

PD/ARW-612 82
[SN-52813

UNCLASSIFIED

**UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523**

BOLIVIA

PROJECT PAPER

DISASTER RECOVERY

AID/LAC/P-167/1 (Amendment)

**Loan Number: 511-F-069
Project Number: 511-0581**

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
 C = Change
 D = Delete

Amendment Number

1

DOCUMENT CODE

3

2. COUNTRY/ENTITY

BOLIVIA

3. PROJECT NUMBER

511-0581

4. BUREAU/OFFICE

LAC

05

5. PROJECT TITLE (maximum 40 characters)

DISASTER RECOVERY

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
 1 | 2 | 3 | 1 | 8 | 5

7. ESTIMATED DATE OF OBLIGATION
 (Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY | 8 | 4

B. Quarter

C. Final FY | 8 | 4

8. COSTS (\$000 OR EQUIVALENT \$1 = \$52000)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
All Appropriated Total						
(Grant)	(7479)	(1521)	(9000)	(7479)	(1521)	(9000)
(Loan)	(8890)	(9110)	(18000)	(8423)	(9110)	(18000)
Other U.S.						
1.						
2.						
Host Country		11818	11818	-	11818	11818
Other Donor(s)						
TOTALS	16369	22449	38818	16369	22449	38818

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) 422(B)				9000	8000		10000	9000	18000
(2)									
(3)									
(4)									
TOTALS				9000	8000		10000	9000	18000

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE CODE

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code

B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

To help the GOB implement important elements of its emergency plan for recovery from the drought in the highlands and flooding in the southeastern area of the country.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY
 09 8 4 0 9 8 5

15. SOURCE/ORIGIN OF GOODS AND SERVICES

Grant Loan G&L
 000 941 Local Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a 42 page PP Amendment)

To add funding for importation of agricultural inputs, USAID Disaster Assistance Program support and additional costs of the infrastructure components of the project.

17. APPROVED BY

Signature
 David A. Cohen

Title
 Mission Director a.i.
 USAID/Bolivia

Date Signed

MM DD YY
 15 04 84

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

UNITED STATES AID MISSION to BOLIVIA
c/o American Embassy
La Paz, Bolivia

USAID - BOLIVIA
APO MIAMI 34032

Telephones: 350120, 350251
Casilla 673
La Paz, Bolivia

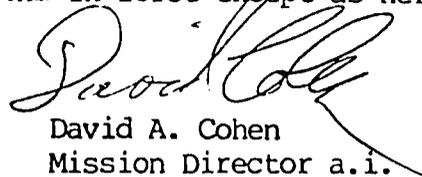
AMENDMENT No.1 TO PROJECT AUTHORIZATION

Name of Country:	Bolivia
Name of Project:	Disaster Recovery Project
Number of Project:	511-0581
Number of Loan:	511-F-069

1. Pursuant to Section 492b of the Foreign Assistance Act of 1961, as amended, the Disaster Recovery Project for Bolivia was authorized on October 11, 1983. That authorization is hereby amended by deleting the first sentence of paragraph 1 and substituting in lieu thereof the following sentence:

Pursuant to Section 492b of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Disaster Recovery Project for Bolivia (the "Cooperating Country") involving planned obligations of not to exceed \$18 million in loan funds and \$9 million in grant funds over a one-year period from date of authorization subject to the availability of funds in accordance with A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The authorization cited above remains in force except as hereby amended.


David A. Cohen
Mission Director a.i.

Date: 5/21/84

TABLE OF CONTENTS

I.	<u>SUMMARY</u>	1
II.	<u>PROJECT RATIONALE AND DESCRIPTION</u>	3
	A. Disaster Situation Update	3
	1. Overview of Effects of the Disasters	3
	2. AID and Other Donor Assistance	6
	3. Modifications to USAID's Overall Disaster Assistance Program	11
	B. Project Strategy	13
	C. Project Description	14
	1. Goal and Purpose	14
	2. Project Components	14
	3. Agricultural Input Subcomponent	15
	a. Need for Imported Agricultural Inputs	15
	b. Importation and Distribution	18
	c. Availability of Credit for Input Purchases	23
	d. Environmental Considerations	23
	e. Use of Peso Sales Proceeds	26
	4. Disaster Assistance Program Support	27
	5. Cost Increases for Infrastructure and Commodity Import Subcomponents of the Original Project	31
III.	<u>COST ESTIMATE AND FINANCIAL PLAN</u>	33
IV.	<u>IMPLEMENTATION PLAN</u>	35
	A. Revised Implementation Schedule	35
	B. Procurement Plan	37
	C. Evaluation Plan	38
	D. USAID Monitoring	38
V.	<u>PROJECT ANALYSES</u>	39
	A. Institutional Analysis	39
VI.	<u>CONDITIONS AND COVENANTS</u>	40
	<u>ANNEXES</u>	
	A. Letter of Request	
	B. 611(e) Determination	
	C. Environmental Assessment	

I. SUMMARY

The USAID Disaster Assistance Program, which has evolved over time in response to changing conditions, currently contains seven components:

- . OFDA Emergency Relief Assistance
- . PL 480 Food Distribution and Sales Programs
- . A Community-based Rural Recapitalization Program
- . PL 480 Title III Program Activities
- . Infrastructure Rehabilitation Activities
- . Commodity Import Activities
- . Disaster Assistance Program Support, including the Disaster Surveillance Data Collection System

The last three of these components are supported by the amended Disaster Recovery Project. The purpose of the project - to assist the GOB to implement important elements of its emergency plan for recovery from the drought in the highlands and flooding in the southeastern area of the country - remains the same. The proposed amendment will provide additional \$10 million, for a new total of \$27 million, which will be used to finance the importation of agricultural production inputs, operational support costs of USAID's Disaster Assistance Program, and additional costs of some of the project's infrastructure components. Proceeds from the sale of \$5.5 million in agricultural inputs to be imported under the project will be used to support development activities, with priority to be given to ones located in drought-affected regions in the altiplano, and local cost support of the USAID Disaster Assistance Program.

The agricultural inputs to be imported under the project include agro-chemicals (fungicides, herbicides and insecticides), veterinary medicines and supplies (parasite remedies, antibiotics, vaccines, vitamins and minerals, semen, syringes, etc.) and small farm machinery (backpack sprayers, water pumps). Five million dollars of the \$5.5 million budgeted for agricultural input imports will be used to finance imports of agro-chemicals. The agricultural inputs to be imported are currently in very short supply within Bolivia due to the country's shortage of foreign exchange. Supplies of these inputs in the altiplano are practically non-existent.

Given the fact that it will be necessary to import substitute agro-chemicals for very toxic ones traditionally used in Bolivia, and in view of the relatively poor agro-chemical handling and application practices prevalent in the country, the project amendment will also finance research, training and short-term technical assistance activities as part of an environmental protection program to promote the use of less toxic chemicals and safe handling and application procedures.

The support to be provided for the Mission's overall Disaster Assistance Program will cover the costs of personnel, regional offices, vehicles and equipment required to monitor implementation of USAID's food

distribution and sales programs, the Rural Recapitalization activity, and a Disaster Surveillance Data Collection System. This component of the project will be financed from both project funds and a portion of the proceeds from the sale of agricultural inputs.

Lastly, a \$2,053,000 is budgeted under the project amendment to finance additional costs of the project's infrastructure components - principally the rehabilitation of the Cochabamba-Santa Cruz Highway and the municipal water systems in Sucre and Potosí.

The USAID Project Development Team for the project amendment included:

Fred Adams III, Project Coordinator, Disaster Recovery Project
Oscar Antezana, Economist, USAID/DP
Robert J. Asselin, Jr., Chief, USAID/PD&I
Gary Bayer, Project Manager, USAID/RD
Donald Calvert, Crop Protection Specialist, Consortium for
International Crop Protection
Jorge Calvo, Agronomist, USAID/RD
David Cohen, Deputy Director, USAID/B
Carroll Collier, Pest Management Specialist, S&T/AGR
José Díaz, USAID/CONT
Ernesto García, USAID/PS
William Garvelink, Deputy Chief, USAID/DP
Thomas Geiger, Senior Regional Legal Advisor, USAID/Perú
Joe O. Hill, Jr., Controller, USAID/B
Lee R. Hougen, Chief, USAID/HHR
Katherine Jones-Patron, USAID/HHR
William G. Kaschak, Deputy Chief, USAID/PD&I
Roberto Leon de Vivero, Chief, USAID/DP
Michael Lofstrom, USAID/PD&I
John Rifenbark, Project Officer, USAID/RD
Robert V. Thurston, Chief, USAID/RD
Gustavo Vega, USAID/PS

II. PROJECT RATIONALE AND DESCRIPTION

A. Disaster Situation Update

1. Overview of the Effects of the Disasters

Beginning in March 1983, Bolivia experienced heavy rains and flooding in the Santa Cruz region and a prolonged drought on the altiplano. These natural disasters occurred in the midst of one of the worst economic and political crises in the country's history and added to the complexity of the economic problems facing the country's nascent democratic government. In 1983, the disasters alone cost the nation more than \$600 million in production losses and unanticipated foreign exchange expenditures. They also fueled political discontent as the government's inability to respond adequately to the country's worsening economic situation and the disasters became more apparent.

A flash flood of the Pirai River occurred on March 19, 1983. It devastated part of the city of Santa Cruz, destroying surrounding crop lands and washing away many of the region's roads and bridges. The flood caused the deaths of more than 100 people and left 16,000 city dwellers homeless. In the area surrounding Santa Cruz, more than 86,000 hectares of some of the nation's most productive agricultural lands were severely damaged or destroyed during the critical harvest period. A total of eight principal bridges were destroyed or damaged, and 123 kilometers of primary roads and 562 kilometers of secondary roads were rendered impassable. Losses attributable to the Santa Cruz flood, have been estimated at about \$80 million.

The 1983 drought in the highlands affected 380,000 square kilometers, or thirty-five percent of Bolivia's territory. The drought area encompassed eighty percent of the altiplano, seventy percent of the high valleys, and ten percent of the lowlands. The affected regions included sections of six of Bolivia's nine departments -- all of the Departments of Potosí and Oruro, and portions of the Departments of La Paz, Cochabamba, Chuquisaca and Tarija. Approximately 1.6 million rural inhabitants of these departments, or forty-eight percent of the rural population in those regions, have been affected. The majority of this population earn incomes of less than \$120 per year. Losses as a result of the drought have been estimated at \$580 million.

At the end of 1983, the Bolivian drought situation was not encouraging. Approximately one million drought-affected rural dwellers faced serious food shortages, although there were no quantifiable increases in human mortality. Year-long food shortages caused many highland farmers to consume higher than normal percentages of their seed stocks. The drought destroyed much of the altiplano's pasture lands and

eliminated traditional water supplies, reducing herds of llamas, alpacas, cattle, and sheep by fifty percent or more and livestock births by seventy percent. There was a general decapitalization of altiplano farmers as their seed supplies, food reserves, livestock, and cash were consumed at alarming rates as a result of drought-related losses and the need to purchase scarce and expensive food supplies. The loss of livestock and ground crops encouraged the migration of rural dwellers (up to thirty-five percent of the population in some areas) to Bolivia's cities or to tropical areas, such as the coca-producing Chapare, in search of employment.

Agricultural production from the 1983 harvest was at least sixty percent below normal. The data from the USAID/Bolivia sponsored "1983 Crop Production Estimate Study" identified disaster-related deficits in food (principally potatoes, corn and rice) exceeding 1,000,000 metric tons, of which 575,000 metric tons were in potatoes, the basic staple for low-income and subsistence farmer groups in the altiplano. As noted above, supplies of staples were scarce and expensive, and often unavailable in some of the remote drought-affected areas of the country. The importation of food to make up partially for production deficits diverted scarce foreign exchange from other uses critical to the nation's general economic recovery efforts.

The drought in the altiplano and in the high valleys continued into the early months of the normal 1983/1984 rainy season. Since early 1984, however, there have been heavy rains in the Department of Oruro, the southern portion of the Department of La Paz, and the northern part of the Department of Potosí. As a result, pasture lands are recovering and livestock herds are beginning to recuperate. Flooding, however, has damaged or destroyed some of the crops grown in these regions. Steady, but milder, rains have been experienced in the rest of the Departments of Potosí and La Paz and in the Departments of Cochabamba, Chuquisaca, and Tarija. These departments are major agricultural centers, and include the principal potato growing regions of the country. The rain has been beneficial to the crops which farmers planted in time. National agricultural production in potatoes may reach as high as eighty percent of normal, and production in other crops, such as quinoa, corn, barley, oats, and alfalfa, could be higher than average. In general, farmers in the poorer agricultural zones affected by the drought planted approximately twenty percent of their normal hectareage in potatoes and a slightly higher percentage in other crops. In the better agricultural areas, farmers planted about sixty percent of normal hectareage in potatoes, with a somewhat higher percentage in other crops. This below average planting resulted from the two-month delay in the onset of rains and shortages of seed.

Through a fortuitous convergence of circumstances, the reduced potato plantings may result in higher than average yields. Because of the reduced availability of native potato seeds in Bolivia, the IDB, FAO, and the Ministry of Rural Affairs and Agriculture (MACA)

financed the importation of seeds from Europe, Argentina and Chile. Contraband seeds from Argentina and Chile were also available. These seeds were improved, high yielding varieties. Fertilizers, which were applied to the fields last year and remained dormant because of the lack of rain, are now helping to increase yields per hectare. Furthermore, fields have been fallow for more than a year and contain more nutrients than normal. Under these circumstances, the recent rains have acted as the catalyst to create the potential for higher than usual yields of potatoes. Moreover, plantings of crops other than potatoes have increased as farmers, who did not plant potatoes but who were unwilling to leave their fields fallow for another year, planted crops with shorter growing cycles (e.g. corn, alfalfa, quinoa, oats). Higher than normal yields are expected in these commodities as well. In Santa Cruz, large harvests are anticipated in rice and corn, which will further help to alleviate the nation's overall food shortages.

There are, however, several caveats to this encouraging agricultural picture. The drought in the altiplano is a long-term economic catastrophe for the farmers of the region. Near normal harvests in 1984 will only begin the recovery process but will not complete it. The drought, combined with the nation's hyper-inflationary economy, have forced many farmers to spend their savings, assume large debts, and use up their food reserves. For many farmers, their limited investment capital was siphoned off early in the drought. It is estimated that a minimum of three years of normal or better than normal harvests will be required before these farmers can recoup their losses.

If the heavy rains continue throughout the altiplano agricultural zones, crops in the field may be ruined. The rains which began late last December enabled almost all farmers to plant at least part of what they normally plant. These rains have continued for three months, however, and are now causing crop damage and livestock deaths in the Departments of La Paz, Oruro, and Potosí. So far, the areas in the altiplano which have suffered damage are primarily livestock regions and marginal agricultural zones. If the rains persist, however, the important agricultural areas in the Departments of Cochabamba and Chuquisaca, and the potato regions in Potosí, will be damaged, and Bolivia could face another disastrous harvest.

Another concern regarding agricultural recovery in the altiplano is that many of this year's plantings were made with seeds from Argentina and Chile which were not adapted to the altiplano's weather conditions or pests, and yields may be affected. Thus, if plant infestations should occur, significant portions of the harvest could be destroyed, especially in view of the limited quantities of pesticides, fungicides, and herbicides available in the altiplano at this time.

2. AID and Other Donor Assistance

a. Other Donors

Assistance to Bolivia from other donors has been provided to the flood victims in Santa Cruz as well as to drought victims in the altiplano. Through the first half of 1983, donor pledges of assistance were slow in coming, especially for drought victims. Consequently, on August 10, 1983, the United Nations Secretary General issued an appeal for additional aid on behalf of Bolivia, Ecuador, and Peru. Pledges of assistance were made to help alleviate food deficits and to assist in Bolivia's recovery efforts. In general, however, actual donations have been slow in arriving and continue to be smaller than anticipated.

The latest United Nations report on emergency contributions to Bolivia indicates that \$7 million in emergency assistance has been provided to the Santa Cruz flood victims by thirteen nations (excluding the United States), the United Nations, the European Economic Community, and voluntary organizations. These donations have included shelter materials, food, boats, health and sanitation facilities, medicines and medical supplies, water pumps and water storage tanks, bridge construction and rehabilitation materials, and some cash. According to UNDR0 figures, some of the largest bilateral donors to the Santa Cruz victims, in addition to the U.S., are Argentina (\$1,580,000), Canada (\$699,186), Italy (\$604,166), France (\$474,000) and the Republic of Korea (\$424,000). The U.S. contribution for flood victims, excluding additional funds from the Disaster Recovery Project, will exceed \$15.6 million.

Assistance to the drought victims to date has totalled \$57.65 million from eleven nations (excluding the United States), the United Nations, the European Economic Community, the IDB, and private and public voluntary organizations. According to UNDR0 figures, the largest donations to the drought victims (in addition to those provided by the U.S.) include: shipments of wheat and kidney beans from Canada (\$8,130,000); \$5,829,300 from the United Nations, including the reactivation of an altiplano potable water project which had been suspended for some time; water pumps, storage tanks, medicines and food commodities from Germany (\$1,040,943); technical assistance in irrigation from Sweden in support of an existing United Nations project (\$848,311); wheat flour and medicines from the European Economic Community (\$726,273); and equipment, powdered milk and water pumps from Switzerland (\$633,385). U.S. drought-related contributions including funds from the original Disaster Recovery Project, will exceed \$33.2 million.

Longer-term disaster recovery assistance is being provided to Bolivia by the Inter-American Bank (IDB) and the Government of Japan. Through a \$37.5 million loan, the IDB is (1) supplying seeds

(\$11.1 million), fertilizers and pesticides (\$5.0 million), and small amounts of other agricultural inputs (\$2.2 million), and (2) financing the repaving of Santa Cruz and Cochabamba road (\$7.0 million) and the rehabilitation of secondary roads (\$5.3 million) in the Santa Cruz area.* The Japanese are supplying the GOB with \$2 million in fertilizers and \$250,000 in pesticides. These items are regular portions of an ongoing project with the Ministry of Campesino Affairs and Agriculture (MACA). Because of the drought, however, the commodities to be imported are being directed solely to altiplano drought victims rather than being used for general distribution throughout Bolivia.

b. AID Assistance

USAID's comprehensive Disaster Assistance Program initially included (a) emergency OFDA-financed assistance to relieve human suffering, (b) additional donations and sales of PL 480 foodstuffs, (c) \$3.5 million of reprogrammed Title III Program funds for the local purchase of agricultural inputs, credit, and construction of mini-irrigation systems, and (d) infrastructure rehabilitation and commodity imports (fertilizers and medicines) financed by the Disaster Recovery Project. The status of these initial Program components is given below.

(1) Initial Responses

In March 1983 when the flash flood struck Santa Cruz, and later in April 1983 when the effects of the drought in the altiplano became evident, USAID (a) obtained \$76,000 in OFDA funds for emergency humanitarian relief activities in Santa Cruz and the altiplano, (b) called upon the Title II voluntary agencies to reprogram food to disaster victims from their regular program inventories to meet immediate needs, and (c) agreed with the GOB to reprogram a portion of available Title III Program resources for victims of the disasters. In the first weeks following the flood and the recognition of the severity of the drought, the Title II voluntary agencies provided almost 20,000 metric tons (\$10.2 million) of food commodities to disaster victims out of their existing inventories. Title III proceeds totalling \$3.5 million were reprogrammed under existing subprojects for seeds, fertilizers, mini-irrigation systems, and credit for small farmers in severely affected areas. Since May 1983, an additional \$6 million has been reprogrammed for these same inputs to continue assisting these struggling small farmers.

* Administrative costs, technical assistance, and contingencies increase the loan total to \$37.5 million.

(2) Food Aid

The Mission has designed a three-pronged food assistance response to the Bolivian disaster situation. Through its regular PL 480 Title II voluntary programs, the Mission has targetted food assistance to residents of the altiplano who have neither the resources to purchase food nor access to the commodities themselves. Through a special allotment of rice under the PL 480 Title III Program, an urban rice sales program was designed to stabilize prices and supply exhausted urban markets. Lastly, through a PL 480 Title II rural sales program, rice is being sold in those areas of the altiplano where people have financial resources to purchase food but do not have access to the commodities. These three food distribution and sales programs complement each other and supply food to the most at-risk populations in the rural and urban areas affected by the flood and drought.

(a) Emergency Title II Food Distribution

In cooperation with the Title II voluntary agencies which reponded immediately to the disasters in March, USAID also designed a medium-term emergency food distribution program. Each of the voluntary agencies agreed to expand its programs in drought areas. Under the new emergency program, 26,820 metric tons were brought into Bolivia. Food for the Hungry, Catholic Relief Services, and the National Community Development Service are responsible for distributing these commodities.

(b) Title III Urban Rice Sales

To complement Title II programs in rural areas, Title III rice was sold in the nation's urban centers to attempt to minimize the food shortfalls there. Through the emergency Title III program, the Mission imported an additional 31,000 metric tons of wheat (\$5.0 million) and 27,000 metric tons of rice (\$8.8 million) in response to the disaster situation. The rice was sold by the GOB's National Rice Board (ENA) to individuals and associations located in and near the capitals of the six affected departments. The proceeds from these sales are being used (a) to finance the operating expenses of ENA, (b) to underwrite the operating expenses of the expanded Title II emergency food distribution programs, and (c) to fund selected rural development projects.

(c) Title II Rural Rice Sales

In addition to the Title II food that is being distributed free in the rural areas, there is also a monetized Title II program through which rice is sold in rural areas where it is determined that inhabitants have sufficient resources to purchase rice but limited access to the commodity. The rural rice sales program is currently selling 15,000 metric tons of rice to rural families and residents of provincial capitals in the six drought-affected departments of Bolivia.

The program is designed to reach more than 570,000 families. The peso proceeds from these sales are being deposited into a special account in the Central Bank and will be used to finance a Rural Recapitalization Program (see below).

The rural rice sales program was purposely organized to be implemented by rural communities and their representatives rather than by the National Rice Board so that sales could be effected quickly and fairly. The Program functions through six departmental committees which have general responsibility for overseeing rice purchases by citizens of rural communities. Each committee consists of representatives of three to five private or public sector institutions with experience in food assistance programs. Officials of the Confederación Unica de Trabajadores Campesinos participate in the committees as observers. The committees meet as often as necessary and are responsible for (1) setting policies for the sale of rice, (2) monitoring certification of purchase requests from participating communities and groups, (3) resolving conflicts concerning rice purchase requests as they arise, and (4) recruiting and training staff to carry out program activities.

Rural communities interested in purchasing the rice hold general assemblies and all community members wishing to purchase a 50 pound bag of rice contribute \$b 13,000 in cash and sign their name or place their fingerprint on an acta de compra. The group elects one to three persons to carry out the purchase for the community and places their names and signatures on the document. The community leaders with purchase responsibility take the acta and the cash to the nearest central sindical for certification. If a purchase group is not organized within a syndicate structure, it takes its acta to the provincial authorities for certification. Following certification, the purchasers travel to the office of the departmental committee to request their rice. At the departmental office, each request is reviewed for accuracy, adequate certification, and signatures. The community name and stamp is checked against the register of previously approved purchases for that province. If it is a first-time purchase, the community name, number of families, and total purchase is recorded. The amount of the purchase is subtracted from the existing balance of the rice quota assigned to that province. If the rice quota has already been exhausted, the would-be purchasing group is not permitted to purchase rice.

The rural rice sales program began operating in March and has met with great success in rural areas where the affected population has been very satisfied with the ease and fairness of the sales system.

(3) Disaster Recovery Project

The Disaster Recovery Project was originally designed with four components: (1) rehabilitation of the Santa Cruz-Cochabamba

highway (including the ninety-meter Tarumá Bridge and four smaller spans); (2) installation of potable water and small-scale irrigation systems in the altiplano; (3) importation and distribution of fertilizers for small altiplano farmers; and (4) importation and distribution of medicines to affected rural areas.

The highway construction component is on schedule despite the fact that construction of the Tarumá Bridge had to be delayed until after the current rainy season. Only one local company bid on the bridge construction contract, and an acceptable contract could not be negotiated with that firm. A slide stabilization/riverway protection expert is currently assisting the National Road Service to finalize construction plans for the highway and the Tarumá Bridge. This component's two long-term advisors have been recruited and will arrive before construction activity starts. Excess property equipment and a stock of spare parts have also been ordered.

Under a Cooperative Agreement with CARE for the construction of small potable water and irrigation systems in the altiplano, a large shipment of construction materials is currently being delivered. Twelve potable water systems have been constructed and 29 were under construction as of March 1, using materials borrowed from CARE's regular program. CARE's small-scale irrigation activities will accelerate as soon as this year's rains stop. One system is already completed and two are being constructed.

Equipment lists and IFBs for the water authority in Potosí and the Departmental Development Corporations (DDCs) in Oruro, Cochabamba and Chuquisaca have been finalized, following notification that excess property equipment previously contemplated would not be available. A contract to complete the design of the Sucre municipal water system will soon be signed. This follows protracted discussion with the local water authorities on the system's requirements.

All project-financed fertilizer was purchased and delivered to the twelve participating cooperatives in time to begin sales during the current cropping season. The cooperatives have sold fertilizer valued at more than ten million pesos so far, and the rest will be sold during the remainder of this calendar year.

Under the medicine distribution component of the project, a consultant assisted the Ministry of Health to design a special distribution system and to complete the list of medicines to be imported. A decision on the method of medicine procurement will be made by the end of April. Bid documents for the purchase of vehicles and equipment have been prepared and will be issued shortly.

In addition to the progress achieved on each of the Disaster Recovery Project's components to date, a Project Coordination Unit has been set up in offices close to the Mission, and the Project Coordinator arrived to begin work in late January.

3. Modifications to USAID's Overall Disaster Assistance Program

In late November and December 1983, disaster relief specialist Robert Gersony was contracted by USAID/Bolivia to assess the disaster situation and to recommend to the Mission ways to make the disaster program more efficient and more responsive to the country's needs. Mr. Gersony's report provided USAID with forty-seven recommendations. The most important ones were: (1) to expand the number of individuals in La Paz and in the field directly involved in the administration of the Mission's food distribution programs; (2) to create a data collection system which would monitor the status of recovery from the drought and its impact on the inhabitants of the affected areas; (3) to establish a program to recapitalize altiplano farmers affected by the drought; and (4) to focus the distribution of Title II voluntary agency emergency food donations and Title II rice sales to rural drought regions most in need of assistance. How the Mission is implementing these recommendations is explained below.

Under the Disaster Recovery Project, a Coordination Unit was established to supervise the implementation of the highway rehabilitation, potable water, irrigation, and commodity import components of the project. This Unit was created because of the deficient capacity of the GOB to coordinate AID project assistance being administered by several Bolivian entities. As a result of the Gersony evaluation, USAID decided to expand the size of its staff involved in the administration of PL 480 food distribution and sales programs. The Mission has contracted a long-term Disaster Food Program Coordinator and is stationing four food inspectors in the field where they can directly supervise the PL 480 Title II rural rice sales program and monitor the Title II voluntary agencies' emergency programs. In addition, two auditors are being employed to review the accounting procedures of, and perform end-use checks on, the organizations cooperating with the Mission in carrying out food distribution programs and other disaster-related efforts.

The Mission is also in the initial stages of creating a Disaster Surveillance Data Collection System (DSDCS) in the six departments which have been affected by the drought. The System will collect data on health, agronomic, economic, social, migration, meteorological, and transportation trends in order to monitor the status of recovery from the drought and the conditions of persons living in drought-affected regions. (See section IIC4 for a more detailed explanation of the DSDCS.)

Following another of Gersony's recommendations, USAID, in cooperation with the voluntary agencies involved in the Title II Program, undertook a reprogramming exercise to target remaining emergency food commodities to those provinces not adequately covered to date. The reprogramming exercise documented the distribution of food by each entity, province, and department covered. The results showed that while

all of the affected provinces had received food, distribution had been concentrated more in some provinces than in others. Rural residents closer to departmental capitals, with more experience in dealing with bureaucracies, received a disproportionate amount of food, while rural residents, who needed assistance more urgently and lived in remote villages, received less. USAID and the voluntary agencies agreed to establish a more equitable distribution system so that the provinces which had already received relatively more food would receive no further assistance. A quota system has been established for the most under-served provinces, assuring that each receives food allotments according to its affected population and need. In addition to this reprogramming, the special program for the sale of Title II rice in rural areas described in the last section was initiated.

The proceeds from the Mission's Title II rural rice sales program will be used to establish a Rural Recapitalization Program in the altiplano. The purpose of this activity is to create a system to finance rural community investments, on an individual or collective basis, to recapitalize the economies of drought-affected regions. The program will inject badly needed capital into the regions of the altiplano which have been most severely decapitalized by the drought.

Over 700 rural villages will be reached by this program. They will be selected from sixteen provinces in the Departments of La Paz and Potosí. The program is scheduled to establish 150 community credit systems per month in the first four months of operation (June - September, 1984), during which about ninety percent of the program's \$2 million in sales proceeds will be disbursed.

Under the Rural Recapitalization Program, participating communities will be eligible for a loan in Bolivian pesos roughly equivalent to \$50 for each resident household. The loan will capitalize "community revolving funds." These revolving funds will be managed by three-person committees elected by the general assembly of each community. Each community's funds will be lent out to community members once per year. How the funds are spent will be a community decision. If the resources are to be used for loans to individual families, each borrower will receive a cash loan whose value is stated in terms of physical commodities. Loans will have to be repaid in-kind. Payment in kind will insure communities' revolving funds against losses due to inflation. Borrowers will also pay a small amount of interest, also in-kind, back to the overall Program's fund. These interest payments will be used by the Program to create revolving funds in other communities. Utilizing these resources, the Program will meet its administrative expenses and be able to add new communities each year until a final coverage of 700 communities, or 43,000 rural households, is attained.

If a community decides to invest its funds in a collective project, the repayment obligations will remain unchanged. Each family will still repay a quantity of produce or livestock to replenish its

community's fund and pay interest to the overall Program at year's end. The resources of each community's revolving fund will thus be used and replenished year after year. Each year, each community will continue to decide how it wishes to use its fund for further projects. Communities will be free to capitalize their funds further through additional quotas levied on residents, profits from marketing produce, or additional borrowing from outside sources.*

The remainder of this Project Paper Amendment outlines how the Disaster Recovery Project is being modified to complement and support existing activities under the Mission's overall Disaster Assistance Program.

B. Project Strategy

The proposed project amendment fully conforms with USAID/Bolivia's CDSS and will provide additional, urgently required support for the Mission's comprehensive Disaster Assistance Program.

Assisting Bolivia to respond to the combined natural disaster of drought in the altiplano and flooding in the southeast is a major element of USAID/Bolivia's assistance strategy. In accordance with this strategy, USAID is providing significant additional assistance to respond to the current economic crisis and natural disasters in the short and medium term while also focusing longer term assistance efforts in the La Paz-Cochabamba-Santa Cruz development corridor.

USAID's Disaster Assistance Program has evolved over time as conditions have warranted. Initially, efforts focused on Bolivia's most immediate needs, beginning with emergency assistance provided to the homeless and additional donations of PL 480 Title II and Title III food to meet supply shortages. Programs to assist with the economic recovery from the disasters were also begun immediately by re-focusing activities

* Initial field tests of the scheme in more than a dozen rural villages in highland Bolivia have proven successful. In the Department of Potosi, for example, the community of Karojo received a revolving fund capitalized at \$1,440,000, the equivalent of 120 quintals of potatoes or \$48 per resident family. Each family agreed to contribute two quintals of potatoes per year for five years to the Fund and to pay interest payments of two arrobas (50 pounds) every year for five years. The community decided to use its fund collectively and has begun to construct a weaving workshop for village women. This activity is designed to increase the cash resources available to the community's families. In the Department of La Paz, the village of Killay Belen received \$1,488,000 valued at 124 quintals of potatoes, or \$48 for each of its 62 families. In its general assembly meeting, the community residents agreed to pay two quintals to their fund and one arroba of interest for five years. This community decided to use its fund to capitalize a consumer cooperative.

under the PL 480 Title III Program. The Disaster Recovery Project was signed last October, and efforts since then have focused primarily on rehabilitation activities. Work has begun under the project to rehabilitate and construct vitally needed infrastructure in disaster-affected regions; fertilizers were imported for the 1983-84 crop season, and a system to supply scarce medicines to affected regions is being established.

The proposed amendment will provide additional financing for the Mission's expanded Disaster Assistance Program. Funds will be provided for another key recovery requirement - the importation of agro-chemicals, veterinary supplies, small pumps and portable sprayers needed by Bolivia's farmers to continue their efforts to recover from last year's disaster-related losses and to restore Bolivia to self-sufficiency in key food commodities. The amendment will also finance personnel and other support costs necessary to administer USAID's expanded Disaster Assistance Program, particularly food sales and distribution, and the Disaster Surveillance Data Collection System. Lastly, additional funding needed to complete the Project's current infrastructure components is also included.

The amended project is an indispensable element of USAID's current Disaster Assistance Program, which now includes seven inter-related components. The components of the full Disaster Assistance Program are: OFDA-financed emergency assistance; PL 480 food distribution and sales; PL 480 Title III Program activities; community-based recapitalization projects; infrastructure rehabilitation; commodity imports; and Disaster Assistance Program Support, including the Disaster Surveillance Data Collection System (DSDCS). The project, as amended, provides direct financing for the latter three components of the Program. In addition, the GOB has agreed to use the equivalent of \$1 million from the proceeds of the sale of the agricultural inputs to be financed under this project amendment to finance local administrative and support costs of the Program.

C. Project Description

1. Goal and Purpose

The project's goal and purpose remain unchanged. The goal is to assist Bolivia to respond to recent natural disasters and return to a self-sufficient status in the food commodities it traditionally produces. The purpose is to help the GOB implement important elements of its emergency plan for recovery from the drought in the highlands and flooding in the southeastern area of the country.

2. Project Components

The revised Project has three major components:

Infrastructure Construction and Rehabilitation

- . Rehabilitation of the Cochabamba-Santa Cruz Highway and associated bridges
- . Rehabilitation of the potable water systems in the cities of Potosí and Sucre
- . Construction of rural potable water systems in the altiplano
- . Construction of small-scale irrigation activities in the altiplano

Commodity Importation and Distribution

- . Fertilizers
- . Medicines
- . Agro-chemicals and other agricultural inputs*

Disaster Assistance Program Support

- . Project Coordination Unit
- . Support for USAID food distribution and rural recapitabilization activities*
- . Disaster Surveillance Data Collection System*

3. Agricultural Input Subcomponent

a. The Need for Imported Agricultural Inputs

This amendment will provide foreign exchange for the importation of three categories of agricultural inputs: agro-chemicals (fungicides, herbicides and insecticides), veterinary medicines and supplies (parasite remedies, antibiotics, vaccines, vitamins and minerals, semen, syringes, etc.); and small farm machinery (backpack sprayers, water pumps).

(1) Agro-chemical and Veterinary Supply Use in Bolivia

Normally, about 65 percent of all agro-chemical imports are used by farmers in the Santa Cruz region. About two-thirds of all imports are made directly by farmer associations through

* New subcomponents

commercial importers. The remaining one-third is imported by commercial importers themselves for sale from stock through their own distribution networks. Most altiplano farmers purchase their inputs as individuals from commercial distribution outlets.

Due to the extreme shortage of foreign exchange during the past two years, legal imports of agro-chemicals have dropped significantly. Contraband imports - mostly from Brazil - are estimated to supply 50 percent of the agro-chemicals currently being used by Santa Cruz farmers. However, agro-chemicals are practically non-existent in the altiplano. Representative farmers and farmer association leaders in the region interviewed during the intensive review unanimously expressed concern over the plight of their current crops should they encounter problems for which they normally would apply agro-chemicals. Although the use of agro-chemicals on a preventative basis has declined dramatically, all farmers interviewed said they would pay the higher prices now necessary to purchase agro-chemicals needed to protect their crops, if only they were available.

Historically, agro-chemical use has been highest in Santa Cruz Department. Within Santa Cruz, the crops on which the greatest volume of the agro-chemicals are used are rice, corn, sugarcane, soybeans, fruits and vegetables. Beef cattle require the bulk of imported veterinary products. Over 90 percent of the producers of these crops and livestock are small farmers. In the valleys and highlands, the crops accounting for the bulk of agro-chemicals use are potatoes, corn, other vegetables and fruits. While a lower percentage of highland and valley farmers apply agro-chemicals than is the case with Santa Cruz farmers, the absolute number of agro-chemical users in the highland and valley areas is greater, taking into account the substantial number of potato growers who apply at least some agro-chemical products. Figures on pesticide use taken from surveys of the agricultural areas of Bolivia* indicate that over 80,000 small potato farmers in the highland and valley areas regularly apply agro-chemicals (other than fertilizers) on at least part of their potato acreage.

* An Analysis of the Variables that Affect the Economic Behavior of Farm Households in the Southern Valley Area of Bolivia. Farm Policy Study, Analytical Document No. 1B, Hyde Van de Wetering, Contract AID SOD/PDC/-C-219, 1981, and Sinopsis Estadística, Datos Socioeconómicos para Areas Seleccionadas de Bolivia, Agency for International Development, Ministry of Rural Affairs and Agriculture (MACA), 1982.

Dairy farmers in particular, as well as some swine, sheep, alpaca and llama producers, use veterinary products. Interviews conducted with selected commercial houses and farmer organizations in traditional growing areas showed that there is a strong demand for the importation of agro-chemicals for the 1984-85 cropping cycles and for veterinary products. These organizations have first-hand knowledge of farmers' needs and their ability to purchase the required inputs.

(2) Recent Import Figures and Determination of Amounts of Agricultural Inputs to be Financed.

As shown in the table below, the combined average annual demand for agro-chemicals and veterinary products between 1978 and 1981 was about \$7.0 million (77 percent agro-chemicals and 23 percent veterinary products). Because of foreign exchange scarcity, imports of agro-chemicals fell sharply to about \$2 million in 1982. Similarly, imports of veterinary products dropped to \$605,000 in 1982. Compared with the value of the combined four-year average (1978-1981) for both categories of imports, only 35 percent of the normally required agro-chemicals and 47 percent of the normally required veterinary supplies were legally imported in 1982. Figures for 1983 are not available, but it is generally believed that imports of the agricultural inputs in question declined further.

Imports of Inputs for Agriculture; Bolivia

	<u>1978-1983 (U.S. \$000)</u>				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
<u>Veterinary Products</u>	1,350	1,266	995	1,533	605
(1978-1981 av.=1,286)					
<u>Agro-chemicals</u>	5,850	5,775	4,469	6,808	1,983
(1978-1981 av.=5,725)					

As a consequence of the dramatic decline in foreign exchange available for financing agricultural input importations, contraband imports have increased markedly. Most contraband products enter the market through non-conventional, small-scale dealers. Products introduced in this fashion, according to farmer sources, are frequently cheaper although of suspect quality. They are not generally perceived as desirable substitutes for the better known commercial brands handled under normal circumstances. It is very difficult, with such a high proportion of contraband imports, to estimate the current total volume of agro-chemical and veterinary supply use in Bolivia. Contraband imports are large but have not made up for the volume of legal imports not made due to shortages of GOB-provided foreign exchange. This is because a) the rise in the peso prices for imported inputs has had an effect on

demand, and b) farmers in the highland and valley areas of Bolivia have had practically no access to contraband imports. It is informally estimated that the total legal and contraband imports of agro-chemicals and veterinary supplies in 1983 were \$4 million and \$800,000 respectively. With only this much available, farmers in the altiplano and high valleys could not be supplied.

Based on the above figures and discussions with farmer associations and importers, USAID has decided to reserve \$5 million for the importation of agro-chemicals under the project for the 1984/1985 cropping seasons, and \$400,000 for the importation of veterinary supplies. The IDB and the Government of Japan plan to finance inputs of pesticides valued at \$750,000 for the 1984/85 cropping season. The IDB-financed imports (\$500,000) will be used exclusively in the potato production program it is financing. The Japanese-financed imports will be sold by the Bolivian Agricultural Bank. This will bring the total available for agro-chemical imports for the 1984/85 cropping season to \$5.75 million, an amount which is very close to average annual imports between 1978 and 1981 and 17 percent less than imports during the last "normal" year of 1981. The \$400,000 reserved for imports of veterinary supplies will finance about 30 percent of "normal" imports of these items. It has been decided to limit AID-financed imports of agro-chemicals and veterinary supplies to the levels indicated above to prevent oversupplying the Bolivian market and causing possible contraband export problems and because of the fact that AID will require the substitution of more environmentally safe agro-chemicals for some very toxic chemicals currently in use in Bolivia.

With regard to the dollar demand for backpack sprayers and small water pumps, reliable import figures are not available. Commercial importers and farmer associations contacted during the intensive review indicated that a significant market exists for these items. Since these implements are currently in very short supply, and are needed by disaster affected farmers, \$100,000 has been budgeted to help meet this shortfall. Imports of these items will be financed only for farmer associations for sale to their members, and not for dealer inventories.

b. Importation and Distribution

(1) Use of Normal Commercial Channels. The importation and distribution of AID-financed agricultural inputs will be carried out using normal commercial practices prevalent in Bolivia. Imports of agro-chemicals and veterinary supplies will be financed for both commercial importers for sale through their own distribution channels and for farmer associations for sale to their members. Commercial importers will be allowed to import agro-chemicals for their own distribution and sale only for altiplano areas, where farmers depend primarily on such channels for their agro-chemical needs. In the Santa Cruz area, sales of agro-chemicals through farmer associations can adequately supply the market. The importation of pumps and sprayers will be restricted to

farmers associations, anywhere in Bolivia, whose members have a special need for such items and have difficulty purchasing them commercially.

Project-funded assistance in purchasing and distribution will be provided to those farmer organizations in the altiplano and elsewhere which have had limited experience with importation of agricultural inputs. Normal market forces will determine the amounts and types of inputs ordered, and normal commercial channels will be used for importation and sales. Adjustments will be made only as needed to ensure that (1) altiplano farmers receive inputs, (2) the importation of highly toxic chemicals is avoided for environmental and safety reasons, and (3) agricultural inputs are purchased in accordance with AID Regulation and only from authorized Code 941 sources.

To ensure that drought-affected altiplano farmers receive inputs financed under the project, which could not be guaranteed if commercial importers and farmer organizations in the Santa Cruz area were left entirely free to use AID-provided foreign exchange to finance whatever amount of imports they desired, 40 percent of the funds made available by AID will be reserved initially for sales in the altiplano. These sales will be made both through selected farmer associations which have the capability to manage direct imports, and through sales from stock by commercial importers which have distribution systems in the altiplano. The forty percent figure is slightly higher than the normal proportion of legal agricultural input imports for the altiplano. It has been set higher in order to ensure that the altiplano receives needed inputs.

The restrictions regarding the types of agro-chemicals eligible for importation under the project arise from the environmental impact assessment carried out during the intensive review. A list of eligible chemicals useful for problems encountered in Bolivia was prepared. Many of these chemicals will have to be substituted for other more dangerous ones currently being used. This subject is discussed more fully in Section IIC 3d below.

The final departure from current commercial practices in Bolivia concerns the necessity to follow the importation rules outlined in AID Regulation 1 and to purchase only from Code 941 sources. These rules will be fully explained in instructions to be prepared for eligible commercial importers and farmer associations.

(2) Use of the Official Exchange Rate

USAID has carefully considered the issue of whether the sale of imported agricultural inputs should occur at the official exchange rate or the parallel market rate, which is currently about 60 percent above official rate (3200 versus official rate of 2000). The Mission would naturally prefer that the discrepancy between the official and market exchange rates did not exist because of (a) the economic subsidy often provided to Bolivian farmers, (b) the likelihood of

windfall profits for importers (whether commercial houses or farmer organizations) or farmers who receive products at subsidized prices and then resell them, and (c) the possibility of stockpiling or **contraband** sales outside of Bolivia. Therefore, during the intensive review, USAID considered trying to get the GOB to impose a surcharge to capture the difference between the official and parallel market exchange rates. It was concluded that asking the Government, in effect, to ignore the legal official exchange rate for one category of imports on a one-time basis would not be acceptable politically, no matter how much economic sense it would make. On April 13, the new cabinet of President Siles took a series of important economic measures to address problems which the Government had been debating for several months. Included in the measures was a devaluation from 500 to 2000 to the dollar. The Government also made it clear that the April 13 measures were first steps in a series of actions (including further devaluations when necessary) that the reconstituted cabinet of President Siles intends to take to put the economy on its feet again gradually. It appears at this time, based on the severity of the measures recently taken, that the new cabinet will make the tough decisions previous Siles cabinets avoided. If it does, the difference between the official and parallel exchange rates should not again reach the exaggerated levels (up to 600%) experienced just prior to the April 13 measures. Given the new cabinet's apparent determination to address the country's economic problems and the urgency of assisting with the continued recovery from last year's natural disasters, it has been decided to proceed with the agricultural input component of the project at the official exchange rate, taking certain measures to mitigate its possible negative effects.

To deal with the windfall profits issue, commercial importers who request project-funded imports for sale through their own distribution channels will be required to submit proposals for price mark-ups, based on the official exchange rate, prior to approval of import transactions by USAID. The location and prices for their sales will be audited, and, if it is found that either inputs have been sold outside the altiplano or at markings higher than those agreed to with USAID, appropriate steps to recuperate AID funds will be taken. Farmer associations will be allowed to price the inputs they purchase in accordance with their existing policies. Any windfall profits farmer associations generate from sales will be used to finance activities to improve or expand services which benefit their members. The types of activities to be undertaken will be approved by USAID when the importation is approved. Farmer associations will also be audited. As for possible contraband sales outside Bolivia, contraband export of agro-chemicals and other agricultural inputs imported into Bolivia at the official exchange rate has not yet been a problem because the domestic market is undersupplied. (In fact, contraband agro-chemicals flow into rather than out of Bolivia.) USAID has fixed the amount of imports it will finance so as not to flood the market and provide incentives for stockpiling or contraband sale outside of the country.

(3) Importation Procedures

In order to participate in the project, commercial

importers must meet the following eligibility criteria:

- . Have been actively involved in importing and distributing agricultural chemicals or veterinary supplies within last three years.
- . Be an established, financially sound commercial firm with contacts with overseas suppliers.
- . Possess a distribution system, or plan for distribution.
- . Submit a price mark-up proposal which is acceptable to USAID and agree to be audited.
- . Be capable of meeting agro-chemical packaging requirements.

Farmer associations wishing to import under the project must meet the following eligibility criteria:

- . Represent farmers producing agricultural foodstuffs (e.g. potatoes, vegetables, rice, sugarcane, wheat, barley, fruit) or raising livestock.
- . Possess the agriculture extension infrastructure and capability to organize, or participate in, agro-chemical training programs.
- . Have sufficient capital, or the capability to obtain credit, to purchase the inputs.
- . Possess adequate administrative capabilities.
- . Present a proposal regarding the pricing of inputs imported and the use of any profits for activities benefitting members.

Farmer associations which currently meet the above criteria are:

- . Cámara Agropecuaria del Oriente
- . Integral Agricultural Cooperative Cochabamba, Limited
- . Integral Agricultural Cooperative Santa Cruz North, Limited
- . Integral Agricultural Cooperative Gran Chaco.

- . Agrocentral, Sucre.
- . Cámara Agropecuaria de Potosí
- . San Jose Integral Cooperative in Monteagudo
- . COINCA Cooperatives in Potosí, Sucre and Tarija
- . Cámara Agropecuaria de Potosí

Other farmer associations which meet the above criteria will also be allowed to participate in the project. Associations which require assistance with the administration of their importation and sales programs will receive help from a project-funded administrative advisor who will coordinate the agricultural input program under the supervision of USAID's Project Coordinator. A Bolivian resident familiar with agricultural input marketing and farmer associations will be hired for twelve months for this purpose.

Farmer associations and commercial importers eligible to participate in the project will undertake their customary market investigations to determine the amounts, types, and timing of agricultural inputs required. Participating importers will present their requests for foreign exchange for specific importations to USAID/Bolivia, whether the imports are for direct sale to a farmer organization or for sale from their own stock. Requests to import for farmer associations will have to include appropriate documentation from the farmer associations verifying the order. Requests to import for sales from stock will have to include a plan for distributing and selling the inputs requested.

GOB law permits imports financed by donor governments to be approved in accordance with project agreements without case-by-case clearance by the Bolivian Exchange Control Commission. To ensure both expeditious handling of requests received from importers and adequate control to guarantee that approved importations meet project objectives, USAID and the Ministry of Planning and Coordination will control the allocation of project dollars for agricultural input imports by reviewing and approving each importation request. Following approval of each request, the importer (whether a commercial firm or a farmer association) will be requested to deposit the peso equivalent of the foreign exchange required (at the official rate of exchange on the day the deposit is made) in a special account of the Executive Secretariat of the PL 480 Title III Program, which will manage expenditures of peso sales proceeds for agreed uses (see Section IIC.3.e. below). AID will then issue a direct letter of commitment to the appropriate overseas supplier. From this point forward, normal commercial practices regarding shipment, customs clearance, delivery and sale will be followed. In cases of importation of agro-chemicals, the commercial importer for whom or through whom the transaction is being carried out will be responsible for obtaining the approval of the MACA Division of Sanidad Vegetal for

the importation of the chemicals requested. Project-funded audits of sales by commercial importers and farmer associations will be carried out during and after the sales take place.

c. Availability of Credit for Input Purchases

The importers of agricultural inputs, whether farmer associations or a commercial firms, will have to finance purchases in advance of shipment, since USAID/Bolivia will require the deposit of pesos before it issues its L/Coms. Commercial firms will finance their purchases with loans from their Bolivian banks. Farmer associations will either borrow from their banks or collect payment in advance from their members.

To purchase the inputs imported under the project, individual farmers will either use their own resources (which should be more possible than appeared would be the case a few months ago as a result of this year's partial agricultural recovery) or borrow from informal or formal sources. The main formal sources of credit will be commercial banks, using the Central Bank's rediscounting facilities (FRA I and FRA II), cooperative credit facilities, or the Title III Program's credit subproject. Farmer associations will facilitate access to bank or Title III credit sources for their members by consolidating and processing loan requests whenever possible. Unless they already extend credit themselves, as in the case of cooperatives, farmer associations will neither borrow on behalf of their members nor extend credit in kind to them for the purchase of agricultural inputs.

Financing arrangements for purchase and sale of agricultural inputs by farmer associations will be developed with the assistance of the project's administrative advisor and closely examined by USAID prior to approval of importation requests.

d. Technical and Environmental Analysis

Bolivia's crop loss each year due to inadequate control of pests and plant diseases is an estimated thirty percent . The use of agro-chemicals is increasing, particularly for commercial crops such as sugarcane, soybeans, cotton and rice, as well as for potatoes, vegetables and fruit trees. However, Bolivian farmers, especially small farmers, have very little knowledge of agro-chemical toxicity, and there is widespread neglect of safety precautions in the handling and use of agro-chemicals. While data on poisonings and chemical residue are incomplete, available information suggests that both are serious problems in Bolivia.

During the intensive review, an investigation of agro-chemical use in Bolivia was carried out to determine what steps should be taken to mitigate possible negative effects of the importation of agro-chemicals under the project. As a result, it has been decided

that the five activities described below will be carried out with \$90,000 in project funds as well as with \$16,700 from the centrally funded **Pest Management and Related Environmental Protection Project** (under which Contract AID/DSAN-C-0252 has been executed with the Consortium for International Crop Protection (CICP) at the University of California and with the International Plant Protection Center (IPPC) at Oregon State University).

(1) Reduction in Toxicity through Selection of Chemicals Registered as Safe.

The first step in developing this component of the project was the selection of agro-chemicals for importation which are classified by the World Health Organization in Categories III, IV or V., all of which are considered "relatively" safe for small farmers use with little or no special training. All of the agro-chemicals eligible for importation under the project are registered in the United States for general use without restriction, except for propineb, which is registered in West Germany and has been evaluated by the Joint FAO/WHO committee on pesticide residues. Other than in cases of gross misuse, such as in the accidental or intentional ingestion of undiluted formulations, injuries or fatalities should not result from exposure to these chemicals. In addition to considering safety criteria, the agro-chemicals selected had to be presumed effective for plant problems encountered in Bolivia while unharmed to the environment. Major plant protection problems in Bolivia were analyzed, and alternative chemicals were selected for those currently in use which are highly toxic, based on efficacy information regarding use on the same or similar crop pests in other countries. Using this methodology, a total of 28 pesticides were selected for importation under the project. (See Table 1, Section V A.)

(2) Training in Agro-chemical Application and Safety.

There are insufficient agriculture extension agents to reach all Bolivian farmers. Consequently, information regarding the introduction of new chemicals and appropriate pesticide application procedures is generally disseminated informally by salesmen, dealers or by word of mouth between farmers. There are few extension bulletins available for agro-chemical users. The limited number of extension agents which do exist have received little or no formal training in agro-chemical usage. The users of the chemical inputs to be financed by this amendment will require orientation regarding appropriate safety procedures as well as the advantages of using low toxicity as compared to high toxicity chemicals.

Project funds will finance an agro-chemical application and safety training program which will be directed toward medium-size farmers as well as the staff and extension agents employed by agricultural cooperatives, agro-chemical dealers, voluntary organizations, and universities. Subjects to be discussed will include a comparison of agro-chemical toxicity and effectiveness, appropriate

handling, mixing and application procedures, as well as the potential harmful effects on humans, animals and the environment of the use of high toxicity chemicals and improper handling procedures. The two to three day training courses will be designed and executed by professionals from the International Plant Protection Center (IPPC) of Oregon State University and by GOB research specialists and will be held in the various regions where agro-chemicals to be imported under the project will be sold. Approximately twenty individuals will be trained at seven locations. The total project budget for this activity, including the participation of two IPPC and six Bolivian technicians from the Ministry of Agriculture and Campesino Affairs (MACA), is US\$55,000.

Up to US\$11,000 in project funds will also be utilized to finance the purchase of Atropine pesticide antidote which will be made available to participating agricultural cooperatives and pesticide dealers for use, with medical supervision, in the event of pesticide poisoning.

(3) Monitoring of Agro-chemical Contamination.

The extent of agro-chemical contamination in the environment has not yet been documented in Bolivia. Some of the required laboratory equipment to develop such information is already available at the MACA Residue Analysis Laboratory. The Director of the laboratory has been trained in residue analysis, but his assistants have not yet received such training. In order to help protect the environment from agro-chemical abuse, the GOB's capability for measuring chemical residue levels must be improved. When information on residue levels are part of an ongoing monitoring program, data collected will reveal dangerous trends in the level of contamination and alert authorities of the need to initiate corrective procedures.

To this end, this amendment will strengthen the capability of the MACA Residue Analysis Laboratory in La Paz to carry out water, soil and plant pesticide residue analysis. Project funds will be utilized to purchase approximately \$10,000 of additional laboratory equipment required for more complete residue analysis than is now possible. In addition, two MACA laboratory technicians will receive six weeks' training in residue analysis at the University of Miami in Florida. The centrally funded Pest Management and Related Environmental Protection Project will finance the university training costs estimated at \$9,900, while per diem and travel for the two MACA chemists will be financed from project funds at a total cost of \$8,000. The Miami course will provide practical knowledge on agro-chemical safety practices and basic information on the chemistry of herbicides, fungicides and insecticides and what happens to them in the environment.

(4) Repackaging of Agro-chemicals.

For relatively small orders, agro-chemicals are imported

by dealers already mixed in small containers to be sold to farmers, while for large imports for farmer groups and big farms are made in bulk containers to be mixed and/or repackaged into containers of convenient size for application. A number of commercial import dealers have repackaging facilities; however, farmer associations have been known to place substantial orders for agro-chemicals which they themselves do not have the capability to repackage. This practice will be discouraged where possible, but it cannot be stopped in the short-run.

As part of a long term effort to improve pesticide handling procedures within the country, the project will jointly finance with CICP a review of existing GOB packaging regulations and the inspection of private sector facilities by two pesticide handling specialists. One of these specialists will be from the private sector and will be financed by project funds, while the other will be from the academic community and will be funded by CICP. Their report will include an evaluation of existing repackaging facilities and containers and include recommendations for strengthening GOB regulations regarding repackaging standards and changes that may be required in existing equipment or procedures to ensure that appropriate safety standards are maintained. In addition, as part of their two-week consultancy, these advisors will investigate and report on the efficacy of pesticide application equipment available within the country.

The cost to the project of this activity is \$6,000, while the Pest Management and Related Environmental Protection Project will provide an additional \$6,800.

e. Use of Peso Sales Proceeds.

The peso equivalent of \$5.5 million will be generated by the sale of project-funded agricultural inputs within Bolivia. These funds will be deposited in a special account established in a commercial bank by the P.L. 480 Title III Executive Secretariat and will be disbursed by mutual agreement between the Executive Secretariat and USAID. Priority will be given to development activities for the areas in the altiplano and high valleys that have been hardest hit by the drought. These peso generations will also be used for operational support for USAID Disaster Assistance Program activities. The following developmental and Disaster Assistance Program support activities will be funded with the peso proceeds of input sales.

(1) Development of Integral Cooperatives (\$1.5 million)

Since 1978, the Title III Program has provided financing which has complemented loan and grant funds from USAID's Small Farmer Organizations Project. Most of the USAID project's funds for cooperative development and credit have been expended, but five agricultural cooperatives developed under the project continue to receive technical assistance from the Project Development Division of the National Federation of Savings and Loan Cooperatives (FENACRE). These

cooperatives currently receive investment credit under revolving credit lines previously established with USAID and P.L. 480 Title III funds, but more credit financing will be required as they expand operations. Peso proceeds from agricultural input sales will be utilized to provide an additional \$1.5 million in credit for the existing five cooperatives and for four others in the altiplano and valley areas to be included in the program during the 1984-85 crop year.

(2) Artisanry Development (\$500,000)

Up to \$400,000 in peso generations will be allocated for the development of Bolivian artisanry projects in the altiplano and valley areas. Funds will be made available for strengthening existing artisanry organizations and for the formation of new ones, as well as for manufacturing and production credit.

(3) Rural Housing (\$2.5 million)

Up to \$2.5 million in peso generations will be reserved for a rural housing improvement program to be managed by the Bolivian Savings and Loan System. The proceeds will provide seed capital for home improvement loans to rural Bolivian families with incomes below the national median.

(4) Disaster Assistance Program Support (\$1 million)

Up to \$1 million in peso generations will be utilized for operational support of USAID Disaster Assistance Program activities. This will include salaries for Bolivian technicians, in-country travel and other operating expenses, and local purchases of materials to support the commodity import, food distribution, and information gathering components of the Program.

4. Disaster Assistance Program Support

The Ministry of Planning and Coordination (MPC) has been designated by the GOB as the entity in charge of coordinating USAID assistance to the many GOB entities involved in the Disaster Recovery Project. For this reason, negotiations for the original project were carried out with MPC assistance, and since the Project Agreement was signed, the MPC has been the Mission's chief contact within the GOB for the implementation of project activities. Give the MPC's shortage of personnel to attend to day-to-day coordination tasks, a Project Coordination Unit, composed of a Project Coordinator, an Irrigation Specialist, an Accountant and an Administrative Assistant has been set up with project funds. Following the Gersony evaluation, USAID expanded the administrative support provided to its food distribution activities and strengthened Mission backstopping for its Disaster Assistance Program as a whole. Consequently, the project's component for disaster program support, which previously only included funding for the Coordination Unit, has been significantly expanded to include additional

personnel, office rental and operation, vehicle and equipment support, training of counterparts, and the Disaster Surveillance Data Collection System.

a. Personnel

In addition to extending the services of the personnel in the Coordination Unit until the revised PACD of December 31, 1985 and hiring an Administrative Advisor for the unit to manage the agricultural input subcomponent of the project, a long-term expatriate Food Program Coordinator has been contracted for twelve months to manage the day-to-day operations of the Mission's PL 480 emergency food distribution programs. An Assistant Food Program Coordinator will also be contracted for six months to assist him. Four food inspectors will be contracted under the project to supervise and advise Title II agencies on their emergency food distribution programs. These inspectors will also assist the Mission in supervising the Title II rural rice sales program, which is being coordinated with technical assistance from a U.S. consulting firm. Inspectors will be located in La Paz, Oruro, Potosí, and Cochabamba. The Cochabamba Inspector will also monitor food distribution programs in Santa Cruz, and the Inspector in Potosí will be responsible for supervising Title II food activities in Chuquisaca and Tarija. The food inspectors will be contracted for six months with project funds, after which they will be financed with proceeds from the sale of the project's agricultural inputs.

The National Community Development Service (NCDS) is a GOB organization which normally administers a small \$1 million PL 480 Title II program, but because of the disaster, its program has been expanded significantly. The amendment will finance an administrative advisor to work directly with NCDS until it distributes all of its emergency food.

Two auditors will be employed. These auditors will reside in La Paz and travel to various project sites food warehouses and distribution centers to perform spot audits and end-use checks. An audit supervisor will be contracted for 18 months to manage these audits and to direct a close-out audit when the emergency food distribution programs are completed. A field auditor will be contracted for twelve months. These auditors will also be available to audit other components of USAID's Disaster Assistance Program and will work with audit firms contracted with project funds to audit the Program.

b. Regional Offices

To establish more direct control over the Mission's disaster-related food distribution programs, four regional offices will be set up, one each in La Paz, Oruro, Potosí, and Cochabamba. The four food inspectors and six departmental data collectors (see section C4e below) will work out of these offices. The Mission is also contracting four secretaries, one for each regional office, for a period of six months, after which they will be financed with input sales proceeds.

c. Vehicles and Equipment

The four food inspectors will be traveling fifteen to twenty days each month in the more remote areas of their respective departments. To facilitate their work, the project will purchase four four-wheel-drive vehicles, one for each of the food inspectors, and sleeping bags.

d. Training

A small amount of funds is also received from input sales for counterpart training. This line item will fund travel and per diem to bring Bolivians working for Title II agencies to La Paz for short training courses in food distribution procedures and proper accounting procedures. Two such training sessions are being planned. The training will be provided by USAID staff.

e. Disaster Surveillance Data Collection System

Based on the recommendation of the Gersony report, the Mission will establish a Disaster Surveillance Data Collection System (DSDCS) in the six departments affected by the drought. In each of the Departments of La Paz, Oruro, Potosí, Cochabamba, Chuquisaca, and Tarija, data will be collected on health agronomic, economic, social, migration, meteorological, and transportation trends. In the near term, the purpose of the DSDCS will be to monitor the status of drought recovery and the impact on the residents of the affected areas. This will allow the GOB and its donors to assess the results of the nation's overall recovery program. In the longer run, the DSDCS will provide users with a data base for future assistance planning.

(1). Organization

The DSDCS will be housed in the MPC's Economic Policy Analysis Unit, which is currently being developed under another USAID project. This Unit is responsible for undertaking analyses of current economic policy options for the GOB's Economic Cabinet. As part of its responsibilities, the Unit is organizing an information system for economic analysis and planning. The DSDCS will be fully compatible, and contribute to, the Unit's information system.

The DSDCS will require the services of six departmental data collectors (one in each of the targeted departments), a field supervisor, and a system supervisor. The departmental data collectors will be responsible for collecting a specific set of information from previously identified sources at predetermined intervals. They will forward monthly reports to the System Supervisor. The Field Supervisor, in addition to training and advising each of the departmental data collectors, will be responsible for assuring that the data sources remain current and valid. In consultation with the System Supervisor, the Field

Supervisor will make the initial selection of data sources in each of the departments. The Field Supervisor will share the responsibility, along with the System Supervisor, of changing the data sources should one or more be found unacceptable. The System Supervisor will receive the raw data, review it to determine the extent of errors or omissions, enter information into a computer, and generate such reports as the GOB and Mission may require.

(2) Methodology

In general, information will be obtained from five sources: the departmental data collectors stationed in each department, the Office of Epidemiology of the Ministry of Health, the National Statistics Institute, field agents of the Ministry of Rural Affairs and Agriculture, and periodic agricultural surveys sponsored by the Mission. The System Supervisor will collect the data from the GOB offices, while the departmental data collectors will be responsible for collecting information from rural sources. A key element of the data collection system will be the establishment of a network of "sentinal communities" selected in a stratified random sample to reflect the population at greatest risk within each of the six departments. Thirty communities will be randomly chosen within each department; fifteen with a populations of 2,000 or less and fifteen with populations between 2,000 and 5,000. Communities to be monitored will be chosen so that all geographic portions of each department are represented. The communities chosen will represent those areas with the potential to be most quickly or seriously affected by a crisis. These will usually be the smaller, poorer, and more remote areas of each department. The samples will attempt to ensure that communities of various sizes are chosen in all the geographic regions of each department.

Data to be collected from the "sentinal communities" in each department will concern water sources, water availabilities, childhood mortality, migration, animal sales, market prices, loan delinquencies, meteorological information, and transportation flows. On a semi-annual basis, the departmental data collectors will secure information on the cost of agricultural land in their departments and on the condition of their departments' livestock and crops. Once per year, the data collectors will also determine the total number of employees (indicating the urban/rural split) working in their departments' hospitals and health posts.

Information collected through the DSDCS will be organized into thirteen surveillance periods (lunar months), each of four weeks' duration. Semi-annual and annual summaries will be prepared of these data, as well as of other information which is available only on a semi-annual or annual basis. These reports will not only be distributed to each of the GOB agencies involved in the USAID Disaster Assistance Program but to AID missions in the Andean region, AID/W, bilateral and multilateral donors, and to the individuals and organizations from which the data is collected.

(3) Inputs

USAID/Bolivia will contract eight full-time persons to implement the DSICS. The System Supervisor will be hired for 18 months and work out of the USAID offices in La Paz. A Bolivian field supervisor will be employed to oversee the day-to-day activities of the departmental data collectors and provide them with limited training. This person will also be assigned to the La Paz regional office. The six departmental data collectors to be hired will be residents of the departments in which they work.

Four of the six departmental data collectors will share office space with the Mission's food inspectors. Because there will be no food inspectors assigned permanently to Chuquisaca and Tarija, the data collectors for these two departments will work out of the GOB's Departmental Development Corporations. Operating expenses for these personnel will also be funded under the project.

To facilitate the compilation and analysis of the data, a micro-computer system will be required. The computer configuration recommended by the consultants who designed the data collection system is an IBM PC-XT with a total of 320 kilobytes of RAM memory (256kb on the motherboard), a 10 megabyte hard disk, a high resolution monochrome monitor; a wide-carriage, graphics-capable, high-speed, dot-matrix printer (Epson FX-100); a memory expansion card with clock and printer spooler (Tecmar PC-Mate); the appropriate interfaces, and a graphics card. The software required includes Lotus 1-2-3, IBM DOS 2.0, Basic, and Wordstar. This computer will be set up to work in tandem with that of the Policy Analysis Unit.

Sixty days after the DSICS has become fully operational, one of the consultants who helped design the system, or another consultant with skills in the design and operation of surveillance systems, will be contracted by USAID/Bolivia to evaluate the indicators chosen in terms of variance and covariance and the apparent reliability, consistency and utility of the data. If appropriate, the consultant will assist the Field Supervisor and the System Supervisor in deleting certain indicators which are not providing unique or useful information, and in modifying or adding other indicators. The consultant will also evaluate the charts, graphs, and reports being prepared from the collected data to ensure that appropriate and useful reports are prepared.

5. Cost Increases for Infrastructure and Commodity Import Subcomponents of the Original Project

In the course of completing final construction plans and cost estimates for the project's infrastructure activities, it has become apparent that additional funds will be required to undertake the construction originally contemplated.

a. Santa Cruz - Cochabamba Highway

As a result of the investigations carried out by the slide stabilization/river fortification expert hired under the project and final cost estimates carried out by the National Road Service (SNC), it has been determined that \$1,114,000 more will be required for the purchase of gabions and culverts. More of these items than originally estimated are required, and unit cost estimates are higher. In addition, it is estimated that \$500,000 more will be required to reconstruct the Tarumá Bridge which must be extended to decrease the danger of collapse from future flooding. SNC's contribution will remain at \$4.1 million and could be higher if actual construction costs exceed the current estimate.

b. Sucre Municipal Water System

In order to pump water over 400 meters uphill to reach the city of Sucre, the project amendment will finance larger pumping equipment than originally contemplated, with the necessary auxiliary pressure gauges and check valves. Additional design work and a construction supervision contract will also be required. Lastly, new power lines and a power transformer will be purchased given the deterioration of existing power equipment in Sucre and the inability of the national electricity company to finance these requirements. The total additional funds required are \$154,000.

c. Potosí Municipal Water System

To renovate the Potosí water system, the project was to purchase one bulldozer and two dump trucks needed to clear out existing ponds, rebuild canals and reservoirs, and maintain access roads in the surrounding areas. This equipment was not available through excess property purchases as originally contemplated. Therefore, the project amendment will provide an additional \$213,000 for the purchase of new equipment and vehicles.

d. Altiplano Irrigation Projects

Cost increases for the irrigation subcomponent of the project totalling \$72,000 are attributable to a higher cost than was originally estimated for irrigation system construction equipment and the need to purchase additional spare parts.

Other budget adjustments have been made in the importation and project support components of the project, mostly to switch funding for local costs from the project to input sales proceeds.

III COST ESTIMATE AND FINANCIAL PLAN
(US\$. 000)

	ORIGINAL GRANT			A. BUDGET			I. D. FUTURE GRANT			D. REQUIREMENTS LOAN			NEW GRANT	TOTALS LOAN	GOB	CUM-MUNI-TY	TOTAL		
	GRANT		LOAN	BUDGET		FUTURE GRANT		REQUIREMENTS LOAN		TOTAL	TOTALS	GOB						CUM-MUNI-TY	TOTAL
	FX	LC	FX	LC	TOTAL	FX	LC	FX	LC										
I. Infrastructure	2,949	2,696	604	7,396	13,645	374	(1,649)	1,614	1,714	2,053	4,370	11,328	4,861	1,338	21,897				
A. Roads	996		604	7,396	8,996			1,614		1,614	996	9,614	4,104		14,714				
Construction																			
Materials			604	3,491	4,095			1,114		1,114		5,209			5,209				
Earth Movement				2,616	2,616							2,616	4,104		6,720				
Bridge Construction				1,289	1,289			500		500		1,789			1,789				
Spare Parts and Excess Property	575				575										575				
Technical Assistance	421				421							421			421				
B. Potable Water and Irrigation	1,953	2,696			4,649	374	(1,649)		1,714	439	3,374	1,714	757	1,338	7,183				
1. Potosí	410				410	213				213	623		95		718				
Materials													61		61				
Spare Parts and Excess Property	400				400	203				203	603				603				
Operating Expenses													19		19				
Maintenance													15		15				
Transportation	10				10	10				10	20				20				
2. Sucre	260	65			325	89	65			154	479		30		509				
Pumps, Instruments, etc.	160	5			165	44				44	209				209				
Pump Houses		25			25						25		30		55				
Pipe	100				100						100				100				
Installation		10			10						10				10				
Transportation		25			25						25				25				
Design and Supervision							65			65	65				65				
Transformer and Power Lines						45				45	45				45				
3. CARE	915	835			1,750						1,750		80	410	2,240				
4. Irrigation	368	1,796			2,164	72	(1,714)		1,714	72	522	1,714	552	928	3,716				
Construction																			
Materials and Labor		1,714			1,714		(1,714)		1,714			1,714	212	928	2,854				
Design and Supervision													240		240				
Equipment and Spare Parts	254				254	72				72	326				326				
Technical Assistance	90	76			166						166				166				
Training	24	6			30						30				30				
Operating Expenses													100		100				
II. Commodity Imports	2,524	196			2,720	220	(178)	5,500		5,542	2,762	5,500	4,709	19	12,990				
A. Fertilizers	1,408	127			1,535	127	(127)				1,535		41	19	1,595				
Fertilizers and Transportation	1,372	86			1,458	127	(86)			41	1,499			2	1,501				
Personnel		29			29		(29)			(29)			29	1	30				
Vehicles	36				36						36				36				
Evaluation and Operating Expenses		12			12		(12)			(12)			12	16	28				
B. Medicines	1,116	69			1,185	20	(68)			(48)	1,137		168		1,305				
Medicines	1,000				1,000						1,000				1,000				
Vehicles and Equipment	72	8			80		(8)			(8)	72				80				
Technical Assistance	44				44	20				20	64		8		64				
Rehabilitation of Facilities		26			26		(26)			(26)					26				
Operating Expenses		3			3		(2)			(2)			26		26				
Transportation		10			10		(10)			(10)	1		112		113				
Training		22			22		(22)			(22)			22		22				

	ORIGINAL GRANT		LOAN		A. BUDGET TOTAL	I. FUTURE GRANT		D. REQUIREMENTS LOAN		TOTAL	NEW GRANT	TOTALS LOAN	GOB	COM-MUNI-TY	TOTAL
	FX	LC	FX	LC		FX	LC	FX	LC						
<u>C. Agricultural Inputs</u>						73	17	5,500		5,590	90	5,500	4,500		10,090
Inputs															
Environ. Protection Activities								5,500		5,500		5,500			5,500
Development Programs from Sales Proceeds						73	17			90	90				90
													4,500		4,500
<u>III. Disaster Assistance Program Support</u>	401	36			437	817	222			1,039	1,476		569		2,045
<u>A. Coordination Unit</u>	240	36			276	45	(6)			39	315		100		415
Coordinator	240				240	45				45	285				285
Irrigation Specialist		18			18		(5)			(5)	13		46		59
Accountant		18			18		(10)			(10)	8		30		38
Secretary							4			4	4		14		18
W/ Input Admin. Advisor							5			5	5		10		15
<u>B. Support for Food and Rural Recapitalization Programs</u>						369	142			511	511		218		729
Coordinator						155				155	155				155
Assistant Coordinator						15				15	15				15
Food Inspectors							25			25	25		75		100
SMA Advisor							12			12	12				12
Secretaries							14			14	14		35		49
TA for Rural Rice Sales						70				70	70				70
TA for Rural Recapitalization Program															
Vehicles						49				49	49		100		100
Equipment						2				2	2				49
Training															2
Field Offices						78	91			169	169		8		8
															169
<u>C. Disaster Surveillance Data Collection System</u>						361	86			447	447		144		591
System Supervisor						180				180	180				180
Field Supervisor							6			6	6		24		30
Data Collectors							30			30	30		120		150
Vehicles						100				100	100				100
Computers						9				9	9				9
Technical Assistance						57				57	57				57
Operating Expenses						15	50			65	65				65
<u>D. Audits and Evaluations</u>						103				103	103		107		210
Audit Supervisor						6				6	6		21		27
Audit Contracts													80		80
Evaluations						90				90	90				90
<u>E. Short Term Technical Assistance and Other</u>	161				161	(61)				(61)	100				100
<u>IV. Contingencies and Inflation</u>		198			198	194		1,172		1,366	392	1,172	322		1,886
T O T A L	5,874	3,126	604	7,396	17,000	1,605	(1,605)	8,286	1,714	10,000	9,000	10,000	10,461	1,357	38,818

IV. Implementation Plan

A. Revised Implementation Schedule

The project is scheduled to be completed by December 31, 1985. The following revised implementation schedule begins as of April 1, 1984 and includes all key project activities up to the PACD.

The fertilizer component of the original Disaster Recovery Project has not been included in the revised implementation schedule, since all fertilizers have been received and are now being distributed to project beneficiaries.

With respect to the agricultural input component of the revised project, all arrangements for the importation of these goods will be handled through normal private sector commercial channels. Importation of agriculture inputs will be based on Bolivian demand for these products and consequently the delivery dates are not as yet known. However, it is estimated that approximately all of the \$5.5 million in agriculture inputs will be ordered within six months of the signing of the project amendment due to the lead time necessary to ensure that the inputs arrive in time for the 1984/85 planting season.

1. Road Rehabilitation Schedule

1984

- April - Prequalification of firms to bid on the contract for construction of the Tarumá Bridge.
- Procurement documents issued for construction materials, equipment, spare parts, culverts, gabion wire baskets and lining for french drains.
- Two long-term technicians contracted for S.N.C.: one heavy equipment specialist and one road construction supervisor.
- May - Procurement of pick-up trucks and jeeps completed.
- Preparation of Tarumá Bridge engineering specifications and bid document.
- Submission of bid document to prequalified firms responding to contract advertisement.
- July - Review and evaluation of bids.
- Arrival of construction materials.
- August - Negotiation, award and signing of contracts for all construction work under the project road component.
- Initiation of construction.

1985

- January - Completion of five bridges.
- April - Completion of the Tarumá bridge.
- December - Completion of road component

2. Potable Water and Irrigation Subproject Implementation Schedule

1984

- April/May - Field surveys and design of water Sucre pump station completed.
 - Mission approves disbursement for first three DDC irrigation sub-projects.
 - DDCs begin construction of subprojects .
 - CARE construction of second group of potable water systems and micro-irrigation systems.
 - Contracting of long-term irrigation engineers.
- June - Procurement of additional pumping equipment and materials.
 - ELAPAS begins construction of pump houses and other civil works in Sucre.
- August - Arrival of construction equipment and heavy duty machinery
 - Initiation of clearance and restoration work by AAPOS for water systems.
- November - ELAPAS completes construction of pump houses. Power lines and transformers installed and operational.

1985

- November - DDC subprojects completed.
- December - CARE potable water, and CARE and DDC irrigation subproject evaluations completed.

3. Implementation Schedule for Medicine Distribution

1984

- April - Determination whether to adopt Oruro model to meet project objectives.
 - Formation of new MOH team to work on project.
 - Definition of regional distribution systems and central responsibilities.
 - Submit PIO/C worksheet to SER/COM for medicine procurement.
 - Scopes of work completed for personnel at regional level.
- May - Acceptance of pari-passu requirements by MOH counterparts.
 - Identification of additional equipment for repacking medicines.
 - Initiate long-term technical assistance (through Bolivian PMO).
 - Finalization of pricing structure at different levels of distribution.
 - Training program initiated for regional system administrators.
- June - Arrival of GSA-purchased medicines.
 - Initial sales to levels I through IV.
- July - Arrival of medicines procured from U.S. market, not

- available through GSA.
- Arrival of repacking equipment for regional offices.
- Sales of non-GSA drugs to levels I through IV.
- August - Readjustment of pricing structure at national level based on economic conditions at that time.
- Review of system operations and adequacy of regional and central personnel.
- Medicine distributions made at regional levels with local repacking of course-of-therapy drugs.

4. Implementation Schedule for Disaster Surveillance Data Gathering System

1984

- April - Selection of Long-Term Advisor
- Selection of Data Collectors.
- May - Arrival of long-term Data System Supervisor.
- Training program initiated for data collectors.
- Arrival of vehicles.
- Field testing initiated.
- June - Data collection process begins.
- August - First analysis of data and recommendation for adjustment in data gathering techniques.

B. Procurement Plan

In keeping with the project's original plan to expedite implementation as much as possible, USAID will be responsible for most of the commodity importation and consultant contracting. The major exception to this rule, as explained above, will involve the procurement of agricultural inputs, which will be carried out using normal Bolivian commercial channels. To carry out the environmental protection aspects of the agro-chemical input subcomponent of the project, USAID will contract with the International Consortium for Crop Protection (CICP) and the International Plant Protection Center at Oregon State University as recommended in the Environmental Analysis.

USAID will hire the operational personnel necessary to support its Disaster Assistance Program, including the DSICCS, under project-funded PSCs. Once funds from the sale of agricultural inputs are available to the Title III Secretariat, the contracts of Bolivians contracted by USAID will be transferred to GOB funding.

Two institutional contracts will be let for the administration of the Title II rice sales program and the rural recapitalization program. The first will be funded under the project and let by USAID. The second contract will be funded and let by the Title III Secretariat.

To help administer the Disaster Assistance Program, USAID will rent office space for food program personnel and data collectors in La Paz, Oruro, Potosí and Cochabamba. For ease of administration, both the rental contracts and the local procurement of office supplies, services and equipment will be effected directly by USAID with project funds.

As in the case of most commodities being imported for the project, the imports required under the amendment will be effected directly by USAID. A PD&S-funded procurement advisor will assist the Mission with these purchases.

C. Evaluation Plan

Two evaluations are currently scheduled, one in September 1984 to assess initial project progress, possibly in coordination with evaluations of AID's disaster programs in Peru and Ecuador, and a final evaluation in September 1985 to measure the impact of the project. Both evaluations will cover the complete USAID Disaster Assistance Program, not solely the components of the Program supported by this project. Results of regular audits financed by the project will be taken into account.

D. USAID Monitoring

Day-to-day monitoring of USAID's comprehensive disaster assistance efforts is accomplished through twice weekly meetings of the Mission Disaster Assistance Coordination Committee, which is chaired by the Deputy Mission Director and includes representatives of all the involved Mission divisions. The project's Coordination Unit supervises the provision of assistance under the infrastructure rehabilitation and commodity import components of the Program. The Coordinator works under the Disaster Recovery Project Manager in the Rural Development Division (RD) and coordinates with the officer responsible for the medicine import component in the Health and Humanitarian Resources Division (HHR). The Mission's Disaster Assistance Coordinator (Chief of HHR) supervises the Food Program Coordinator, who runs the food distribution and rural recapitalization programs. Assistance to the DSACS is managed by the Office of Development Planning (DP). It is through the regular meetings of the Mission Disaster Assistance Coordination Committee that all of the above Disaster Assistance Program elements are coordinated and supporting assistance from the Mission's staff offices is arranged.

V. PROJECT ANALYSES

A. Institutional Analysis

Given (a) the weak administrative capacity of many of the Bolivian institutions with which USAID/B is working to implement the Disaster Recovery Project owing to frequent personnel turnovers and the lack of operating funds, and (b) the emergency nature of the activities being undertaken, the project provides funds for significant amounts of technical and administrative assistance and operating cost support. In order "to get the job done" and alleviate the administrative burden on the Bolivian implementing agencies, USAID is responsible for commodity importation and contracting of consultants. The Coordination Unit has adopted a "hands on" approach in assisting the Ministry of Planning and Coordination (MPC) to coordinate project activities and in working with GOB implementing agencies.

The capabilities of the Bolivian entities implementing the project's infrastructure rehabilitation and commodity import components were reviewed in the original Project Paper. The new agricultural input importation subcomponent will involve the participation of established commercial importers of agricultural inputs who will have to meet specific criteria to participate in the program which will confirm their ability to carry out importation and distribution. No problems are expected with the ability of these firms to carry out these tasks.

A variety of farmer associations will participate in this subcomponent of the project. Some, such as the CAO, the integral cooperatives in Cochabamba, Santa Cruz and Yacuiba, and Agrocentral in Sucre, have adequate staff and have undertaken importation and distribution of inputs in the past. These organizations will have no difficulty meeting the criteria necessary to participate in the program, and should require little assistance from this subcomponent's administrative advisor to carry out their functions. Other farmer groups, however, such as the Cámara Agropecuaria de Potosí (CAP) and smaller cooperatives, do not have similar experience and will require assistance if they import directly.

In addition to the assistance to be provided by the project's administrative advisor, who will arrange and coordinate specific import transactions, these other farmer associations, which meet minimum requirements for participation in the program, will be able to (a) associate with the CAO to effect imports (as has been done by the CAP in the past, and which the CAO is willing to consider for other regional cámaras), or (b) in the case of cooperatives, receive assistance in planning their importations and distribution from FENACRE's consultancy section for cooperatives. If it is clear that even with such assistance some farmer groups will not be able to manage importations adequately, they will not be allowed to participate, and distribution by import companies though their own normal commercial channels will be relied upon.

The other major new project activity, the DSDCS, will require the support of the MPC's Economic Policy Analysis Unit. This Unit was only recently created and is still being staffed and organized. It relies on funding from another USAID project and the Title III Program. Personnel for its Information Division have not yet been hired, but candidates have been identified by the Unit's Director and Information Systems Advisor. Since the Information Division of the Unit is just getting organized and its computer system is compatible with that contemplated for the DSDCS, no difficulty is expected in setting up the DSDCs under the MPC Economic Policy Analysis Unit.

Given the nature of the new components to be financed under this amendment, no additional technical, economic, financial or social analyses were carried out during the intensive review. The Environmental Assessment is included as Annex C.

VI. CONDITIONS AND COVENANTS

The amendment to the project agreement will contain a condition precedent to disbursement of the additional funds provided requiring the customary legal opinion of the Attorney General. Covenants to be included in the amended agreement are:

Importation of Agricultural Inputs

"Bolivia agrees that A.I.D. will administer the importation of agricultural inputs financed under the Project by receiving, reviewing, and approving or disapproving applications from private Bolivian importers for foreign exchange to import specific agricultural inputs and by disbursing foreign exchange for importers under disbursement methods suitable to A.I.D. Annex I, Detailed Project Description, contains a more detailed description of this component and contains a list of eligible agricultural inputs and a list of eligibility criteria and requirements for importers. Each importer receiving foreign exchange under the Project for importation of agricultural inputs will deposit into an account approved by A.I.D. of Bolivia's Executive Secretariat for the Public Law 480 Agreement the equivalent in local currency at the official exchange rate on the date the importer deposits the local currency in said account. The importation of agricultural inputs by importers under the Project is subject to the terms and conditions of A.I.D. Regulation 1 as from time to time amended and in effect, except as A.I.D. may otherwise agree in writing. If any provision of A.I.D. Regulation 1 is inconsistent with a provision of this Agreement, the provision in this Agreement shall govern".

Utilization of Agricultural Inputs.

Bolivia will use its best efforts to assure: that accurate arrival and clearance records for agricultural inputs imported pursuant to Section 6.3 are maintained by customs authorities; that imports of agricultural inputs under the Project are promptly processed through

customs at ports of entry; that said imports are removed from customs and/or bonded warehouses within fifteen (15) calendar days from the date the imports are unloaded at port of entry; and that the imports financed under the Project will not be reexported in the same or essentially the same form unless A.I.D. otherwise agrees in writing. Bolivia will exempt the imports of agricultural inputs financed under the Project from all taxes, duties, customs, levies, tariffs or similar charges imposed under laws in effect in the territory of Bolivia in accord with Section B.4(b) of Annex 2, Combined Loan and Grant Standard Provisions Annex, to this Agreement."

Exemption for Agricultural Inputs

"Bolivia will exempt and exonerate the agricultural inputs imported pursuant to Section 6.3 above from any and all regulations and procedures, including but not limited to registration requirements, administered by the Division de Sanidad Vegetal of the Ministry of Agriculture so that such inputs maybe imported into and utilized in Bolivia without any delays or waiting periods related to such regulations and procedures."

Consultations

"Bolivia agrees to consult with A.I.D. before approving the acquisition of foreign exchange for the purpose of importing into Bolivia agro-chemicals or veterinary supplies not financed under the Project in order to avoid a surplus supply of such commodities in the market."

Packaging of Agro-chemicals

"Bolivia will use its best efforts to adopt and enforce packaging requirements for agro-chemicals recommended by technical assistance advisors provided under the Project."

Utilization of Pesticides.

"Bolivia will make reasonable efforts to assure that pesticides, herbicides and fungicides financed under the Project are properly handled and utilized by the beneficiary agricultural producers."

Local Currency Program

"Bolivia agrees that the local currency deposited in an account of the Executive Secretariat for the Public Law 480 Agreement ("Executive Secretariat") will be utilized for development purposes mutually agreed upon by A.I.D. and the Executive Secretariat as described in detail in Annex I, Detailed Project Description to this Agreement. For all purposes relevant to the local currency program under this Agreement, including amendment of those portions of Annex I, Detailed Project

Description, dealing with the local currency program, Bolivia will be represented by the individual holding or acting in the office of Executive Secretary of the Executive Secretariat."

Distribution of Agricultural Inputs

"Bolivia agrees that, except as A.I.D. may otherwise agree in writing, not less than forty percent (40%) of all imports of agricultural inputs pursuant to Section 6.3 of this Agreement will be for utilization by farmers and producers in the altiplano region of Bolivia."

Included in the Annexes to this Project Paper are (a) a letter of request for the additional \$10 million and (b) a 611 (e) Determination revising the project as amended. The checklists from the original Project Paper remain valid.



La Paz, 3 MAYO 1984

Señor
Henry H. Bassford
Director, USAID/Bolivia
Presente.-

Señor Director:

Con relación al Proyecto para Recuperación de Desastres, ratifico a usted nuestro acuerdo con la Enmienda del mismo. En principio y mediante la presente, solicito a USAID, por su intermedio un préstamo adicional de US\$. 10 millones que, junto con el préstamo original de US\$ 8.0 millones y la donación original de US\$ 7.25 millones para el Proyecto de Recuperación de Desastres hará un total de US\$25.25 millones.

Como es de su conocimiento, durante el año pasado se han presentado desastres causados por la naturaleza que han afectado seriamente extensas áreas del país y han ocasionado una serie de problemas sociales y económicos, a los cuales el gobierno de mi país tiene que hacer frente en forma prioritaria. En este sentido, mi gobierno ha elaborado un Plan de Emergencia que incluye los siguientes seis grandes componentes:

- 1) Aumento en la producción agrícola, provisión de fertilizantes y otros insumos de producción, y proyectos de riego;
- 2) Provisión de alimentos suplementarios;
- 3) Rehabilitación de la infraestructura; carretera Cochabamba-Santa Cruz;
- 4) Construcción y rehabilitación de proyectos de agua potable;
- 5) Respaldo logístico para la distribución de alimentos y medicamentos;
- 6) Prevención contra riadas.

Entendemos además que USAID bajo el rubro del mismo proyecto, firmó un convenio de donación con CARE por la suma de \$us. 1.75 millones para la construcción, con la participación de las Corpora-

//..

113

ciones Departamentales de Desarrollo, de Oruro, Potosí y Chuquisaca, proyectos de agua potable y mini-riego.

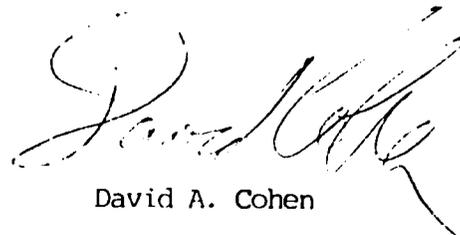
Aprovecho la oportunidad para agradecer por su intermedio, al gobierno y pueblo norteamericanos por el eficiente apoyo que están prestando a Bolivia.

Con este motivo, reitero a usted, señor Director, las seguridades de mi distinguida consideración.

Flavio Machicado
Ministro de Finanzas

CERTIFICATION PURSUANT TO SECTION 611(e)
OF THE FOREIGN ASSISTANCE ACT OF 1961,
AS AMENDED

I, David A. Cohen, the principal officer of the Agency for International Development in Bolivia, having taken into account, among other factors, the maintenance and utilization of projects in Bolivia previously financed or assisted by the United States, do hereby certify that in my judgement Bolivia has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance portion of this project:
Disaster Recovery, as amended.



David A. Cohen
Director a.i., USATD/Bolivia

Environmental Assessment

The Environmental Assessment (EA) was prepared by the Consortium for International Crop Protection (CICP) and submitted to the Mission and AID/W in draft. Among other things, it recommended the initiation of an integrated pest management (IPM) research program on potatoes to begin to develop more cost-effective and less toxic means of controlling the diseases and pests which commonly occur in the highland potato-producing regions of Bolivia. In a final review of the project proposal by the DARE on April 16, it was decided to accept all of the recommendations in the EA except the IPM research, given the short-term, emergency nature of the project. Consequently, the environmental protection activities to be financed under the amendment are:

- a) Restriction of agro-chemical imports to the list of less toxic, but effective chemicals recommended in the EA.
- b) Training in agro-chemical application and safety.
- c) Monitoring of agro-chemical contamination.
- d) Assistance in establishing repackaging standards.

These activities are described on pages 24-26 of this PP. The CICP Environmental Assessment is attached to this Annex.

Consortium for International Crop Protection

ENVIRONMENTAL ASSESSMENT FOR PROPOSED PESTICIDE USE IN
BOLIVIA DISASTER RECOVERY PROJECT
(USAID Loan No. 511-0581)

December 1983

Carroll Collier
Pest Management Specialist
Office of Agriculture
Agency for International Development
Washington, D.C. 20523

and

Donald Calvert
Crop Protection Specialist
Consortium for International Crop Protection
Berkeley, California 94704

Table of Contents

	<u>Page</u>
I. Introduction	i
II. The Environmental Setting	2
Natural Resources	3
Wildlife Resources	5
Mineral Resources	6
Agriculture	7
III. Impact of Pesticide Purchase on the Environment and Mitigative Measures	8
IV. Pesticide Procedures	9
A. EPA Registration Status	10
B. Basis for Selection	11
C. The Proposed Method of Application	15
D. Acute and Long-Term Toxicological Hazards	16
E. Effectiveness of Pesticides	19
F. Target and Non-Target Ecosystems	19
G. Conditions under which Pesticides are to be Used	20
H. Availability and Effectiveness of Other Pesticides or Non-Chemical Control Methods	20
I. Bolivia's Ability to Regulate or Control Pesticide Use	21
J. Provisions Made for Training	23
K. Provisions Made for Monitoring	25
V. Technical Assistance Initiatives	26
A. Training in Pesticide Safety	27
B. Monitoring Program and Residue Analysis Training	28
C. Training of Laboratory Technicians	29
D. Review of Existing Pesticide Repackaging Facilities	30

48

Table of Contents (cont.)

VI. Summary of Specific Actions	30
VII. Proposed Budgets for Various Initiatives	
A. Pesticide Management	
Training Workshop	32
B. Potato IPM Project	33
C. Review of Existing Pesticide	
Repackaging Facilities	34
D. Pesticide Analysis Training	34
E. Pesticide Analysis Laboratory	34
F. Training of Medical and Paramedical	
Personnel	35
VIII. References Cited	37

I. Introduction

A national survey of 1,400 farmers cultivating 32 different crops in five departments of Bolivia was sponsored in 1983 by USAID to assess the effects of a prolonged drought in the highlands (Altiplano) and flooding in the southeastern part of the country. Field observations of the condition of the crops in the Altiplano areas of La Paz, Oruro and Potosi were also conducted to evaluate the extent of crop losses due to the drought. This study concluded that the yield of basic agricultural products in 1982-83 would be between 40-50% of the amount normally harvested. A later assessment of projected agricultural production for the 1983-84 crop year postulated that even under extremely good climatic conditions, Bolivian food production would be far short of pre-disaster levels for several years to come. To assist Bolivia in implementing important elements of its emergency plan for recovery from the effects of these natural disasters, a \$15.25 million dollar disaster recovery project was signed in October 1983 by the governments of Bolivia and the United States. The major components of this two year project are the rehabilitation of the Cochabamba - Santa Cruz highway; construction and expansion of potable water/sanitation facilities; and the provision of fertilizers and medicines to drought-affected rural areas. In addition, contingency food relief measures were being considered by the U.S., Japan, Swiss and other governments.

In December 1983, a ten million dollar amendment to the above project was under consideration by USAID for the purchase of agricultural inputs, including pesticides. The latter have been in short supply throughout the country during the past year due to the extreme shortage of foreign exchange to finance imports. The funding of this amendment was proposed by USAID as a short term

response to the needs of the country for these essential agricultural inputs. Since these funds would be used for the purchase of pesticides, an assessment of the anticipated impacts of these pesticides on humans and the physical environment was made to assure that their use would comply with the established policies, regulations and environmental procedures of USAID.

II. The Environmental Setting

Bolivia is the fifth largest country in South America and has a land area of approximately 1,098,580 square kilometers. It is divided into three distinctive geographic regions by two chains of the Andes mountains. The western chain occurs along the border with Chile while the eastern chain extends down the middle of the country in a north - south direction; the two ranges meet in the southwest corner of the country. The area between these two mountain ranges, known as the "altiplano", extends southward from Peru to the Argentine frontier for a distance of 500 miles at altitudes varying between 12,000 and 14,000 feet and an average width of 80 miles.

The second geographic region is located on the eastern slopes of the eastern cordillera and includes the Yungas and Valles areas. This region is comprised of steep tropical and subtropical river valleys with heavy rainfall as well as drier and colder high mountain valleys. The Yungas consists of a series of narrow river valleys with rich soils, heavy rains and lush vegetation. The Yungas lands are almost entirely in the La Paz Department and are the most fertile in Bolivia. The Valles region has valleys and basins that are broader and more extensive than in the Yungas. This region supports the country's most intensive agriculture. The third region - the "oriente" - is a vast lowland plain that includes all of the country located to the east of the

Andes. The northern part of this region is characterized by tropical jungle with a transition to vast grasslands (the "pampas"), subtropical jungle and, in the south, a semi-arid and arid region (the "Gran Chaco"). The great eastern lowlands of the Oriente comprise approximately 70% of the total area of Bolivia, the Altiplano between 14-16% and the Yungas and Valles regions about 15% of the national territory.

The population was estimated at 5,915,000 in 1982, with a rate of population increase of 2.7%. Bolivia is among the least densely populated countries of South America, while its literacy rate and per capita income are also among the lowest in Latin America. The distribution of the population is extremely uneven with about 80.3% of the total population occurring in the Altiplano and the Yungas and Valles regions, while in the Oriente, vast tracts of land still await settlement.

Natural Resources. - Mean annual temperatures increase progressively from west to east - from a mean of 45 -50 F. in the Altiplano to temperatures averaging up to 80 F. annually in the rain forest and savannas of the northern Oriente. Precipitation is lightest in the Altiplano and heaviest in parts of the Oriente; it tends to decrease from north to south. Most of the rainfall occurs between October and April, but this varies considerably from year to year as well as seasonally. In 1956 and 1957, a sustained drought virtually destroyed the crops in the Altiplano. The rain-bearing winds of the Altiplano come from the Amazon basin in the east and reach the high plateau only after having dropped most of their moisture on the Oriente and the eastern slopes of the Andes. The amounts vary from about forty inches annually around Lake Titicaca to as little as two inches in the semideserts of the south. The Yungas region receives precipitation of up to sixty inches annually, while in the sheltered and densely populated valleys and basins of the Valles, rainfall averages from 25-35

inches. Rainfall is abundant and falls the heaviest in the summer months in the northern Oriente, but further south, in the Department of Santa Cruz, annual precipitation is from 40-60 inches.

Water Resources. - A scanty number of streams originate in the Cordillera Occidental and drain both eastward to the interior plateau and westward to the Pacific Ocean. Various small streams of the Cordillera Real drain westward onto the Altiplano, but the larger water-courses drain eastward toward the Amazon Basin or southward toward the La Plata Basin. Lake Titicaca is South America's largest lake and straddles the Peruvian border in the northern part of Bolivia. It has an extent of 3,500 square miles and is sufficiently large to exercise influence on the climate in its vicinity. The discharge of urban and industrial wastes into nearby rivers and streams without any kind of treatment is a common practice and many of the high lakes and streams are severely contaminated with discharges from mining operations. Although the actual extent of such pollution and its effects are not known, unsafe water supplies are said to be one of the major causes of health problems in Bolivia.

Forest Resources. - The extent of forest cover in Bolivia is estimated at 40-42%. According to some estimates, there are 300 tree species suitable for timber, resin or oil extraction to be found in the tropical, largely ever-green rain forests of the northern Oriente. However, because of problems of transportation, they are not readily exploitable. In the Yungas, the natural vegetation is montane rain forests. The valley and basins of the Valles region are covered with drought-resistant scrub and small trees while at higher elevations, there are only grasses and occasional stunted trees. The easternmost part of this region contains a strip of semi-deciduous forest from about Santa Cruz south to the Argentine border. In the southeastern Oriente, there is

semideciduous tropical forest with vegetation intermediate between rain forest and the dry forest of the Chaco region. There are no native trees in the Altiplano.

One of the major environmental problems of Bolivia is deforestation, a major cause of which is the gathering of wood for fuel and charcoal production. The clearing of forest land for agriculture is also an important cause of the loss of forest cover.

Soil Resources. - There exists a wide diversity of soils in Bolivia, although the actual composition is not well documented. The plateau floor of the Altiplano is made up of sedimentary debris washed down from the adjacent mountains and reaches enormous depths. The material frequently appears to consist of rock, but it is actually made up of compressed sandy materials, clays, and gravels. The soil powders readily, is highly susceptible to erosion and has so little organic material that fields are left fallow for periods of up to eight years. In the Oriente, alluvial soils of good quality exist along the courses of rivers and support high forest growth. About half of the Santa Cruz Department consists of poor quality sandy soil known as "pampa blanca."

The alluvial soils in the Valles and Yungas region are very fertile and support the country's most intensive agriculture. In the lowlands of the northern part of the Oriente, the topsoil is underlaid by a clay hardpan, causing poor drainage and converting much of the area seasonally to swamp. Soil erosion is an important problem in Bolivia and is most severe in the Yungas and Valles areas of the country because of the region's steep slopes.

Wildlife Resources. - Bolivia has a rich and varied wildlife resource. Several species of the camel family - the llama, alpaca, vicuña and guanaco - are native to the Altiplano. Also indigenous to this area are the scarce chinchilla and its still scarcer, long-tailed relative - the vixcacha. Other animals include

the Patagonian hare and the guinea pig, which has been domesticated as a source of meat.

The greatest variety and abundance of animals are found in the plain and forests of the Oriente and in the lower reaches of the Yungas. The best known and most spectacular of the bird species in the Altiplano and surrounding Andes mountains is the condor. The rhea, or South American ostrich, is found in the southern part of the highlands while a wide variety of bird species inhabit the vicinity of Lake Titicaca.

Wildlife serve as an important source of protein in many areas of the country. In certain parts of the lowlands of the Oriente, for example, the local population eats animals such as armadillos, wild pigs, coatimundis, alligators, snakes and certain birds.

Fish are abundant in many of the streams and lakes of Bolivia. Lake Titicaca provides several kinds of fish, among them rainbow trout, enormous salmon trout and a kind of bass called the "boga." Fish in the Pilcomayo River of the Valles region are reported to be so numerous that they are stranded in great numbers on its banks and sandbars during periods of low water.

The fish capacity of Bolivia's three major river basin areas has been estimated at 400,000 tons per year, but this resource is utilized only to a limited extent. The national consumption of fish was estimated at only 2,400 tons per year. There are no industries derived from fishing.

Mineral Resources. - Bolivia has enormous mineral resources, both in terms of size of deposits and variety of ores. Copper and tin, as well as gold and silver, were extracted during the pre-Columbian period; however, by the beginning of the nineteenth century the richest precious metal resources had been exhausted. Tin deposits are distributed in a belt that follows the Cordillera

Real, reaching almost to the Argentine border. It is often found in lodes that also contain other metals, such as zinc, silver, lead, bismuth, antimony and tungsten. Tin has been the bulwark of the Bolivian economy since the late nineteenth century. Production peaked during the 1920's, but a subsequent decline in the quality of ores has caused the closing of many of the mines and a scaling down of operations in others. Despite its prominence, the mining sector offers employment to only about 3% of the population.

Agriculture. - Bolivia has a total land area of about 109,858,000 hectares; nearly seven percent of this is classified as prime land for production of agricultural crops. About 56% of the 7.8 million hectares of prime crop land are not known to have ever produced agricultural crops while another 6.5 million hectares of more marginal land currently classified as pastures, ranges and forest are estimated to be capable of crop production. A high proportion of the land (approximately 32%) is in fallow, reflecting the traditional rotation system of the Altiplano and Valles regions. Fallowing may last from 3-10 years and can include from 10-85% of a farmer's land. Significant amounts of land, on the other hand, have been abandoned due to rampant erosion. This problem is most serious in the Valles and Yungas regions, especially on hillside plots. Only 12% of the area classed as prime land for crop production is currently being used.

Potatoes are the most important food crop and constitute the basic diet of the highland population. About 168,000 hectares were planted in 1980, mostly on the Altiplano, but also in the valleys and near Santa Cruz. Production tends to fluctuate, but the country generally is self-sufficient. Corn is the second most important food crop and is grown mainly in the valleys and lowlands. In terms of production value, potatoes, vegetables (including sweet corn, onions, tomatoes and green peas), and corn have been the most important

cro²ps. These and most other Bolivian crops are produced for subsistence consumption, with excesses made available for sale in urban markets.

The typical rural family cultivates only 1 to 2 hectares of land and derives its income principally from potatoes, barley, wheat, rice, vegetables and coca. The farm sector occupies as much as two-thirds of the population. Agricultural practices tend to be primitive and, with the exception of sugar cane, cotton and soybeans, crops in Bolivia are produced on a family scale. The use of fertilizers is low because of their high cost, and the use of pesticides is concentrated in the Santa Cruz region in the production of cotton, sugarcane and rice. Modern farm machinery is in only limited use in the country, and it ranks last in South America in the level of tractor use.

Livestock play an important role in the agricultural sector and most small farmers own some livestock. Beef cattle are the most important product of the Oriente, but cattle production is also important in the northern Altiplano. Sheep are raised in the plains, while llama and alpaca are kept in the higher, colder mountain regions. Livestock numbers tend to be large in relation to the carrying capacity of the land and overgrazing, leading to soil erosion, is the frequent result. Erosion is particularly severe in the Altiplano where large numbers of sheep have stripped the vegetation cover and compacted the soil.

III. Impact of Pesticide Purchase on the Environment and Mitigative Measures

The use of pesticides for the control of pests and diseases in Bolivia is very low despite the estimated 30% loss in potential crop yield sustained by farmers. Nevertheless, pesticide use is continually increasing, especially on crops produced on an industrial scale, such as cotton, sugarcane and soybeans; to a less extent, it is also increasing on rice, potatoes, tomatoes and vege-

tables in general, as well as fruit tree crops. According to figures released by the Ministerio de Asuntos Campesinos y Agricultura (MACA), Bolivia imported an average of 1,702,837 kilograms of pesticides per year during the period, 1979-82. In 1979, Leopoldo E. Caltagirone, entomologist, University of California, Berkeley, evaluated the need for pesticides by the small farmer in Bolivia and the risks involved with their use. In his report, he discusses the general ignorance and neglect of safety precautions in the handling and use of pesticides, especially among field workers, and he states that there seemed to be a high disregard for the toxicity of these materials among the persons responsible for their use.

Accurate data on the incidence of pesticide poisonings are not available, but information gained by the authors of this report, as well as others, indicates that this is a serious problem in Bolivia. Caltagirone considered that the risks to humans derived from an increase in the use of pesticides should be minimized if the existing legislation of the country were to be enforced adequately. In his report, he recommended the initiation of an aggressive program to develop integrated pest management programs to minimize pesticide use.

IV. Pesticide Procedures

It is AID policy to undertake a review of any of its assistance programs that are to be involved in the procurement or use of pesticides for the purpose of identifying and considering the possible environmental consequences of the proposed activities and to ensure that environmental factors and values are integrated into its decision making process (22 CFR Part 216). Any pesticide improperly used is harmful to humans, animals and the environment; however, their potential adverse effects can be reduced to a minimum through appropriate

public education programs and training courses for persons using these materials. A number of actions are proposed in this document to ensure that the use of pesticides does not present unreasonable hazards to the human population or the environment.

The relative toxicity of pesticides is determined by the oral administration of the chemicals to a population of test animals in the laboratory. The amount of the chemical required to kill 50% of these animals is known as the LD/50 value. The U.S. Environmental Protection Agency has ranked pesticides into the following four categories based on the value of their oral LD/50:

<u>Category</u>	<u>LD/50 Value (mg/kg)</u>	<u>Comments</u>
I	0-50	extremely hazardous
II	50-500	highly hazardous
III	500-5000	moderately hazardous
IV	greater than 5,000	slightly hazardous

A. The EPA Registration Status of the Pesticide to Be Purchased With AID Funds

The registration status of the pesticides selected for emergency purchase in Bolivia is shown in Table 1. All of the pesticides to be purchased are registered in the United States for general use, without restriction, except for propineb. Propineb is registered in W. Germany and has been scientifically evaluated by the Joint FAO/WHO Committee on Pesticide Residues. It has an established acceptable daily intake (ADI) of 0.005 mg/kg of body weight and maximum residue levels (MRLs)* as follows:

51

Bananas	1.	Melons	1
Beans	0.5	Potatoes	0.1
Carrots	0.5	Tomatoes	3
Cucumbers	0.05	Wheat	0.2
Lettuce	1		

B. The Basis for Selection of the Pesticides to be Purchased

The ideal way to develop a list of safe and effective pesticides is to have detailed information on both efficacy and cost/unit treatment for each candidate chemical. This coupled with information on economic damage thresholds (i.e., the level of a pest infestation below which it is uneconomical to treat the crop) and a knowledge of the chemical's toxicity characteristics can serve as a sound basis for pesticide selection. Unfortunately, data other than a chemical's acute toxicity are generally not available in Bolivia. Of the insecticides currently recommended for use by agricultural experiment stations most are too highly toxic for ready clearance under AID Regulation 16 [15] or they are chlorinated hydrocarbon compounds and have been banned for use in agricultural crops in most developed countries based on their persistent and bioaccumulative properties.

More than 75% of the insecticides recommended for use in the Santa Cruz Department by the local experiment station [3] are in the Toxicity Category I of the World Health Organization safety classification system. This toxicity category is reserved for pesticide chemicals which are considered to be too toxic for use by the general public. In the U.S. and most other developed countries, these chemicals are only sold to certified applicators and are never sold over-the-counter to the general public. Examples of such pesticides which

Table 1. Registration Status of Pesticides Selected for Emergency Disaster Relief Project

<u>Pesticide</u>	<u>Type of Pesticide</u>	<u>Tolerances Have Been Obtained 1]</u>	<u>EPA Registration Category</u>
acephate	Insecticide	M, S, F	general use
carbaryl	Insecticide	F, M, P, R, So, S	general use
captafol	Fungicide	M, P	general use
chlorpyrifos	Insecticide	F, M, So, S	general use
copper oxychloride	Fungicide		general use
dimethoate	Insecticide-Acaracide	F, M, P, So, S	general use
maneb	Fungicide	F, M, P	general use
mancozeb	Fungicide	M, P, S	general use
endosulfan	Insecticide-Acaracide	F, M, P	general use
fenvalerate	Insecticide	F, M, P, S	general use
permethrin	Insecticide	M, P, S	general use
polyram	Fungicide	P	general use
propineb	Fungicide	2]	not registered 3]
trichlorfon	Insecticide	F, M	general use
tridemorph	Fungicide	B	general use
trifluralin	Herbicide	M, So	general use
diuron	Herbicide	M, So, P	general use
alachlor	Herbicide	F, M, P, So, S	general use
methoxychlor	Insecticide	F, M, S, So, P, R	general use
propanil	Herbicide	R	general use
2,4-D	Herbicide	M, P, R, So	general use
dalapon	Herbicide	F, M, P, So, S	general use
atrazine	Herbicide	M, So	general use

61

Table 1. (cont.)

<u>Pesticide</u>	<u>Type of Pesticide</u>	<u>Crops For Which EPA Tolerances Have Been Obtained 1]</u>	<u>EPA Registration Category</u>
metribuzin	Herbicide	M, P, S	general use
acifluorfen	Herbicide	R, S	general use
bromacil	Herbicide	C, Pi	general use
hedonal *	Herbicide	F, M, P, So, S	general use
metolachlor	Herbicide	M, P, So, S, F	general use

*mixture of dichlorprop and 2,4-D

1] R = rice, M = maize, S = soybeans, So = sorghum, F = beans, P = potatoes

B = bananas, C = citrus, Pi = pineapples

2] Residue tolerances have not been established by EPA, but have been recommended by FAO/WHO

3] Has obtained MACA registration

62

are in common use in Bolivia include: Lannate, parathion, paraquat, methidathion, azodrin, phosphamidon and gusathion. The chlorinated hydrocarbon, Endrin, is also widely recommended and used in Bolivia and intensively used on rice and cotton. The first priority in selection of an alternate list to the above mentioned chemicals was to identify candidate chemicals that have a WHO toxicity Classification of II or III [17]. All chemicals in these categories are considered "relatively" safe even for use by small farmers that have had minimal or no exposure to pesticide safety training. Other than in cases of gross misuse, as in the accidental or intentional ingestion of the undiluted formulation, it is not expected that fatalities would result from exposure to these chemicals.

In addition to the above safety criteria the pesticide had to be "presumed" to be efficacious for the purpose(s) intended. For all crops this selection was made after a careful review of several locally available research/extension documents [3] wherein could be found an extensive discussion of the major plant protection problems, including listings of those crop pests considered to be of major economic importance. In addition, crop protection researchers, extension agents, farmers, officials from farm cooperatives, and pesticide sales agents were interviewed.

All of the above, coupled with efficacy information for the selected pesticides on the same or similar crop pests in other countries were used to develop a list of "acceptable" pesticides both in terms of safety to the pesticide applicator and expected effectiveness against the target pest population. Every attempt was made to locate and select pesticides of U.S. origin since the data base on the efficacy of these products was more familiar to the preparers of this assessment. However, other pesticides having international

clearances or clearances for the same or similar use in one or more major developed nations, were also considered.

The selection process described above, with regard to "presumption" of efficacy and in the absence of solid cost vs. benefit data can only be justified under "emergency" conditions. Therefore, special provision has been made to obtain the necessary data essential to a truly cost-effective pesticide selection process. This will include efficacy comparisons of a variety of pest control agents, selected without regard to origin, that meet requisite safety criteria and have a valid registration label in one or more major developed countries for the same use. (see Section V)

C. The Proposed Method or Methods of Application Including Availability of Appropriate Application and Safety Equipment

Most of the pesticides will be emulsifiable concentrates or wettable powders and will be applied by means of hand operated backpack sprayers. The larger farmers will sometimes use motorized backpack sprayers and still larger farmers may use tractor drawn spray rigs. Granules will be applied directly by hand or with simple hand operated granular applicators. No pesticides will be applied by air unless this use is specifically permitted on the label and all labelling precautions have been fully met. All pesticides which are purchased will have a Spanish label, and this label will be in general conformity with sample labelling approved at the Cartagena Conference (7)

D. "Any Acute and Long-Term Toxicological Hazards, Either Human or Environmental, Associated With the Proposed Uses of the Pesticides and Measures Available to Mitigate the Hazards"

Table 2 provides information on the acute oral toxicities of the various pesticides along with the WHO classification of the pesticide's active ingredient. None of the pesticides are known to have adverse chronic toxic effects at the exposure levels expected to be encountered, when used according to label directions.

None of the pesticides are highly persistent or bioaccumulative and none present special adverse hazards to either fish or wildlife. Special precautions required with regard to bees, fish and wildlife are provided on the labels.

Careless use of the organophosphate and carbamate insecticides approved under this assessment will lead to depressed levels of the enzyme, acetylcholinesterase, in the blood.

Table 2. Acute Oral LD/50 Data on Pesticides Selected for Emergency Disaster Relief Purchase

<u>Pesticide</u>	<u>Acute Oral LD/50 (mg/kg body weight)</u>	<u>WHO Toxicity Category</u>
acephate	866-945	
carbaryl	500-850	II
captafol	5,000-6,200	*
chlorpyrifos	97-276	II
copper oxychloride	700-800	
dimethoate	215	II
maneb	6,750	*
mancozeb	>8,000	*
endosulfan	30-110	III ^{1]}
fenvalerate	451	
permethrin	>4,000	
polyram	>10,000	
propineb	8,500	*
trichlorfon	150-400	II ^{2]}
tridemorph	1,112	II ^{3]}
trifluralin	>10,000	*
diuron	3,400	*
disachlor	1,800	
methoxychlor	6,000	*
propanil	1,384	
2, 4-D	370	II
dalapon	970	*

Table 2. (cont.)

<u>Pesticide</u>	<u>Acute Oral LD/50 (mg/kg body weight)</u>	<u>WHO Toxicity Category</u>
atrazine	1,780	
metribuzin	1,100-2,300	
acifluorfen	1,300	
bromacil	5,200	
hedonal	800	
metolachlor	2,780	

* not classified by the WHO recommended scheme

1] 5% dust formulation

2] 50% EC formulation

3] 75% EC formulation

6/1

E. The Effectiveness of the Pesticides to Be Purchased for the Proposed Use

Some of the pesticides to be purchased are known to be effective based on their current widespread use by Bolivian farmers and their recommendation in a local extension publication [3]. Other pesticides were selected on the basis of their known efficacy in other parts of the world against the same or similar pest species. A special effort was made to identify the least expensive pesticide which would have the needed pest control characteristics but which would still fall below the WHO Toxicity Category II Classification and would therefore be suitable for general use purposes if registered in the U.S.

Other factors that were considered in the selection of these chemicals were the possible adverse effects of the pesticide on beneficial parasites and predators and the likelihood of the early onset of pest resistance with continued use; for example, pyrethroids were not selected, when suitable alternatives could be identified, since early buildup of resistance to this group of pesticides is known to be a problem.

F. Compatibility of the Proposed Pesticides With Target and Non-Target Ecosystems

All of the pesticides will be used on permanently cleared farm settings where severe ecological disruptions have already occurred. Due to the relative non-persistence of the compounds selected, runoff into aquatic sites is expected to be minimal except for areas where severe sheet erosion occurs shortly after application. With the exception of aerial applications, drift into nontarget areas is expected to be minimal. Since aerial applications are mostly performed on cotton and the level of cotton production is rapidly decreasing each year [10,16], the adverse impact is expected to be minimal.

G. The Conditions under Which the Pesticides are to Be Used, Including
Climate, Flora, Fauna, Hydrology and Soils

The pesticides will be used in the following Departments of Bolivia: Santa Cruz, Chuquisaca, Potosi, Cochabamba, La Paz, Oruro, and Tarija. All of these agroecological zones are described in detail in the Bolivian Country Profile [14] and a brief review of these conditions was presented in Section II above.

H. The Availability and Effectiveness of Other Pesticides or Non-Chemical Control Methods

The pesticides proposed for purchase in this assessment are all known to be readily available even though not all of them have previously been used in Bolivia, due to a lack of a strong marketing emphasis by some developed country pesticide manufacturers in the Andean area. Also, the Bolivian emphasis, placed on low cost pesticide products with total disregard for farmer safety, has resulted in certain pesticides not being available in local pesticide sales stores.

A priority purpose of this assessment is to introduce to the maximum extent possible a variety of relatively safe pesticides as replacements for the more highly toxic pesticides which now enjoy widespread use. It is expected that this substitution can be made without a loss of efficacy and with a substantial decrease in harmful effects on nontarget beneficial insects.

Practical, non-chemical control methods do not exist in Bolivia. However, based on information contained in a recent survey of pest control problems in Santa Cruz [4] a number of researchable biological control possibilities exist which could well serve as important segments of future integrated pest manage-

ment programs.

1. Bolivia's Ability to Regulate or Control the Distribution, Storage, Use and Disposal of Pesticides That Will be Purchased

Bolivia has adequate legislation [5] to allow for strict regulation of pesticides in terms of registration, importation, sale and control of use. However, like most other developing countries, there is virtually no implementation of the law and small farmers can buy any pesticide available in the local stores, regardless of its toxicity. All products imported into the country, however, are subjected to technical review and all national labelling and packaging requirements must be met. The situation of gross pesticide misuse described by Caltagirone in 1979 [1] is still the same today. He describes a situation characterized by inadvertent poisonings, deaths from intoxication, excessive applications of pesticides, and general ignorance and neglect of precautions in handling and use, especially among field laborers. 1979 study by the Instituto de Seguridad Ocupacional also indicates that poisonings and deaths from pesticide exposure are a serious problem.

Storage of pesticides is not considered to be a serious problem since most of the potential pesticide distribution outlets (pesticide stores and farmer cooperative organizations) appear to have adequate facilities and storage sites.

Within the context of this assessment, disposal of pesticides should not be a problem. Pesticide purchases will be limited to a single year's supply. In the event of an overage at the end of the season, the product will be distributed during the ensuing growing season. It is expected that most of the pesticides purchased will have a shelf life extending beyond two growing



seasons.

The demand for pesticide inputs in Bolivia is greater than the available supply so aging stocks have never been a problem. This is also true in most other developing countries except where excessive "dumping" of pesticides has been made by bilateral donors. Usually, these donors are countries having a highly developed pesticide industry.

Distribution problems are not encountered with medium to large scale farmers since the package sizes normally imported are closely enough matched to their needs that repackaging is not necessary. Smaller farmers, on the other hand, usually require smaller containers than are usually imported and in these cases the repackaging which occurs in-country is under little or no supervision. Also, they tend to buy from third level vendors [1]. Dust and granular formulations are frequently dispensed in unlabeled Kraft paper bags of very poor quality while liquids are dispensed in any convenient container, including corked beer bottles and soda pop containers with no labelling. Not only does the small farmer risk excessive exposure from these inappropriate packages but the repackagers themselves are greatly at risk. Furthermore, the repackaging facility itself almost surely poses a major point source of pollution from the improper disposal of large waste containers and spilled liquids and granules. Often these wastes are dumped directly into rivers and streams, a practice which can result in massive fish kills or in gross disturbances of the natural ecological balance. The opinion is often expressed that repackaging operations should not be permitted in developing countries; however, as long as a profit can be made by subdividing larger packages into smaller saleable units, the practice will continue and, if properly controlled, it can legitimately serve to create new jobs and increase in-country recycling of farm income.

C. The Role of the Small Farmer in the Areas of Pesticide Users and Applicators of Pesticides

The typical small farmer in the areas of Potosí, Santa Cruz, Chuquisaca, Oruro and Tarija is rarely, if ever, visited by extension agents and receives little or no practical instruction on pesticide use from any source other than from the pesticide salesman or pesticide distribution outlet directly supplying the pesticide. Word-of-mouth dissemination between farmers is about the only other form of information exchange and this is subject to the distortions and compounding of errors commonly experienced in this type of communication. The small farmer is not the only individual lacking in adequate information on proper use and application of pesticides. Almost all other groups and individuals comprising the agricultural production chain, including: extension agents, pesticide distributors and salesman, charitable and religious organization workers and agricultural cooperative staff personnel, are also lacking in adequate information on safe pesticide use practices. There are almost no extension bulletins available and very few of the professionals have received any training, even of a short term nature, in proper pesticide use.

Since the provision of direct and formalized instruction to the small farmer is usually impossible, any improvement in safe pesticide use procedures must be achieved through those individuals who directly or indirectly affect and interact with the small farmers. This includes the following types of individuals:

- intermediate sized farmers who employ small farmers on a part time basis or who provide guidance to smaller farmers
- staff members of agricultural cooperatives who provide advice and guidance to their small farmer members
- extension workers of all types
- appropriate staff from charitable and religious and PVO organizations who interact with small farmers
- owners and employers of stores which sell pesticides to small farmers
- ing. agronomos, researchers and other technical staff at universities, research institutes and government agencies who have direct or indirect involvement in agricultural production

A training course will be developed for these individuals and will be conducted, in Spanish, in the following locations: Cochabamba, Oruro, Potosí, Santa Cruz, Sucre, Tarija and La Paz.

Local arrangements for this training will be made by the organization(s) who will buy and distribute pesticides under the AID disaster assistance subsidy. These groups will provide the following services:

- where available,
 - a suitable location for the training session including a room with adequate seating, acoustical, ventilation and service facilities, including meals
- transportation of students to and from training site to central locations in nearest city
- time off for all relevant personnel of the pesticide distribution organization to attend the training sessions
- widespread advertisement of the course with special efforts made to inform all university, governmental, volunteer, and pesticide sales/distribution organizations within the region, both by personal contact as well as by mail and poster advertisements
- travel and per-diem arrangements for course attendees

Development and conduct of the training course will be the responsibility of the Consortium for International Crop Protection (or other contractor). Course conduct will be patterned after local needs and will be aimed at promoting safe pesticide use practices. Maximum utility will be made of local talent in the conduct of the training course.

A simple training manual will be distributed at the training course and information on all pesticides which are included in the AID emergency pesticide purchase will be included in the manual along with directions for their use.

One training course will be conducted in each of the seven areas and its duration will be 2-3 days depending on course content. A budget for this training program is provided in Section VII.

K. The Provisions Made for Monitoring the Use and Effectiveness of the Pesticides

The Ministry of Agriculture and Rural Affairs (MACA) in La Paz has a pesticide residue/formulations laboratory which is reasonably well equipped and that with some additional equipment [Table 3] could become operational. The chemist in charge is reportedly already trained in pesticide residue analysis but judging from the current status (laboratory not operating) has either not had the time or the inclination to get the operation on-stream.

ST/AGR will also attempt to arrange for assistance in training in formulation analysis but strongly recommends that this effort be deferred until a genuine residue analytical capability has been developed. If and when such a facility becomes operational, its utility in monitoring pesticide use (or misuse) by small farmers is obvious and ST/AGR would be delighted in assisting with design of a meaningful monitoring program.

The quality of imported pesticide formulations from reputable developed country concerns is usually not a serious problem since the larger manufacturers can usually be depended upon to furnish products which will comply in all respects, including percentage of active ingredient, with the registered labelling. If, however, should any specific shipment or lot of chemical become suspect, ST/AGR would arrange for a referee analysis by an unbiased third party.

V: Technical assistance initiatives to aid in the improvement of pest and pesticide management programs in Bolivia.

Integrated pest management programs use a combination of control methods to combat a specific pest species, or complex of pest organisms, in order to suppress and maintain the pest population at a level that does not cause any economic loss to the crop. The control methods selected for use and integration in these programs are the naturally occurring mortality factors of the environment, such as natural enemies, diseases and host plant resistance, together with man-made chemicals. The employment and integration of these methods is based on criteria developed to identify whether, when and where control of the pest is justified. The chemicals used in these programs are selected on the basis of criteria which seek to minimize the risks to humans, nontarget organisms and the environment.

In keeping with this philosophy and, because many of the chemicals currently in use for the control of pests in Bolivia are extremely toxic, a number of initiatives are described below which are designed to provide improved pest control as well as to reduce the hazard to humans and the environment from the use of pesticides.

A. Training in Pesticide Safety

A second aspect of the technical assistance program which is being recommended for consideration and adoption is the presentation of a series of three-day workshops in the safe and efficient use of pesticides, i.e. pesticide management. This training is intended for persons who deal directly with pesticides, such as farmers, pesticide applicators, formulators, extension agents, etc. Each workshop will be designed to accommodate 15-20 trainees. The latter should have similar backgrounds with regard to level of education and training. The purpose of this training is to improve the efficiency and safety with which pesticides are used in integrated pest management systems and thereby help to minimize their potentially harmful side effects to health, the agro-ecosystem and the environment.

Among the topics which will be covered in these workshops are the following:

- (1) the place of pesticides in integrated pest management systems
- (2) establishing the need to use pesticides (pest monitoring, economic thresholds, etc.)
- (3) social and economic aspects of pesticides

- (4) properties of pesticides (chemistry, toxicology, mode of action.)
- (5) pesticide regulation and registration (safe handling of pesticides, labelling, etc.)
- (6) pesticide application (formulations, application methods in relation to the target, etc.).

Courses will be conducted by two CICP consultants in collaboration with local Bolivian technical specialists. A preliminary visit to Bolivia to plan, coordinate and schedule this series of workshops will be necessary 2 or 3 months prior to their presentation. During this visit, the program of the workshops will be discussed and finalized in consultation with MACA, IBTA, CIAT and other officials, and necessary administrative arrangements made. Selection of the appropriate training site, local instructors, housing facilities, etc. will be made at this time. The course could be presented in the classroom of a local university or technical institution, or in the facilities of a hotel, grower's association, etc. The use of audiovisual aids is contemplated so a site with electrical power is necessary. A budget for these training workshops is provided in Section VII, A.

B. Program for monitoring pesticide contamination levels and need for training in residue analysis

The extent of pesticide contamination in the environment and the actual hazard that the use of these toxic substances presents to humans in Bolivia has not been documented at the present time, but in order to ensure and protect the safety of humans from the consequences of their use, a quantitative measure of their residue levels has to be obtained. The acquisition of such information is essential and necessary to provide an objective basis for evaluating the

problem presented by the use of pesticides. These data are also vital to ensure general compliance with standards established by a regulatory agency and to provide support for a program of enforcement. When obtained as part of an ongoing monitoring program, these data are also critical for revealing alarming trends in the level of pesticide contamination and thus can alert authorities of the need to take corrective action.

Environmental samples should also be taken to determine and evaluate the extent of the contamination by pesticides. These samples should be systematically collected and analyzed and should consist of potato tubers, stems, leaves and roots of the potato plant. Also, soil and water samples taken from the fields where this crop is grown should be analyzed.

C. Training of laboratory technicians

The head of the pesticide residue analytical laboratory has had sufficient training to conduct the analyses of these samples; however, his two chemist assistants, Walter Claros and Margarita Ureña, have not. Therefore, we recommend that these two individuals attend a six-week course on methods of residue analysis presented by the University of Miami in Florida. This course provides practical knowledge in sample extraction and clean-up, use of analytical equipment and identification/quantification, pesticide safety practices and basic information on the chemistry of herbicides, fungicides and insecticides and their fate in the environment.

D. Review of Existing Pesticide Repackaging Facilities

In cooperation with MACA officials, two consultants from the U.S. will review the pesticide formulating/repackaging/labelling practices of three pesticide repackaging facilities located in Santa Cruz, La Paz and Sucre, respectively. Items that will be considered during this two week review include: a) adequacy of facilities in terms of quality control procedures, occupational safety, storage, disposal, and pollution potential; b) acceptability of specifications for inert formulating ingredients and conformity of the latter to these specifications; c) conformity of formulated products to CIPAC physical and chemical specifications; d) adequacy of packaging materials and labelling; e) distribution system for moving pesticides to retail outlets and small farmers. Upon completion of the review, the team will prepare recommendations for future actions and propose a "standard" for a practical and safe reformulating facility. The assistance of U.S. state and federal formulation chemists will be solicited for help in analyzing randomly collected off-the-shelf samples and a special report on the analyses of these formulations will be submitted to MACA and USAID.

VI. Summary of Specific Actions to Be Considered In Support of Purchase of Pesticide Inputs Under the Bolivian Agricultural Disaster Assistance Project

- A. Purchase of Pesticide Inputs (to be filled out by Mission)
- B. Purchase of Pesticide Application Equipment (to be filled out by Mission)
- C. Purchase of Laboratory Supplies for Equipping a Pesticide Analysis Laboratory
(See List as supplied by MACA and amended by USAID/La Paz)
- D. Assist MACA personnel in setting-up and training personnel for a pesticide residue analysis laboratory

Conduct training programs on safe use of pesticides in the following areas: Cochabamba, Oruro, Potosi, La Paz, Santa Cruz, Sucre and Tarija.

Assist the government of Bolivia in developing environmental criteria, occupational health standards and packaging quality specifications for existing pesticide repackaging facilities

Provide training to medical and paramedical personnel in clinics, hospitals, and at private physician's offices. Training to consist of information related to the management and recognition of pesticide poisonings and will be in the following areas: Cochabamba, Oruro, Potosi, La Paz, Santa Cruz, Sucre and Tarija. Also, distribute free atropine treatment kits to all interested parties.

VII. Proposed Budgets for Various Initiatives Covered in this Environmental Assessment

A. Training Workshop

Review of Repackaging Facilities

& Activation of Pesticide Analysis Laboratory - Training, Supplies and Equipment

G. Training of Medical and Paramedical Personnel

A. BUDGET FOR BOLIVIA PESTICIDE MANAGEMENT TRAINING WORKSHOP

SEPTEMBER 1984

<u>Pre-workshop expenses</u>	<u>U. S. Dollar Account</u>	<u>Peso Account (U. S. Dollars)</u>
One U.S. consultant to Bolivia in July 1984 for two weeks to select training sites and local coordinator:		
Airfare San Francisco/La Paz-RT	\$ 1,697	
Intra-country travel: La Paz/Santa Cruz/ Cochabamba/Sucre/Potosi/Tarija/Oruro/La Paz	150	
Per diem:		
2 days La Paz @ \$47/day	94	
2 days Santa Cruz @ \$37/day	74	
2 days Cochabamba @ \$35/day	70	
8 days other cities @ \$24/day	192	
Consultant fee 14 days @ \$150/day	2,100	
DBA Insurance	<u>68</u>	
Total pre-workshop expenses	<u>\$ 4,445</u>	
 <u>Workshop expenses</u>		
Instructors:		
Two U.S. consultants, one Bolivian coordinator and 5 Bolivian counterparts to participate for one month each:		
Airfare Ithaca/La Paz-RT	\$ 1,718	
Airfare San Francisco/La Paz-RT	1,697	
Airfare and ground transportation for intra-country travel for eight @ \$150 each	1,200	
Per diem for eight instructors:		
7 days each @ La Paz @ \$47/day	2,632	
6 days each @ Santa Cruz @ \$37/day	1,776	
3 days each @ Cochabamba @ \$35/day	840	
12 days each in other cities @ \$24/day	2,304	
Fees:		
Bolivian coordinator - one month	100	
Two U.S. consultants - 33 days each @ \$200/day	13,200	
Five Bolivian counterparts - one month @ \$60/each	300	

BUDGET - CONTINUED
 BOLIVIA PESTICIDE MANAGEMENT TRAINING WORKSHOP
 SEPTEMBER 1984

<u>Workshop expenses (continued)</u>	<u>U. S. Dollar Account</u>	<u>Peso Account (U. S. Dollars)</u>
Trainees:		
Airfare 140 trainees @ \$40 each		\$ 5,600
Per diem for 140 trainees 4 days @ \$15/day		8,400
Training materials @ \$15/trainee		2,100
Hall rental		800
DBA Insurance	\$ 429	
Training manual duplication - 200 copies	1,000	
Telephone & cable expenses for Bolivian coordinator	<u>100</u>	
Total workshop expenses	<u>\$27,296</u>	<u>\$16,900</u>
Total direct cost	<u>\$31,741</u>	<u>\$16,900</u>
IPPC overhead - 21% of total direct costs	<u>\$ 6,666</u>	<u>\$ 0</u>
Grand Total	<u>\$38,407</u>	<u>\$16,900</u>

52

C. BUDGET FOR REVIEW OF EXISTING PESTICIDE REPACKAGING FACILITIES

Two consultants from U.S. to advise on occupational health standards, environmental criteria and packaging quality specifications: 1 trip at total of 4 man weeks \$13,000

D. BUDGET FOR PESTICIDE ANALYSIS TRAINING

Training for two chemists at U. of Miami for 6 weeks (\$ 9,900) *

Per diem plus travel for two chemists for training at the U. of Miami \$ 8,548

E. BUDGET FOR PESTICIDE ANALYSIS LABORATORY

(To be based on whether supplies are for residue lab, formulations lab, or both. Mission input needed)

* Institutional costs to conduct training; no charge to project.

83

G. BUDGET FOR TRAINING OF MEDICAL AND PARAMEDICAL PERSONNEL

Train-the-trainer training at the University of Miami for 2 TDY employees from the GOB Ministry of Health	\$
In country travel and per-diem for MOH employees for one week stops at Cochabamba, Oruro, Potosi, La Paz, Santa Cruz, Sucre and Tarija	\$
Atropine, 2-PAM and syringes for distribution to hospitals, clinics and physicians in high pesticide use areas	\$10,664

Table 3. Supplies for Laboratorio de Pesticidas de MACA

The following items as submitted on the master list from MACA are suitable for purchase for use in pesticide residue analysis:

Items: 1, 29-33, 42-49, 94-96, 103-106, 115-117, 183-185 (From List #1)

Items: 2, 3, 4, 6, 7, 9, 12, 14-22, 24-25, 28-29 (From List #2)

Items: 8, 9, 10, 11, 23, 24, 25, 26, 28-36 (From List #3)

Items: none (all available from USEPA free of charge) (From List #4)

Items: 1, 5, 7, 8, 9, 10 (From List #5)

All other materials requested are for a pesticide formulation analysis facility. It is not recommended that these supplies be purchased at this time since the same group of chemists could not handle both residues and formulations in an effective manner. If monies are available, it is recommended that they be held for possible future use in the pesticide residue area later in 1984 or 1985.

VIII. References Cited

1. Caltagirone, L.E. 1979. Use of pesticides by small farmers in Bolivia: an assessment. Consortium for International Crop Protection report for USAID. 58 pp.
2. CIAT/BTAM. 1980. Proteccion de Cultivos. Santa Cruz, Bolivia. Investigacion y desarrollo. 66 pp.
3. CIAT/Estacion Experimental Agricola de Saavedra. 1983. Guia Practica para el Agricultor y el Ganadero. 100 pp.
4. Clarke, R.O.S. 1983. Plant protection problems and control strategies for the Department of Santa Cruz, Bolivia. CIAT/BTAM Working Paper No.31 54 pp.
5. Government of Bolivia. 1972. Decreto Supremo No. 10283. 36pp.
6. Hawes, B.A. and J.D. Candia. 1983. Interdisciplinary integrated pest management (IIPM) and environmental assessment of the use of pesticides in the Chapare region of Bolivia. Consortium for International Crop Protection report for USAID. 51 pp.
7. IICA. 1982. Reunion de consulta sobre la armonizacion de etiquetado y registro de plaguicidas para los paises del area andina, Bolivia, Colombia, Ecuador, Peru, Venezuela. Proceedings of a meeting held in Cartagena, Colombia. August 23-26, 1982. 75 pp.
8. Inter-American Development Bank. 1983. Economic and Social Progress in Latin America. Natural Resources. 398 pp.
9. MACA. Bolivia. 1982. Boletin Informativo No. 1/82. Lista de Productos Registrados con Vigencia hasta el 30 de Septiembre. 19 pp.
10. MACA (Direccion de Planificacion Sectorial). 1982. Diagnostico y Programa 1982-1984 Sector Agropecuario. 463 pp.

11. MACA/USAID. 1983. Estudio de pronostico agricola. 15 pp. + 2 appendices
12. Moore, J. E. and R. Baldomar. 1979. Investigaciones sobre proteccion de cultivos en el departamento de Santa Cruz, 1977/78. CIAT/BTAM Informe No. 4. 67 pp.
13. Pruet, C. S. and E. Colque A. 1980. Control integrado de plagas de insectos en la caña de azucar en Santa Cruz. Bolivia. CIMCA Documento de Trabajo No. 1. 38 pp.
14. Science and Technology Division, Library of Congress. 1979. Draft Environmental Report on Bolivia. 62 pp + Appendix. (Prepared for the U.S. Man and the Biosphere Secretariat)
15. U.S. Government Code of Federal Regulations. 1980. Agency for International Development. 22 CFR Part 216. Environmental Procedures. 13 pp.
16. Vaughan, M. 1979. Control integrado de plagas en Bolivia. Informe de viaje del Oficial Regional de Proteccion Vegetal. FAO internal report. 45 pp. + 6 appendices.
17. WHO Chronicle. 1975. Recommended classification of pesticides by hazards. Vol 29: 397-401.