomo I; Aspectos Sociales, Migración y Empleo. Tomo II, Análisis Sectional. Tomos III-IV; Propuesta Global, Enfoque Subregional y Centro Urbano Sucre Macro Proyectos. Sucre, Bolivia. 1987.

Note: A 363 page document outlining the development objectives of CORDECH for the entire Department of Chuquisaca. A tremendous source of statistical data.

CORDECH. "Proyecto de Riego Corma." Sucre. 1989.

CORDECH. "Proyecto de Riego y Agua Potable-Alcantarillado Padilla." Estudio de Factibilidad. Tomo I. Salzgitter Consult GMBH. Sucre. 1987.

CORDECH. "Proyecto de Riego y Agua Potable Tirkipata." Sucre. Abril 1990.

CORDECH. "Proyecto de Riego Machareti." Tomo I: Informe Principal. Salzgitter Consult GMBH. Sucre. 1988.

CORDECH. "Sequía e Infraestructura en el Departamento de Chuquisaca. Sucre. Junio, 1990.

CORDECH, Gerencia de Planificación. "Subprograma de Apoyo al Desarrollo Frutícola de los Valles de Cinti". Sucre, Bolivia. 1989.

Note: A project profile drawn up with the cooperation of the FOCAS program.

CORDECO (Corporación e Desarrollo de Cochabamba). "Construcción de Sistemas de Agua Potable en Areas Rurales. (Propuesta)." Cochabamba. Julio 1990.

CORDECO. "Plan de Emergencia para Afrontar los daños de la sequía en el departamento de Cochabamba, 1990". Vol. I. Cochabamba, Bolivia. Abril 1990.

CORDECO. "Plan de Emergencia para Afrontar los daños de la sequía en el departamento de Cochabamba, 1990". Vol. II, Anexos. Cochabamba, Bolivia. Abril 1990.

CORDECO. "Pozos de Hundimiento para el Departamento de Cochabamba." Cochabamba. Mayo, 1990.

CORDECO. "Proyecto de Aprovechamiento de Aguas Subterráneas, Pozos de Hundimiento Tipo Ranney Para Microrriegos en el Departamento de Cochabamba." Cochabamba. Mayo, 1990

CORDECO. "Proyecto Microrriegos Unidad Esmeralda Baja." Cochabamba. Enero, 1990.

CORDECO. "Proyecto Micro Riego Via Rancho." Cochabamba. Enero 1990.

CORDECRUZ (Corporación de Desarrollo de Santa Cruz). "Micro Riego." Inversiones por Programa y Proyecto. Santa Cruz. 1990.

- CORDEPO (Corporación de Desarrollo de Potosí). "Ayuda Memoria, Programa de desarrollo integrado en área de base agropecuaria, Norte de Potosí". Potosí, Bolivia. Abril 1990.
- CORDEPO. "Centro ganadero del altiplano sur y alta puna andina sureña". Potosí, Bolivia. 1990.
- CORDEPO. "Programa Agroindustrial 'La Lava'". Potosí, Bolivia. Abril 1990.
- CORDEPO. "Programa agroindustrial 'La Lava', Componente Productivo". Tomo II. Potosí, Bolivia. Abril 1990.
- CORDEPO. "Programa de Desarrollo Intregrado en Area de Base Agropecuario 'Daniel Campos y Nor Lipez'". Potosí, Bolivia. 1990.
- CORDEPO "Programa de Desarrollo Intregrado en Area de Base Agropecuaria 'Oronkota-Turuchipa'". (Perfil); Potosí, Bolivia. Oct. 1988
- CORDEPO "Programa de Desarrollo Intregrado en Area de Base Agropecuaria 'Oronkota-Turuchipa'". (Diagnostic); Potosí, Bolivia. Oct. 1988.
- CORDEPO "Programa de Desarrollo Intregrado en Area de Base Agropecuaria 'Oronkota-Turuchipa'". (Estudio) Potosí, Bolivia. Oct. 1988.
- Note: This document is the full presentation of the project, and presents all sectors. To be used with the Diagnostic which contains statistical data.
- CORDEPO. "Programa de Desarrollo Integrado en Area de Base Agropecuario 'Potosí-Centro'". Potosí, Bolivia. 1990.
- CORDEPO. "Programa de Desarrollo Rural Integrado. PDRI." UNICEF. Potosí. N.D.
- CORDEPO. "Proyecto BOL/86/030-BOL/86/CO1. Acacio-Anzaldo. Informe Mensual Mayo. 1990. No. 05/90.
- CORDEPO. "Proyecto de desarrollo por áreas - Subregión Potosí-Centro Provincias: Cornelio Saavedra, Tomas Frias". Tomo I, Estudio de prefactibilidad, Diagnostico. Potosí, Bolivia. Junio 1989.
- CORDEPO. "Proyecto de Desarrollo Rural Integrado Norte Potosí." Agrodev Canada. Inc. Potosí. Septiembre, 1984.
- CORDEPO. "Proyecto de Riego Charca Mekani. Pre-Factibilidad." Potosí. 1985.
- CORDEPO. "Proyecto de Riego Khea Khea." Potosí. 1984
- CORDEPO. "Proyecto: Integración y desarrollo del norte de Potosí (Prov. Bilbao, A. de Ibanez y Charcas)". Potosí, Bolivia. Mayo 1986.
- CORDEPO. "Proyecto Micro Riego Represa de Sorocota." Potosí. 1984.

125

- CORDEPO. "Proyecto Represa de Muni Palca (Provincia Chayanta)." Proyecto de Prefactibilidad. Potosí. 1984.
- CORDEPO. "Proyecto Represa de Sauce Mayu." Potosí. 1984.
- CORDEPO. "Vivero Forestal Comunal." Potosí. N.D.
- Davies, E.P. y P.G. Lee. "Aceites Esenciales y el Proyecto de Menta, San Julian. C.I.A.T Doc. de Trabajo No. 53. Santa Cruz, Bolivia. Julio 1985.
- Davies, Penelope. "Systemas alternativos de producción para cacao en la zona norte de colonización: Un análisis económico exploratorio". C.I.A.T. Documento de Trabajo No. 55. Santa Cruz, Bolivia. Enero 1986.
- Development Alternatives, Inc. "Environmental Assessment of the Chapare Regional Dvelopment Project, Bolivia. Final Report." DAI. Washington, D.C. January, 1990.
- Development Alternatives, Inc. "A Midterm Review of the Bolivia Associated High Valleys Project." Washington, D.C. July 1990.
- Development Alternatives, Inc. "Plan for Implementation of the PDAC. 1989 Operating Plan." Chapare Regional Development Project, Associated High Valleys Component. Cochabamba. May 9, 1989.
- Development Alternatives, Inc. "Regional Planning and Strategy Analysis for the Chapare Regional Development Project." Washington, D.C. July 1990.
- De Vries, David et al. "Informe de la Misión de Evaluación de Proyectos de Desarrollo Agropecuario Bajo Riego." PNUD/COTESU/Coop. Holandesa/ MACA. 1990.
- DHV Consultants. "Bolivia Agricultural Development Project (ADP)", Vol 1 Main Document. Amersfoort, Holland. March 1990.
- Dickenson, Joshua C. et al. "The Associated High Valleys Project in Cochabamba, Bolivia." Tropical Research and Development/ DESFIL/USAID. Gainesville, Florida. August, 1988.
- Durana, James. et al. "Population Estimate for the Chapare Region, Bolivia." DESFIL/ USAID. Agust, 1987.
- Escobar de Pabón, Silvia and Carmen Ledo Garcia. Urbanización, Migración y Empleo en la Ciudad de Cochabamba. CEDLA-CIDRE. La Paz. 1988.
- FAO Proyecto Fertilizantes. Santa Cruz, Bolivia. 1989.

Note: A series of publications that explain the FAO Fertilizer Project in Bolivia. There is a brochure, a resume of activities, a consultant's report on Cochabamba, and a table of activities for 1990-1991.

Federación Departmental de Clubes de Madres. "Proyecto de Huertos Familiares en 50 Clubes de Madres en Santa Cruz". Santa Cruz, Bolivia. 1990.

Federación Departmental de Clubes de Madres. "Implementación de Microproyectos de Producción en Clubes de Madres en Santa Cruz". Santa Cruz, Bolivia. 1990.

FENACRE (Federación Nacional de Cooperativas de Ahorro y Crédito de Bolivia). Programa de Formación y Capacitación Curricular. Catálogo. Cochabamba, Bolivia. 1990.

Foss George, Paulette. "Export Marketing: A Bibliography". Postharvest Institute for Perishables. Moscow, Idaho. June 1983.

Froment, M.A., et al. "Research Planning: The Farm Systems Project Chane-Piray". C.I.A.T. Working Document No. 43. Santa Cruz, Bolivia. April 1984.

Froment, M.A. "Investigación de Sorgo Escobero en Santa Cruz, Bolivia, 1983-86. Panorama de un Programa Experimental Efectuado bajo el Enfoque de Investigación de Sistemas Agropecuarios. C.I.A.T. Informe de Trabajo No. 39. Santa Cruz, Bolivia. Nov 1986.

Fundación Chile. "Restauración Productiva de la Cuenca del Río Tolomosa." Santiago. 12 de septiembre, 1988.

Fundación Chile, Departamento Agroindustrial. "Estudio de Diversificación de Cultivos". Santiago. Agosto 1988.

Note: A study conducted on the possibilities of diversification or expansion of ten (10) agricultural crops in the departments of Cochabamba, Chuquisaca, and Tarija.

Gallo Morales, Abel. "Proyecto Lechero, Southland S.A."; Tupiza - Bolivia. 1988.

Note: A private consultant's report prepared for Sr. Jorge Pereira Ganam. Proposal is for the construction of a dairy plant in Tupiza. Very complete data on construction costs, milk products, and supplies, fairly good marketing plan.

Giuliano, Michael A., "Fresco y del Exterior: Una Guía Completa sobre el Mercadeo de los Productos del Caribe y Latinoamérica". Washington D.C. Noviembre 1987.

Hatch, John K. Our Knowledge: Traditional Farming Practices in Rural Bolivia. Vol II. Rural Development Services, New York, N.Y. 1984.

Note: This is a three (3) volume series that covers all aspects of rural (or campesino) life in Bolivia. Vol. I covers the Altiplano and Valleys region; Vol. II Temperate Valleys Region; Vol. III Tropical Lowlands. All the volumes are transcriptions of the campesinos descriptions of their lives. It is in a completely narrative format, interesting and easy to read.

Hoyos, F., P. Davies. "Uso y Adopción de Tecnología en la Cultivo de Maiz, 1986/87 Pailón Sur - Los Troncos". C.I.A.T. Documento de Trabajo No.70. Santa Cruz, Bolivia. Nov. 1988.

- INBOPIA. Perfiles de Proyectos. Cochabamba 26 de Julio, 1990.
- INE (Instituto Nacional de Estadística). Encuesta Integrada de Hogares 1989. "Migración." Santa Cruz. 1989. Pp. 13-26.
- INE (Instituto Nacional de Estadística). Encuesta Nacional de Población y Vivienda. Santa Cruz. 1988. Pp. 55-56.
- INE (Instituto Nacional de Estadística). "Estimates to 1987." Published in Ultima Hora, October 24, 1987. Reprinted in: Agriculture Sector Assessment for Bolivia. IQC Contract Number PDC-1406-I-00-7707. Chemonics International Consulting Division. Washington, D.C. January, 1988. Pg. 16
- ISNAR (International Service for National Agricultural Research). "Fortalecimiento del Sistema de Investigación y Transferencia de Tecnología Agropecuaria en Bolivia." ISNAR R45s. Informe al Gobierno de Bolivia. Septiembre, 1989.
- J.C. Latex. "Proyecto: Planta de Guantes de Latex para Uso Médico". Santa Cruz, Bolivia. 1990 (?).
- Johnson, James. "Farm business management and accounting terms". C.I.A.T. Working Document No. 64. Santa Cruz, Bolivia. Junio, 1988.
- Johnson, J., D. Virhuez. "A Survey of San Pedro: Vol. I, Credit in the Colony" CIAT Working Document No. 60, Santa Cruz, Bolivia. May 1987.
- Johnson, J., D. Virhuez. "A Survey of San Pedro: Vol. II, Non- mechanised rice production and its credit requirements" CIAT Working Document No. 61, Santa Cruz, Bolivia. May 1987.
- Johnson, J., D. Virhuez. "A Survey of San Pedro: Vol. III, Credit and mechanised agriculture" CIAT Working Document No. 62, Santa Cruz, Bolivia. May 1987.
- JUNAC (Junta del Acuerdo de Cartagena)/PCAB (Programa de Cooperación Andina a Bolivia). "Agribusiness in Bolivia: Perspectivas de la Agroindustria". La Paz, July 1990.
- JUNAC/PCAB. "Identificación y Desarrollo de Oportunidades de Inversión Productivas." La Paz, 1989(?).
- Note: Executive summaries of all 46 profiles plus the five complete feasibility studies (for achiote, beekeeping, sheep/camelid skins, coffee and yuca processing) are on 3.5" diskettes provided by JUNAC (WordPerfect 5.0 program).
- La Paz. Honorable Alcaldía Municipal. GTZ. "Regulación de la Cuenca Kellumani." Financiamiento de la Comunidad Económica Europea. La Paz. Junio, 1990.
- Lawrence-Jones, W. and N. Rodríguez. "A farming systems research approach: Concepts and methodologies for CIAT, Santa Cruz". CIAT Working Paper No. 50. Santa Cruz, Bolivia. July 1985.

- Ledo, María del Carmen and Oscar Zegada. "Población, Migración y Empleo en Cochabamba. (1988). Informe Preliminar." Universidad Mayor de San Simón. Centro de Estudios de Población. Serie: Documento No. 5. Cochabamba. 1989.
- Lee, P.G. "The climate of Santa Cruz and its effects on the suitability of perennial crops". C.I.A.T. Working Document No. 58. Santa Cruz, Bolivia. March 1986.
- Maxwell, Simon, et al. "Análisis Marginal: Un juego para la enseñanza del método del CIMMYT para análisis económico de datos agronómicos". C.I.A.T. Documento de Trabajo No. 20. Santa Cruz, Bolivia. Junio 1981.
- Montes de Oca, Ismael. Geografía y Recursos Naturales de Bolivia. Academia Nacional de Ciencias. La Paz. 1989.
- National Agriculture and Rural Industries Centre, Bolivia. FRE Appraisal Report. NAC International. (Bolivia), Inc. Washington, D.C. N.D.
- "New Naradavan Project" Cochabamba, Bolivia. 1990
- Note: A project being developed by the Hare Khrisna community in Bolivia. Seeking financial aid and technical assistance.
- Organización de los Estados Americanos. CORDECruz. "Proyecto Múltiple Parapeti. Estudio de Prefactibilidad. Resumen." Santa Cruz. Marzo, 1988.
- Ovando Sanz, Jorge Alejandro. "Mas Ideas para la Media Luna Cochabamba (El Parque Nacional del Tunari)". La Paz. 1989.
- Pacheco Ramírez, J.L., Revollo de Pacheco, G. "Proyecto Frutícola Turuchipa (Huayllavi) 'VID'". Potosí, Bolivia. Marzo 1986.
- Painter, Michael. "Institutional Analysis of the Chapare Regional Development Project (CRDP)." Institute for Development Anthropology. Binghamton, New York. 1990.
- Painter, Michael. "Social Issues in the Development of the High Valleys of Copchabamba, Bolivia." Institute for Development Anthropology. Binghamton, New York. July, 1987.
- Painter, Michael and Roger Rasnake. "Human Rights Dimensions of the War on Drugs." Development Anthropology Network. Bulletin of the Institute for Development Anthropology. Vol. 7, No. 2. Fall, 1989. Pp. 8-16.
- Paterson, R.T. et al. "El Uso de Vicia spp. como Cultivos de Cobertura en Santa Cruz". C.I.A.T. Informe de Trabajo No. 28. Santa Cruz, Bolivia. 1984.
- Pattie, Preston S., et al. "Agriculture Sector Assessment for Bolivia". Chemonics, Inc. Wash D.C. Jan 1988.

Note: A complete and exhaustive study (247 pages, plus 8 Annexes) on almost all aspects of agriculture in Bolivia.

- PERTT (Programa Ejecutivo de Rehabilitación de Tierras en el Departamento de Tarija). "Cuadro I: Estimación de Trabajos de Requerimientos para un Plan de 20 Años." N.D.
- PERTT. "Desarrollo Agroforestal en el Valle de Tarija." Relato Final Fase I y Pre-Evaluación para el Saneamiento de la Tierras Erosionadas en la Cuenca del Río Camacho. Tomo I: Parte A: Resumen y Conclusiones; Tomo II Parte B: Anexos Técnicos I a V; Tomo III Parte C: Anexos Técnicos VI a VIII. Tarija. Diciembre, 1988.
- PERTT. "Ley 1122. Ley Obligatoria de Rehabilitación de Tierras en el Dpto. de Tarija." Ley de 16 de Noviembre de 1989.
- PERTT. "Proyecto de Reforestación Comunal con Fines Múltiples." Tarija. N.D.
- PERTT/FAO "Proyecto: Restauración Forestal y Rehabilitación de Suelos en la Alta Cuenca del Río Guadalquivir. GCP/BOL/016/NOR." Estudio y Formulación del Plan de Manejo y Conservación de las Subcuencas que Aportan a los Embalses de Sella y Canasmoro. Tarija. Octubre, 1989.
- PERTT/FAO "Proyecto Restauración Forestal y Rehabilitación de Tierras en la Alta Cuenca del Río Guadalquivir. GCP/BOL/016/NOR." Unidad de Desarrollo Integral Comunal Agroforestal de Obrajes. UDICAF. Tarija. Octubre, 1989.
- PERTT/FAO. "Proyecto Restauración Forestal y Rehabilitación de Tierras en la Alta Cuenca del Río Guadalquivir. GCP/BOL/016/NOR." Unidad de Desarrollo Integral Comunal Agroforestal de Tucumilla. UDICAF. Tarija. Octubre, 1989.
- Plan Internacional. "Linea de Base." Sucre. 1988. Pp.103-104.
- Presencia. Documentos. Decreto Supremo No. 22407. Jaime Paz Zamora, Presidente de la Republica. Políticas de acción para consolidar la estabilidad y promover el crecimiento económico, el empleo, el desarrollo social y la modernización del Estado. La Paz. 12 de Enero, 1990.
- Price Waterhouse. Secretaria Ejecutiva PL-480 titulo III. "Evaluacion de las Actividades de Reestructuración del Ministerio de Asuntos Campesinos y Agropecuarios (MACA). La Paz. 23 octubre, 1989.
- PROCAMPO. Revista del Desarrollo Rural. "En la Década del Medio Ambiente." La Paz. Junio 1990.
- PRODER (Programas de Desarrollo Rural) and ASED (Asesores en Desarrollo). "Estudio Socio Económico. Provincia Gral. Bilbao Rioja. 1ra. Sección-Potosí." Cochabamba. 1988.
- Programa ACLO-Chuquisaca. Transformación de la Economía Campesina, Julio 1989 a Junio 1992". Sucre, Bolivia. 1989.

- Programa de Desarrollo Alternativo de Cochabamba. Informe Anual 1989. PDAC. Cochabamba. 1990.
- Programa de Desarrollo Alternativo de Cochabamba. Informe Sobre Resultados de la Aplicación de las Prácticas de Conservación de Suelos y Aguas en el Area de Aiquile. Campaña Agrícola 1989-1990. Cochabamba. 7 junio, 1990.
- Programa de Desarrollo Alternativo de Cochabamba. Plan Integral de Desarrollo y Sustitución, PIDYS. "Plan Operativo 1990." PDAC. Cochabamba. 1990.
- Programa de Desarrollo Alternativo Regional (PDAR). "Curso de Técnicas de Extensión en Conservación de Suelos y Aguas." Cochabamba. 1990.
- Pruett, Christopher. "Situación Actual de la Sericicultura en Bolivia." Santa Cruz. July, 1990.
- Puch C., R. y W. Tapia A. "Forrajes Exóticos del Altiplano Boliviano". Universidad Autonoma "Tomas Frias", Facultad de Ciencias Agrícolas y Pecuarias, Programa Pastos y Forrajes. Potosí, Bolivia. 1986.
- Quiton Daza, Jose. "Costumbres y Derechos de Agua en un Sistema de Riego Tradicional." Tiraque "A", Provincia Arani, Cochabamba, Bolivia. Proyecto IBTA/GT2 PN 83.2073.1-01.200. Cochabamba. Noviembre, 1985.
- Rasnake, Roger and Michael Painter. "Rural Development and Crop Substitution in Bolivia: USAID and the Chapare Regional Development Project." Institute for Development Anthropology. Binghamton, New York. October, 1989.
- Rivera P., Alberto. "Diagnóstico Socio-económico de la Población del PDAR (Programa de Desarrollo Alternativo Regional), Chapare." Cochabamba. Abril, 1990.
- Rodríguez, María Hilda. "La problemática del trigo en Bolivia". Cochabamba, Bolivia. Oct. 1989.
- Note: A report (in Spanish) of the 1989 activities of the Cochabamba Regional Seed Board. It also outlines its 1990 activities.
- Romero, I., et al. "Una cosechadora no destructiva de pequeña escala para semilla de gramíneas tropicales". Informe No. 15 CIAT, Santa Cruz, Bolivia. Mayo 1982.
- SNDC (Servicio Nacional de Desarrollo de la Comunidad). "Estudio Socio-agro-económico Micro-Regional." Parte I: Carapari, Yacuiba; Parte II: Comunidad Pueblo Nuevo; Parte III: Comunidad Camacho. Tarija. SNDC. 1988-89.
- Sotomayor Consultores. "Programa de Fomento Lechero de Chuquisaca". Vol. I Naturaleza del Estudio. Vol. VII; A. Producción de Semilla, Mejormiento Ganadero e Inseminación Artificial. Sucre, Bolivia. 1989(?)

Note: Part of an 11 volume study on developing the dairy industry in Chuquisaca; carried out for CORDECH.

Sotomayor Consultores. "Programa de Producción de Cereales de Chuquisaca". Vol. I Antecedentes del Estudio. Sucre, Bolivia. 1989(?).

Suárez, Sergio. "Estudio de Factibilidad Técnico Económica de la Criación de Cochinilla (Dactilopius Cocus, Costa)." Santa Cruz. 1990.

Thiele, G. "Chane-Magallanes: Agriculture and Social Change in the Colonization Zone. CIAT Working Paper No. 59, Santa Cruz, Bolivia. April 1987.

Tull, Kenneth. Experiencias de Exito. Estudios de Casos Sobre la Producción Suficiente de Alimentos por Medio de la Agricultura Regenerativa. Rodale International. Emmaus, Pennsylvania. 1987.

UCF (Unidad Crediticia y Financiera) Chuquisaca. "Proyectos Pendientes de Desembolso." Sucre. Junio, 1990.

UCF (Unidad Crediticia y Financiera) Cochabamba. "Proyectos Financiados por UCF (Frutillas, Frambuesas, y Tumbos). N.D.

UCF (Unidad Crediticia y Financiera) La Paz. "Cuadro No. 3. Situación de Proyectos Aprobados Requerimiento Crediticio al 31-XII-89." N.D.

UCF (Unidad Crediticia y Financiera) Potosí. "Indicadores Financieros y de Impacto de los Proyectos Financiados con Recursos de la Línea Focas." "Registro de Informes de Evaluación de los Proyectos Presentados a la UCF Potosí." N.D.

UCF (Unidad Crediticia y Financiera) Tarija. Departamento de Promoción de Inversiones. "Perfiles de Proyectos Identificados para el Departamento de Tarija." 22 Jun 1990.

UNICEF. PROANDES (Proyecto Subregional Andino de Servicios Básicos). Plan Operativo 1990-1994. Norte del Departamento de Potosí. Propuesta. October. 1989.

UNCTAD/GATT. International Trade Centre. Market News Service. "Newsletter of the North American Office." April 1989.

United Fresh Fruit and Vegetable Association. "Outlook: the Management Magazine of the Produce Industry." Vol. 12 No. 6. Alexandria Virginia. November-December 1985.

United Nations. Development Program. (UNDP). "Proyecto de Promoción de Inversiones (PPR). Estado de Proyectos en Vienna." Proy BOL/89/017.

United Nations. Food and Agriculture Organization. Bolivia. "Agricultural Development Prospects for the Altiplano and Valleys Region. Sector Review. Working Papers." FAO/World Bank Cooperative Programme. Investment Centre. Report No. 43/87 CP-BOL 24 WPS. Rome. 7 April 1987.

USAID/Bolivia. "Private Agricultural Producer Organizations". La Paz, Bolivia. September 1986 (Date of Distribution).

Note: Project Paper whose stated purpose is "to strengthen and expand the capacity of private agricultural producer organizations to provide services to their members".

USAID/Bolivia. "USAID/Bolivia Action Plan, FY 1991-1992"; La Paz, Bolivia. February 1990.

Note: The two year plan as presented to the Director, LAC/DP in Washington D.C. Gives program descriptions of six target areas.

USAID/Bolivia. "Scope of Work for Evaluation of the Chapare Regional Development Project (CRDP). N.D. (1990?)

USAID/Washington. "Action Memorandum for the Chief Environmental Officer (LAC). Washington, D.C. June 6, 1989.

USAID/Washington. "Policy Determination. Assistance to Support Agricultural Export Development." PD-15. September 13, 1986.

USDA. Economic Research Service. "Fruit and Tree Nuts: Situation and Outlook Yearbook." Washington, D.C. August 1989.

USDA. Foreign Agricultural Service. "Horticultural Products Review." Washington, D.C. January 1990.

Vacher, J.J. et al. "Net Radiation and Potential Evapotranspiration (ETP) of the Bolivian Altiplano." Misión ORSTON. CP 8714. La Paz. 1989.

Vega, Leonidas y Cándido Pastor. "Informaciones Preliminares sobre la Tuna (Opuntia sp) y Cochinilla (Dactilopius Coccus) como Componentes de los Sistemas Agroforestales en los Valles Altos de Mizque y Aiquile, Cochabamba". Cochabamba, Bolivia. August 1990.

Velasco, O. "Producción de Semillas Forajeras Tropicales en el Dpto. de Santa Cruz, Bolivia". Informe de Trabajo 35. Noviembre 1984.

Victorrini, Ray. "Proposal for a PL-480 Program, 1990-1992"; La Paz, Bolivia. Sept. 1989.

Note: An internal document for internal circulation and comment by the USAID/Bolivia staff. This was used to develop the USAID/Bolivia Action Plan, and the PL-480 strategy. Very good discussion of the social objectives of USAID in Bolivia.

Wilkins, J.V. "British Tropical Agricultural Mission, Santa Cruz, Bolivia, 1976-1989." Santa Cruz, Bolivia Dec. 1989.

Note: Overview of the British Mission within the CIAT (Bolivia) research program.

Wilkins, J.V. "Livestock Production as an Agro-ecological Stable System in the Humid Tropics of Bolivia." BTAM/CIAT. Santa Cruz. April 1986.

Wilkins, J.V. "The search for a viable alternative to slash and burn agriculture in the lowland plains of Bolivia". BTAM Document. Santa Cruz, Bolivia. November 1988.

The World Bank. Country Department III, Latin America and the Caribbean Regional Office. "Eastern Lowlands: Natural Resource Management and Agricultural Production Project". Staff Appraisal, Report No. 8101-BO, February 20, 1990.

The World Bank. International Financial Statistics. May, 1990.

The World Bank. Projects Department. Latin America and the Caribbean Regional Office. Bolivia. Agricultural Sector Review. Report No. 6852-BO. June 22, 1987.

The World Bank. International Finance Corporation. "Water Supply for the Dispersed Rural Population of the Bolivian Highlands. September 5, 1989.

The World Bank. A Study on Poverty in Bolivia (exact title unknown; document has no title page). Washington, D.C. 1990 (?).

The World Bank. Vetiver Grass. The Hedge Against Erosion. Third Edition. The World Bank. Washington, D.C. 1990.

ANNEX 8
LIST OF INTERVIEWS

INTERVIEWS

<u>Department</u>	<u>Institution</u>	<u>Persons Interviewed</u>			
CHUQUISACA (Sucre)	ACLO	Miguel Cuéllar			
	Cons. Nac. de Semillas	Julio Loredó E.			
	CORDECH		Santiago Arana B. Alvaro Claros Winston Gavarra Ricardo González Oscar Landaeta A. Oscar Montero V́ctor Pacheco Andrés Presseich Rolando Romero Edwin Villegas		
		Eureka/Cám. de Comercio	Marcelo Santa Cruz		
		Federación de Cámaras		Ariel Avilés Walter Bernal Saúl León Bernardo Navas Alberto Rodríguez Eduardo Solares Carlos Villa	
			FAO	Ricardo La Fuente	
			FONDESA	Alvaro López A. Victor Yáñez C.	
			COCHABAMBA	Agro Yungas	Edgar Arandia
				APISBOL	Daniel Arispe
	ASOBAN	Jaime La Fuente			
Asoc. de Avicultores	Alfredo Maidonado				
BBA	Efraín Morales M.				
CADEXO	Mario Siles				

Cám. Agropec. de Cochabamba	Willy Soria
Cámara Nac. de Industrias	Alfredo Arana R.
Cám. Dept. de Indust./IDEA	Edgar Heredia H.
CEDESCO	Duane Anderson
CESAT	María Hilda Rodríguez
CIC	Tomás Báez Gerardo Wille
CIDRE	Antonio Stanbuk
CNS/Euroconsult	Jan Morrenhof
Consejo Regional de Semillas	Cintha Gutiérrez Guido Revollo
Cooperazione Internazionale	Elio Giroletti
CORDECO	Luis Coscio Severo España Mateo Kuipers José Polo N. Víctor Ricaldi Faustino Rico Toro
CORDECO/COTESU	Ing. Dfáz
DAI	Carlos Aliaga Wayne Hickey William McDowell Leonidas Vega
Dillman	Gustavo Luna Hugo Peña Roberto Peña
Experience, Inc.	Alfredo Alvarado Joseph López
FAO/IBTA	César Pérez René Schoenmaker

Fed. Empresarios. Privados	Enrique Levi Carlos Olmedo
FENACRE	Alberto Montero
FOTRAMA	Father Jerry Ziegendeist Sister Bearnice
GTZ	Gerben Gerbrandy
IMBOPIA	Marco Antonio Taboada
MACA	Lucio Arce
PDAR	René Caballero Humberto Cordillera José Decker Jaime Lima Candido Pastor Guillermina Quispe José Salinas Ing. Villagómez
PDAR/IDA	Carlos Pérez
PPI	Gonzalo Grossberger
Private Entrepreneur	Martha Escobar Edgar Heredia David Gutiérrez
Prog. de Cooperación Andina	Gabriel Loza T.
SEASA	Fernando Quiroga
SERVIFLOR	Ivannia Mata
UCF	Marcelo Prudencio
UMSS/Centro de Población	Carmen Ledo G.
UMSS/Sociología	Erwin Melgar O.
UNPD	Mathieu A. J. Kuipers

LA PAZ

USAID	Conrado Camacho Lucio Colque Gerald Fisher Humberto Gandarillas Ney López
Academ. Nacional de Ciencias	Carmen Miranda
ADP	Edgar Núñez
ADRA/OFASA	Armando Surcolento
AESA	Rodolfo Castillo
ASOBAN	Fernando Rollano
ASOBAN/Bco.Nac.	Fernando Calvo
ASOBAN/Bco.Sta. Cruz	Fernando Kempff
BCB	Susana Knaudt
IDB	Raúl Alberguchi
Bolivian Hardwood S.R.L.	Juan Carlos Paccieri
Bolsa de Valores	Martha Galicia Fernando Sánchez de Lozada Ernesto Wende
CAF	Arturo Castaños Alejandro MacLean
CARE	Chris Roesel
CEPB	Manuel Arana Carlos Calvo Johnny Nogales
CNI	Alfredo Arana Hugo Castellanos
Cons. Nac. de Semillas	Isabel Canedo R. Dexter A. Vargas
Consulting Engineer	Ricardo Ayala A.

CORDEPAZ	Jaime Sejas
COTESU	Carlos Carafa Thomas Zeller
Dutch Technical Mission	Jos M.M. Bult
EDAM	José Olazábal
Embassy of Germany	Rainer Willingshofer
FAO	Gerardo Lozano Tom Oomen Jan Karl Sorgdrager
FENACRE	Jorge Vargas
FIDA	Roberto Handry
HAM/GTZ	Rolando Lenz Egüez Enrique Fernández
INPEX	Oscar Farfan Jorge Iturry
JUNAC	Benjamín Grossman Gabriel Loza
LIDEMA	Mario Baudoin
MACA	David Montecinos Ismael Montes de Oca Gary Nava Hernán Zeballo
MACA/GTZ	Eberhard Goll
MACA/IBTA	Florencio Zambrana
MACA/WB/DHV	David de Vries
Management Systems Int'l	Roger Popper
MINPLAN	Mario Candia Rosario Casulich

Museo Nacional de Etnografía y Folklore	Hugo Daniel Ruiz
Peace Corps	Donald Peterson
PL-480	Jorge Noda
UNPD	Dr. Salzman
PPI	Raúl Garron José Daniel Kwasks Winston Pacheco
Private Entrepreneur	Richard North Reinout de Roover
Proassist	Carmen Torres Goitia Deborah Llewellyn
Robert Nathan Associates	Camilo Arenas Haim Duvshani René Urquidi
RONCO	Kamal Dow
SEASA	Luis Palenque
SNV	Jan Bartlema
SUBDESAL	Oswaldo Antesana Waldo Tellería Roxana Ybarnegaray de Paz
UCF	Waldo Dávalos Edgar Sanjinés
UNFDAC	Giovanni Quaglia
UNICEF/Proyectos de Mujeres	Yara Carafa
USAID	Jorge Calvo Deborah Carrol César Castellón Matt Cheney Ernesto García Jerry Harrison-Burns

Charles Hash
 David Jesse
 Robert Kramer
 David Lozano
 Darell M^oIntyre
 Luís Moreno
 Jaime Muñoz
 Julio Patino A.
 Tim Seims

World Bank

Matthew McMahon
 Fernando Mendoza

POTOSI

ACLO

Carlos Alarcón
 Marfa de Aliaga
 Jaime Bartrolli
 Hermán Garate

Cámara Agropecuaria

José Luís Claire
 Gustavo Dfáz
 Jaime Ocuña

CORDEPO

Eloy Cortez
 Germán Cupé
 Guillermo Estrada Vargas
 Lourdes López
 Rodolfo D. Torres

CORDEPO/PNUD
 Fund. Contra el Hambre

Jorge Córdoba
 Gerardo Wayar

PDAI

Rodolfo Castro

UCF

Juan Manuel Decormis

SANTA CRUZ

AGROROQUE

Elbio Rivera

ASOFRUT

José Arteaga
 Aurelio Echazú
 Ciro Montaña
 Selema de Serrate

Banco de la Unión

Jorge Arias

Banco de Santa Cruz	Alfonso Alvarez
Banco Nacional	Alfredo Otero
CADEX	Francisco Terceros
Cám. Nac. Forestal	Arturo Bowles
CARITAS	Alfonso Martinez
CDF	Juan Alberto Saavedra
Centro Menonita	Phil Bender
CIDAC/ARTECAMPO	Ada de Vaca
Cons. Regional de Semillas	Jorge Rosales
CIAT/British Ag. Mission	Penelope Davies James Johnson John V. Wilkins
CIAT	Alan Bojanic
CIC	Goran Marcovich José Velez
CIMAL	Cristóbal Roda Vaca
CIMCA	Christopher Druelf
CIPCA	Shigueru Matzusaki
CORDECRUZ/UPRA	Jaime Aguilera Carlos Cargo Carlos Moreno Mercedes Nostas Fernando Santiago Ricardo Tarabillo
CORDECRUZ/ASOFRUT	Jorge Aguilera B.
FAO/fertilizantes	Ernst E. Reynaert
Fed. Clubes de Madres	Katrin Linzer

FINDESA	Allan Kambell Karen Steinbach de Sacre
Grupo Indust. Miranda	Félix Miranda P.
IBCE	Carlos Roca
INE	Lic. Méndez Lic. Parada
Lodos y Servicios Bol. Ltd.	Ronald Aliaga M
MACA	Guillermo Moscoso M.
ONUDI/PNUD/PPI	Carlos Carrasco
Plantaciones Forestales	various
Private Entrepreneur	Waldo Aliaga Germán Antelo Hugo Antelo Jaime Arguedas Carlos González Julio Mendoza Mario Ortiz Mario Suárez Sergio Suárez Carlos Tarabillo Gonzalo Vargas
SEARPI	Raúl Roca Hans van Duijne
Univ. Gabriel René Moreno	Aura Teresa Barba
TARIJA	
ACLO	various
Asoc. San Jacinto	Román Jijema Carlos Torrico
Cámara Agropecuaria	Ricardo Baldivieso Jaime Ruiz
CARE	various

CODETAR		José Arciénaga E. Hugo R. Brun O. V́ctor F. Bustamante Ramón Colodro V. Gabriel Gaité U. Mario Lea Plaza Antonio Márquez Jaime Mendoza N. Carlos Rossel V́ctor A. Villarroel
Diputado		Arturo Liebers
FAO		Miguel Menéndez
MACA		Lorenzo Estrada Guillermo Moscoso
PERTT		Martín Gallardo
RONCO		Teresa D'Arlach Sergio Delgado
Serv. Nac. de Cert. Semillas		Ivar P. Garzón A.
SNDC		Lic. Antelo Eduardo Suárez Alfonso Vacaflorés
UCF		Iván Galarza
US Army Corps of Engineers		Scott Cottrell
OTHER		
Belgium	Private Entrepreneur	Jorge Martínez
Bolivia	USAID/Quito/Environ. Off.	Howard Clark
Chile	Private Entrepreneur	Luis Pérez Freire
Florida, USA	AgroFood	Herbert Fiss Rodrigo Valle
Florida, USA	Dole	Luis Claure