

BIBLIOGRAPHIC DATA SHEET

1. CONTROL NUMBER  
PN-AAK-296

2. SUBJECT CLASSIFICATION (695)  
DA00-0000-6512

3. TITLE AND SUBTITLE (240)

Bolivia: a country profile.

4. PERSONAL AUTHORS (100)

5. CORPORATE AUTHORS (101)

Evaluation Technologies, Inc.

6. DOCUMENT DATE (110)

1978

7. NUMBER OF PAGES (120)

102p.

8. ARC NUMBER (170)

9. REFERENCE ORGANIZATION (190)

ETI

10. SUPPLEMENTARY NOTES (500)

~~Country Profile~~  
(Prepared for AID's office of Foreign Disaster Assistance)

11. ABSTRACT (950)

BR

~~Statistics~~  
surveys

communications

12. DESCRIPTORS (920)

Bolivia  
profiles  
government  
disasters  
population

health housing  
nutrition geography  
agriculture power  
transportation  
economic conditions

13. PROJECT NUMBER (150)

-

14. CONTRACT NO. (140)

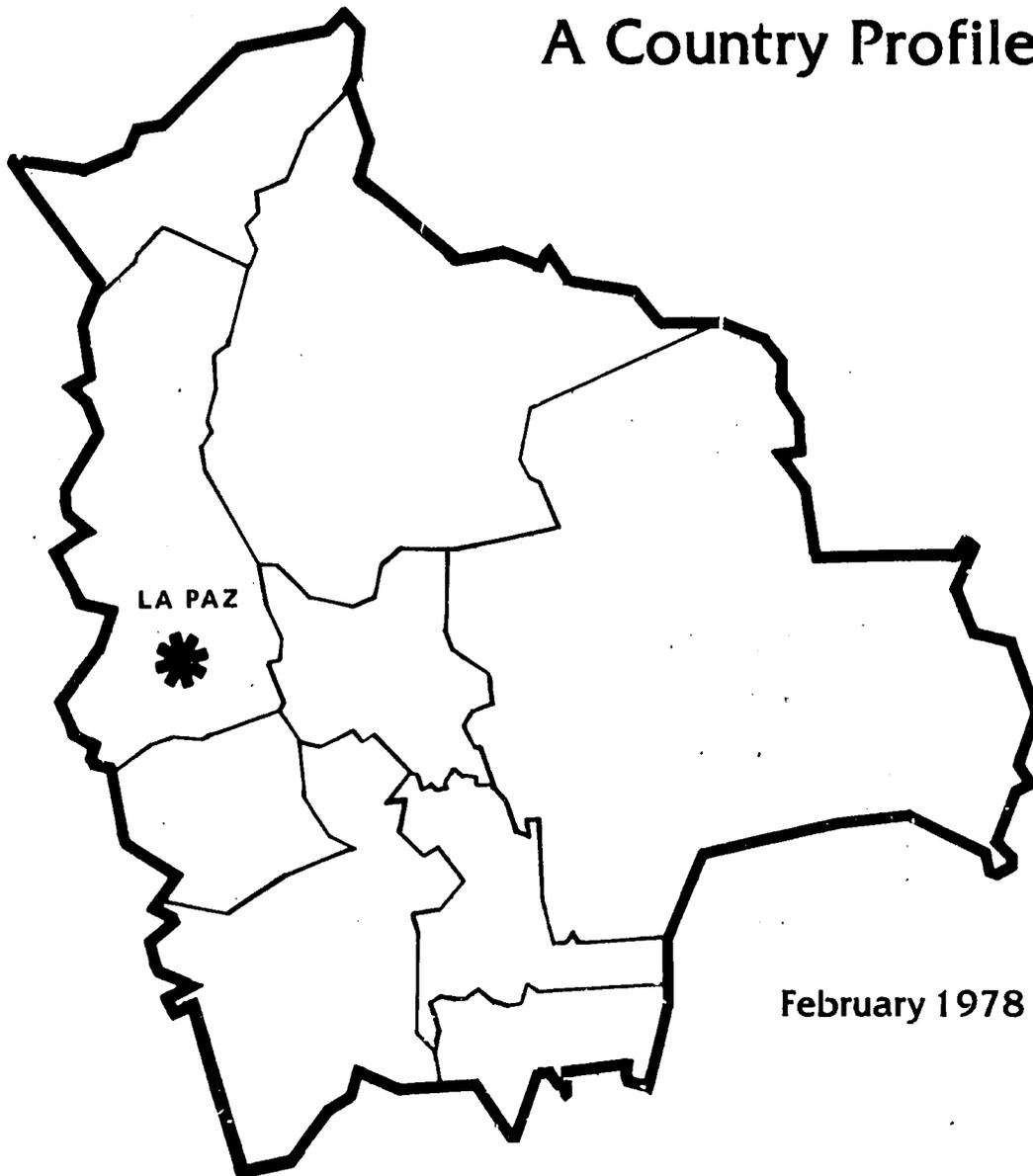
AID/SOD/PDC-C-0283

15. CONTRACT TYPE (140)

16. TYPE OF DOCUMENT (160)

# **Bolivia**

## A Country Profile



February 1978

Office of Foreign Disaster Assistance  
Agency for International Development  
Washington, D.C. 20523



OFDA COUNTRY PROFILES: APRIL 1981

AFRICA

Cape Verde  
Chad  
Djibouti  
East Africa Regional Profile  
Ethiopia  
Mali  
Mauritania  
Niger  
Sahel Transportation Survey  
Senegal  
Somalia  
Uganda  
Upper Volta  
Zaire

ASIA

Bangladesh  
Burma  
India  
Indonesia  
Malaysia  
Nepal  
Pakistan  
Philippines

CARIBBEAN

CARICOM Regional Profile  
Dominican Republic  
Haiti

LATIN AMERICA

Bolivia  
Chile  
Ecuador  
El Salvador  
Guatemala  
Honduras  
Nicaragua  
Peru

NEAR EAST

Turkey

SOUTH PACIFIC

Fiji  
Tonga  
Western Samoa

INDIAN OCEAN

Island Countries of the  
Indian Ocean

BOLIVIA: A COUNTRY PROFILE

prepared for

The Office of U. S. Foreign Disaster Assistance  
Bureau for Private and Development Cooperation  
Agency for International Development  
Department of State  
Washington, D. C. 20523

by

Evaluation Technologies, Inc.  
Arlington, Virginia  
under contract AID/SOD/PDC-C-0283

The profile on Bolivia is one in a series designed to provide baseline country data in support of the planning, analysis and relief operations of the Office of U. S. Foreign Disaster Assistance (OFDA). Content, scope and sources have evolved over the course of the last three years, and no doubt will continue to do so. The relatively narrow focus is intentional. To avoid redundancy, some topics one might expect to find in a "country profile" are not covered here.

If the information provided can also be useful to others in the disaster assistance and development communities, so much the better. Every effort is made to obtain current, reliable data; unfortunately it is not possible to issue updates as fast as changes would warrant. A cautionary note, therefore, to the reader: statistics are indicators at best, and if names and numbers matter, the bibliography will point to a current source.

We invite your comments and corrections. Address these and other queries to OFDA, AID, as given above.

February 1978

CONTENTS

List of profiles.....	1
Preface.....	11
General information.....	1-6
Geographic codes.....	1
Country names.....	1
Ethnic and social groups.....	1
Languages.....	2
Religion.....	2
Official holidays.....	2
Currency exchange rate.....	3
Host mission in US.....	3
US mission to Bolivia.....	3
Treaties and agreements.....	4
Travel and visa information.....	6
Time zones.....	7
Government.....	7-9
National government.....	7
Regional organization.....	7
Recent events.....	8
Key political figures.....	9
Disaster preparedness.....	10-22
Host disaster plan.....	10
US plan.....	12
Contact list.....	14
Major volags.....	15
International organizations.....	16
GOB capacity.....	17
Inventory of host resources.....	17
Disaster types.....	18
US volags.....	18
Population.....	23-28
National population.....	23
Regional population by departments.....	23
Urban/rural distribution.....	27

Health, nutrition, and housing.....	29-51
Major health problems.....	29
Vital statistics.....	32
Facilities and services.....	32
Distribution.....	33
Diet: MDR/intake.....	39
Drug habit.....	44
Housing settlements.....	45
Housing policies and institutions.....	47
Housing types, materials, construction and services.....	48
Public utilities and services.....	50
Economy.....	52-55
Overview of economy.....	52
Aid and other economic assistance.....	53
Trade.....	54
GNP.....	54
Imports.....	55
Agriculture.....	56-64
Overview of agricultural sector.....	56
Production.....	57
Agricultural imports.....	62
Agricultural exports.....	63
Physical geography.....	65-71
Climate by natural region.....	65
Temperatures.....	66
Rainfall.....	66
Landforms.....	67
Land use.....	68
Resources.....	69
Hydrography.....	69
Mountains.....	71
Transportation and logistics.....	73-88
Summary of road system.....	73
Traditional transport.....	73
Vehicles.....	73
Surface distances.....	74
Railway system.....	78
Rail carriers.....	79
Ports.....	79
Air transport.....	80
Personal entry requirements.....	82
Aircraft entry requirements.....	83
Air carriers.....	84

---

Transportation and Logistics (cont'd)	
Aircraft.....	86
Air distances.....	86
Power and communications.....	89-91
Electric power sources.....	89
Radio receivers.....	90
Telephone systems.....	91
Television stations.....	91
Bibliography.....	92-94

TO:

COUNTRY PROFILE USER Dear \_\_\_\_\_

Please use this form to note any changes, additions, corrections or suggestions you think would update and improve this country profile. Since our aim is to make these profiles as relevant as possible, your critique is essential and very much wanted. Return comments to Lucy Drobot, OFDA Country Profiles, Room 1262A.

NAME/OFFICE: \_\_\_\_\_ PHONE: \_\_\_\_\_ Date: \_\_\_\_\_

TOPIC	COMMENTS

## 1. General Information

### 1.1 Geographic Codes

Aid Standard	511
State Regional	ARA
FIPS	BL

### 1.2 Country Names

Official	Republic of Bolivia
Local	Republica de Bolivia
Short	Bolivia

### 1.3 Ethnic and Social Groups

Geographic barriers have kept groupings more or less isolated, preserving cultural patterns at expense of an integrated society. No other Latin American nation has so large a proportion of Indians.

Highland Indian groups: The Aymara form 25% of the total but 90% of population in La Paz department. The Quechua (30%) are found throughout Altiplano and Intermontane valleys of central and southern Bolivia; their subcultures differ with altitude, climate and proximity to markets but remain rural and isolated by language (only half speak Spanish).

Mestizos (those of mixed European and Indian ancestry) number about one-third of the population. "Cholo" was a general synonym for Mestizo during the colonial period; it is used also to describe an upwardly mobile Indian, or a transition between Indian and Mestizo. Cholo denotes low status town campesinos, whom other Mestizo town dwellers regard as "refined" Indians. Most Mestizos are at least marginally literate.

At the top of the ethnic pyramid are the Blancos, 5-15% of population, who claim descent from original Spanish settlers or later European immigrants; there are very few who have no Indian ancestry. Blanco status is defined by socioeconomic and cultural boundaries, and the traditional upper class characteristics acquired at birth, reinforced by exclusive group consciousness and sense of superiority. These "gente decente" or "gente buena" are found in large and small towns as professionals, wealthy merchants or high government officials.

#### 1.4 Languages

Both Mestizos and Blancos speak Spanish, the official language. About 36% speak Spanish as a mother tongue. Mestizos are usually bilingual in Spanish and one Indian language. Large percentage of the Indian population is monolingual in Quechua or Aymara.

Literacy: 40% overall; but only 20% of rural population. 60% among those over 15 years of age.

#### 1.5 Religion

90% Roman Catholic. Church holds little economic, social or political power. Since men feel no negative sanctions from non-participation in church life, burden of activity falls on women. Priesthood has never been a popular vocation for Bolivians. In late 1960's 80% of clergy were foreigners; high number and strong influence of foreign priests resented by nationals.

Protestants represent a small but respected enclave in most rural areas. Appealing factors include few economic demands made on the Indian, greater concern for the individual's temporal state, equal status of believers, etc. Significant inroads made in education, social work and medical assistance. Seventh Day Adventists and Baptists in Titicaca; Baptists and Methodists in La Paz; Church of the Brethren and Methodists in Santa Cruz.

#### 1.6 Official Holidays

Sixteen, not including Sundays and local holidays, which the departments may declare:

New Year's (January 1)  
Carnival (Monday, Tuesday and Wednesday at Onset of Lent)  
Holy Thursday  
Good Friday  
Holy Saturday  
Labor Day (May 1)  
Corpus Christi (May 28)  
Bolivian Independence Days (August 5, 6 and 7)  
Family Day (October 12)  
All Saints', All Souls' (November 1, 2)  
Christmas (December 25)

Miners are honored on December 21; some curtailment of work also on Day of Martyrs of the National Revolution, July 21; Day of the Indian, August 2; Day of the Student, September 21. Abaroa Day, March 23. La Paz Municipal Holiday, July 16.

### Business Hours

Business Hours in La Paz: 9:00AM-12:00Noon  
2:00PM- 6:00PM

Saturday: 1/2 day: Government Offices closed on Saturday

General suspension of business activity from Saturday afternoon to Monday morning keeps La Paz isolated from outside world (closing down of international telephone and telegraph connections).

### 1.7 Currency Exchange Rate (December 1980)

Bolivian peso (\$B)  
US \$1.00 = \$B24.5  
\$B1.00 = US\$0.04

### 1.8 Host Mission in USA

Embassy of Bolivia  
Chancery: 3014 Massachusetts Ave. N.W  
Washington, DC 20008  
Phone: 483-4410, 11, 12

#### Staff:

Charge d'Affaires.....Brig. Gen. Felix Camacho  
Counselor.....Dr. Gonzalo Bilbao La Vieja  
Economic Counselor.....Miguel Zalles  
Commercial Counselor.....Angel R. Rios  
Second Secretary.....Aida Valdivia  
Attache.....Carlos Bernal  
Air Attache.....Col. Hector Caballero  
Naval Attache.....Rear Admiral Fernando Guillen  
Asst. Military Attache.....Col. Ernesto Cadima

1.9 US Mission to Bolivia

Banco Popular del Peru Building  
 Corner of Calles Mercado y Colon  
 La Paz  
 APO NY 09867

Tel. 50251      Telex bx 5240

## Staff:

AMB.....Marvin Weissman  
 DCM.....Alexander Watson  
 POL/ECO.....Robert M. Fouche  
 COM.....Richard Ades  
 LAB.....Enrique Perez  
 CON.....James Haimo  
 ADM.....Douglas Langan  
 AGR.....Richard L. Barnes (resident in Lima)  
 AID.....Malcolm H. Butler (acting)  
 PAO.....James Meyer

1.10 Treaties and Agreements

With US  
 (Among others)

Agricultural Commodities Agreement  
 Air Transport Services  
 Amateur Radio Operations  
 Defense Agreement  
 Economic and Technical Cooperation  
 Investment Guaranties  
 Relief Supplies and Packages  
 (providing for payment by the US of ocean freight costs,  
 duty and tax free entry and payment of inland transport to  
 point of destination by Bolivia)

With Others

Chile: peace and friendship  
 Czechoslovakia: credit for smelter construction  
 USSR: economic assistance

**Multilateral and Membership in International Organizations:**

Member of OAS, Inter-American Institute of Agricultural Sciences, Inter-American Indian Institute, the Inter-American Development Bank; the UN and each of its related agencies except the Inter-Governmental Maritime Consultative Organization and the General Agreement on tariffs and trade.

**United Nations and Related Bodies:**

Permanent: Economic Commission for Latin America;

Elected: Economic and Social Council; Committee for Natural Resources; Committee on Review and Appraisal; Executive Board for UNICEF

Also: Membership in United Nations Specialized Agencies and the International Atomic Energy Agency (IAEA):

IMF; IBRD; Convention on International Civil Aviation; FAO; UNESCO; ILO; World Meteorological Organization; International Finance Corporation; WHO; International Development Association; Universal Postal Union; International Telecommunication Union

**Key Treaties:**

International Coffee Agreement  
International Tin Agreement  
Rio Pact

**Also:**

Banning nuclear weapon tests in the atmosphere, in outer space and under water  
Consular relations  
INTELSAT treaty  
International Air Services Transit Agreement  
International Wheat Trade Convention  
Narcotics Single Convention  
Non-Proliferation of Nuclear Weapons

### 1.11 Travel and Visa Information

Passport and tourist visa for stay up to 90 days; may be extended 90 days. Visa must be used within 15 days. Tourist, courtesy and/or business visa issued at no charge. Check embassy/consulate for specific requirements.

#### Consulates:

In California, Florida, Louisiana and New York

See also Host Mission in USA

#### Health:

Yellow fever vaccinations required for arrivals from infected countries. USPHS recommends inoculation against typhus, yellow fever and typhoid.

Due to the altitude, newcomers should rest the first three days, eat lightly and avoid alcohol and cigarettes the first week. Because of low humidity, drink plenty of liquids.

Sanitation conditions are poor. Avoid tap water, unwashed fruits and vegetables, and undercooked meats and fish.

### 1.12 Time

EST + 1 HR; GMT - 4 HRS

## 2. Government

### 2.1 National Government

The constitution (adopted in 1967) provides for the traditional executive, legislative and judicial powers. The armed forces, however, dissolved the National Congress (1969) in a revolutionary mandate; since then governments have ruled by decree.

Ex-President Banzer's de facto military dictatorship (comprising coalition of 2 leading parties and armed forces) completed 6 years in office in August 1977, giving Bolivia an appearance of stability. However, increasing industrial and student unrest resulted in coup by Air Force Gen. Juan Pereda in mid-1978.

In this centralized republic, nine political subdivisions (departments) have limited autonomy.

Judicial capital: Sucre

Administrative capital and largest city: La Paz

Legal System: based on Spanish law and Code Napoleon.

Suffrage: universal and compulsory at age 18 if married,  
21 if single.

### 2.2 Regional Organization

There are nine territorial departments divided into 96 provinces, subdivided into 940 cantons. Governors of departments are named by president. There are no regional legislatures, but city and town councils.

Each department has a prefect, appointed by the president for a four-year term. Prefects hold the overall authority in military, fiscal, and administrative matters, working in each substantive area under the supervision of the appropriate minister. Centralized control is further ensured by the president's appointment of the sub-prefects, officials vested with the administration of the provinces. The cantons are in the charge of corregidores (administrative officials), who are appointed by the prefects of their departments. Traditionally, many of the corregidores have been accustomed to serve without formal stipends and thus have been perhaps

---

the governmental link most susceptible to favoritism and corruption. In some areas another category of officials function under the supervision of the corregidores, the agents (agentes), who have quasi-judicial-executive functions.

Municipal governments are autonomous and function under the direction of municipal councils, elected in the capitals of all departments and provinces. Although mayors are supposed to be elected by municipal councils, the president actually chooses a mayor from among the members of the municipal councils. Hierarchical supervision of the work of the municipalities within the structure of local government reinforces this control in Bolivian governmental practices.

In some areas the Indians are still to be organized in their traditional community groups (alliyus). Even during the long period of Indian disenfranchisement on a national level, they continued to make quasi-political decisions in the selection of local communal leaders (jilkatas or mallcus). This tradition of local communal responsibility may have aided them in the resumption of national political responsibility.

### 2.3 Recent Events

Since November 1978, four military coups have continued the Bolivian pattern of unstable civilian governments buffeted by social unrest and overthrown every few years by military coups. Coups in 9/69, 10/70 (2), and 8/71, and a attempted coup in November 1974, were followed by the communist dictatorship of Col. Hugo Banzer Suarez. The results of the National elections held in July 1978 were disputed and the new president deposed by Brig. Gen. David Padilla Arancibia. Civilian elections were held in July 1979 with inconclusive results; the designated interim executive was ousted in short-lived military coup of November 1979; widespread civil unrest, including a paralyzing strike in La Paz, forced the resignation of coup leader Col. Natusch Busch. Lydia Gueller Tejada was designated interim president, but despite her popular support, military controlled key government appointments.

Unrest continued in 1980 with an abortive leftist uprising in Santa Cruz in March and the ransacking of the U.S. Consulate in Santa Cruz in mid-June. June 29 election was closely followed by yet another military takeover, this time by Gen. Luis Garcia Meza. He was then sworn in as president. The U.S. ambassador was recalled, military aid suspended and new economic aid stopped. The takeover was deplored in an official OAS announcement and condemned by the Andean Pact, from which Bolivia subsequently withdrew.

#### 2.4 Key Political Figures as of January 1981

President.....García Meza Tejada, Luis, Maj. Gen.  
 Mbr., Ruling Junta.....Bernal Periera, Waldo, Brig. Gen.  
 Mbr., Ruling Junta.....Terrazas Rodríguez, Ramiro, Adm.  
 Min. of Aeronautics.....Bernal Periera, Waldo, Brig. Gen.  
 Min. of Agriculture & Campesino  
     Affairs.....Molina Suarez, Julio, Col.  
 Min. of Defense.....Reyes Villa, Armando, Maj. Gen.  
 Min. of Education & Culture.....Coca Aguirre, Ariel, Col.  
 Min. of Energy & Hydrocarbons.....Sossa Salazar, Lider, Frigate Capt.  
 Min. of Finance.....Sanchez Calderon, Jorge, Brig. Gen.  
 Min. of Foreign Affairs.....Cerruto Calderon, Javier, Maj. Gen.  
 Min. of Health &  
     Social Security.....Rivero Parado, Abelino, Capt.  
 Min. of Industry.....Guzman Moreno, Mario, Col.  
 Min. of Integration.....Mariaca Salas, Francisco, Frigate Capt.  
 Min. of Interior.....Arce Gomez, Luis, Col.  
 Min. of Labor.....Caldero, Augusto, Gen. (Ret.)  
 Min. of Mines.....Morales Nunez del Prado, Carlos, Col.  
 Min. of Planning  
     & Coordination.....Larrain Frontanilla, Oscar, Brig.  
 Min. of Social Welfare.....  
 Min. of Transportation &  
     Communications & Aeronautics....Guzman Fortun, Rene, Col.  
 Min. of Urban Affairs  
     & Housing.....Velzaga Barron, Arturo, Brig. Gen.  
 Min. Sec. Gen. of the  
     Presidency.....Escobar Guerra, Mario Col.  
 Chief of Military Household.....Villa Urioste, Oscar

### 3. Disaster Preparedness

#### 3.1 Host Disaster Plan

Evaluation of the National Civil Defense Plan of Bolivia, published in 1977, must await translation of the document. Legislation governing relief and financing still does not exist. The plan provides a basic outline of disaster mitigation concepts (types, phases, stages); lines of authority and responsibility on the national, departmental and provincial level for prevention, preparedness, emergency operations. Attention is given public order, evacuation, public health and medical services (treatment priorities, epidemiological and sanitary concerns, rodent control, corpse disposal, health education), transport logistics and communications. Disaster planning factors focus separately on vulnerability to earthquakes, brush and forest fires and flooding.

The permanent relief organization is known as the National Disaster Relief Committee. Its titular chief is:

Gen. Hugo Bretal Barba  
Ave Argentina No. 1870  
Tel. 26170

#### Assigned Responsibilities within GOB Organization

Functions		Telephone
Damage Assessment	Mr. Hermelindo Menacho	58852
Food	Col. Hugo Rocha Patino	61348
Water	Col. Hugo Rocha Patino	58852
Health	Dr. Dorian Gorena	26223
Relief Supplies	Mr. Isaac Viorel	58852
Coord w Local Govt & Volags; Donors: US Embassy & Volags; Intl.	Col. Hugo Rocha Patino	58852

## Assigned Responsibilities within GOB Organization Con't:

Records and Reporting	Lt. Luis Barrios	61348
Logistics and Transport	Lt. Luis Barrios	58852
Infrastructure	My. Hermelindo Menacho V.	58852
Communications	Col. Federico Paz Lora	56782

See also GOB Capacity

Apart from the official governmental organizations (Ministries of ...) with functions integrated in the Civil Defense system, the following decentralized public agencies may have significant roles:

Corporaciones de Desarrollo o sus Similares

Corporacion Boliviana de Fomento

Empresa Nacional del Arroz

Yacimientos Petroliferos Fiscales Bolivianos

Servicio Nacional de Caminos

Direccion General de Aduanas

Corporacion Minera de Bolivia (COMIBOL)

Consejo Nacional de Vivienda

Junta Nacional de Accion Social de la Presidencia

Servicio Nacional de Desarrollo de la Comunidad

Alimentos para el Desarrollo (ALDE)

Consejo Nacional de Educacion Superior

Servicio Geologico de Bolivia (GEOBOL)

IDPS Participants

International Disaster Preparedness Seminar participants,  
AID/OFDA Annual Seminar

- |      |  |
|------|--|
| 1975 | Maj. Victor Lopez Pena<br>Chief of Civil Defense Operations<br>Ministry of Civil Defense<br>La Paz                                   |
| 1977 | Colonel Vidal Ayala Mercado<br>Director General<br>Civil Defense<br>La Paz   |
| 1978 | Invitation extended  |
| 1978 | ONEMI International Disaster Relief Seminar,<br>March 6 - 14, attended by<br>Dr. Angel Ponce, president of Bolivian Relief Committee |

3.2 US PlanTeam Function

Special Mission Disaster Relief Team Responsibilities

Embassy

Ambassador -- Disaster relief policy determination and implementation: Determines and declares existence of disaster after receiving specific request for disaster assistance from GOB; decides on extent of country team's participation; directs and coordinates all US agencies and personnel. Convenes Disaster Relief Operations Center (DROC); requests additional financial support and technical manpower as required.

DCM -- DROC: organizes and supervises operation; as charged, performs functions listed for AMB.

ADM -- Administration and reporting: provides related support including secretarial and C & R assistance; collaborates in report preparation.

Physician -- medical service: Evaluates epidemic potential or related medical health problems and recommends strategy; advises on commodity requirements.

CONSUL -- consular affairs: as required.

USIS Director -- information press releases, arranges for photographic, radio, or TV coverage; coordinates with US and foreign news media services.

#### USAID

AID Director -- monitors overall activity and supervises USAID technical and material inputs including accounting for all US civilian disaster assistance.

MDRO/Public Health Advisor -- Report preparation, surveys and assessment: arranges evaluation of disaster's scope using country team personnel; draws on external sources such as MITS, UN and other international donors as needed.

Engineer -- Engineering and Sanitation: Advises GOB on evaluation and implementation in coordination with MILGRP.

Administrative officer -- Secretarial pool: organizes and supervises operation of clerical and typing assistance.

FFP officer -- food commodity distribution: plans and implements as required.

#### MILGRP

Commander MILGRP -- transportation and logistics: plans, implements and supervises military support for relief operations.

MILGRP/DRO -- alternate MDRO: assists or replaces MDRO in disaster relief operations.

#### Procedures

The transfer of commodities to GOB will be effected with an inventory accompanied by a covering letter from the mission director to the Director of the National Disaster Relief Committee (NDRC). Commodities will be received by NDRC immediately and directly from the mission, if flown in

on special request. In the case of food commodities, Catholic Relief Services and/or CARE will be authorized to deliver the materials through their counterparts Caritas Boliviana, or Junta Nacional de Accion Social (JNAS) to the NDRC and participate in the supervision of the distribution process. In both cases, NDRC will be responsible for storage and will provide written reports to the mission on the number and location of the ultimate recipients.

### 3.3 Contact List

#### US Team

##### EMBASSY

Ambassador	Paul Boeker
DCM	William Beal
ADM	Gerald Snyder
Physician	Leo J. Falk, MD
Consul	Thomas Murphy
USIS Director(acting)	Clifton Naughton

##### USAID

Director	Frank B. Kimball
MDRO, PH Advisor	A.S. Landry
Engineer	George Hoover
Admin. Officer	D. Ostergaard
FFP	A. Penaloza

##### MILGRP

Commander	Col. Gerald Fisher
DRO Alternate MDRO	Lt. Col. John Frye

### 3.4 Volags, Major

Voluntary organizations with demonstrated capacity for providing disaster relief assistance:

<u>Agency</u>	<u>Rep</u>	<u>Phone</u>
Catholic Relief Services (CRS)	John Conroy	23335
Caritas Boliviana (CB)	Adhemar Pinaya Rv. Leonardo Blanco	41757
CARE	George Kraus	63227
Junta Nacional de Accion Social (CARE counterpart)	Dr. Alex Arteaga C.	53380

All of these are capable of providing food (Title II commodities, upon mission authorization to CRS and CARE for implementation from their warehouses), vehicles for distribution of supplies, and personnel for monitoring distribution of relief supplies, especially food.

Through the mechanism of a commodities coordinator committee (which meets periodically on a year-round basis) CRS and CB have coordinated their efforts very closely with USAID and other international donors. However, there is no standing committee for disaster relief operations comprised of volags. In past years, ALDE (Alimentos Para el Desarrollo, a world food program counterpart) has assumed responsibility for calling together, on an ad-hoc basis, when a disaster occurred, all potential local and international collaborators in relief activities.

Only local relief organization which has responded to emergency relief requirements: the Bolivian Red Cross. Nevertheless, the Junta Nacional de Accion Social (not a relief organization) was assigned disaster relief responsibilities during the 1973 and 1974 flooding problems.

#### Bolivian Red Cross

President: Dr. Gaston Ponce Caballero

Ave. Simon Bolivar No. 1515, Phone: 40948 OR 26223

Capability: collects medicine, clothing, food and obtains supporting assistance from international counterparts; distribution of relief supplies.

#### Junta Nacional de Accion Social

President: Mrs. Yolanda Prada de Banzer; VP: Dr.  
Alex Arteaga

Edificio Loteria - 6th floor, phone: 53380

Capability: implement distribution plan, especially in city of La Paz and nearby areas.

Note: GOB has always welcomed participation of volags and international donors in relief operations.

### 3.5 International Organizations

Advance arrangements have been made to exchange and coordinate information on disaster relief needs and intended responses; this will be the responsibility of the National Disaster Relief Committee, specifically, Col. Vidal Ayala Mercado.

#### United Nations

Henry C. Meyer, Rep. Phone: 58589

Provides services of UNDR0; relief materials, vehicles and personnel; mobilizes other UN member organizations in Bolivia: PAHO, WFP, UNDP etc.

#### Pan American Health Organization (PAHO)

C. Pineda, Rep. Phone: 29127

Provides personnel services: Sanitary engineer, physican, other public health personnel as needed; contributes medical commodities; loans vehicles (possibly 3).

#### Organization of American States (OAS)

R. Beguiristain, Rep. Phone: 27668

Provides supervisory personnel for distribution of relief supplies; contributes materials.

**World Food Program (WFP)**

E. Zaccar, Rep. Phone: 25833

Contributes food commodities.

**Catholic Relief Services (CRS) See Volags, Major**

Provides supervisory personnel for distribution of relief supplies and food commodities; contributes materials (blankets, drugs, etc.); loans vehicles (up to 3).

**Caritas Boliviana See Volags, Major**

Provides supervisory personnel for distribution of food commodities.

**3.6 GOB Capacity**

"When a major disaster strikes (usually in the form of flooding in the first quarter of the year) the country is not apt to have sufficient emergency supplies such as temporary housing or tents, food commodities and preparation facilities; potable water, supplies and medicines to meet the needs of more than 500 victims..."

Planning and implementation of relief preparedness has been hampered by reassignment of trained personnel and limited functional capability of civil defense centers located throughout the Republic. There is much reliance on international donors' assistance. Greatest need is likely to be for food and shelter. Relief operations have lacked organization and coordination, which usually has resulted in an over-supply of material. Implementation of the new plan published in 1977 should help to resolve this problem.

**3.7 Inventory of Host Resources**

When the draft Bolivian Disaster Relief Plan, which considers health, food, transportation, heavy equipment and communications requirements, is approved by the GOB, the mission intends to develop locator maps for those resources.

### 3.8 Disaster Types

Floods and epidemics have been Bolivia's most serious natural disasters.

Disaster History						
<u>Date</u>	<u>Location</u>	<u>Disaster</u>	<u>Number Killed</u>	<u>Affected</u>	<u>Number Home-less</u>	<u>Dollar Dmg (000)</u>
64/11/04	La Paz	Civil Strife	40			
65/12/22	Cangalli, Tipuani R	Flood	40	500		\$100
66/02/00	Beni, Mamore & Ibare R	Flood		5,500	5,500	\$500
66/06/29	Puerto Grether	Flood	14	2,000	600	\$100
67/03/12	Bermejo	Flood		10,000	100	\$10
66/12/09	Vicchoca & Totora	Storm		3,955		\$8
68/02/11	C, Rio Grand Valley	Flood	24	20,000	6,000	\$3,000
69/02/00	Magdalena Beni Reg	Epidemic	16	24		
69/11/00	Cochabamba & Sucre	Epidemic	2	53		
71/08/19	Major Cities	Civil Strife	200			
74/02/00	Beni, La Paz, Oruro	Flood	31	18,000	18,000	\$10,500
76/10/13	Santa Cruz Sierra	Accident	112			\$2,000
77/00/00	Alto Plano, Potosi	Drought				
77/01/03	Santa Cruz Prov	Flood	10	70,000	20,000	\$10,000
78/02/00	4 Provinces	Flood		63,000		
78/12/00	Santa Cruz	Flood	40	100,000	15,000	
80/00/00		Flood				
			529	293,032	65,200	\$26,418

### 3.9 US Volags

<u>Agency</u>	<u>Personnel Intl/local</u>	<u>Programs</u>
American Institute for Free Labor Development	1/-	Ed; Ind Dev
American Women's Hospitals Service	-/13	CD; Med & PH; SW
Andes Evangelical Mission	30/-	CD; Equip & Mat Aid; Med & PH; SW; Youth

---

<u>Agency</u>	<u>Personnel Int'l/local</u>	<u>Programs</u>
Association for Voluntary Sterilization, International Project	-	Pop & Fam Serv
CARE	2/15	C.H.P.; Ed; Med & PH; Nutr
Catholic Medical Mission Board	-	Equip & Mat Aid; Med & PH
Catholic Relief Services	1/4	CD; Coop & Loans; Equip & Mat Aid; Food Prod & Ag; Med & PH
Sisters of Charity of St. Elizabeth Western Province	4/-	CD; Ed
Christian Nationals' Evangelism Commission	-/8	Comm; Ed
Church World Service	-	Equip & Mat Aid; Ind Dev; Med & PH
Compassion	-/6	SW
Direct Relief Foundation	-	Equip & Mat Aid; Med & PH
Foster Parents Plan	1/55	CD; Food Prod. & Ag; Med & PH; Coops & Loans
Franciscan Missionary Sisters of the Sacred Heart	5/5	Coops & Loans; Ed Med & PH
Franciscan Sisters of Allegany	4/3	Ed; Equip & Mat Aid; Med & PH; Nutr
General Conference Mennonite Church	2/-	CD
Gospel Missionary Union	8/-	Food Prod & Agr; Med & PH
Helper Project International	1/-	Food Prod & Agr

---

<u>Agency</u>	<u>Personnel Int'l/local</u>	<u>Programs</u>
Inter. Voluntary Services	2/1	Coops & Loans; Food Prod & Ag; Ind Dev; Med & PH
W. K. Kellogg Foundation	-/4	Med & PH
Lutheran World Relief	-	CD; Ed; Food Prod & Ag; Med & PH; Nutr;
Map International	1/-	Food Prod & Ag; Med & PH
Maryknoll Fathers	-	CD
Maryknoll Sisters of St. Dominic	37/-	Comm; CD; Ed; Med & PH
Meals for Millions Foundation	4/4	Med & PH; Nutr
Medical Mission Sisters	1/-	Med & PH
Mennonite Board of Missions	6/-	Food Prod & Ag
Mennonite Central Committee	47/10	Coops & Loans; ED Food Prod & Ag; Med & PH; SW
National Council of Catholic Women	-	Med & PH; SW
Option	-	Med & PH
Oxfam-America	-	CD
Pan American Development Foundation	-	Ed; Food Prod & Ag; Med & PH
National Association of Partners of the Alliance	-/-	CD; Ed; Food Prod & Ag; Med & PH; SW
Pathfinder Fund	-	Pop & Fam Serv

---

<u>Agency</u>	<u>Personnel Intl/local</u>	<u>Programs</u>
Sisters of the Most Precious Blood	6/2	Med & PH
Project Concern	4/4	Med & PH
Public Administration Service	-	Pub & Bus Admin
Salesians of St. John Bosco	-/104	Ed; Food Prod & Ag; SW
Seventh-Day Adventist World Service	-	Med & PH
Summer Institute of Linguistics	115/-	Ed; Food Prod & Ag; Med & PH
United Methodist Committee on Relief	-	Comm; CD; Coops & Loans Ec & Dev Pl; Med & PH
World Concern (King's Garden)	-	Food Prod & Ag; Med & PH; SW; Youth
World Gospel Mission	4/25	Ed
World Mission Prayer League	19/-	Med & PH
World Neighbors	-/8	Food Prod & Ag; Med & PH; Pop & Fam Serv
World Rehabilitation Fund	-	Med & PH
World Relief Commission/N.A.E.	-	Equip & Mat Aid; Med & PH
World Vision Relief Organization	1/-	Med & PH; SW
Xaverian Brothers	-	CD; Ed
YMCA	-	SW; Youth
YWCA	-	Equip & Mat Aid; Youth

## Key:

CD.....Community Development  
C.H.P.....Construction, Housing and Planning  
Coops & Loans.....Cooperatives, Credit Unions and Loans  
Ec & Dev Pl.....Economic and Development Planning  
ED.....Education  
Equip & Mat Aid.....Equipment and Material Aid  
Food Prod & Agr.....Food Production and Agriculture  
Ind Dev.....Industrial Development  
Med & PH.....Medicine and Public Health  
Pop & Fam Serv.....Population and Family Services  
P & Bus Admin.....Public and Business Administration  
SW.....Social Welfare

#### 4. Population

##### 4.1 National Population

Bolivian Census (1976)\*: 4,647,816

US Census Bureau's Adjusted Figure: 4,853,000, constitutes a 4.2% adjustment

Mid-1980 estimated population: 5.6 million (Population Reference Bureau)

World Bank growth rate (1970-1978): 2.6% - somewhat below the average for the region.

More than 50% under age 20; less than 6% over 60. Overall population density is about five persons/sq km. However, because of Bolivia's vast forests, ranges and watersheds, density is about 38 persons per sq km for arable (and potentially arable) land. Average family size in urban areas was 4.5 and in rural areas 5.5.

\*Underenumeration is estimated between 4-5%; factor may vary considerably from region to region.

##### 4.2 Regional Population by Departments

Provisional results of the September 1976 census are given here for departments, provinces, and provincial capitals. Further breakdown for provinces into cantons, population centers and dispersed population by sex can be found in the 1977 publications of The Instituto Nacional de Estadística, see Bibliography.

	<u>1976</u>	<u>Cumulative Annual Increase Since 1950 Census</u>
Chuquisaca Dept. Total	357,244	1.22
Provinces:		
Orpeza	106,082	1.62
Sucre	62,207	1.87
Rest of Province	43,875	1.29

---

Azurduv	20,832	1.00
Zudanez	27,585	0.65
Tomina	30,672	0.75
Herando Siles	30,751	3.08
Yamparez	28,442	1.50
Nor Cinti	60,953	0.53
Bellisario Boeto	13,933	1.71
Sur Cinti	22,029	0.49
Luis Calvo	15,965	1.36
La Paz Dept. Total	1,484,151	2.15

## Provinces:

Murillo	695,566	3.41
La Paz	654,713	3.51
Rest of Province	40,853	2.11
Omasuvos	83,621	1.05
Pacajes	65,582	0.62
Camacho	73,016	0.69
Munecas	21,275	0.21
Franz Tamayo	16,260	0.67
Ingavi	86,189	1.37
Loayza	42,623	1.69
Inquisivi	76,027	1.87
Sud Yungas	45,468	2.39
Los Andes	62,779	0.90
Aroma y Gualberto Villarroel	82,847	3.72
Nor Yungas	48,397	3.72
Abel Rurrealde	4,300	1.30
Buarista Saavedra	10,696	0.14
Manco Kapac	23,561	0.73
Gualberto Villarroel		

(Figures are included under Aroma Province)

Cochabamba Dept. Total	730,358	1.87
------------------------	---------	------

## Provinces:

Cercado	221,856	3.88
City of Cochabamba	205,002	3.95
Rest of Province	16,854	3.12

---

Campero	31,964	1.58
Ayopaya	56,020	1.51
Estaben Arce	27,914	0.07
Araní	38,049	1.42
Arque	29,206	0.55
Capinota	22,974	0.37
Jordan	25,646	0.54
Quillacollo	76,711	1.56
Chapare	57,701	1.73
Tapacari	22,285	0.80
Carrasco	46,826	2.15
Mizue	27,882	1.66
Punata	45,324	0.79
Oruro Dept. Total	311,245	1.87
Provinces:		
Cercado	158,713	2.53
City of Oruro	124,121	2.93
Rest of Province	34,592	1.37
Avaroa	34,008	0.79
Carangas	24,972	0.64
Sajama	14,612	1.79
Litoral	2,885	
Poopo	19,464	0.22
Pantaleon Dalence	33,452	2.91
Ladislao Cabrera	10,842	1.00
Atahualpa	5,043	
Saucari	7,254	
Sabaya		0.78
Potosí Dept. Total	658,713	1.00
Provinces:		
Tomas Frias	122,677	1.86
City of Potosí	77,334	2.26
Rest of Province	45,343	1.26
Bustillos	91,570	1.62
Cornelio Saavedra	54,191	0.65
Chayanta	90,525	1.17

Charcas	31,962	0.48	
Nor Chichas	48,426	0.06	
Alonso de Ibanez	23,446	0.24	
Sud Chichas	55,018	1.17	**
Nor Lipez	9,162	0.95	
Sud Lipez	4,140	1.27	
Linares	53,858	0.58	
Quijarro	37,991	0.19	
General Bilbao	9,358	0.02	
Daniel Campos	5,769	1.02	
Modesto Omiste	20,620		
** (Combined with Modesto Province)			

Tarija Dept. Total	188,655	2.34	
--------------------	---------	------	--

## Provinces:

Cercado	57,655	2.33	
City of Tarija	39,087	3.40	
Rest of Province	18,568	0.75	
Arce	34,296	4.28	
Gran Chaco	43,305	3.15	
Avilez	13,480	0.77	
Mendez	24,899	0.89	
O'Connor	15,020	1.57	

Santa Cruz Dept. Total	715,092	4.21	
------------------------	---------	------	--

## Provinces:

Andres Ibanez	318,804	6.67	
City of Santa Cruz	256,946	7.27	
Rest of Province	61,858	4.85	
Warnes	31,294	3.77	
Valasco	24,478	2.20	
Ichilo	37,993	6.27	
Chiquitos	33,736	2.52	
Sarah	28,387	2.68	
Cordillera	54,493	2.25	
Vallegrande	30,481	0.35	***
Florida	21,488	2.38	
Obispo Santiesteban	78,719	7.15	
Nulfo de Chavez	32,949	1.88	
Angel Sandoval	8,057	3.59	
Manuel M. Caballero	14,213		

\*\*\* (Includes rate for Manuel M. Caballero)

---

Beni Dept. Total	167,969	3.33
------------------	---------	------

## Provinces:

Cercado	34,983	3.82
City of Trinidad	27,583	3.74
Rest of Province	7,400	4.11
Vaca Díez	43,026	5.19
General Ballivan	24,664	3.14
Yacuma	15,084	2.05
Moxos	14,896	2.40
Marban	11,614	2.53
Mamore	9,317	2.08
Itenez	14,383	2.59

Pando Dept. Total	34,409	2.92
-------------------	--------	------

## Provinces:

Nicolas Suarez	12,239	2.59
City of Cobija	3,636	2.94
Rest of Province	8,603	2.46
Manuripi	8,180	3.56
Madre de Dios	8,928	3.17
Abuna	3,065	0.43
G.F.Roman	1,997	

4.3 Urban/Rural Distribution

One of the most rural and least densely populated countries of Latin America; 66-70% of the population are living in the countryside. The GOB regards an uneven distribution by geographic region as its basic population problem. Too many are crowded on relatively poor lands while enormous stretches with fertile soil remain virtually unpopulated. Urbanization quickened following the 1952 revolution with the enactment of agricultural reform legislation.

La Paz	
Cochabamba	More than 100,000
Santa Cruz	
Oruro	
Potosí	More than 50,000
Sucre	

Tarija	
Trinidad	Under 40,000
Cobija	Less than 10,000

When "urban places" are defined (UN) as those with populations in excess of 2,000, the department capitals represent as much as 80% of the urban total. (See also Regional Population.) However, the USAID mission to Bolivia (in their health sector assessment) feels that a more realistic definition would include only the six major cities as urban centers. All other areas satisfy one or both of the following requirements which, in practical terms, characterize a rural environment in Bolivia: 1) at least one half of the population is engaged in agriculture or related activities, or 2) at least one half of the local economy stems from agriculture or related activities. At the present time, therefore, the rural sector would include all localities with fewer than 50,000 inhabitants and contain 78.5 percent of Bolivia's total population. This breakdown is especially important in terms of the development of rural health delivery systems. Since almost 60 percent of the population is dispersed or living in communities of less than 200 inhabitants, there are considerable difficulties in the delivery of health and other social services.

## 5. Health, Nutrition, and Housing

### 5.1 Major Health Problems

Health problems are predominantly those of a developing country. Communicable diseases, notably respiratory, gastrointestinal and parasitic diseases, along with trauma, complications of pregnancy and malnutrition are major causes of morbidity and mortality. Most of these problems could be lessened through implementation of public health measures (potable water and sewage disposal systems), vaccination campaigns, health education programs, maternal and dental health services, better housing, etc. Problems are more severe in rural and marginal urban areas. Despite these facts and the predominantly rural population, the GOB health system has concentrated its resources in curative medicine and urban areas, rather than preventive medicine and rural areas. The system, moreover, is very inefficient, fragmented -- approaching anarchy.

### Patterns

There is a "demographic disease pattern" which can be described in terms of a cycle. Approximately 50 percent of Bolivia's population is under 20 years of age. There is a lot of illness in the pre-school age group. These illnesses fall mostly within the diarrhea-pneumonia complex conditioned by high prevalences of malnutrition, parasitic and other communicable diseases. The severity of these diseases and the near non-existence of adequate preventive and curative services leads to high infant and child mortality rates. The desire of families, for economic and cultural reasons, to have an adequate number of children encourages high fertility rates to compensate for high mortality. The proportion of young in the population in turn remains high and the cycle is perpetuated.

The complex of respiratory diseases, gastroenteritis, and malnutrition is most significant for infant and child mortality in all parts of Bolivia. Other diseases include measles, whooping cough, tuberculosis, and parasitic diseases.

### Geographic Variations

In the Altiplano, respiratory diseases and gastroenteritis are most significant. Specific diseases of importance are tuberculosis, typhus, and scabies, as well as silicosis among the miners. The valleys of Bolivia have a similar disease pattern, with an increased importance of some gastrointestinal diseases, some leprosy, and probably a significant amount of Chagas' disease.

The tropical areas have a very distinct pattern: The three-disease complex is still very important, but gastrointestinal illnesses and malnutrition have relatively more importance compared to respiratory illnesses. Parasitic diseases, especially hookworm and amoebiasis, have very great importance in terms of morbidity. Here malnutrition is more of a problem than in the other two areas of Bolivia, despite the fact that these are agricultural areas. Higher rates of infection with intestinal parasites and enteritis probably contribute to this problem. Some special diseases with higher morbidity and/or mortality rates are special threats to economic development in the tropical areas, namely malaria, yellow fever and Bolivian hemorrhagic fever. Chagas' disease and leprosy are also significant problems.

### Prevalence

#### 1. Communicable Diseases

Major direct causes of mortality and morbidity. Different regions have different CD patterns:

Tropics: malaria, yellow fever, hemorrhagic fever, leprosy, leishmaniasis, hookworm and Chagas' disease.

Valleys: Formerly malaria, now Chagas' disease and leprosy.

Altiplano: Most other CD's, including venereal, respiratory and diarrheal, tuberculosis; intestinal parasites (other than hookworm) are known throughout.

#### Respiratory Diseases

Number one cause of mortality and morbidity, chiefly through tuberculosis (80,000 active cases). Lack of drugs and follow-up limits effectiveness of control programs.

#### Diseases Preventable by Vaccination

In the under-5 age group, measles is a major cause of mortality due to complications (pneumonia) with malnutrition. Whooping cough is the second major cause of mortality. Diphtheria (involving children and young adults) and tetanus (neo-natal) are also significant.

#### Enteric Diseases

Affect all age groups, but children more severely. The bacterial (typhoid, shigella, etc.) and parasitic (amoebiasis, hookworm) types are

significant causes of morbidity and mortality. Hookworm causes severe anemia and affects nearly 100% of the rural population in tropical areas.

### Malaria

7,000 cases were reported in 1973 with 50% of cases in the Department of Tarija--due to a large extent to international migration patterns. Major morbidity (but not mortality) threat for colonization areas.

### Yellow fever and Bolivian hemorrhagic fever (BHF)

Jungle (not urban) yellow fever is a perennial problem. No effective control on traffic or vaccination requirements. A rodent trapping program has been effective: no cases of BHF since 1972. All BHF cases originated in the Beni.

### Chagas' Disease

One of the major public health challenges; in endemic areas 18% of the population is infected. As a chronic and usually fatal disease, it affects morbidity especially in the middle-aged.

## 2. Malnutrition

Prevalence highly variable. Adjacent towns may have very different rates of malnutrition. Factors: economics, education, social class and customs, speculation in commodities, maldistribution. Also some regional patterns: lack of protein in colonization areas. In rural areas where high-protein foods (eggs, chicken, meat) are produced, they are not consumed since their economic value is so great. There is a net deficit of calories and protein in country's food supply. In general malnutrition is probably worst in rural and tropical areas.

While malnutrition also exists among the elderly, it has the greatest effect on the mortality and morbidity in the pre-school age group. A PAHO study on mortality in the under-5 age group showed nutritional deficiency was the number one associated cause, and judged a related cause in nearly 50% of the deaths. Disease and malnutrition exacerbate the vicious cycle.

Iodine deficiency is also a significant nutritional problem in some areas, causing goiter and mental retardation.

## 5.2 Vital Statistics

	<u>WB 70</u>	<u>ABS 79</u>
Crude Birth Rate -	44/1000	
Crude Death Rate -	19/1000*	18.4
Infant Mortality -	154/1000**	147
Life Expectancy -	47	

\* Highest in Latin America. Only about 20% of deaths generally are registered; infant deaths are even less often reported. Actual death rates, therefore, are probably much higher than official estimates.

\*\* Enormous variation in rural/urban rates; 300/1000 vs 60/1000.

## 5.3 Facilities and Services

Characteristics: Lack of coordination among the various service agencies, heavy urban orientation, and lack of strong sectional policy planning. There are 3 agencies-- the Ministry of Health, The Social Security System (with ten service affiliates), and the National Social Development Council-- which have primarily health service mandates. There are also three decentralized public agencies which provide health services to their employees and/or service populations: the National Institute of Colonization, the National Road Service and the National Railroad Company. Sixteen agencies (5 national and 11 local) have responsibility for the planning and execution of water supply and sewerage systems. The National Community Development Service, in addition to promoting water supply projects, is also involved in the construction of health posts and the training of health promoters. There are 8 departmental public works and development corporations involved in health development activities. In all, at least 37 government agencies participate in the health sector; many of these have multiple and/or overlapping responsibilities.

Non-governmental institutions in health activities: 3 university schools of medicine, 4 nursing schools and a school for social workers. Religious and voluntary organizations are listed under US Volags. All of these organizations combined reach less than 50% of the population.

Problem Recap: Lack of preventive medicine: inappropriate training; inadequate supply supervision; minimal community involvement and confidence; non-integration with other programs (agriculture, education) and within the health sector.

5.4 Distribution

Physical facilities are scarce by LA standards. Total number of beds is 10,333, or 1.94/1,000 population (LA average was 3/1,000). Distribution is uneven; vast majority are in urban areas with significant concentration in mining areas.

Health Facilities/Ministry of Health

<u>Health District</u>	<u>Hospitals</u>	<u>Health Center or Satellite Post</u>	<u>Health Center Hospital</u>	<u>Medical Post</u>	<u>Sanitary Post</u>
La Paz	5	6	25	4	40
Chuquisaca	4	1	12	6	33
Cochabamba	2	1	13	7	16
Santa Cruz	4	4	14	17	71
Tarija	2	1	4	4	15
Potosí	2	1	3	7	35
Oruro	1	1	8	1	29
Beni-Riberalta	3	2	5	2	38
Pando	1	1	1	2	9
Tupiza	1	1	3	0	18
	-----	-----	-----	-----	-----
Total	25	19	88	50	304

Health Facilities/Other Hospitals

<u>Health District</u>	<u>COMIBOL</u>	<u>CNSS</u>	<u>Military</u>	<u>Railway</u>	<u>Petro- leum</u>	<u>Other Including private</u>
La Paz	3	8	1	2	-	25
Chuquisaca	-	2	-	-	-	6
Cochabamba	-	4	1	1	-	14
Santa Cruz	-	-	3	3	1	10
Tarija	-	1	1	2	3	1
Potosí	5	3	-	2	-	4
Oruro	13	4	-	1	-	6
Beni-Riberalta	-	-	1	-	-	1
Pando	-	-	1	-	-	-
Tupiza	-	2	-	1	-	4
Total	21	24	8	12	4	71

Hospital Beds by Department and Agency (1973)

<u>Department</u>	<u>Ministry of Health</u>			<u>Other Institutions</u>			<u>Total</u>
	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	<u>COMIBOL</u>	<u>CNSS</u>	<u>Other</u> (A)	
La Paz	936	219	1,155	306	848	735	1,889
Chuquisaca	705(B)	120	825	--	85	125	210
Cochabamba	473	152	625	--	239	312	551
Santa Cruz	565	285	850	--	89	494	583
Oruro	220	60	280	404	111	136	651
Tarija	205	89	294	--	45	153	198
Potosí	160	238	398	892	243	162	1,297
Pando	--	42	42	--	--	10	10
Beni	112	322	434	--	12	27	39
<b>Total Beds</b>	<b>3,376</b>	<b>1,527</b>	<b>4,903</b>	<b>1,602</b>	<b>1,672</b>	<b>2,154</b>	<b>5,428</b>

Pop Served  
(000's) 373.0(C) 3,931.9 4,304.9 142.2 631.3 252.3(D) 1,052.8

Beds per 1000 9.05 0.39 1.14 11.27 2.65 8.54 5.29

- (A) Includes other institutions of the social security system and the private sector  
 (B) Includes 447 psychiatric beds  
 (C) In reality the MPSSP attends a larger population made up of overflow CNSS beneficiaries  
 (D) Based on estimates of a 145,000 private sector market (125,000 urban; 20,000 rural)

Bed Totals

<u>Department</u>	<u>All Beds Total</u>	<u>Population Served (000's)</u>	<u>Beds per 1000 Population</u>
La Paz	3,044	1,722.3	1.77
Chuquisaca	1,035(B)	483.6	2.14
Cochabamba	1,176	862.6	1.36
Santa Cruz	1,433	547.5	2.62
Oruro	931	359.0	2.59
Tarija	492	260.9	1.89

<u>Department</u>	<u>All Beds Total</u>	<u>Population Served (000's)</u>	<u>Beds per 1000 Population</u>
Potosí	1,695	855.4	1.98
Pando	52	34.0	1.53
Beni	473	205.4	2.30
Total Beds	10,331	--	--
Pop Served (000's)	--	5,330.7	--
Beds/1000 Pop	--	--	1.94

More detailed information on medical facilities is attached to the mission disaster relief plan of 2/22/77. A list of Social Security (CNSS) hospitals, clinics, etc., by region provides number of beds, MD's and auxiliary personnel at each facility. A list of Ministry of Health hospitals, health centers, etc., for each region gives type of facility, (usually) location, and number of beds. Also national totals and per capita figures for expenditures, beds and physician hours, etc., are given for each agency or organization providing medical services. Although totals differ somewhat from those used here, the listings by location and type may be useful.

### Utilization

Low level of utilization indicates scarcity is not the critical limiting factor. Existing facilities are, in fact, used only to a small fraction of their capacity. Rural beds of the MOH have an occupancy rate of less than 20%. Urban and social security bed occupancy ranges from 49 to 81 percent. This is counteracted by the extremely long average stay, 18.7 days/patient. Combination of low occupancy and long stay indicates very poor output from facilities and equipment. Part of the inefficiency is explained by poor state of maintenance; the more fundamental cause is poor administration.

### Personnel Supply/Demand

Medical manpower structure is top heavy; too many professionals per middle level worker providing preferential care to an urban elite at the expense of Campesinos and rural poor. Note: Estimates of the number of physicians vary by as much as 50 percent.

Estimated Number of Health Workers in Bolivia

<u>Type</u>	<u>Min</u> <u>(1970)</u>	<u>Min</u> <u>(1974)</u>	<u>System</u>	<u>Tot</u> <u>Pop</u>	<u>Rec of</u> <u>Min</u> <u>Health/</u> <u>10,000</u>
Doctors	2143	674	1055	4.35	6
Dentists	903	91	195	1.83	2.0
Sanitary Engrs	7	12	1	.01	
Veterinarians	250	92		.51	
Pharmacists	1600	28	195	3.20	
Dieticians or Nutritionists	24	35	13	.05	
Health Educators	12	10		.02	
Social Workers	296	40	38	.60	
Graduate Nurses	542	354	1116	1.10	4.5
Auxiliary Nurses	1264	1066		2.56	14.5
Nutrition Auxiliaries	8	4		.02	
X-ray Technicians	9	30	46	.02	
Lab. Technicians		74	180		3
Medical Technicians		2			
Health Inspectors	74	248		.15	

Number of dentists and pharmacists appears adequate. Critical deficiency in other allied medical personnel. Professional training has been stressed far more than paramedical training. There is an oversupply of "educated" persons looking for meaningful employment -- cause for formation of the union of unemployed physicians and immigration of MD's to other countries and transfer to other occupations.

Distribution of Professional Health Workers by Specialty, 1970

<u>Category</u>	<u>Number</u>	<u>Per 1,000 Persons</u>
Doctors	2143	4.35
General Medicine	876	1.78
Specialists	1234	2.5
Public Health		
Physicians with Special Training	33	.06
Dentists	903	1.83
Working in Public Health	91	.18
Special Training in Public Health	5	.01

Engineers		
Working in Public Health	7	.01
Sanitary Engineers	1	
Graduate Nurses	542	1.30
Post Graduate Training in Public Health	49	.10

The fact that 57 percent of physicians are "specialists" is indicative of the inappropriateness of the medical structure. There is a grave shortage of trained maintenance and administrative personnel.

Estimated Availability of Physicians by MOH Regional Health Office and Rural/Urban Location, 1974

Regional Health Office	#MD's	Urban		MD (A)		Rural*	
		1974 (B)	Pop/MD	MOH	Tot	Pop 1974 (B)	Pop/MD
La Paz	(800)	633,100	791	30	35	1,115,525	31,872
Potosí	70	70,230	1003	8	11	725,565	65,960
Cochabamba	220	192,440	875	20	41	696,260	16,982
Santa Cruz	(150)	139,030	927	20	(37)	379,370	10,253
Chuquisaca	102	52,560	515	22	24	460,040	19,168
Oruro	110	101,370	922	6	6	279,630	46,605
Tarija	50	25,690	514	10	11	204,010	18,546
Beni	20	19,940	997	5	(15)	140,229	9,349
Pando	--	--	--	5	5	25,080	5,016
Tupiza	15	14,701	980	4	6	157,804	26,301
Riberalta	(10)	13,071	1307	2	(2)	25,455	12,728
Total	1,547	1,262,132	816	132	193	4,208,968	21,808

\* Estimates exclude physicians employed by the social security system affiliates in the rural area

Source: (A) Le Bow, Robert H., Consultant Report, USAID/Bolivia, 1974  
 (B) Ministerio de Previsión Social Y Salud Pública, 1973-1978, La Paz, 1973, P. 12.

Efficiency of medical manpower, judged by number of patients seen/physician hour, gives Bolivia a low rating.

Current yields in selected agencies are:

Ministry of Health-Urban	2.09	visits	per	hour
Ministry of Health-Rural	1.31	"	"	"
CNSS	3.5	"	"	"
COMIBOL	3.6	"	"	"
Caja Petrolera	3.9	"	"	"
Railroad workers	2.5	"	"	"

Physician supply appears to exceed demand in urban areas: Increase in demand could come about by increasing efficiency of utilization through additional auxiliary personnel.

Traditional practitioners: neither their number, size of practice nor income is known. Often the sole providers of medical care to the dispersed population, they also play a significant role in urban areas, selling their medications and services at town markets. Practice combines pre-Columbian Indian, Spanish colonial concepts, herbology, religion, magic and mysticism. "Specialists" range from witch doctors (brujos) to folk healers (curanderos) and midwives (parteras). Some traditional practitioners are organized and cover extended geographic areas -- such as the callahuayas or "traveling doctors" -- while others practice locally.

### Drug Delivery

Pharmaceuticals -- drugs and vaccines -- may be either abundant or scarce. Those in the social security system may be getting too much; system pays too much for drugs (40-50% of medical costs for drugs). MOH hospitals, however, do not usually provide medication to their largely urban patients. Prices in pharmacies are such as to deny drugs to many. Only 34% of rural medical facilities have adequate drug supplies--purchased retail by staff for resale. There are 10,000 licensed products in use. Aim was to reduce list to 4-500. Vaccines are imported except for rabies produced by Ministry of Agriculture (quality in doubt). One-third of drugs used are produced in country. GOB sets prices.

Principal raw material imports: antibiotics, vitamins B1 and B2, analgesics and glucose. Finished drug imports are headed by antibiotics and vitamins. Import process slow and costly, minimum 6 months for receipt. Sent by ship to Peru or Chile (theft and storage loss), train to La Paz. GOB fixes price with a 50% profit over all costs (initial price, transport, taxes, losses, operational costs). Thriving black market supplied by theft and smuggling--price difference may be extreme.

Distribution: Central, regional and local warehouses' accessibility is 16:1 for urban vs rural patients. Law allows a 27% gross profit for pharmacies. Rural areas: variety of informal markets exist. Tiendas (small general stores) sell some drugs. Migrant vendors (sanitarios) prescribe and sell medicines in rural ferias where older sellers of traditional herbal home remedies are being replaced by vendors of Alka Seltzer and aspirins. In terms of potential public health benefits for any level of assistance, the rural market is now considered more important than the urban. Rural prices are higher than urban charges. See also Drug Habit.

### 5.5 Diet: MDR/Intake

Calorie Intake as % of requirement: 70

Per capita protein intake: 46 grams

GOB's food and nutrition development objectives are to increase PC, calorie intake from 1,890 to 2,200 and protein intake from 46 to 56 grams daily. See also Malnutrition under Prevalence.

### 5.6 Regional Variations

	<u>Caloric Intake</u>	<u>% of Requirement</u>
Altiplano	Adults 1880	83
	Children 1000	76
Valleys	Adults 1894	84
	Children 855	63
Tropics	Adults 1892	89
	Children 811	72

#### Altiplano

Within the departments of La Paz, Oruro, Potosi  
 Altitude: 3,700 - 4,000 meters ASL  
 Language: Aymara, Quechua, Spanish  
 Area: 17% of country

Meals

- 6 AM Breakfast: Thick potato soup, whole cereals, dehydrated potato (chuno), edible tallow, onion leaves, dried pepper.
- 11 AM Snack in the field: Broiled potato, oca, dried potato, corn, peas, broad beans and few pieces of meat. Dried pepper as seasoning.
- 2 PM Snack in the field: Same as first snack.
- 6 PM Supper: Same as breakfast.

Foodstuffs

Flour: From whole barley, quinoa, canahua, corn, wheat for soup, porridge or pito (toasted and finely ground); steamed dumplings made of flour, salt, fat and slaked lime. Bread baked in nearby communities from wheat flour, water, leavening and salt.

Table Oil: Considered expensive and used mostly as medicine. Donation programs are introducing it for salted porridge and soup. Tallow is widely used.

Vegetables: Fresh stems and leaves of quinoa, papalisa (a wild potato), dried green peppers, tomato, lettuce and sometimes carrots.

Fruit: Fresh/dried/preserved, etc. Only occasionally fresh banana, orange, peaches, apples, and cactus fruit.

Milk: Fresh cow's and sheep's milk and their products are sold in urban areas. Only milk from donation programs is consumed.

Meat: Fresh beef, mutton, guinea pig and llama, boiled or fried. Llama meat is also dried. Canned meat is readily accepted but considered too expensive. Salted viscera and dried blood boiled or fried.

Fowl: Dove, partridge, duck and other water birds.

Grain: Wheat flour for baking; wheat, corn, quinoa, canahua (whole or ground) for soups, porridge, etc.

Fish: Fresh fish either broiled, fried or steamed; salted fish either broiled or cooked with soups.

### Beverages

Water, hot coffee out of clay containers and glass bottles, fermented corn, lemon juice and soft drinks.

Water is virtually the only regular drink of the majority of Altiplano campesinos; chicha (a fermented corn beverage), beer and soft drinks are only occasional beverages.

### Cooking location and fuel

Usually inside on primitive stove; mostly brush, straw, dung, sometimes kerosene.

### Valleys

Within the departments of Cochabamba, Tarija and Sucre

Altitude: 200 meters ASL  
Language: Quechua and Spanish  
Area: 21% of country

### Meals

- 6 AM Breakfast: Thick corn flour or wheat soup with potatoes, chill and vegetables or coffee with whole wheat bread.
- 11 AM Snack: Potatoes, stewed corn and chill with meat, cheese or eggs and a mixture of onion and fermented corn.
- 3 PM Snack: Same as 11 AM snack.
- 7 PM Supper: Same as breakfast.

### Foodstuffs

Flour: From whole barley, wheat, corn, quinoa for bread soups and stews; fermented corn for toasted and ground cereals (pito). Break baked from wheat flour mixed with fermented corn sediments and salt, lard or tallow; and toasted cereal mixtures. Baking done in beehive ovens.

Fats: Normally lard; vegetable oil beginning to be used in salads.

**Vegetables:** Approximately 200 grams of fresh vegetables per capita; onions, carrots, green chili, tomatoes, pumpkin, cabbage, fresh corn, radish, lettuce, parsley; boiled or toasted broad beans, peas, lentils; peanuts only infrequently.

**Fruit:** Fresh bananas, apples, peaches, cactus fruit and oranges, but, in small quantities, also dried peaches.

**Milk:** Fresh milk (cow, sheep, goat) normally destined for urban markets; daily per capita intake approximately one ounce; non-fat dry milk for mother and child feeding under donation program.

**Meat:** Beef, pork, mutton, goat, rabbit, guinea pig and dried blood from first four, boiled or fried.

**Fowl:** Chicken, duck, dove and other game birds, boiled or fried.

**Grain:** Wheat, corn, quinoa, barley, rice, whole or ground.

**Fish:** Dried, fresh, broiled and preserved; canned fish is prestige food.

#### Beverages

Fermented corn, water, coffee and a very limited quantity of soft drinks, water and coffee every day as well as fermented corn (for adults). Clay jars and glass bottles.

#### Cooking location and fuel

About 70% cook inside using minimal primitive stove; wood, animal dung and kerosene as fuel source.

#### Tropics

Within the departments of Santa Cruz, Beni and Pando

Altitude: 240 - 440 meters ASL  
Language: Spanish  
Area: 62% of country

Meals

- 5 AM Breakfast: Coffee with bread, yucca, banana or rice.  
10 AM Snack in the field: Yucca and cooked banana, toasted corn  
with chili and some dried meat and water.  
2 PM Snack in the field: Same as 10 o'clock meal, but smaller.  
6 PM Supper: Same as breakfast or rice soup and coffee with  
brown sugar or honey.

Foodstuffs

Flour: White cornmeal, rice and yucca starch, banana meal and occasionally wheat flour. Wheat and yucca bread mixed with cheese, lard and leavening.

Fats: Mostly lard and tallow.

Vegetables: Fresh, dried, preserved, etc. Fresh onion stems, green chili and occasionally fresh cabbage and palmito.

Fruit: Fresh, dried, preserved, etc. Despite variety of tropical fruits available, mango and banana constitute bulk of local fruit diet.

Milk: School children accept non-fat dry milk from donation programs; otherwise milk and cheese are rarely consumed.

Meat: Fresh and preserved beef, pork and turtle; canned meats acceptable but cost limits use.

Fowl: Wild birds, fresh, or dried; occasionally chicken.

Grain: Whole and ground corn and rice.

Fish: Dried fish preferred.

Other: Fresh turtle eggs, whole and toasted peanuts, Brazil nuts.

Beverages

Water, boiled corn and yucca using homemade clay containers and gourds.

Cooking location and fuel

Mostly outside on minimal, primitive stove; firewood.

### 5.6 Drug Habit

Chewing of coca leaves is widespread among highland Indians and common among the Cholos, but rare in lowlands. Habit is acquired early in life, common to both sexes. Chewing of the tea-like plant leaf (together with lime ash which releases active ingredient) briefly reduces sensitivity to cold and hunger pangs and increases ability to perform hard manual labor. (Highland Indian is noted for physical endurance and ability to travel long distances on foot with little sustenance). GOB has discouraged use since prolonged use may be habit forming and result in low productivity. Coca, raw material for production of cocaine, remains a major cash crop in the Yungas, though the chewing of the leaves may be on the decline.

### Utensils

#### Cooking and Eating

##### Altiplano

Pots, 1/2 - 8 liters  
 Tin container, 2 liters  
 Jars, 1/4, 5 - 20 liters  
 Bowls, 1/2 - 5 liters  
 Grain toaster, 1 kg. capacity  
 ... made of aluminum, wood or clay  
 Only spoons, of low grade aluminum, are used for eating

La Paz: Water boils at temperatures so low that pressure cookers are in great demand.

##### Valleys

Pots, 1,2,3,6, and 19 liters  
 Boiling pan, 2 - 4 liters  
 Jars, 1/4, 6 - 20 liters  
 10" frying pan  
 Bowls, 3/4 - 6 liters  
 Grain toaster, 2 kg. capacity  
 ... of aluminum, ceramic, plastic, wood, enameled iron.  
 Enameled and plastic utensils are much liked - replacing those manufactured locally.  
 Only medium or small aluminum spoons are used for eating.

### Tropics

Pots, 3 liters  
Tin cans, 1/2 - 2 liters  
10" frying pan  
Tutumas (gourds), 3 - 25 oz.  
Bowl, 10 oz.  
... of clay, tin, wood, aluminum, gourd.  
Medium and small spoons for eating.

### 5.7 Housing Settlements

Growing urbanization in recent years is evidenced by the rise in percentage of people living in cities of over 2000 inhabitants from 30.5% in 1965 to 34% in 1975. An urban growth rate of 4% per year during the same period compares with a rural rate of 2.1% and an overall growth rate of 2.9%. Between 1950 and 1976 Santa Cruz recorded the fastest growth rate at 7.3% per year; the main cities of La Paz and Cochabamba grew at 3.5% and 3.9% respectively. About 80% of the rural population lives in the highlands (30%) or valleys (50%). Lowlands are sparsely populated.

Provision of housing and services has not kept pace with urban growth. Despite government efforts of recent years, including expropriation of large urban holdings and redistribution of land (Urban Reform Law of 1963), creation of a housing council (1964) and housing bank (1974) to accelerate construction of low-cost units, much housing of urban poor is makeshift, self-built, and lacking in basic services. 83% of the housing stock in the cities of La Paz, Cochabamba, Oruro, Potosí, Sucre, and Tarija was considered marginal by the Ministry of Planning in 1972. Overcrowding is a common problem; 60% of dwellings in Trinidad, 40% in Sucre, have 3 or more persons per room. 1966-1972 census data showed that more than half of the urban units were rented while 98% of rural dwellings were owner-occupied.

The rural population consists mainly of subsistence farmers who work small plots. In general there is little buying and selling of homes, and self-construction is the usual method. The typically small rural home is built of adobe brick in the highlands and of natural plant materials in the lowlands.

An estimated annual housing demand of 40,000 units is equally divided between urban and rural; production through formal institutions, however, does not exceed 5,000 units.

Estimates of National Housing Deficit  
(CONAVI)

<u>Cities</u>	<u>Population</u>	<u>Housing Demand</u>	<u># of Existing Houses</u>	<u>Housing Deficit</u>
La Paz	806,448	161,289	49,500	111,789
Cochabamba	173,779	34,755	15,900	18,855
Santa Cruz	159,410	31,882	17,040	14,842
Oruro	138,768	27,753	10,556	17,197
Potosí	114,969	22,993	6,850	16,143
Sucre	100,836	20,167	6,300	13,867
Tarija	42,401	8,480	3,700	4,780
Trinidad	27,080	5,416	3,545	1,871
Cobija	5,609	1,121	405	716
Total	1,569,300	313,856	113,876	199,980

Source: AID Shelter Sector Assessment , 1976.

Household and Family Size

	<u>Persons per Household</u>	<u>Family Members per Household *</u>	<u>Labor Force Participation Rate</u>
Bolivia	5.11	5.00	39%
City of La Paz	4.72	4.51	38%
Other Urban Areas	5.32	5.10	34%
Rural Areas	5.12	5.07	41%
<u>Provinces:</u>			
Chuquisaca	5.21	5.11	34%
La Paz	4.76	4.67	44%
Cochabamba	5.10	4.95	40%
Oruro	5.04	4.97	32%
Potosí	5.19	5.15	33%
Tarija	5.67	5.48	36%
Santa Cruz	5.85	5.56	36%
Beni	6.84	6.67	36%

\* excludes non-relatives living in the household

Source: AID Shelter Sector Assessment , 1976.

### 5.8 Housing Policies and Institutions

Ministry of Urban Development and Housing (MUV), established in 1970, was given the central role by the 1973 Housing Law to give single source direction to housing and urban development activities. The Housing Division of MUV has three principal sections: Housing, Community Development, and Technology. As the community development arm, Dirección General de Promoción Comunal (DGPC) has low-income community development plans as its main function.

Banco de la Vivienda (BANVI) - financial entity created by Housing Law. Solution to financing low-income shelter expected to be its primary objective.

The Bolivian Savings and Loan System - consisting of central bank and regulatory agency, Caja Central de Ahorro y Prestamo (CACEN), and 11 member associations is the only institutional source of long-term financing in the private sector. Since change in AID Housing Guaranty policy, savings and loan institutions have been involved in low-cost shelter programs. CACEN is principal contact with government and international lending institutions.

Banco Hipotecario and other commercial banks lend for housing on short-term basis only.

The Consejo Nacional de Vivienda (CONAVI), founded in 1964 as largest housing council, is semi-autonomous under MUV and an effective implementing agency in the housing sector.

#### Disaster Low-cost Housing

Several recent housing "solutions" have received external financing.

1. IBRD - 1977 Urban Development Project included 5,525 serviced plots in El Alto section of La Paz, about 85% with core dwelling options; upgrading of 4,500 units with basic infrastructure and construction material credits based on mutual aid.
2. IDE - \$21 million loan to CACEN for emergency shelter for Trinidad flood victims in 1976 that provided 800 core units and services on high land on city outskirts.
3. Interamerican Savings and Loan Bank (BIAPE) - negotiated \$15 million in June 1978. CACEN presented solicitation for \$3 million loan for construction of low-cost urban units to begin mid-1979.

4. AID - proposed two \$4 million housing guarantees in 1979: one to BANVI to finance 2,090 shelters in Plan Socio Urbano projects, about 25% of them completed core units; one to savings and loan system for 2,870 shelters in rural areas, about 20% completed core units.

### 5.9 Housing Types, Materials, Construction and Services

#### Urban

The near absence of lean-to's and shacks in urban low-cost housing of the Altiplano is attributed to Bolivians' skill in constructing with adobe block. Thus, dwelling walls in La Paz or Sucre, for example, appear solid, though floors may be earthen, roofs of a variety of materials, and windows few. Slum housing in the lowlands, where sun-baked bricks are the common building material, is less durable.

About 62% of the population of La Paz lives in marginal housing on city outskirts, chiefly on steep, landslide-prone slopes; poor site selection, overcrowded conditions, and an absence of services are greater problems than structure durability.

In the lowland city of Trinidad, a recent survey found 80% of the housing to be substandard and in need of repair. Over 50% of units were built in the traditional manner: mud and cane walls, tile or palm roofs. 78% of the dwellings lacked sanitary facilities; 50% depended on a public spigot for water supply.

#### Rural

Rural homes are usually small and rectangular in shape. In the highlands they are typically of adobe brick construction with steeply gabled roofs of thatch (scrub). The kitchen may be a separate structure but cooking is usually done in the main house. Houses may be grouped or in compounds.

Low-cost housing in the lowlands is less permanent, with plant materials, such as reeds, palm fronds or thatch extensively used. Mud, cane, and palm are traditional building materials in the eastern parts of country. Roofs of palm fronds are steeply gabled.

Basic sanitary facilities are usually lacking; electric service is available only in, or near, major cities or towns. Manure or wood is used as fuel for cooking, kerosene lamps or candles for lighting.

Usual low-cost housing materials are adobe walls, cyclopean footings, and tin or clay tile roofing. 90% of traditional materials are domestically produced. Cement, brick, block, cement tiles, adobe, and wood for windows and doors are locally available; reinforcing steel, aluminum, sanitary fixtures, electrical conduit, pipes, glass, and hardware must be imported. Cement also is increasingly imported since annual production of about 266,000 tons does not meet demand. An inadequate transportation network and general inflation add to cost of materials.

Roofing: clay tiles common in La Paz; imported asbestos, aluminum, and zinc sheets have become popular.

Flooring: dirt floors common; otherwise, concrete slab is easiest, if not least expensive, material to use. Wood is preferred in higher altitudes; cement tiles set in mortar or compacted earth are often used in lowlands.

Walls: adobe brick in the Altiplano; clay brick or cement block in lowland urban areas.

Windows: increasingly seen (doors only openings in traditional homes); iron or wood frames most common in low-cost housing.

There were 176 construction companies in 1977: La Paz (104), Cochabamba (25), Santa Cruz (22). Technicians and unskilled workers are in adequate supply but shortage of skilled labor exists.

Self-construction and improvement of homes is Bolivian cultural tradition. The basic shell which most low income families are capable of constructing can often be brought up to adequate standards with modest investments in improvements and addition of infrastructure.

Classification of Housing: According to Quality of Construction in 1972

<u>Cities</u>	<u># Inhabitants</u>	<u>Type I</u>	<u>Type II</u>	<u>Type III</u>	<u>Type IV</u>	<u>Total</u>
La Paz	582,000	2,802 5.81%	6,965 14.45%	12,403 25.73%	26,032 54.01%	48,202 100%
Cochabamba	163,940	1,359 7.99%	2,985 17.55%	5,697 33.51%	7,861 46.23%	17,002 100%
Oruro	103,740	88 0.65%	1,055 7.85%	5,372 40.0%	6,928 51.54%	13,443 100%
Potosí	72,070	22 0.32%	313 4.51%	2,407 34.71%	4,193 60.46%	6,935 100%

<u>Cities</u>	<u># Inhabitants</u>	<u>Type I</u>	<u>Type II</u>	<u>Type III</u>	<u>Type IV</u>	<u>Total</u>
Sucre	52,890	80 1.1%	488 6.57%	2,837 38.86%	3,903 53.46%	7,308 100%
Tarija	29,110	127 3.19%	350 8.80%	1,239 31.18%	2,258 56.82%	3,974 100%
Total	1,003,750	4,478 4.62%	11,248 11.61%	29,955 30.93%	51,175 52.84%	96,856 100%

Type I: good quality construction with a full endowment of public facilities and amenities.

Type II: less luxurious than Type I but of good construction and access to public utilities. Includes most of the public sector housing.

Type III: marginal units, built of simple materials with no amenities, poor access to public utilities, and inhabited often by more than one family. This class includes deteriorating tenement buildings and boarding houses.

Type IV: slums or squatter units. The least stable construction, combined with an absence of all or most utilities and comforts.

Source: Ministerio de Planeamiento y Coordinación. "Diagnostico de Vivienda" as cited in AID Shelter Sector Assessment, 1976.

#### 5.10 Public Utilities and Services

40% of urban housing units lack water service, 63% lack sewer facilities. Only 1% of rural population has access to piped water and 11.2% to adequate sewage disposal. Not more than 5% of rural households had electricity in the early 1970's.

A water treatment plant and related trunk lines were expected to be in operation by 1978, facilitating development of the Altiplano. There were no sewer treatment plants in Bolivia in 1976, though construction of one in La Paz was being negotiated that year.

Percent of Housing Units with Service

<u>City</u>	<u>Year of Census</u>	<u>Water</u>	<u>Electricity</u>	<u>Sewer</u>
Potosi	1972	43%	65%	32%
Tarija	1970	*	82%	*
Cochabamba	1967	61%	72%	41%
Oruro	1972	58%	83%	27%
Sucre	1972	71%	78%	46%

\* No data available

Source: Ministerio de Planeamiento y Coordinacion as cited in AID Shelter Sector Assessment, 1976.

6. Economy6.1 Overview of Economy

Economic growth rate averaged 6.3% in the 1973-77 period, dropped to 3.9% in 1978, then rose to 6% in 1979. Growth rates of real GDP, however, declined 3-4% in 1978 and 1-2% in 1979. 1978 Current Account Deficit was \$385 million. Foreign debt was \$3.8 billion in 1979. Inflation rate was 5.5% in 1976, 13.5% in 1978.

Industrial Origin of GDP  
(Current Market Prices)

	<u>1977*</u>	
	<u>BN Pesos</u>	<u>% of Total</u>
Agriculture, Forestry, Fishing	3.05	16.4
Mining & Quarrying	1.84	9.9
of which:		
Hydrocarbon	.301	1.6
Manufacturing	2.82	15.2
Construction	.77	4.1
Energy	.26	1.4
Transport & communications	1.67	9.0
Commerce, hotels	3.01	16.2
Banking	.53	2.9
Ownership of Property	1.42	7.7
Government	1.62	8.7
Other services	1.59	8.5
GDP	18.58	100.0

\* Provisional, Banco Central de Bolivia

Revenue for GOB comes largely from taxes on tin exports and from levies placed on almost all imported goods.

Resources

Endowed with great natural wealth, Bolivia is one of the two least developed, poorest Latin American countries. Mining in the extreme highlands; petroleum and natural gas resources, timber and good soils in the lowlands and lower valleys, have failed to achieve economic impact for several reasons, especially near constant political and social unrest and isolation by the Andes to the West and long stretches of virtually uninhabitable land to the east and north. There are extensive pastures for

cattle and hogs in the lowlands and valleys. Rivers and lakes provide ample fish and vast hydroelectric potential. Llama and alpaca are important domestic animals in the Altiplano for meat, wool, transportation; except at extreme heights, they are gradually being replaced by burro, cattle and sheep.

Low productivity, traditional agriculture engages majority of population. (See Agriculture).

Industry is at an early stage of development. Sector's share of GNP -- about 10% -- has not changed much since 1968. Rural population -- majority -- has little real purchasing power for industrial products: textiles, cottage industries, processed goods, beverages, clothing.

Mining accounts for 10% of GDP, employs 3% of labor force, provides almost 75% of exports (1977). Bolivia is the world's second largest tin producer, after Malaysia. Bolivian mining is a capital-intensive, costly activity due to natural obstacles and institutional weakness (high altitude, narrow-veined underground deposits, primitive technology, poor management, taxation unrelated to costs, lack of credit). Government-controlled COMIBOL accounts for over 50% of mining exports, 33% of employment; most mines very low levels of ore reserves. GOB objectives have include intensive exploration (shifting from tin to ferrous and non-metallic minerals), investing in ore processing, extraction, volatilization, continued development of smelting projects and a steel industry. Mineral exports grew by 23% in '76, 32% in '77 and 5% in 1978. By about 27% for '77.

Petroleum: 1976 through 78 saw a decline of production and exports due to well depletion and falling reserves. New fields have been discovered, but more are needed to supply rising domestic consumption and need to export. Despite high world prices, increasing domestic need was expected to change status to net importer by the early 1980's.

## 6.2 Aid and Other Economic Assistance

Bolivia is recipient of aid from many sources. IBRD and IDB are major multilateral donors: IDA, WFP, WHO, UNESCO, FAO and UNICEF all have programs. U.S. program has been scaled down in recent years. DAC country assistance (other than US) comes from West Germany, USSR, Eastern Europe, Japan, Denmark, UK and Switzerland, among others. Principal thrust of AID program is to "increase agricultural productivity among small farmers, to improve basic medical and health care delivery systems and to make rural education more relevant and responsive to needs of the poor."

### 6.3 Trade

#### Trading Partners

U.S.A. and Great Britain have been chief markets for Bolivian metals. They are also important suppliers, but development of petroleum exports to Argentina, Chile and Brazil may alter pattern -- Bolivia can then buy food and manufactures from its neighbors.

### 6.4 GNP

GNP per capita in 1978: US \$510 (World Bank)\*

### 6.5 Imports

Mainly chemicals, transportation equipment, capital goods, pharmaceuticals, foodstuffs. See also Agriculture. Public sector purchases approximately 70% of all imported goods and services.

	<u>Imports (\$ MN)</u>		
<u>Commodities</u>	<u>1975</u>	<u>1976</u>	<u>1977 *</u>
Non-durable consumer goods	67.5	62.7	61.8
Durable consumer goods	60.3	56.0	64.9
Raw materials & semis	199.2	195.8	219.3
Capital goods for industry	92.6	98.2	111.2
Transport/equipment	99.3	103.7	117.4
Construction materials	24.6	25.5	29.1

\* Preliminary

#### Tariffs and Trade Controls

Most imports are subject to an ad valorem duty based on CIF value; many items also pay a specific duty. Some non-essential goods are on a prohibited list. Many imports require a license. Contraband is a serious problem; over 20% of consumer goods are said to be smuggled.

6.6 ExportsExports (\$MN) \*

<u>Commodity</u>	<u>1976</u>	<u>1977</u>
Tin	216.1	490.5
Petroleum**	112.6	67.4
Natural gas**	54.9	67.4
Zinc	39.1	44.7
Silver	24.3	30.8
Tungsten	34.8	45.1
Cotton	12.0	17.7
Sugar	29.9	12.6
Antimony	31.4	18.05
Wood	10.0	12.0
Bismuth	3.7	5.1
Coffee	13.1	18.7

\* Banco Central de Bolivia

\*\* Pipelines

State oil company operates 2,462 km of oil pipelines and 754 km of gas pipelines. Oil pipelines allow access from major production fields near Santa Cruz to Pacific seaport of Arica and to Argentine border. Bank-financed natural gas pipeline conveys gas to Argentina.

## 7. Agriculture

### 7.1 Overview of Agricultural Sector

Agriculture generates 25% of GDP, contributes 12% of exports, and employs 50% of labor force, mostly on subsistence level. Demand for food increases 4% annually; domestic food production has increased only 2%. Major crops are potatoes, corn, sugar cane, cassava, rice, barley, wheat, cotton, yuccas, bananas, coffee, livestock.

Typical rural family cultivates 2 1/2 - 5 acres of land. Over 90% of farm income stems from barley, wheat, rice, coca or vegetables, balance from mixed livestock. Minimum family subsistence costs are about \$800/annum; value of farm production ranges from \$600 - \$1,000/annum.

Despite growth potential, there are serious social and institutional constraints. Between 1972-75, average annual growth rate was 4.4% (1968-72, less than 1%). Principal problem; about 80% of rural population is concentrated in the cold, infertile Altiplano and in Andean valleys (30% of Bolivia's area); while the Yungas (lower tropical valleys) and Oriente (eastern tropical lowlands) regions with 70% of land have only 20% of population. Thus, unevenness of population distribution and density, long distances between agricultural regions and markets, and extremely rugged terrain result in high costs for transport, communication and social services. Problems compounded by frequent floods. Subsistence farmers in Altiplano do not speak Spanish; thus language is yet another barrier to development.

GOB has had little success in promoting large-scale migration to eastern lowlands. Reasons for failure include low income yields during first years; lack of appropriate technology for small farm production in lowlands; high transport costs and marketing problems; lack of credit, extension services and technical assistance.

Stagnation of subsistence farming is evident in stable structure of crop production, and decreasing rate of growth. Small scale of Altiplano farms and low soil fertility reduce chances to increase production. Yet, Campesinos feed themselves plus one-third of urban population which together accounts for three-fourths of Bolivia's food consumption, supplying cereals (corn and quinoa) and most fruits and vegetables for urban areas. Commercial agriculture and imports supply remaining quarter.

Consumer prices are controlled, reducing production incentives. Improvements in health, education and other basic needs of the Campesino are prerequisite to achieving increased production.

Lagging performance in Altiplano and Valleys contrasts with rapid growth of modern, export-oriented sector in Santa Cruz region of Oriente. Here private agriculture has been very responsive to GOB policy and marketing incentives, supported by good infrastructure (Cochabamba-Santa Cruz road), loans, credits, extension services, influential producers' associations, land clearing and GOB investment in sugar refineries which have helped to stimulate import substitution in beef, sugar, rice and cotton.

Little consensus on size of coffee production. COBOLCA estimates that 30% of coffee production is consumed locally. Yet serious shortage exists in La Paz; blame goes to GOB's dual pricing system drawing larger quantities out of country. COBOLCA views coffee as a promising crop to substitute for coca.

## 7.2 Production

	<u>1976</u>			<u>1977</u> 1/		
	<u>Area</u> <u>has</u>	<u>Yield</u> <u>kg/ha</u>	<u>Prod'n</u> <u>MT</u>	<u>Area</u> <u>has</u>	<u>Yield</u> <u>kg/ha</u>	<u>Prod'n</u> <u>MT</u>
<u>Grains &amp; Soybeans</u>						
Wheat	80,815	864	69,815	73,415	655	48,085
Rice	71,790	1,575	113,045	62,915	1,600	100,504 2/
Barley	115,665	793	91,770	111,920	534	59,805
Corn	235,370	1,453	342,120	243,590	1,228	299,190
Oats	3,500	690	2,415	3,400	670	2,280
Rye	900	500	450	900	500	450
Soybeans	12,100	1,270	15,370	8,000	1,200	9,600
<u>Tubers</u>						
Potatoes	128,300	6,422	823,890	125,515	5,406	678,560
Cassava	22,000	13,850	304,700	23,000	12,800	294,400
<u>Vegetables</u>						
Broad beans	28,000	1,960	54,880	27,000	1,960	59,920
Tomatoes	5,100	8,000	40,800	5,000	7,600	38,000
Onions	6,200	7,500	46,500	6,250	7,500	46,875

Fruits

Oranges	4,500	17,000	76,500	4,800	16,500	79,200
Mandarines	1,140	16,403	18,700	1,200	14,000	16,800
Lemons	2,060	11,796	24,300	2,080	11,750	24,440
Grapes	3,340	5,930	19,808	3,870	6,000	23,250
Apples	3,550	5,500	19,525	3,600	5,400	19,440

Source: Ministry of Agriculture

1/ Estimated

2/ Reliable rice production figures not available. Marketing done by private traders and ENA. Also, much rice never reaches commercial channels. Domestic consumption estimated at 50,000 MT/yr. Much excess rice is of poor, non-exportable quality, leaving only 40,000 MT eligible for export.

<u>Industrial Crops</u>	<u>1976</u>			<u>1977 3/</u>		
	<u>Area Has</u>	<u>Yield kg/ha</u>	<u>Prod'n MT</u>	<u>Area Has</u>	<u>Yield kg/ha</u>	<u>Prod'n MT</u>
Cottonseed	-	-	34,800	n/a	n/a	n/a
Peanuts	11,000	1,300	14,290	12,200	1,315	16,045
Tobacco	2,030	1,098	2,230	2,005	1,131	2,270
Cotton	29,665	425	12,615	39,800	392	15,625

Forages

Alfalfa	12,000	25,000	300,000	12,300	25,000	307,500
---------	--------	--------	---------	--------	--------	---------

Source: Ministry of Agriculture

3/ Provisional figures

Oilseeds and Products

Soybean production is projected substantially lower for 1977, due to reduced acreage and lack of experience at farm and crushing level. Cottonseed available for crushing will be down too (small cotton crop). Most of peanut output goes into direct human consumption. Industry is plagued by overcapacity: Villamonte, in extreme south, suffers from total lack of locally grown products. USAID is assisting in the clearing of

10,000 hectares (in the Chaca Humida region) to grow peanuts. To keep plant operational, lard is imported for hydrogenation. GOB's overriding objective is to supply local fats and oils for human consumption, rather than protein meal for animal feeds. Total annual demand for refined product: 35,000-40,000 MT. Extent to which contraband imports supply local market not known.

### Wheat

The poorer 1977 yield was reportedly due to inclement weather during growing season.

### Area Planted, Yield and Production<sup>1/</sup>

<u>Year</u>	<u>Area (Hectares)</u>	<u>Yield Production</u>	
		<u>(kg/ha)</u>	<u>(MT)</u>
1974	73,570	849	62,460
1975	76,860	803	61,750
1976	80,815	864	69,815
1977 <sup>2/</sup>	73,415	655	48,085

1/ Ministry of Agriculture

2/ Estimate

### Feedgrains

Projected poor 1977 corn production due to fewer acres planted and bad weather. 1/3 of corn production goes for human consumption; over 50% for animal feeds. All of corn is consumed locally.

Barley production for 1977, lowest since 1968.

### Cattle and Beef Production<sup>1/</sup>

With exception of some large cattle ranches in Beni area, livestock raising is a small farm enterprise.

<u>Item</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
No. of Head 2/	2,658,810	2,755,450	2,876,630
Tot. export live animals 3/	65,440	58,420	67,520
Number slaughtered	343,540	349,440	375,740
Meat pro- duction (MT)	61,840	62,900	67,630
Meat exports (MT)	1,971	93	-
Apparent National Consumption (MT)	59,869	62,807	67,630

1/ Ministry of Agriculture

2/ Inventory as of January of each year

3/ Includes estimated illegal exports

Sheep and Meat Production 1/

<u>Item</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
No. of Head 2/	7,322,770	7,506,020	7,693,847
Number Slaughtered	1,486,350	1,523,540	1,530,312
Meat pro- duction (MT)	16,350	16,760	16,833
Apparent Natural Consumption (MT)	16,350	16,760	16,833

<u>Item</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Wool pro- duction (MT)	1,860	1,910	1,960

1/ Ministry of Agriculture

2/ Inventory as of January of each year

Hogs and Pork Production 1/

<u>Item</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
No. of Head 2/	1,050,000	1,102,500	1,157,625
Number Slaughtered	634,300	665,910	704,855
Meat pro- duction (MT)	22,200	23,310	24,670
Apparent National Consumption (MT)	22,200	23,310	24,670

1/ Ministry of Agriculture

2/ Inventory as of January of each year

Planting and Harvesting Dates

	<u>Planting</u>	<u>Harvesting</u>
Cereals and Grains:		
Barley:		
Cold zone (high Altiplano).....	October-December	Last of May, June
7,200-11,800'.....	November-January	"
Corn:		
7,200-11,800'.....	Aug. 15 - Nov. 15	April and May
5,900-7,100'.....	Sept. 15 - Dec. 15	"
Below 5,900'.....	Sept. 1 - Dec. 1	"
Oats.....	Nov. - Dec.	May - June

Rice.....	Oct.- Nov.	March - May
Wheat:		
Winter.....	June	October - November
Spring.....	Nov. - Dec.	May - July
Quinoa (Altiplano)...	Aug.- Sept.	February - April
Coffee.....	-	February - April
Fibers:		
Cotton (Santa Cruz) ..	Sept.- Nov.	April - June
Fruit:		
Oranges.....	-	Begins in April
Sugarcane.....	May - June	May - September
Tobacco.....	August	January - June
Vegetables:		
Potatoes:		
Altiplano.....	August - December	March - August
6,100-10,000'.....	Sept.- Oct.	April - July

#### 7.4 Agricultural Imports

##### Wheat: Imports by Country of Origin, 1974 - 1977 1/ (in metric tons)

<u>Country</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977 2/</u>
Argentina	40,000	10,000	55,000	60,000
USA	30,000	20,000	58,000	80,000
Uruguay	-	15,430	-	-
Donations	15,000	600	4,110	-
Total:	85,000	55,430	117,110	140,000

1/ Ministry of Industry, Commerce and Tourism

2/ Estimate

Note: Current producer price for domestically grown wheat is 4.13 pesos/kg = U.S. \$5.62/bushel. High price has led to illegal flour imports from Argentina; though appreciable, exact amount not known.

Storage facilities for wheat are a serious problem, particularly at Chilean port of Antofagasta, which has no storage capacity. Wastage runs as high as 3% at port alone. Silos are being planned. By end of '77, holding capacity for wheat within country will be about 19,000 MT.

Wheat Flour: Imports by Country of Origin, 1974 - 1977\*  
(In metric tons)

<u>Country</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977*</u>
Argentina	48,217	104,300	45,960	-
USA	41,556	2,000	1,000	-
Germany	3,416	-	-	-
Other	5,826	5,000	3,000	-
Total:	99,015	111,300	49,960	85,760

\*Ministry of Industry, Commerce and Tourism

### 7.5 Agricultural Exports

Commercial agricultural sector (eastern province of Santa Cruz) continued growth with export values at \$60 million (FOB) in 1976. Despite reduction from 40,000 - 29,000 hectares for cotton cultivation, exports were \$11.4 million. Sugar hurt by drop in world prices. Outlook for 1977 good--total agricultural exports about \$82 million (FOB).

Exports in current prices (In thousands of US \$)	<u>1973</u>	<u>1974</u>	<u>1975*</u>	<u>1976*</u>
Sugar	12,400	16,960	21,145	24,700
Cotton	9,700	21,970	18,459	12,800
Coffee	5,900	4,300	6,775	14,000
Fruits	1,500	2,100	2,116	-
Timber	7,700	12,902	12,669	10,000
Meat	3,100	221	15	-
Others	3,200	4,847	4,099	12,000

	<u>1973</u>	<u>1974</u>	<u>1975*</u>	<u>1976*</u>
Export Indices (1974 = 100)	63.57	100.00	86.02	83.78
Sugar	35.00	100.00	82.00	56.40
Cotton	95.59	100.00	84.85	105.70
Coffee	122.18	100.00	100.00	172.20
Fruits	66.61	100.00	80.66	-
Timber	110.11	100.00	89.41	98.86
Meat	82.90	100.00	97.11	-
Others	63.57	100.00	86.02	88.38
Exports in Constant 1974 Prices	<u>68,432</u>	<u>63,300</u>	<u>75,889</u>	<u>87,727</u>
Sugar	35,437	16,960	25,786	43,794
Cotton	10,147	21,970	21,755	12,110
Coffee	4,829	4,300	6,775	8,130
Fruits	2,252	2,100	2,623	-
Timber	6,993	12,902	14,170	10,115
Meat	3,740	221	15	-
Others	5,034	4,847	4,765	13,578
Export Volume (Metric Tons)	<u>1973</u>	<u>1974</u>	<u>1975*</u>	<u>1976*</u>
Sugar	63,804	30,536	46,432	76,000
Cotton	22,266	48,212	47,735	11,100
Coffee	4,130	3,678	5,795	4,842
Fruits	7,336	6,840	8,546	-
Timber	46,495	85,784	94,193	-
Meat	2,792	165	12	-
Prices (US \$/Metric ton)	<u>1973</u>	<u>1974</u>	<u>1975*</u>	<u>1976*</u>
Sugar	194.4	555.4	455.4	325
Cotton	435.6	455.7	386.7	514.7
Coffee	1,428.6	1,169.2	1,169.2	2,891
Fruits	204.5	307.0	247.6	-
Timber	165.6	150.4	134.5	-
Meat	1,110.3	1,339.4	1,294.0	-

\* Provisional



## 8. Physical Geography

### 8.1 Climate by Natural Region

Extreme differences in elevation produce great variety of climatic conditions. From W to E, temperatures increase progressively; precipitation decreases, N to S. Most rainfall occurs October to April; considerable variation from year to year; both floods and droughts common.

#### Altiplano

Mean annual temperature 45 - 50°F. Cold nights even in summer; winter nights to zero. Because it lies in a deep canyon, La Paz is spared extremes of plateau. Lake Titicaca exerts a maritime influence on surrounding region (water temperature about 51°F throughout year), reducing diurnal and seasonal ranges of adjacent lands. Rainfall ranges from about 40" annually around Lake Titicaca to as little as 2" in semideserts and salt pans of South. Yet Oruro, encrusted in salt, may become inundated; rain comes in torrents. Irregularity of rainfall and freezing temperatures -- even around Lake Titicaca -- produce crop losses averaging one in 5 years. Hail and frosts are common on much of Altiplano.

#### Yungas (east of Cordillera Real)

Range with altitude from tropical through subtropical to temperate with high humidity. Easterly winds bring rain, up to 60" annually.

#### Valles (south of Yungas)

Temperatures similar to, but slightly lower than, Yungas; humidity considerably lower. Sheltered and densely settled valleys and basins average 25 - 30" rainfall annually. Area around Sucre is drier; system of dikes was built to control flash flooding.

#### Eastern Lowlands, Differentiated

##### Rain forest and savannahs of Northern Oriente

Temperatures average up to 80 F annually; little diurnal or seasonal variation; humid haze. Rainfall abundant, heaviest in summer, causing rivers to overflow forming vast, shallow lakes.

### Santa Cruz Plains

To south, heat, humidity, rainfall decline. Temperatures average 75° F or less; sharp drop when dust-laden winds, surazos, blow from Paraguay. Annual rainfall 40 - 60".

### Bolivian Chaco, far south of Oriente

Semi-tropical, rainfall further reduced. "Annual" rainfall of 35 - 40", however, comes during December through February, turning area into seasonal swamp; semidesert remaining 9 months.

## 8.2 Temperatures\*

<u>Station</u>		<u>Jan</u>	<u>Apr</u>	<u>July</u>	<u>Oct</u>	<u>Extreme</u>
Concepcion	Max	85	86	81	88	101
"	Min	66	62	54	62	32
La Paz	Max	63	65	62	66	80
"	Min	43	40	33	40	26
Sucre	Max	63	63	61	65	88
"	Min	48	45	37	46	25

\* In Degrees Fahrenheit

## 8.3 Rainfall (in Inches)

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Concepcion	7.2	4.7	4.4	1.8	2.0	1.5	1.1	0.9	1.2	2.9	5.0	5.9
La Paz	4.5	4.2	2.6	1.3	0.5	0.3	0.4	0.5	1.1	1.6	1.9	3.7
Sucre	7.3	4.9	3.7	1.6	0.2	0.1	0.2	0.3	1.0	1.6	2.6	4.3

#### 8.4 Landforms

Area: 424,162 square miles or 1,098,160 km = size of Texas and California combined; or greater than France, Spain and Portugal together. It extends approximately from 9°44' to 23° south, and from 58° to 70° west. Fifth largest country in South America, landlocked behind the barriers of the Andes, Atacama desert, Amazon forest and empty Chaco lands, bounded on north and east by Brazil, on southeast by Paraguay, on south by Argentina, on west by Chile and Peru. Land boundaries: 6,083 km.

#### Dominant Features

Altiplano - high plateau

Yungas - eastern slopes of Cordillera Real

Valles - valleys and basins south of Yungas

Oriente - all country east of Andes

Bolivia has been called the "Tibet of South America": one-third of the Republic is over a mile high, the "Roof of South America". The high plateau (Altiplano, Cordillera Occidental), region is flanked by a volcanic mountain system, the western Cordillera (aligned parallel to the Chilean frontier), and the eastern, or Cordillera Real, geographically older and of even greater height. See Mountains for details.

#### Altiplano

The country's heartland, backbone of national economy (mineral deposits); holds most of the population, principal cities, industrial centers.

A relatively flat-floored depression 500 miles long by 80 broad, with altitudes between 12 - 14,000', sloping gently southward (400' lower than Lake Titicaca). At 12,507' this lake is South America's largest (3,500 sq. miles) and world's highest body of navigable water, straddling Peruvian border in north. Mediterranean conditions have made this lake basin area the most heavily populated and agriculturally productive section of Altiplano. Lake Titicaca is drained by Desaguadero River which empties 200 miles south into Lake Poopo, very saline, only 10' deep. Grassland

deteriorates southward, scrub disappears and merges into clay and salt flats of Uyuni. Near Argentine border, transverse hill systems span gap between eastern and western Cordilleras.

### Yungas

Sharply tilted mountain valleys descend eastward from crests of Cordillera Real. 3 zones: highest, "Ceja" (eyebrow), similar to Altiplano; lowest, or tropical zone, relates to Oriente. Between, at levels of 3,000-9,000', are the true semitropical Yungas: Series of narrow river valleys with rich soils, heavy rains, lush vegetation.

### Valles

South of Yungas, descent to lowlands more gradual, in a series of steps; valleys and basins broader and more extensive; alluvial soil around Cochabamba (second largest cluster), Sucre and Tarija supports Bolivia's most intensive agriculture. Puna high ridges and plateaus are unproductive and sparsely settled. Poor water retention causes alternating droughts and floods.

## 8.5 Land Use

Total land area: 271.2 million acres (estimates vary). Of these, 41% or 110.9 million acres, are forests, largely located in tropical lowlands and unexploited (lack of transport). Almost 38% of the total area, or 102 million acres, are considered unfit for agriculture. 13% of total area is under cultivation; 7 acres per capita. Potential farm land, however, is much higher. Much pasturage and idle land.

Serious man-to-land use imbalance: Altiplano: 14% of total area, 56% of population, 43% of land cultivation (but only 34% of agricultural production by value -- crop damage too -- frosts, hailstorms; extensive erosion, lack of fertilizer). Lack of fit between demographic and natural resources; long distances, between agricultural regions and markets, extremely rugged terrain (high costs for transport). Problems compounded by frequent floods, frosts, hailstorms. Crop rotation only form of soil conservation; more manure is used for household cooking fuel than as fertilizer. Wooden plows, pointed digging sticks for potatoes and other primitive tools are common except on larger farms in lowlands. Bolivia ranks last in tractor use in South America. See also Agriculture.

## 8.6 Resources

### Forests

Timber resources -- most in tropical lowlands -- largely unexploited. Chief forest products: rubber, quinine, almonds and Brazil nuts, dyewoods.

### Fuels

Petroleum abounds in whole territory east of Andes -- potentially largest oil field in South America. Substantial resources of natural gas. See pipelines under economic exports.

### Minerals

From the 16th - 19th century (when mines became exhausted) Bolivia was world's leading silver producer. Tin replaced silver by beginning of 20th century. Zinc, lead, antimony, copper, tungsten, bismuth, gold, sulfur, silver and iron ore are produced. Mines are located at high altitudes, in narrow-vein underground deposits. GOB policies have inhibited exploration.

## 8.7 Hydrography

Altiplano, largest basin of inland drainage in South America, centered around Lake Titicaca. About the size of Puerto Rico, lake contains 25 islands (Inca and pre-Inca settlements). Great variations in depth, very shallow to maximum of 892'. See also Landforms and River Ports.

The few streams originating in the western Cordillera drain either eastward to the interior plateau or westward to the Pacific. Loa River is only year-round watercourse to Pacific.

Amazon drainage system: more than 30 rivers transecting eastern plains are navigable for thousands of miles. Some sections require shallow-draft vessels. Some rivers constitute the main, and in some places only, routes of communication between settlements and rest of country.

Valles drainage pattern is divided between the system of the Pilcomayo River (rising in the heart, flowing south to join Paraguay River near Asuncion, Paraguay), and the system of the Chapare, Ichilo, and Rio Grande which join the Oriente to form the Mamore whose waters reach the Amazon.

In Oriente, drainage is part of the Madeira river system -- a major Amazon tributary formed by junction of Beni and Mamore near extreme

northeast. Rivers of plains are wide and sluggish, navigable by shallow-draft paddle wheel steamers or barges. Water transport is chiefly of local importance to river settlements. Chaco streams drain south into Paraguay.

Cordillera Real, southern extension, has small streams which drain westward onto plateau heading towards Lake Poopo, but larger water-courses drain eastward toward Amazon Basin, or south toward La Plata basin.

Principal Navigable Rivers  
Distances in Kilometers

<u>Location</u>		<u>12</u>	<u>11</u>	<u>10</u>	<u>9</u>	<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>
(Rio Mamore)												
Boca Rio Grande	(1)	1041	849	673	669	489	457	343	243	216	147	112
Camlaco	(2)	929	737	561	557	377	345	231	131	104	35	
Boca Rio Secure	(3)	894	702	525	522	341	309	195	95	69		
Boca Cort. Toribio	(4)	825	633	456	453	272	240	126	26			
Boca Rio Ibare	(5)	799	607	430	427	246	214	100				
Boca Rio Tijamuchi	(6)	699	507	330	326	146	114					
Boca Rio Apere	(7)	584	393	216	212	32						
Boca Rio Yacuma	(8)	553	361	184	160							
Cachuela Matucare	(9)	372	180	30								
Puerto Siles	(10)	369	177									
Boca Rio Itenez	(11)	192										
Guayaramerin	(12)											

<u>Location</u>	<u>Puerto Grether</u>	<u>Boca Rio Ichoa</u>	<u>Puerto Villarroel</u>	<u>Boca Rio Chimore</u>	<u>Boca Rio Chapare</u>
(Rio Mamore)					
Guayaramerin	1450	1439	1317	1228	1075
Boca Rio Itenez	1268	1246	1125	1096	883
Puerto Siles	1091	1070	949	920	706
Cachuela Matucare	1088	1066	945	916	703
Boca Rio Yacuma	907	885	765	736	522
Boca Rio Apere	875	854	732	704	490
Boca Rio Tijamuchi	761	740	619	590	376
Boca Rio Ibare	661	640	518	489	276
Boca Cort. Toribio	635	614	492	463	250
Boca Rio Secure	566	544	423	394	181
Camlaco	531	509	387	359	146
Boca Rio Grande	419	397	276	247	33
(Rio Ichilo)					

<u>Location</u>	<u>Puerto Grether</u>	<u>Boca Rio Ichoa</u>	<u>Puerto Villarroel</u>	<u>Boca Rio Chimore</u>	<u>Boca Rio Chapare</u>
Boca Rio Chapare	385	363	242	213	
Boca Rio Chimore	171	150	29		
Puerto Villarroel	142	121			
Boca Rio Ichoa	22				
Puerto Grether					

<u>Location</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>
(Rio Orthon)														
Boca Rio														
Orthon (1)...	85	230	315	262	313	402	511	97	28	158	259	405	478	756
Humaita (2)...	145	230	347	398	487	596	182	113	243	344	490	563	841	
Teduzara (3)....	85	492	543	632	741	327	258	388	489	635	707	986		
Puerto Rico (4)....	577	628	717	826	412	343	473	574	720	793	1071			
(Rio M de Dios)														
Sena (5).....	51	140	249	359	234	358	459	605	678	956				
Cachuela Camacho (6).....	89	198	410	285	409	510	656	729	1007					
Cachuela Monte Verde (7).....	109	499	374	498	599	745	818	1096						
Puerto Heath (8).....	608	483	607	708	854	927	1205							
(Rio Beni)														
Cachuela Esperanza (9).....	125	255	356	502	575	853								
Riberalta (10).....	130	231	377	450	728									
Boca Rio Geneshuaya (11).....	101	247	320	598										
Arroyo Diata (12).....	146	219	497											
Boca Rio Madidi (13).....	73	351												
Boca Rio Negro (14).....	278													
Puerto Salinas (15).....														

8.8 Mountains

As the Andean mountain system leaves Peru and swings into a north-south alignment, it reaches maximum width of 500 miles, forming western Bolivia. Three, structural and physiographic units: western Cordillera, central Altiplano (described under landforms) and eastern Cordillera.

Western Cordillera (Cordillera Occidental) forms border with Chile with crests above 13,000'; some are perpetually snow-capped, above 16,000'. Highest, Sajama, 27,391' elevation. For the most part, an igneous plateau littered with volcanic cones and solfataras (see Volcanoes).

Eastern Cordillera (Cordillera Real) continuing the Corabaya Cordillera of Peru: Andes rise to an even greater height in the narrower eastern range which extends southeastward to a line drawn between Oruro and Cochabamba. Beyond, Andes broaden into complex system that bends southward to Argentina. The northern hinge is differentiated from the southern hinge:

Cordillera Real, of Paleozoic origin, forms impressive peaks above snow line, average elevation over 18,000'. Structurally a simple range of granitic core flanked with sedimentary rocks. Many peaks above 20,000', best known are Illampu at 21,500' and the triple crown of Illimani which rises at 21,300' behind the city of La Paz. From the sides of these granite peaks descend the largest glaciers of tropical Latin America.

Southern extension of the Cordillera Real includes Cordillera Central and Cordillera Oriental (Eastern Cordillera). At times, latter names are used to identify entire eastern Andes. Southern portion of the cordillera differs from northern in relief, drainage and utilization. Crests rarely rise above 16,000' near Lake Poopo, but further south peaks again rise to 19,000' plus. Western face of Cordillera is the sharper (eastern slopes, "Puna", more gradual), rising in a series of escarpments above Altiplano, contains major mineral deposits: mines are linked by rail with Oruro.

### Volcanoes

Western Cordillera (Cordillera Occidental) has quiescent volcanoes and solfataras, volcanic vents producing sulfurous gases, e.g., Tacora, Sajama and Ollague.

## 9. Transportation and Logistics

### 9.1 Summary of Road System

System consists of about 38,000 km, of which 3% (1,166 km) are paved, 17% (6,559 km) are gravel surfaced (usable all year) and the remainder, 80% (29,831 km) are unimproved earth roads. Network is concentrated in Altiplano and Andes Valleys, with 84% of the population in 34% of the territory. In contrast, lowlands of northern and eastern regions (twice the area of other two regions) are insufficiently serviced by a few low standard roads. Road network generally is laid out in the form of a Y" with Oruro as center; main stem pointing to south toward Sucre, Potosi, Tarija and through Villazon and Bermejo into Argentina; left arm stretching through La Paz into Titicaca and Yungas regions; and right arm leading through Cochabamba into lowlands of Santa Cruz. In view of road conditions, road transport is primarily important only on relatively short hauls.

Landslides are common in mountains and cause frequent delays and costly maintenance. The Pan-American highway, a 705-mile route linking Argentina and Peru, crosses from south (Villazon to Potosi, Oruro, La Paz, Desaguadero) to northwest. The longest paved road is the 350-mile (560 km) Cochabamba-Santa Cruz highway. With reasonably good weather and no landslides, the 500 mile (800 km) distance between La Paz and Santa Cruz can be traveled in 2 days.

New projects include construction of a Trans-Chaco highway linking La Paz with Asuncion, Paraguay.

### 9.2 Traditional Transport

Men and women have hauled food, ores and industrial goods on their backs over long distances, at high altitudes, for centuries. Even in the 1970's transport by man and pack train (llamas and burros) prevails along mountainous tracks and remains only means of bringing agricultural products to collection points.

### 9.3 Vehicles

Results of expansion of road system are seen in rising number of registered motor vehicles.

In 1974 there were 15,499 cars, 25,853 trucks and vans, 3,135 buses and 5,012 jeeps.

Trucking very important element in marketing process. Trucks operate on organized regular basis plying between specific points known to local people, carrying cargo and passengers. Buses are often slow and in poor condition.

### Bus Service

T.I.S.A. International: La Paz; international bus services; bus charter; car and bus hire; tours.

### 9.4 Surface Distances

#### Distances to Major Cities (kilometers)

Alt. (M)	Location	<u>Cochabamba</u>		<u>La Paz</u>		<u>Potosi</u>		<u>Sucre</u>	<u>Villazon</u>		
		<u>Bermejo</u>	<u>Desaguadero</u>	<u>Oruro</u>	<u>Santa Cruz</u>	<u>Tarija</u>					
3823	Achacachi	1241	479	179	96	315	650	979	816	1034	1118
3750	Achocalla	1156	394	118	25	230	565	894	731	949	1033
3356	Aguirre	1062	45	541	448	273	509	477	343	855	939
2242	Aiquile	868	217	713	620	445	315	459	149	661	745
	Alcoche	1347	585	295	182	421	756	1085	922	1140	1224
3300	Allisos	248	919	1092	999	760	425	1161	553	41	235
2740	Arani	1049	55	551	458	283	496	464	330	842	926
3654	Atocha	579	811	946	853	614	279	1053	445	372	274
3875	Ayo Ayo	1078	316	180	87	152	487	816	653	871	955
	Bella Vista	1086	630	734	641	402	495	1130	661	879	963
415	Bermejo		1085	1258	1165	926	591	1327	719	207	401
3617	Betanzos	600	489	714	621	382	47	727	119	393	477
817	Boyuíbe	548	904	1371	1278	1039	704	1146	538	357	551
3821	Caihuasi	968	186	310	217	42	377	686	543	761	845
2406	Camargo	394	691	864	771	532	197	933	325	187	271
654	Camatindi	478	974	1338	1245	1006	671	1216	608	287	481
827	Camiri	615	837	1304	1211	972	637	1079	471	424	618
2950	Canasmoro	229	876	1049	956	717	382	1118	510	22	192
273	Canada Oruro	576	1132	1436	1343	1104	769	1374	766	385	579
2439	Capinota	1143	63	485	392	217	552	563	429	936	1020

<u>Ait.</u> <u>(M)</u>	<u>Location</u>	<u>Bermejo</u>	<u>Desaguadero</u>	<u>Oruro</u>	<u>Santa Cruz</u>	<u>Tarija</u>					
3818	Carabuco	1307	545	245	162	381	716	1045	882	1100	1184
3600	Caracato	1120	358	222	129	194	529	858	695	913	997
3772	Caracolillo	966	204	292	199	40	375	704	541	759	843
599	Caranavi	1329	567	277	164	403	738	1067	904	1122	1206
2706	Ciiza	1054	39	535	442	267	501	469	335	847	931
2558	Cochabamba	1085		496	403	228	532	500	366	878	962
4029	Comanche	1149	387	169	76	223	558	887	724	942	1026
1815	Comarapa	1086	259	755	662	487	533	241	367	879	963
3841	Copacabana	1303	541	241	158	377	712	1041	878	1096	1180
3100	Corani	1083	66	562	469	294	530	498	364	876	960
1760	Coripata	1281	519	229	116	355	690	1019	856	1074	1158
3959	Corocoro	1120	358	266	173	194	529	858	695	913	997
1377	Coroico	1261	499	209	96	335	670	999	836	1054	1138
3005	Cotagaita	485	717	852	759	520	185	950	351	278	180
356	Cotoca	1348	521	1017	924	749	795	21	629	1141	1225
3416	Cruce Iscayachi	262	823	996	903	664	329	1065	457	55	139
3433	Cruce Mojo	375	936	1109	1016	777	442	1178	570	168	26
3827	Cruce Quime	1003	241	255	162	77	412	741	578	796	880
3580	Cucho Ingenio	551	572	707	614	375	40	814	206	344	428
2972	Culpina	428	747	920	827	588	253	989	381	221	305
	Chacabuco	267	818	991	898	659	324	1060	452	60	144
2450	Chaguaya	244	947	1120	1027	788	453	1189	581	69	263
4006	Challa	1032	122	374	281	106	441	622	488	825	909
3715	Challapata	805	349	453	360	121	214	849	380	598	682
4054	Charana	1421	659	207	276	495	830	1159	996	1214	1296
	Chijllani	613	472	727	634	395	60	714	106	406	490
1754	Chululmani	1285	523	233	120	359	694	1023	860	1078	1162
2658	Chaupiuno	307	778	951	858	619	284	1020	412	100	184
3810	Desaguadero	1258	496		113	332	667	996	833	1051	1135
3602	Don Diego	577	508	691	598	359	24	750	142	370	454
4082	El Alto	1155	393	103	10	229	564	893	730	948	1032
1230	Entre Rios	300	987	1160	1067	828	493	1229	621	109	303
2841	Epinaza	956	129	625	532	357	403	371	237	749	833
3820	Escoma	1322	560	260	177	396	731	1060	897	1115	1199
284	Guabira	1382	555	1051	958	783	829	55	663	1175	1259
3811	Guaqui	1236	474	22	91	310	645	974	811	1029	1113
	Hornillos	420	782	917	824	585	250	1024	416	213	115
1010	Huacareta	864	782	1249	1156	917	582	1024	416	673	867
3932	Huanuni	917	277	381	288	49	326	777	298	710	794
3739	Huari	818	362	466	373	134	227	862	393	611	695
3819	Huarina	1220	458	158	75	294	629	958	795	1013	1097
3824	Huatajata	1232	770	170	87	306	641	970	807	1025	1109
3000	Impora	344	787	960	867	628	293	1029	421	137	221

<u>Alt.</u> <u>(M)</u>	<u>Location</u>	<u>Bermejo</u>	<u>Desaguadero</u>	<u>Oruro</u>	<u>Santa Cruz</u>	<u>Tarija</u>					
1618	Incahuasi	692	760	1227	1134	895	560	1002	394	501	695
2622	Independencia	1117	224	459	366	191	526	724	590	910	994
2739	Inquisivi	1111	349	355	262	185	520	849	686	904	988
1885	Irupana	1316	554	264	151	390	725	1054	891	1109	1193
3072	Italaque	1356	594	294	211	430	765	1094	931	1149	1233
	Kalapaya	538	514	769	676	437	102	756	148	331	415
3853	Kasani	1311	549	249	166	385	720	1049	886	1104	1188
4643	La Cumbre	1190	428	138	25	264	599	928	765	983	1067
562	Lagunillas	673	791	1258	1165	926	591	1033	425	482	676
3843	Laja	1180	418	78	35	254	589	918	755	973	1057
3577	La Paz	1165	403	113		239	574	903	740	958	1042
1221	La Plazuela	1339	577	287	174	413	748	1077	914	1132	1216
2328	Las Carreras	321	764	937	844	605	270	1006	398	114	198
2017	La Vina	1113	93	589	496	321	560	528	394	906	990
3426	Lecori	478	607	780	687	448	113	849	241	271	355
3970	Lequepaica	982	172	324	231	56	391	672	538	775	859
1892	Licoma	1150	388	394	301	224	559	888	725	943	1027
2480	Luribay	1085	323	279	186	159	494	823	660	878	962
3881	Llallagua	851	323	427	334	95	260	823	259	644	728
3513	Macha	756	420	524	431	192	165	711	162	549	633
3708	Machacamarca	893	261	365	272	33	302	761	468	686	770
1379	Mataral	1139	312	808	715	540	586	188	420	932	1016
2840	Mecapaca	1193	431	141	28	267	602	931	768	986	1070
2030	Mizque	906	148	644	551	376	353	497	187	699	783
1138	Monteagudo	763	689	1156	1063	824	489	931	323	572	766
293	Montero	1378	551	1047	954	779	825	51	659	1171	1255
3990	Ocuri	765	460	564	471	232	174	671	122	558	642
3702	Oruro	926	228	332	239		335	728	501	719	803
1996	Padcaya	147	938	1111	1018	779	444	1180	572	60	254
3400	Padcoyo	460	625	798	705	466	131	867	259	253	337
2080	Padilla	909	556	1023	930	691	356	798	190	702	786
	Paycho	304	855	1028	935	696	361	1097	489	97	181
720	Palos Blancos	378	1065	1238	1145	906	571	1307	699	187	381
2465	Parotani	1117	37	459	366	191	526	537	403	910	994
3789	Patacamaya	1056	294	202	109	130	465	794	631	849	933
3705	Pazna	843	311	415	322	83	252	811	418	636	720
3865	Pillapi	1227	465	53	82	301	636	965	802	1020	1104
3700	Pinos	233	904	1077	984	745	410	1146	538	26	220
3376	Pocoata	776	400	504	411	172	185	731	182	569	653
3745	Poopo	869	285	389	296	57	278	785	444	662	746
289	Portachuelo	1397	570	1066	973	798	844	70	678	1190	1274
3976	Potosi	591	532	667	574	335		774	166	384	468
3846	Pucarani	1195	433	98	50	269	604	933	770	988	1072

<u>Alt.</u> <u>(M)</u>	<u>Location</u>	<u>Bermejo</u>	<u>Desaguadero</u>	<u>Oruro</u>	<u>Santa Cruz</u>	<u>Tarija</u>					
1495	Puente Arce	814	271	767	674	499	261	513	95	607	691
2229	Puente Sucre	669	416	783	690	451	116	658	50	462	546
1190	Puente Villa	1260	498	208	95	334	669	998	835	1053	1137
3833	Puerto Acosta	1347	585	285	202	421	756	1085	922	1140	1224
223	Puerto Grether	1515	688	1184	1091	916	962	188	796	1308	1392
	P San Francisco	1198	217	713	620	445	645	613	479	991	1075
3276	Puna	535	550	733	640	401	66	792	184	328	412
2717	Punata	1042	48	544	451	276	489	457	323	835	919
2536	Quillacollo	1098	13	483	390	215	545	513	379	891	975
2969	Quime	1090	328	334	241	164	499	828	665	883	967
3217	Ravelo	778	425	627	534	295	225	667	59	571	655
	Remanzo	1379	552	1048	955	780	826	52	660	1172	1256
2704	Sacaba	1099	14	510	417	242	546	514	380	892	976
	Sachapera	502	1070	1362	1269	1030	695	1312	704	311	505
1639	Samaipata	1207	380	876	783	608	654	120	488	1000	1084
328	San Carlos	1439	612	1108	1015	840	886	112	720	1232	1316
2040	San Lorenzo	223	870	1043	950	711	376	1112	504	16	186
3120	San Lucas	479	644	817	724	485	150	815	207	272	356
258	San Miguel	1174	193	689	596	421	621	589	455	967	1051
427	San Rafael	1153	172	668	575	400	600	568	434	946	1030
3250	Sapahaqui	1196	434	174	81	270	605	934	771	989	1073
1997	Santa Ana	212	899	1072	979	740	405	1141	533	21	215
402	Santa de Huachi	1404	642	352	239	478	813	1142	979	1197	1281
2500	Santa Barbara	219	866	1039	946	707	372	1108	500	12	182
416	Santa Cruz	1327	500	996	903	728	774		608	1120	1204
3934	Stgo de Huata	1258	496	196	113	332	667	996	833	1051	1135
2690	Santivanez	1087	33	503	410	235	534	502	368	880	964
4357	Sayari	1055	99	397	304	129	464	599	465	848	932
3917	Sicasica	1036	274	222	129	110	445	774	611	829	913
2572	Sipesipe	1131	27	473	380	205	540	527	393	924	1008
2677	Sorata	1293	531	231	148	367	702	1031	868	1086	1170
2790	Sucre	719	366	833	740	501	166	608		512	596
3284	Tarabuco	784	431	898	805	566	231	673	65	577	661
3870	Taraco	1239	477	65	94	313	648	977	814	1032	1116
3327	Tarapaya	616	538	642	549	310	25	799	191	409	493
2710	Tarata	1064	33	593	500	261	511	479	345	857	941
1866	Tarija	207	878	1051	958	719	384	1120	512		194
2459	Tarvita	998	645	1112	1019	780	445	887	279	791	875
3843	Tiwanacu	1216	454	42	71	290	625	954	791	1009	1093
3815	Tiquina	1262	500	200	117	336	671	1000	837	1055	1139
205	Todos Santos	1198	217	713	620	445	645	613	479	991	1075
2626	Tojo	339	900	1073	980	741	406	1142	534	132	62
3974	Tolar	1090	328	168	75	164	499	828	665	883	967

Alt. (M)	Location	Bermejo	Desaguadero	Oruro	Santa Cruz	Tarija					
2600	Tolomosa	223	894	1067	974	735	100	1136	528	16	210
1923	Tomatas	213	872	1045	952	713	378	1114	506	6	188
2650	Tomayapu	330	801	974	881	642	307	1043	435	123	207
2050	Tomina	874	521	988	895	656	321	763	155	667	751
2789	Totora	942	143	639	546	371	389	385	227	735	819
3442	Totora Palca	518	567	740	647	408	73	809	201	311	395
2565	Tumusla	526	676	811	718	479	144	918	310	319	221
2956	Tupiza	443	797	932	839	600	265	1039	437	236	92
2550	Turuchipa	608	584	839	746	507	172	826	218	401	485
3865	Uncia	844	330	434	341	102	253	830	252	637	721
3123	Unduavi	1211	449	159	46	285	620	949	786	1004	1088
3100	Urmiri	1118	356	196	103	192	527	856	693	911	995
3665	Uyuni	832	773	908	815	576	241	1015	407	625	709
2030	Vallegrande	1194	367	863	770	595	641	243	475	987	1071
3853	Viacha	1177	415	125	32	251	586	915	752	970	1054
2400	Victoria	216	887	1060	967	728	393	1129	521	9	203
2309	Villa Abecia	349	736	909	816	577	242	978	370	142	226
383	Villa Montes	448	1004	1308	1215	976	641	1246	638	257	451
2728	Villa Rivero	1050	56	552	459	284	497	465	331	843	927
2112	Villa Serrano	937	584	1051	958	719	384	826	218	730	814
292	Villa Tunari	1166	185	681	588	413	613	581	447	959	1043
2150	Villar	947	594	1061	968	729	394	836	228	740	824
3443	Villazon	401	962	1135	1042	803	468	1204	596	194	
2526	Vinto	1102	17	479	386	211	549	517	383	895	979
3935	Viscachani	1064	302	201	103	137	473	802	639	857	941
332	Warnes	1357	530	1026	933	758	804	30	638	1150	1234
626	Yaculba	548	1116	1408	1315	1076	741	1358	750	357	551
3092	Yamparaez	749	396	863	770	531	196	638	30	542	626
288	Yapacani	1452	625	1121	1028	853	899	125	733	1245	1329
3401	Yocalla	641	513	617	524	285	50	824	216	434	518
1185	Yolosa	1254	492	202	89	328	663	992	829	1047	1131

### 9.5 Railway System

Economy relies primarily on railway system to carry external trade (mining, prime activity) as well as some significant part of domestic freight and passenger traffic. There are 3,400 km of meter gauge single track railway, all government-owned and operated by ENFE except 105 km from Machacamarca to Uncia operated by COMIBOL, GOB mining enterprise.

Western system: Built between 1870 - 1920, consists of 2,197 km railway. Most important line connects mining areas and La Paz with Chilean ports of Arica and Antofagasta. System links main towns in southwest and provides access to port of Matarani in Peru; and (via Villazon) to Argentine ports. Western system carries 60% of total railway traffic. 63% of freight is for export/import.

Handicap: Western and eastern system are not directly linked (only connection runs through Argentine territory). Link is long-time Bolivian and Brazilian aspiration. WB will review Brazilian feasibility study for a through-railway from Santos in Brazil to Arica in Chile--through Bolivia --avoiding detour through Argentina.

Eastern system: Built during 1950's, 2 lines are operating about 1,300 km. Santa Cruz-Corumba line (643 km) connects with Brazilian system; Santa Cruz-Yacuiba line (539 km) with Argentine system. Railways are only significant surface transport mode; about 85% of traffic (cotton, timber, sugar) is export/import.

Evaluation and Mapping: for analysis of rail transport system see, Bolivia: Appraisal of a third railway project, World Bank. April 29, 1977.

## 9.6 Rail Carriers

### GOB

Empresa Nacional de Ferrocarriles: Administers most of the railways.

#### Private:

Machacamarca-UNCIA (owners: Corporación Minera de Bolivia) ..... 108 km

Uyuni-Pulacayo (owners: Empresa Minera Pulacayo)..... 52 km

## 9.7 Ports

Landlocked, Bolivia has access to the Pacific through the Chilean ports of Antofagasta and Arica, and to the Peruvian Port of Matarani and

Mollendo. The latter are reached from Bolivian side of Lake Titicaca (Port of Guaqui) to the Peruvian Lake Port of Puno, and then by rail and road.

Argentina granted Bolivia free port facilities at Rosario on the river Parana. Atlantic ports used by Bolivia are Buenos Aires, and the Brazilian free ports of Santos, Belem and Porto Velho.

There are numerous river ports in various states of development along the 14,000 km of navigable inland waterways. See Hydrography.

#### Authority

All river and lake waters, navigation and vessels are under jurisdiction of the Lake and River Force (Fuerza Fluvial y Lacus Re) under Ministry of Defense.

Lloyd Fluvial Boliviano (National Roads Service), and the Peruvian Corporation operate fleets on various waterways. Bolivian Naval Force operates small river transports. Hydrofoils and ferryboats ply Lake Titicaca.

#### 9.8 Air Transport

Aviation plays a vital role in meeting passenger and perishable (high value goods) needs because of difficult topography, dispersal of population and high cost of ground transportation development. Yet system is a relic of the 1940's, plagued with many accidents, reported and unreported.

There are roughly 300 airports, but only 30 serve scheduled domestic cargo and passenger flights provided by LAB. Airports at La Paz, Cochabamba, Santa Cruz and Trinidad account for more than 80% of regular passenger and 70% of cargo traffic. These airports, with some weight restrictions (see Airports) are used by jet aircraft. All other airports are in poor condition and can accept only small propeller-driven aircraft. During wet season, several of these are closed for considerable periods due to flooding and other hazardous conditions -- a serious limitation since it coincides with time when all other modes of transport (except some river transport) are also out of service.

NB: For up-to-date information consult latest issue of weekly International Notams, International Flight Information Manual, and/or ICAO'S Air Navigation Plan for appropriate region.

Runway Characteristics

<u>Location</u> <u>Coordinates</u>	<u>Eleva- tion M/ Temp C</u>	<u>NR/Type</u>	<u>Slope %</u>	<u>Aircraft/ Length M</u>	<u>CL</u>	<u>Aircraft Strength (1000 kg)</u>	<u>Fuel/ Octane</u>
Cochabamba/ Jorge Wilsterman							JP1 ON REQ.
17 24'S	2550	0A/22		B727		B727	100/
66 12'W	23.7	N-Instr	-	2500	A	AUW 59/2	130

Aids: LB, LO, MD, MC, MT, MFD, R. Flares on request.

La Paz/ Kennedy Intl							JP1
16 31'S	4071	09R/Z7L		B707-300C		B707-300C	100/
68 11'W	12.3		-	4000	A	AUW 133/A	130

Remarks: Alternative aerodromes are Antofagasta/Cerro Moreno, Arica/Chacalluta, Lima-Callao/Jorge Chavez Intl, Pisco/Pisco.

Aids: LVA (on 09R only), LR, LTX LO, L6, MD, MC, MT, MFD, MTX, MO, R, S1. Lights on request. Glide slope 2.5 DEG. Flares on request.  
Aerodrome also referred to as El Alto.

Santa Cruz/ El Trompillo							JP1 ON REQ.
17 48'S	439	14/32	-	B727		B727	100/
63 11'W	31.6			2300	A	AUW 80/2	130

Remarks: Alternative aerodromes are Cochabamba/Jorge Wilsterman and Trinidad/Trinidad.

Aids: LR, LB, LO, L1, MD, MT, MO, R. Lengthening of runways to 2780M in progress, 11/75. Lights on request.

Trinidad/ Trinidad							
14 48'S	155	13/31		B727		B727	
64 46'W	32	N-INSTR	0.03	2700	A	NA NA	

Remarks: This is an alternative aerodrome for SANTA CRUZ/El Trompillo

Aids: (LR, LTX being installed 11/75) LO, MD, MT, MFD, MTX, MO.

## Codes:

- AUW -All-up (aircraft) weight
- L1 -Strip lights or portable runway lights
- L6 -High Intensity Runway lights
- LB -Aerodrome or Identification beacon lights
- L0 -Obstruction lighting
- LR -Runway edge, threshold and end lighting
- LTX -Taxiway lighting
- LVA -Visual approach slope indicator system (lighting)
- MC -Runway center-line markings
- MD -Runway designation markings
- MFD -Fixed distance markings
- MO -Obstruction markings
- MT -Runway threshold markings
- MTX -Taxiway center-line and holding position markings
- N-Instr -Non -Instrument approach runway
  - R -Radio facilities with voice availability
  - SI -(aircraft) storage

### 9.9 Personal Entry Requirements

Passport: required

Visa: required

Tourist card; valid for 90 days. It is not necessary to report to the Bolivian Immigration Office with this type of documentation. Tourist card permits leaving country without exit permission.

Tourist Visa: Valid for 90 days, necessitates reporting to Immigration office within 48 hours after arrival. Also requires visa for departure.

Other visas: Same as tourist visa.

Health certificate: See Health.

#### 9.10 Aircraft Entry Requirements

Permission for private or commercial aircraft to enter Bolivia should be directed to the Director de Aeronautica Civil, Av. Camacho No. 1372, 3R. Piso, La Paz, Bolivia. Cable address: Aerocivil La Paz Bolivia.

Following information must be submitted with request:

Aircraft: make, type and license number; crew: names, titles and citizenship; passengers: names and citizenship; name of operator, address and citizenship; purpose of flight: tourist, business, etc.; itinerary: list of landing points in Bolivia; probable date and place of entry.

Any foreign aircraft authorized to fly into and land at one or more points in the country, may not engage in the carrying of merchandise and/or passengers within the country.

#### Corridors

Entry or departure shall be made through the following corridors. Aircraft coming from or going to a foreign country shall cross the border only through the points listed below:

From Arica, Chile, aircraft shall enter Bolivia at a point on the border located 3 kilometers SW of Charana, and thence, on a true track of 046 degrees to La Paz. Departure from La Paz to Arica shall be on a true track of 226 degrees to Charana.

From Paraguay, aircraft shall enter Bolivia overflying at a point on the border located at Guarani, and thence on a true track of 328 degrees to Santa Cruz. Return from Santa Cruz to Paraguay shall be on a true track of 148 degrees to Filadelfia or Asuncion.

From Argentina, aircraft shall enter Bolivia at Villazon and thence on a true track of 324 degrees to Uyuni, and then continue on a true track of 320 degrees to La Paz. From La Paz to Argentina, on a true track of

140 degrees to Uyuni and thence on a true track of 144 degrees to Villazon.

From Argentina via Yacuiba, aircraft shall fly a true track of 007 degrees from Yacuiba to Santa Cruz. On return from Santa Cruz to Argentina, via Yacuiba, fly on a true track of 187 degrees to Yacuiba.

For entry into Bolivia via Yacuiba to Cochabamba, fly a true track of 344 degrees. Return from Cochabamba to Yacuiba shall be on a true track of 164 degrees.

From Arequipa, Peru, aircraft shall enter Bolivia on a true track of 095 degrees to Taraco and thence on a true track of 093 degrees to La Paz. Return from La Paz to Taraco shall be on a true track of 273 degrees to Taraco, and thence leave on a true track of 275 degrees.

From Brazil, aircraft shall enter Bolivia at a point located at the Puerto Suarez airport, and thence on a true track of 290 degrees to Robore, and thence on a true track of 280 degrees to Santa Cruz. Return from Santa Cruz to Brazil shall be on a true track of 100 degrees to Robore and thence, on a true track of 110 degrees to Puerto Suarez.

From Porto Velho, Brazil, aircraft destined for Guayaramerin shall enter on a true track of 217 degrees. Return from Guayaramerin to Porto Velho shall be on a true track of 037 degrees.

From Leticia, Colombia, aircraft destined for Cobiya shall enter on a true track of 168 degrees. Return from Cobiya to Leticia shall be on a true track of 348 degrees.

### 9.11 Air Carriers

#### Domestic

##### Civil Aviation:

Lloyd Aereo Boliviano (LAB): Casilla 132, Cochabamba; AVDA. Camacho 1460, Casilla 691, La Paz; G.R. Moreno Esq. Suarez de Figueroa, Santa Cruz; almost totally government-owned. Operates internal services linking main localities. Joint services with other national lines to Argentina, Brazil, Chile, Peru, Paraguay, Panama and the U.S. fleet.

### Bolivian Air Force:

Through Transportes Aereos Militares--Although its civil activities have been curtailed--continues to provide service on some of the unprofitable, low-density routes.

### Foreign

Following foreign airlines serve Bolivia: Aerolineas Argentinas, Aerolineas Paraguayas, Avianca, Braniff, Cruzeiro do Sul, Iberia, Lufthansa and Varig.

### Unscheduled

Cargo service is provided by several private operators, who are normally engaged in the transport of meat from the department of Beni to La Paz and other cities in the Altiplano. They are owned by meat wholesalers, cattle owners' associations, and slaughterhouses and operate under difficult circumstances. Due to low capital investment, almost all of about 50 aircraft in use are more than 20 years old. Most typical type is the C-46, 5 to 6 tons capacity on short flights. Small aircraft are operated by air taxi companies and individuals and, although the number of passengers and cargo transported is small, these aircraft provide vital services to large areas of the country which lack all-weather roads.

### Traffic

#### Traffic Volume by Carrier Type (1975)

	<u>Passengers</u>	<u>Cargo (tons)</u>
Lab	396,000	4,300
Air taxi operators	30,000	1,600
Transportes Aereos Militares	16,500	200
Government oil company	11,700	-
Non-scheduled cargo airlines	9,000	32,000

9.12 Aircraft

<u>Airline</u>	<u>On Register (1975)</u>	<u>Number of Aircraft</u>
Lloyd Aereo Boliviano	Boeing 727-100	3
	Boeing 727-200	1
	Fairchild F-27	4
	Douglas DC-3	3
Non-scheduled Airlines	Douglas C-54	4
	DC-7B	1
	C-53	1
	C-47/DC-3	10
	Fairchild F-27	2
	Curtiss C-46	20
	Convair 440	5
Others	5	
Yacimientos Petroliferos	Aero Commander	2
Fiscales Bolivianos	D. H. Beaver	1
	D. H. Twin Otter	2
Air Taxi Companies and Private	Various small Aircraft	170
Aerial Work or Training	"	86
	Total	320

9.13 Air Distances

## Statute Miles

Cochabamba to:  
(Jorge Wilsterman)

Concepcion	283
Corumba	571
La Paz	148
Lima	821
Oruro	71
Puerto Suarez	561

Cochabamba to:  
(Jorge Wilsterman)

Robore	428
Salta	516
San Ignacio de Velazco	352
San Jose de Chiquitos	360
Santa Cruz	199
Sao Paulo	1331
Sucre	122
Yacuiba	354

Concepcion to:

Arequipa	629
Corumba	348
La Paz	406
Lima	1038
Oruro	351
Puerto Suarez	339
Robore	211
San Ignacio de Velazco	75
San Jose de Chiquitos	141
Santa Cruz	129

Guayaramerin to:

Riberaita	50
San Joaquin	164
San Ramon	178
Santa Ana	202
Trinidad	279

La Paz to:

Antofagasta	506
Arequipa	223
Arica	192
Caracas	1873
Cochabamba	148
Cuzco	327
Letitia	857
Lima	672
Oruro	124
Panama City	1925
Puerto Suarez	705

## La Paz to:

Quito	1329
Rio	1677
Robore	571
Rurrenabaque	147
Salta	604
San Borja	336
San Ignacio de Velazco	479
San Jose de Chiquitos	501
Santa Cruz	343
Santiago	1177
Sao Paulo	1479
Talara	1208
Trinidad	257
Yacuiba	479

## Puerto Suarez to:

Robore	130
San Ignacio	272
San Jose de Chiquitos	207
Santa Cruz	357

## Santa Cruz to:

San Ignacio de Velazco	176
San Javier	116
Sao Paulo	1139
Sucre	164
Trinidad	232

## 10. Power and Communications

### 10.1 Electric Power Sources

Access to electricity in urban areas is about 90%; in rural areas, only 5%. With completion of AID-financed rural electrification program, this will increase to 15%, benefiting 55,000 rural families, covering 27,000 sq km. Implementation of plans through mid-80's will furnish power for irrigation pumping systems machine operation.

During 1969-74, El generation grew at 6.1% annually. Most recent (WB 1977) estimate of per capita consumption was 177 kwh, one of the lowest in South America.

Current produced is of alternating type: 50 cycles in La Paz, Cochabamba, Oruro, Potosi, Santa Cruz, Sucre, and Tarija; 60 cycles elsewhere. Voltage is 110, 115, 220, 230, 380 or 400.

<u>Category</u>	<u>Consumption</u>		<u>Clients</u>	
	<u>GWH</u>	<u>%</u>	<u>Number</u>	<u>%</u>
Domestic	211.4	24.4	142,343	82
General	105.9	12.2	29,329	16
Industrial	167.1	19.3	( 1,102	2 )
Mining	382.6	44.1		
Total	867.0	100.0	172,744	100

Three major producers of electricity: BPC (Bolivian Power Company), ENDE (Empresa Nacional de Electricidad), and the Corporacion Minera de Bolivia (COMIBOL). First two are public utilities; COMIBOL, the principal Bolivian consumer of electricity, is a self-producer with 11% of installed capacity.

ENDE is responsible for generation and transmission, except for the La Paz area, as well as for the integration of the systems in country and interconnections with neighboring countries. Accounts for 34% of installed capacity.

BPC, a subsidiary of the U.S. controlled Canadian International Power Company (CIP), is in charge of generation, transmission and distribution in the La Paz area; also supplies bulk power to the Oruro area and to COMIBOL in the central system. Accounts for 41% of installed capacity. Until mid-60's, BPC monopolized supply in La Paz and Oruro.

In addition, there are some small private, municipal and cooperative producers with 14% of installed capacity. Furthermore, other enterprises such as Yacimientos Petroliferos Fiscales Bolivianos (YPFB), sugar mills and some mining companies generate part of their power requirements.

	Capacity MW			Generation GWH		
	Hydro	Thermal	Tot	Hydro	Thermal	Tot
<u>Public Service</u>	214	47	261	606	101	707
Private (BPC)	142	-	142	427	-	427
Government	72	47	119	179	101	280
Self-Producers	27	62	89	158	128	286
COMIBOL	22	17	39	129	22	151
Others	5	45	50	29	106	135
Total	241	109	350	764	229	993
Percentage (%)	68	32	100	77	23	100

### 10.2 Radio Receivers

2.5 million

288/1,000 population (1970)

#### Stations

Dirección General de Telecomunicaciones: Departamento de Radiodifusión, La Paz; government-controlled broadcasting authority.

Asociación Boliviana de Radiodifusoras (ASBORPA): Casilla 5028, La Paz.

There are 89 AM and 18 FM stations, the majority of which are commercial. Broadcasts take place in Spanish, Quechua, English and German.

### 10.3 Telephone Systems

About 55,000 phones installed. Most local companies are privately owned; some are cooperatives (Santa Cruz). Dial service in large towns.

Domestic telegraph service is provided by GOB--international by private companies. About half of post offices provide telegraph and telephone service. Bolivia is member of Andean Postal Union.

### 10.4 Television Stations

Two, one of which is Television Boliviana, S.A.: Casilla 900, La Paz.

45,000 television sets.

- 
- American Council of Voluntary Agencies for Foreign Service. TAICH Country Report: Bolivia. New York: Technical Assistance Information Clearing House, December 1974.
- Banks, Arthur S. (ed.). Political Handbook of the World. New York: McGraw-Hill, 1980.
- Butland, Gilbert J. Latin America: A Regional Geography. 3rd ed. New York: Wiley, 1972.
- Economist Intelligence Unit, LTD. Quarterly Economic Review of Peru, Bolivia. Annual supplement 1977. London: Economist Intelligence Unit Ltd., 1977.
- Europa Publications. Europa Yearbook, Volume II: Africa, The Americas, Asia, Australia. London: Europa Publications, 1980.
- Fifer, J. Valerie. Bolivia: Land, Location, and Politics since 1825. Cambridge, England: University Press, 1972.
- Food and Agriculture Organization of the UN. World Crop Harvest Calendar. Rome: FAO, 1958.
- Government of Bolivia. Plan Nacional de Defensa Civil. La Paz: Ministerio de Defensa Nacional, Defensa Civil de Bolivia, 1977.
- International Air Transport Association. Air Distances Manual. 4th ed. London: IATA-International Aeradio Ltd., May 1977.
- International Civil Aviation Organization. Air Navigation Plan: Caribbean and South American Regions. 8TH ed. DOC 8733/8. Montreal: ICAO, November 1975.
- US Government
- Agriculture Department. Planting and Harvesting Seasons in Latin America. FAS-M-37. Washington, DC: GPO, July 1958.
- \_\_\_\_\_ . Western Hemisphere Agricultural Situation: Review of 1976 and Outlook for 1977. FAER Rept #136. Washington, DC: USDA, May 1977.
- \_\_\_\_\_ . Foreign Agricultural Service, Lima. Bolivia: Third quarter 1977 highlights. Lima: FAS, October 25, 1977.

- 
- Agency for International Development. USAID Mission to Bolivia: Health Sector Assessment. La Paz: USAID, January 1975.
- \_\_\_\_\_. Congressional Presentation FY 1979, Annex A: Development Assistance Programs. Washington, DC: AID, February 1978.
- \_\_\_\_\_. Country Development Strategy Statements, FY 82 and 83. Washington, DC: AID, January 1980 and 1981.
- \_\_\_\_\_. USAID Mission to Bolivia. Foreign Economic Trends Report for 1977. La Paz: USAID, September 2, 1977.
- Central Intelligence Agency. National Basic Intelligence Factbook. Washington, DC: GPO, July 1980.
- \_\_\_\_\_. National Foreign Assessment Center. Chiefs of State and Cabinet Members of Foreign Governments. CR CS 78-001. Washington, DC: Library of Congress, January 1981.
- Commerce Department. Environmental Science Services Administration. Climates of the World. Washington, DC: GPO, 1972.
- State Department. Background Notes: Bolivia. Washington, DC: GPO, August 1976.
- \_\_\_\_\_. Diplomatic List. Washington, DC: GPO, November 1980.
- \_\_\_\_\_. Key Officers of Foreign Service Posts. Washington, DC: GPO, January 1981.
- \_\_\_\_\_. Treaties in Force. Washington, DC: GPO, January 1980.
- \_\_\_\_\_. Visa Requirements of Foreign Governments. Washington, DC: GPO, 1978.
- Transportation Department. Federal Aviation Administration. International Flight Information Manual. Washington, DC: FAA, May 1978.
- Well, Thomas E. et. al. Area Handbook for Bolivia. 2ND ed. Washington, DC: GPO, 1974.
- World Bank. Economic Memorandum on Bolivia. Report No. 2195-B0. Washington, DC: World Bank, November 3, 1978. For Official Use Only.

\_\_\_\_\_. Bolivia: Appraisal of an Aviation Development Project. Report No. 1458B-B0. Washington, DC: World Bank, April 28, 1977. For Official Use Only.

\_\_\_\_\_. Bolivia: Appraisal of a third Railway Project. Report No. 1466B-B0. For Official Use Only.

\_\_\_\_\_. Appraisal of a Fourth Power Project, Empresa Nacional de Electricidad S.A. (ENDE) Bolivia. For Official Use Only.

Research Completed: February 1978

Gudrun Huden

Updating: February 1981