1 INTRODUCTION

(1) Background of the Study

The Republic of Bolivia is a landlocked country located between 10 degrees and 23 degrees South, has an area of 1,098,581km^2 (3 times as large as Japan) with a population of 8,137,000 (1999), and is also known as one of the poorest countries in Latin America.

Bolivia continues to promote popular participation and decentralization laws, as it maintains its policies on free economy.

The Bolivian government has launched "5-year National Plan = Action Plan (1997-2002)" with the purpose to alleviate poverty. In the medical and public health sector, it aims to reduce by half under-five mortality rate and maternal mortality rate, addressing policies on a) introduction of Basic Health Insurance, b) improvement of nutritional status, c) infectious disease control (e.g., Chagas' disease, malaria, tuberculosis).

Beni Department occupies 213,000km^2, 20% of the nation's total land, and has approximately 365,000 people (2001 Census) that account for the second lowest population density in the country. The annual population growth rate in Beni is rather high at 3.16%, while that of the urban areas is 5.19%, and the rural areas 0.43%, showing a remarkable trend of migration from rural areas to urban centers.

Three major illnesses in Beni are ARI, malaria and diarrhea. Three major causes of death are heart disease, diarrhea and pneumonia. Diarrhea, ARI and malnutrition account for high infant mortality rate. Maternal mortality rate is also high, though the rate of rural areas is twice as high as that of urban areas. Major causes of maternal mortality are hemorrhage, eclampsia and unsafe abortion.

In Beni prefecture, along with the central government and municipal government, donors such as USAID, UNICEF, CIDA, WHO/PAHO, UNFPA and NGOs, are implementing health sector projects. There is still no comprehensive department and/or district health plan. Coordination among donors will be expected in planning and project implementation.

In response to the request of the Government of the Republic of Bolivia, the Government of Japan decided to conduct the Study on Enhancement of District Health System for Beni Prefecture in the Republic of Bolivia. The Japan International Cooperation Agency (JICA) dispatched a preparatory study team in January 2001 and Scope of Work (S/W) for the Study was signed on 25th January 2001.
The Study Team (JST) has been dispatched by JICA to Beni department from the end of June 2001 to start the activities of the Study.

(2) Objectives of the Study

1) To formulate a Master Plan on the enhancement of district health system for Beni Prefecture for the target year 2010, and to formulate priority program(s) identified in the Master Plan, which will be able to contribute to the development of the health decentralization process;
2) To pursue technology transfer to the counterpart personnel in the course of the Study.

(3) Study Area

Beni Department.

(4) Study Approach

1) Phase I Study

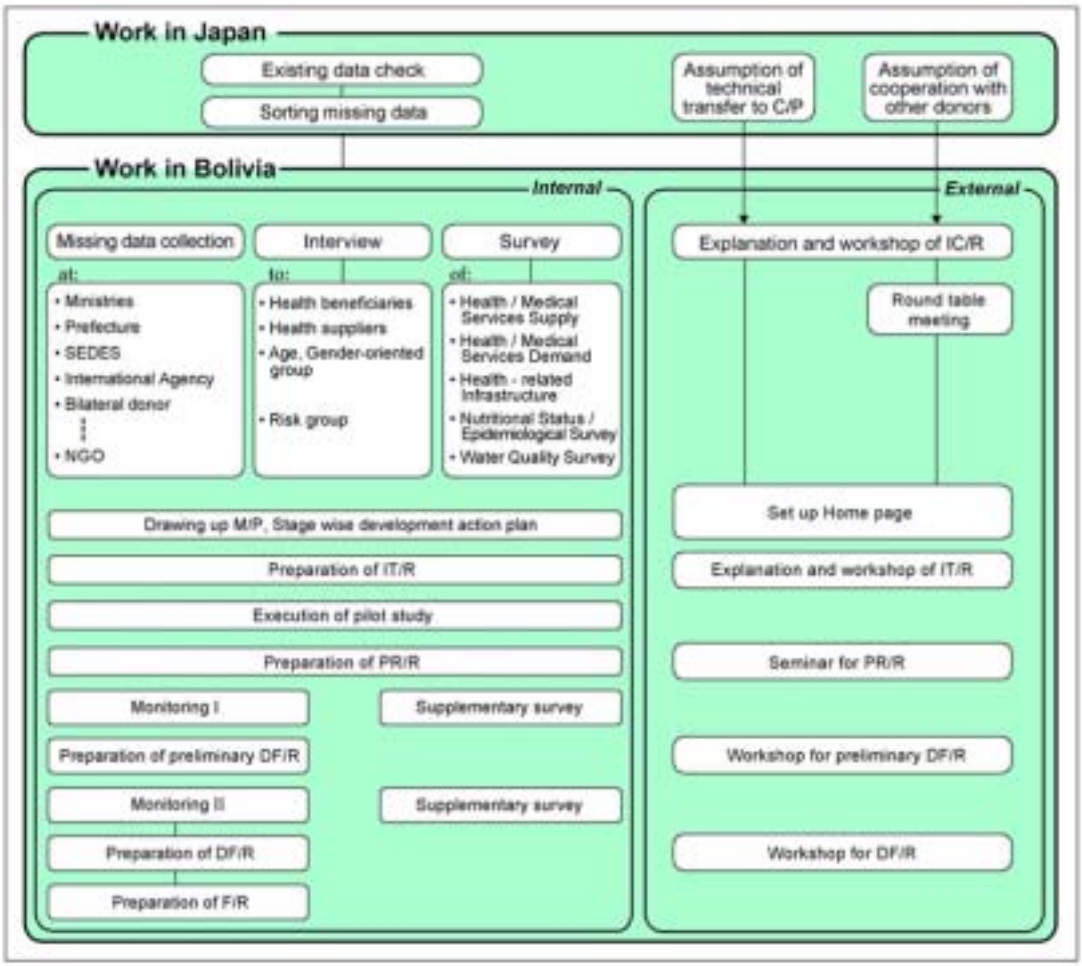
a. Analysis of the existing conditions of socio-economic background and demand for and supply of health services

b. Formulation of Master Plan on the district health system and stagewise implementation plan

c. Selection and identification of the priority programs for the Pilot Study in Phase II

2) Phase II Study

Development of the priority programs through the implementation and monitoring of the Pilot Study.



The Study Team has conducted the Phase I survey and formulated the Master Plan including identification of the Pilot Study in December 2001 and submitted the Interim Report (IT/R) to the Bolivian side. In February 2002, the Study Team commenced the Phase II of the Study, focusing mainly on the startup of the Pilot Study described in the IT/R. Progress Report was submitted to the counterpart agency, Beni Prefecture by the end of February on the progress and results of the field survey. In the Phase II survey, the first and second monitoring of the Pilot Study were carried out between January and December 2002, based on the understanding among the Prefectual Government, municipal governments, SEDES, OTBs, donors, NGOs and other agencies concerned.

The Final Report consists of the Main report, Appendices and Annexes. Tables/ figures, list of

collected data, minutes of meetings and records of meetings are compiled into Appendices. Questionnaires for monitoring of Pilot Study, results of training/ education for 2 hospitals in Trinidad, results of education/ training for 2 CSs and medical boat, own evaluation report on Pilot Study, results of water quality survey and detail data of facilities and medical equipment on Pilot Study are included in Annexes.

2 COORDINATION AND PARTICIPATORY APPROACH

2 COORDINATION AND PARTICIPANTORY APPROACH

2.1 Explanation and Discussion on the Inception Report (IC/R)

After protocol visits to the Ministry of Finance and Ministry of Health and Social Provision (MSPS) and several donors such as WHO/PAHO, USAID and CIDA, the JST explained and discussed on IC/R with the Prefect and his staff of the Beni department. The Minutes of Meeting on IC/R, affixed in Appendices, was signed on July 3, 2001 between the JST and the Bolivian side, Prefecture, Ministry of Finance and MSPS after some clarification of its contents. Based upon the IC/R, technical activities have been implemented by the JST with the Bolivian counterparts.

2.2 Workshop on the IC/R

(1) Date and Place

Province	Preparatory meeting	Workshop
Vaca Diez	Guayaramerin: 9th July	Guayaramerin: 10th July
	Riberalta: 11th July	Riberalta: 11th July
Mamoré	16th July	17th July
Cercado	6th July	13th July
Moxos	18th July	19th July

(2) Objectives

1) To explain and to exchange opinions on the Inception Report.
2) To clarify the selection criteria of OTB/ communities for the study in detail of the health supply and demand and to propose the designated OTB/ communities for the selection in each province by the participants. Table 2.1 shows details of selected communities for the Survey.

(3) Discussion Points and Comments

1) Limited human resources and accessibility and availability problems of the health services.
2) Importance of the use of the participatory methods.
3) The criterion that the Law of Decentralization and Popular Participation need to strengthen prevails.
4) To focus the efforts in the reduction of the poverty in the indigenous groups and dispersed rural communities.
5) Inadequate health infrastructure and basic services.
6) Counterpart fund availability for the Pilot Study.

(4) Workshop Results and Preliminary Conclusions

1) Explanation of the IC/R.
2) Activities that have taken place during the first month in Bolivia and the results of these activities.
3) Confirmation of the counterpart participation and preparation of the local fund for their participation.
4) Coordination improvement among agencies concerned in Trinidad. It has had a good progress with mutual trust and an active environment.

2.3 Adhoc Committee

(1) Date and Place

Date: September 2001
Place: Prefectural Government of Beni, Trinidad

(2) Participants

Table 2.2 lists the participants.

(3) Objectives

1) Explanation and discussion on Inception Report.
2) Promotion of coordination among agencies concerned.

(4) Discussion Points and Comments

1) Requirement of coordination among agencies concerned.
2) Prefecture Action Plan: 10 years plan.
3) Hospital Materno Infantil (Maternal and Child Hospital): equipment requirement but no assessment and review of the D/S and past experience of O&M.
4) NGOs: no activities in urban areas but for rural areas.
5) Training requirement for CS in the surrounding areas of Trinidad.
6) O&M cost: No coordination between hospitals and municipal government.
7) Limitation of human and financial resources.
8) Importance of institutional and organizational plan in M/P.
9) Pilot Study for supply and demand side of health services.

2.4 General Committee Meeting (Adhoc)

(1) Date and Place

Date: 14th September 2001
Place: Trinidad

(2) Participants

Refer to Table 2.3.

(3) Objectives

1) Explanation and discussion on Inception Report.
2) Promotion of coordination among agencies concerned.

(4) Discussion Points and Comments

1) Explanation of strategies of the Study, health condition and system in a coverage area by the JICA Study Team.
2) Expressing effort and possible support to the activity of the JICA Study Team by participants.

2.5 Meeting with MSPS

(1) Date and Place

Date: 27th September 2001

Place: MSPS, La Paz

(2) Participants

Refer to Table 2.4.

(3) Objectives

Explanation and discussion on the progress of the Study at MSPS in La Paz.

(4) Discussion Points and Comments

1) Difficult situation of Beni in terms of decentralization and popular participation. Confusion of the HIPC system.
2) Promotion of PRSP for poverty alleviation.
3) Donor coordination.
4) Health Master Plan prepared by IDB in 1990.
5) Prevalence of POA.
6) ITEM allocation.
7) DUF activities.
8) Hospital integration in Beni.
9) Unsettled personnel system in SEDES.
10) Gaps between intent and the reality in MSPS.

2.6 Meeting with the Prefecture and Relevant Parties

(1) Date and Place

Date: 2nd October 2001
Place: Trinidad

(2) Participants

Refer to Table 2.5.

(3) Discussion Points and Comments

1) Establishment of Steering Committee and Technical Committee as an autonomous body.
2) Selection, human/financial resource allocation and implementation of Pilot Study.
3) Radio communication in the rainy season between hospitals and auxiliary nurses.
4) ITEM allocation and HIPC funds.
5) Plan and check of POA by relevant agencies.
6) Reform of Management for the Hospital German Busch and the Hospital Materno Infantil.

2.7 Preliminary meeting for the Steering Committee

(1) Date and Place

Date: 13th November 2001
Place: Prefectural Government of Beni, Trinidad

(2) Participants

See Table 2.6.

(3) Objectives: Discussion and regulation of Steering Committee

1) Comment on the Draft document on Pilot Study.
2) Preparation of draft regulation of Pilot Study .

(4) Discussion Points and Comments

1) Explanation of the objective of the Study, summary of the Progress Report and work schedule to come.
2) Revising the regulation of the Steering Committee and the Technical Committee.
3) Analyzing main intervention factors and their provisions.

2.8 Preliminary meeting for the Technical Committee in San Ignacio

(1) Date and Place

Date: 16th November 2001
Place: Municipal Government of San Ignacio, San Ignacio

(2) Participants

See Table 2.7.

(3) Objectives: Discussion and regulation of Technical Committee

1) Comment on the Draft document on Pilot Study.
2) Preparation of draft regulation of Pilot Study.

(4) Discussion Points and Comments

1) Explanation of the regulations for the Technical Committee for the Pilot Study.
2) Explanation of the ITEM allocation for the Pilot Study.

2.9 Preliminary Meeting for the Technical Committee in Trinidad

(1) Date and Place

Date: 26th November 2001
Place: Prefectural Government of Beni, Trinidad

(2) Participants

See Table 2.8.

(3) Objectives: Discussion and regulation of Technical Committee

1) Comment on the Draft document on Pilot Study.
2) Preparation of draft regulation of Pilot Study.

(4) Discussion Points and Comments -

1) Explanation of objectives of a Master plan and its formulation and design.
2) Explanation of objectives of the Technical Committee and its functions.
3) Participation of the relevant agencies in the Pilot Study.

2.10 First Steering Committee

(1) Date and Place

Date: 14th December 2001
Place: Prefectural Government of Beni, Trinidad

(2) Participants

Refer to Table 2.9.

(3) Objectives

Explanation of the Interim Report including the Master Plan of the District Health System, Priority Program and Pilot Study.

(4) Discussion Points and Comments

1) Problems and limitation of the District Health System.
2) Master Plan of the District Health System up to the year of 2010.
3) Priority programs.
4) Plan and implementation for the Pilot Study
   a. Establishment of the Steering Committee and Technical Committee
   b. Human resource allocation to the Pilot Study.
   c. Education and training on the Pilot Study.
   d. Target models of the Pilot Study: i) Urban health model, ii) Urban poverty area model, iii) Rural poverty area model, iv) Integrated and comprehensive development model

The detail of discussions on the committee is recorded into the Minutes of Meeting on the IT/R, affixed in Appendices, signed on December 14, 2001.

2.11 Second Steering Committee

(1) Date and Place

Date: 21st January 2002
Place: Prefectural Government of Beni, Trinidad

(2) Participants

See Table 2.10.

(3) Objectives

1) Analysis and sign of the Mancomunidad document.
2) Preliminary selection for the assignment of the ITEM.
3) Definition of the Lands for the construction of the Medical Centers in the selected areas for the Pilot Study.

(4) Discussion Points and Comments

1) Discussion about cost sharing for maintenance of the Medical Boat among municipalities and organizations concerned.
2) Manifestation of budget allocation by PROSIN.

The details of contents of the committee are described on the Minutes of Meeting for the

Second Steering Committee, affixed in Appendices.

2.12 First Technical Committee

(1) Date and Place

Date: 8th February 2002
Place: Municipal Government of Trinidad, Trinidad

(2) Participants

See Table 2.11.

(3) Discussion Points and Comments

1) Explanation of the contents of the Pilot Study and the Master Plan.
2) Explanation of the obligations of the Pilot Study.
3) Human resource allocation.
4) Land acquisition.
5) Route of the medical boat.
6) Operation shared costs of the medical boat

The details of contents of the committee are described on the Minutes of the First Meeting of the Technical Committee, affixed in Appendices.

2.13 Meeting with MSPS

(1) Date and Place

Date: 19th February 2002
Place: MSPS, La Paz

(2) Participants

See Table 2.12.

(3) Discussion Points and Comments

1) ITEM allocation: 78 medical staffs by HIPC II to municipalities in Beni Department and allocation of medical staffs to hospitals/health centers are decided by municipal governments
2) Cooperation for the Pilot Study of JICA among relevant international and domestic agencies is encouraged.
   a. World Bank: EXTENZA program
   b. USAID (PROSIN)
   c. NGO (CARITAS, EPARU)
3) Way of solution regarding shortage of ITEM and the other human resources for Pilot Study.
   a. EXTENZA
   b. Navy support especially for technical personnel other than medical staff.

2.14 Meeting with Ministry of Finance (MOF)

(1) Date and Place

Date: 20th February 2002
Place: DUF (Directorate of Funds), La Paz

(2) Participants

See Table 2.13.

(3) Discussion Points and Comments

1) Implementation body of the district health network system
   a. Central government or Prefecture: Bilateral aid will be available as the beneficiaries will be covered in a wider area than individual municipalities.
   b. Application method of DUF fund is still under trial operation. Discussion with DUF is still necessary regarding the latest identification and decision making of program implementation on this district health system.
2) Pilot Study will be excluded from PRSP principles for the following grounds.
   a. Implementing body (Counterpart agency) being MSPS and Prefecture.
   b. Bilateral technical cooperation.

2.15 Second Technical Committee

(1) Date and Place

Date: 9th August 2002
Place: Municipal Government of Trinidad, Trinidad

(2) Participants

See Table 2.14.

(3) Discussion Points and Comments

1) Explanation of monitoring results of the Pilot Study by own evaluation.
2) Cost sharing of human/financial resource, facilities/equipments and service coverage for the CSs in Santishima Trinidad and Nueva Trinidad, and the Medical Boat.
3) Results of training and reform of management system in the Hospitals German Busch and Materno Infantil

The details of contents of the committee are described on the Minutes of Meeting of the 1st Monitoring of the Pilot Study.

2.16 Third Steering Committee

(1) Date and Place

Date: 21st August 2002
Place: Prefectural Government of Beni, Trinidad

(2) Participants

See Table 2.15.

(3) Discussion Points and Comments

1) Commitment and role of human/financial resource allocations by the Prefectural Government, SEDES and EXTENZA.

2) Initial situation of the Hospitals German Busch and Materno Infantil and the CSs of Nueva Trinidad, Santisima Trinidad and the Medical boat.
3) Education and training to directors and administrative personnel and technicians of the two hospitals by Santa Cruz's Japanese Hospital.
4) Assignment of ITEMs in the CS.
5) Primary Health Care of the CSs and the Medical Boat.
6) Service coverage and facilities/equipments of the CSs and the Medical Boat.
7) Explanation of the second monitoring.

2.17 Workshop on the First Monitoring of the Pilot Study

(1) Date and Place

Date: 22nd August 2002
Place: Municipal Government of Trinidad, Trinidad

(2) Participants

See Table 2.16.

(3) Discussion Points and Comments

1) Summation of the first monitoring.
2) Confirmation of the second monitoring.

2.18 Third Technical Committee

Date: 9th December 2002
Place: Municipal Government of Trinidad, Trinidad

The Third Technical Committee aimed at verifying the results of the second monitoring of the Pilot Study. Understanding from a larger audience than that of the first was sought, pursuing to formulate a full-scale project to be started following this Study. This full-scale project will be designed considering potential assistance by donors (including Japan) and NGOs (Refer to the minutes of meeting in Appendix).

2.19 Fourth Technical Committee

Date: 17th January 2003
Place: Municipal Government of Trinidad, Trinidad

Additional information of the 2nd monitoring was reported to the Committee, and general evaluation of the 1st and 2nd monitoring of the Pilot Study was carried out at this Committee.

2.20 Workshop on the Second Monitoring of the Pilot Study

Date: 23rd January 2003
Place: Prefectural Government of Beni, Trinidad

Not only the evaluation result of the 2nd monitoring but the background of this study and the evaluation result of 1st monitoring were explained by Bolivian counterparts to community

leaders, OTB representatives and volunteer groups concerned.

2.21 Fourth Steering Committee

Date: 23rd January 2003
Place: Prefectural Government of Beni, Trinidad

Outline of the Draft Final Report (existing health condition, M/P and evaluation result of monitoring of the Pilot Study) was explained by the Study Team, and the content of M/P was discussed by the participants (Refer to the minutes of meeting in Appendix).

3 SOCIO ECONOMIC CONDITION IN BENI DEPARTMENT

3 SOCIO-ECONOMIC CONDITION IN BENI DEPARTMENT

3.1 Geography

The department of Beni was founded on the 18 of November of 1842 during the government of General José Ballivián. Located in the northwestern part of the national territory, in the Amazon region, it borders in the north with Pando, in the east with Brazil, in the west with La Paz and in the south with Santa Cruz and Cochabamba. It has a surface area of 213,564 km^2, representing 19% of the Bolivian territory.

Located at 115m above sea level, the relief of Beni is plane, except for scarce hills in the east and north of the Department (Provinces Mamoré, Iténez and Vaca Diez). Three types of landscape cover the Department: forests, pampas and savannas. The climate is humid and warm, with a medium temperature of 26°C; frequent strong winds are present, known popularly as *surazos*, that lower the temperature to as low as 4°C. According to the PDD of Beni Prefecture, on average it rains 122 days a year and half of the precipitation falls at the 1,700 mm with a very marked period of rain between November and March.

The hydrographic panorama is momentous for the development of the Department and it is comprised of systems corresponding to the rivers Beni, Mamoré and Iténez with its tributaries.

3.2 Administrative Boundary

According to the effective administrative political division, Beni consists of 8 provinces, 19 municipalities according to the Law 1551 of Popular Participation (refer to Table 3.1).

3.3 Transportation

Similar to other departments of Bolivia, the highways and roads of Beni are in poor conditions, hindering the communication between the provinces and municipalities; that situation turns critical in the rainy season in which many of the roads are flooded or destroyed (refer to Fig. 3.1). The main communication roads are detailed as follows

1) Air through the LAB Company (Lloyd Aereo Boliviano), TAM (Transportes Aereo Militar), Amaszonas and Aerotaxis.

2) National system of highways roads consisting of;
   a. Fundamental network (of the National Road Services): 163.31 km paved, 731.25 km rubble, 343.23 km dirt, making a total of 32%.
   b. Departmental net (of the Prefecture of the Department.): 9 km paved, 74.15 km rubble, 705.85 km dirt, making a total of 20%. The tracts of the Departmental road network of Beni total 1.960 km.
   c. Municipal network: 247.45 km paved, 1.591 km dirt, constituting 48%.
   d. River: 5,000 km of navigable rivers in the whole year, among them Madera, Mamoré, Itenez, Beni, tributaries to the Amazons; and lakes such as the Rogagua and Rogaguado, countless lagoons, lagunetas, curiches and yomomos.

3.4 Demography

In 2001, the population of Beni constituted 4.41% of the total population of Bolivia; in 1950

it was 3.65% (*Resultados preliminares del Censo 2001 a nivel nacional*, INE, 2001).

The population of Beni has grown in a sustained manner; between 1950-1976 the annual rate of growth was 3.29%, between 1976-92 it was 3.14% and between 1992-2001, 3.16%. The departmental annual growth rate has kept a higher rate than that of the national average since 1950, though the actual increase has slowed down as with the national growth.

Contrary to the quick urbanization process of departments like La Paz and Santa Cruz, the rural population growth rate in Beni has stayed around 3.17 in the last 50 years, indicating a rather slow socioeconomic development achieved by the department.

The female/male ratio in the department is 100 to 107.42 (year 2001). For the period 2000-2005 the projections of the total fertility rate is 2.4, the gross death rate is 7.97, and the life expectancy at birth is 61.9 years.

As for migration more people from Beni migrate to Santa Cruz, Cochabamba and La Paz than Beni receives incoming migration.

In Beni seven ethnicities are located: *araonas*, *cavineños*, *esse-ejjas*, *reyesanos*, *takanas*, *chacobos* and *pakawaras*, sparsely along riverside communities, in conditions of life and deplorable health. Eighty-five per cent of these communities count with less than 300 inhabitants.

3.5 Education

According to the INE (1996), the illiteracy rate in the department is 12.80%, the breakdown of which varies according to the province; Moxos shows a rate of 29.1%, Marbán 20.60%; the situation is less critical in Vaca Diez with 9.3% and Cercado with 7.2%. The situation is always severer in the rural area and among women; for example, at the departmental level, illiteracy in women older than 15 years in rural areas reaches 47% (in Trinidad, the capital, the rate is 5%).

3.6 Economic Activities, Poverty and Development Plan

According to the PDD of the Prefecture of Beni, the economic activities can be summarized as following. The contribution of Beni to the GDP is 4.1% (INE, 1998). The population with employment is distributed: in the agricultural sector 40%, in the industry 19%, in services 15.6%, among the main sectors.

The activities contribute more are: agricultural production; forestry, hunting and fishing; industry of foods, drinks and tobaccos; and non-industrial agricultural production. The following outlines some particularizes.

(1) Cattle Raising

The main activity in Beni is the traditional cattle raising, contributing at the national level with 4.7% of the agricultural GDP and the 28.04% at the regional level, which has been sustained until today thanks to the abundant fodder of the natural prairies with excellent nutritional value, in which they raise around 2,772,550 heads of cattle, representing 48.49% of the total cattle in Bolivia. Beni covers 50% of the national markets, mainly the departments

of La Paz, Cochabamba and Santa Cruz.

(2) Arable Land

The Department has approximately 11 million hectares of arable land (54% of the territory) of natural grass. The extension of the natural grass with its quality can harbor up to 7.5 million heads of cattle, with an appropriate handling of the cattle herds. The pasture is regularly burned and rotated, and livestock is fed nutritious supplementation, silage, protein from the forests and applied new technologies for the genetic improvement.

(3) Hydro-biological Resources

In Beni there are the 3 important rivers: Mamoré, Itenez and Beni, which are flowing from the Andean region to the Amazon basin. The extensive net of tributaries and streams may have less importance. Also, many lakes and lagoons are permanent sources of surface water for cattle use, among them the Rogagua, Rogaguado, Ginebra, Ocean, in which great variety of aquatic resources and other craniate species are found naturally in these currents and deposits of waters.

(4) Artisanal Activities

All indigenous communities of Beni have developed manual skills in the elaboration of all types of crafts, taking advantage of available natural resources in each region.

The communities manufacture handcrafts based on different types of resources in each region; e.g., cotton, vegetable fibers, wood and ceramic.

The crafts that take place with more frequency are vegetable fiber knitting, notably, *jasaye*, hats, mats, baskets, *sarzos, urupe,* etc. Among the cotton products, *hamacas*, saddlebags, *caronas*, etc are prominent. Finally, wooden products include carriage wheels, canoes, oars, pans, sugar mill, etc.

Fruits, roots and seeds are used in the traditional medicine. In Beni a great diversity of roots shafts, barks, resins, leaves, flowers, fruits and seeds are employed for medicinal, nutritious, industrial uses and ornament-making that contribute to increase the departmental production as an alternative for the development of the craft, medicine, etc. Forty-nine profitable species of plants have been identified for the traditional medicine among those are the *copaibo, uña de gato, quebra piedra, sábila, sangre de grada,* etc. Likewise, tropical fruits such as *cayu, achachairu, guapuru, urucu, paquio* and others are used.

(5) Forest Resources and Fauna

The existence of more than 2,000 vegetable species in Beni that represent more than 60% of varieties found in the whole country demonstrates the diversity and wealth of their forests. Some 49.17% of the total area of the department is constituted by the forests, rivers and lakes, representing an approximate area of 105,000 km^2. Most of the forest area nurtures approximately 105 timber-yielding species of high commercial value including *mara,* cedar, oak, *sangre de toro, palo maría, ochoo, tajibo.* Non timber-yielding species such as rubber and the chestnut with great agro industrial potential are found in the Amazon forests of the north and east, Vaca Diez and Iténez.

(6) Tourism Heritage

The whole Department is constituted in an important tourist potential, mainly for the diversity and exceptional originality of its ecosystems, fauna and flora that are largely pristine. Also the characteristic of the Beni population interrelates with the nature. Particularly they stand out as tourist potentials the savannas of the North, Cachuela Esperanza, area of the lakes in the province of Yacuma, the rivers Itenez, Mamoré, Beni, the indigenous territories, the national parks or protected areas. In general, the throughout the territory tourist attractiveness is found that can be taken advantage of for adventure tourism. The protected areas of Beni concentrate to southern and southwestern part of the Department, mainly in the region of the Subandino and Foot of Mount with humid forests, mainly always green and savannas.

3.7 Departmental Economic and Social Development Plan of Beni (PDD)

The PDD 1999-2002 of the Prefecture of Beni describes bases and development strategies according to the following pillars: the opportunity, fairness, institution and dignity. In conformity with the Law of Administrative Decentralization, the Prefecture becomes an articulated entity between the central government and the municipal governments. It maintains, however, responsibilities of the construction and maintenance of road, water-related infrastructure and support to the production, rural electrification, conservation of natural resources and the environment, programs of institutional strengthening, promotion of tourism, among others.

A specific attribution is the formulation and execution of departmental plans of economic, social development and pre-investment projects and public investment. These plans should be formulated in coordination with the municipalities.

On the other hand, according to the Supreme Ordinance that standardizes the structure of the prefectures, one of the departmental directions is the Departmental Service of Health (SEDES). The Prefecture health services have established the following norms and services:

- Recruiting human resources of regulation and administration.
- Indicators of health.
- Diagnoses of health
- Departmental strategic plan of health
- Annual operative plan of health
- Projects of health in: infrastructures and equipment
- Projects of endemic illnesses: Malaria, yellow fever, hemorragic fever, leishmaniasis
- Regulation for the supervision and evaluation of the health services
- Departmental adaptation of the national norm for accreditation and certification of commercialization of goods and for the health service provision at the first and second levels
- Training program
- Adaptation of the training modules of the Basic Health Insurance (IMCI–LAM)
- Services
- Provision of qualified human resources to Districts
- Diffusion of Indicators
- Permanent diffusion of health-diagnoses in the department
- Diffusion of Departmental strategic health plan

- Diffusion of the POA
- Financial facilitation: through
  - Agreements of administration
  - Mechanism of resources assignment
- Facilitation of evaluations
- Supervision of the Districts and health services
- Certification of goods: medical equipment and inputs of the first and second levels
- Accreditation of the health services of the first and second levels
- Training and technical attendance to the health Districts
- Training to the human resources in health
- Certification of health professionals' registration (doctors, nurses and others)
- Training in the programs of:
  - Rehabilitation and social reinsertion of drug-addicts and alcoholics
  - Handicapped and blind people
- Certification and sanitary registration of foods and drinks
- Quality control of foods and drinks
- Sanitary control of public establishments of restaurants, hotels

The PDD specifically described the resources assigned to health. The Program 13, Integral Health is allocated with US $2,286,752.85, which are removed in five routines: Infrastructure and Sanitary Equipment: US $1,692,549.59; Training of human resources in health: US $20,325,20; Feeding and Infant Nutrition: US $29,268,29 and Infant Health and Adolescent: US $15,772.37; and Control and endemic Surveillance: US $528,837.40.

3.8 Municipal Development Plans (PDM) and Annual Operative Plans (POA)

The PDM constitutes the general framework of the planning of each municipality for a 5-year administration. The PDM usually begins with an extensive diagnosis of the local situation of sectors, including health. Also included are elements of strategic planning (mission, vision, objectives, plans and budgets). The PDM, in theory, governs the municipal administration from which the POA is developed.

The POA is developed in compliance with the legal and technical administrative resolution No.1021 of August 3, 1999 issued by the viceministry of Budgeting and Accounting.

POA constitute the strategic, legal and organizational framework of the operation of the municipalities during a fiscal year. In general terms, in each municipal POA the mission, and the legal base is defined, the objectives, the priorities, the strategic lines and the general budget and for sectors, including the health sector.

However, a great diversity is observed in the items and amount assigned by each municipality to the health sector, with the exception of the Health Insurance (Seguro Básico de Salud: SBS), which is included in all the POA. For example, Guayaramerin has 10 subprograms and Bs. 177 assigned per each inhabitant, San Javier 2 subprograms and Bs. 98 per inhabitant, Trinidad 5 subprograms and assigned only Bs. 35 per inhabitant. The outline of the situation is tabulated in Table 3.2.

3.9 Poverty Alleviation

In Bolivia, poverty affects most of its population (58.5 percent according to a 1997 record), within which extreme poverty affects one third. Most critical levels of poverty is observed in rural regions far from the urban centers such as La Paz, Cochabamba, Santa Cruz, where most of the economic activity concentrates.

Among the problems that hit especially hard the poor in Bolivia is their vulnerability in the face of certain illnesses due to poor conditions of life (poor quality of housings and absence of social infrastructure including potable water and sanitation), malnutrition, lack of access to appropriate health services and basic education. Illiteracy or lack of basic education, especially of the women, has a direct relationship with high morbidity rates and maternal and infant mortality as well as of fecundity. Also the problems of health and especially of education, among others, impede their access to reasonable income generation.

Poverty is a multifaceted issue that can mean deprivation in diverse aspects, quantitative or qualitative. Quantitative or "material" deprivation is such as that related to basic income, basic consumption, health, basic education, etc. Qualitative deprivation includes as those related to gender, race or generational discrimination, security, social integration, etc.

In general, the diverse forms of deprivation are usually closely related and reflect complex problem of poverty, which should not be analyzed from the material point of view but also from a dynamic perspective that links poverty with social, political, cultural and natural factors.

In Bolivia, recent administrations have made efforts of various kinds to attack poverty as the central issue of the country. Although some progress is recognized, it is still necessary to overcome social stratification affecting the rural area, women and children, particularly in certain departments.

The income per cápita was US $796 in 1995, US $1130 in 1996 and US $865 in 1997 (INE). The 1970s and 80s were characterized by constant growth of poverty associated with the political uncertainty and the deterioration of main macroeconomic indicators. In 1985, structural adjustment program began, and its effect in price stabilization eventually reversed the negative tendency of the GDP growth. In 1987, the country had a positive GDP growth rate; in the period 1989-1999, the annual growth average was higher than 4%; the GDP per capita grew to an annual stocking of 1.9%. The incidence of urban poverty diminished by 6.4%, and that of extreme poverty also went through a similar decline between 1990-1997. The situation of rural poverty is somewhat different; between 1993 and 1997 the figure decreased only by 0.4% and of 0.6% in the case of extreme poverty.

In the Department of Beni, it is estimated that 74.8% of the population live under conditions of poverty (Moral, R.: Bolivia, Economic Politics, Geography and Poverty, UASB, 2000). The poorest provinces are Moxos, Marbán and Ballivián.

According to the UNDP, the Human Development Index of the Department in 1998 was 6106.

3.10 Decentralization and Popular Participation Policies

3.10.1 Decentralization

Under the governmental policy of decentralization, the Prefecture Government has been taking responsibility for the administration of public health/ medical service and school education since the establishment of Administrative Decentralization Law (Law No. 1654: July 28, 1995). Such responsibilities belong to the prefecture are shown as follows.

1) To formulate and execute the programs and projects of public investment in the areas of public social assistance as of health service and school education.
2) To administer, supervise and control, through the national government delegation, the human resources and budget assigned to the functioning of the public health service and education.
3) To administer, supervise and control the functioning of the social assistance services of health and education.

In the health sector, Departmental Health Service (SEDES) had been taking responsibility for the health service in the prefecture as a local agency of MSPS, but after the establishment of the Law, SEDES has a position subordinate to the social development department of the prefecture government keeping a strong linkage with MSPS as before (Refer to 4.2.1 Health Sector Policy).

3.10.2 Popular Participation

Popular Participation Law (Law No. 1551: April 20, 1994) confers the rights to OTBs to control and supervise the realization of public services and works for well being according to the necessities of the communities, that is to say, to identify, prioritize and cooperate in the execution and administration of public services and works for the general well being concerning formal/ non-formal education, housing enhancement, health care/ protection, sports and enhancement of the production technique.

In the health sector, a free title is transferred from the central government to the municipalities of the property rights on the physical infrastructure of the public health service, such as 2nd/ 3rd level hospitals, district hospitals, CSs and PSs depending on SEDES, corresponding to the MSPS. Consequently, the municipal governments are now responsible for following matters.

1) To supply the equipment, furniture, education materials, consumables, medicine and food in the health services, administering and supervising their use, for an adequate functioning of the health infrastructure and the health service.
2) To supervise and propose the change or approval of the authorities in the public health sector, with rulings about the subject by direct administration or the request of the OTBs and the surveillance committee.
3) To build new infrastructure in education and health service.

The municipal governments through the co-participation scheme are transferred of the income of the national rents, i.e. 20% of the indirect tax will be destined to the municipal governments and 5% to public universities (Refer to 4.2.3 (3) Human and Financial Resources).

3.10.3 HIPC II, Bolivian Strategy of Poverty Reduction, and National Dialogue Law

Accepting the special program of the cancellation for Bolivian multilateral debt by the debtor countries (the Enhanced HIPC Initiative: hereinafter referred to as HIPC II) under the policy of Poverty Reduction Strategy Paper (PRSP) of the World Bank, the Bolivian Government is required establish a law that stipulates the methodology to control the reward resources from HIPC II. The National Dialogue Law 2000 (Law No. 2235) was established on July 31, 2001 on this background.

Main objective of this Law is to establish the basic limit for the administration of the Strategy of Poverty Reduction that will guide the action of Bolivia to promote an equitable growth and poverty reduction. The Law refers to the outline of the Bolivian Strategy of Poverty Reduction (EBRP), and it recognizes all Bolivians as its beneficiaries, strong emphasis is placed on women, towns, indigenous communities, and marginal urban neighborhoods.

Under this Law, the Municipal Solidarity Fund was constituted for the school education and public health with the purpose of making up for the deficit that accumulated until 2001 of ITEM for the educational personnel and the medical personnel and paramedics. The Fund has annual contribution of the resources coming from HIPC II, in the following amounts:

- US$ 5,000,000 for the administration (2002), and
- US$ 27,000,000 per annum in the next 15 years (2003 - 2017)

The resource of the Municipal Solidarity Fund for the school education and public health will be appropriated to the Ministry of Education, Culture and Sports and the Ministry of Health and Social Provision according to the deficit of human resources in the sectors of school education and public health. To make such a disbursement, the Bolivian government founded Unique Directory of Fund (DUF) as an implementation body in the Ministry of Finance.

The actual selection of the personnel of the public service is conducted by a Local Committee of Selection in each municipality. In the health sector, the Committee consists of i) municipal government delegate or representative of municipal union (mancomunidad), ii) delegate of municipal council or district health, iii) hospital director or district health, and iv) delegate of prefecture health service.

4 EXISTING CONDITIONS OF DISTRICT HEALTH SYSTEM IN BENI DEPARTMENT

4 Existing Conditions of District Health System in Beni Department

4.1 Health Situation and Health Programs

The Acute Respiratory Infections (ARI), Acute Diarrheal Diseases (ADD), malnutrition, parasitosis and other illnesses characteristic of the conditions of life of Beni population prevail. It should be taken into consideration that many of these cases are not assisted in the health service due to problems of accessibility and availability, therefore a high mortality takes place without medical attention. But even in cases attended by institutional services, the mortality of children under five years of age at the first level of service is 11.4%, the highest in the country. Another illustrative figure is 310 deaths within the first week of birth out of 487 neonatal deaths.

The epidemiological situation is presented in the following Tables 4.1 and 4.2.

The Expanded Program on Immunization (EPI) may have received more support from the part of various donors and NGOs. However, the situation of cold chain and the availability of the vaccinations should be evaluated carefully; for example, Table 4.3 shows coverage surpassing 100%, which speaks clearly of problems in program organization and in registration.

4.2 Health Policy and Institution

4.2.1 Health Sector Policy

(1) Policies of the MSPS

The strategic health plan of the Ministry of Health and Social Provision (MSPS) promotes and defines health through an alliance with the Bolivian population to fight against poverty, in which a universal health system is desired to be built that is accessible, efficient, of quality and sustainable with multiple health providers.

The Bolivian health defines:

1) Vision:
   - It guides to realize the Bolivian health system that is accessible, efficient, sustainable, of quality and warmth with multiple service providers
   - It promotes life, family, human security and healthy habits
   - It strengthens its normative, regulating, modulating, evaluating and supervising roles.

2) Outline
   - Nutritional enhancement
   - Coverage extension and enhancement of the attention quality
   - Incorporate regional pathologies at the primary health strategy
   - Service network reorganization

3) Basic programs
   - Integrated Management of Childhood Illness
   - Integrated Management of Women and Reproductive Health
   - Integrated Management of School Age Children and Adolescents

- Integrated Management of the Elderly
- Management and Prevention of Domestic Violence
- Mental Health
- Food intake and Nutrition, Healthy Habits and Life Style

All mentioned above is carried out by means of universal access based on primary care through the family and community medicine, epidemic shield, basic health insurance, free medical insurance for the elderly, short-term public health, promotion of the healthy municipality and occupational health, with participation and social control.

The MSPS has the following functions:

a. Rule and regulate the management of the public health system
b. Coordinate the economic necessities and budget assignations for the execution of national programs with the prefectures
c. Subscribe agreements as marks of application for the national health policy
d. Define foreign cooperation necessities
e. Define technical criteria to determine corresponding fees and duties to the health service and observe their compliance
f. Rule the professional health service
g. Train the executing bodies and the health insurance
h. Elaborate the policies and technical accreditation norms of the health service, the obligatory compliance for all the institutions related to the public health system.

(2) Prefecture and SEDES Policies

The laws and ordinances that govern the health sector institutions have been updated through the Supreme Ordinance No. 25060 that substantiates the Decentralization law. It indicates the Prefecture structure, having the following levels:

- Prefect
- Departmental Director
- Technical director of the Departmental Services
- Unit Chief

The Departmental Social Development Division is responsible for the health promotion and surveillance of the accomplishment of the objective and results of the departmental health services.

The operative part is undertaken by the Departmental Health Services (SEDES) that demands a specialized technical management; the SEDES also has a legal advisory and administrative unit. As such, it is responsible for the human resources in the health sector.

The central government will define the basic organization of service in each department by means of a Supreme Decree, according to which each prefecture will organize and put into operation its respective departmental services.

The Supreme decree No. 25233 indicates that the Strategic Health Plan is the mainstream to fight poverty; to achieve this objective, SEDES has the fundamental missions to:

- Execute as health authories in the department

- Establish control and consistently evaluate the health situation in the department.
- Promote the health demands and plans, coordinate, supervise and evaluate their offers.
- Oversee the quality of the health service provided by the public and private sectors
- Promote public sector participation and society to formulate plans, programs and projects.
- Coordinate with the responsible institutions on health promotion and prevention of diseases
- Work with the responsible institutions to make programs operative and support projects to the prevention, rehabilitation and social insertion of drug addicts and alcoholics, and give effective support to the handicapped.
- Direct health activities at the departmental level
- Articulate the services to the organizational structure of the prefecture
- Integrate the mechanism of understanding
- Coordinate among institutions at the departmental level
- Articulate the services with the technical institutions from MSPS

In the POA 2001 SEDES states their mission is "to be responsible for the health of Beni population and implementation of the strategic health plan. Our main commitment is to strengthen the health service network, its benefits and human resources in order to guarantee the accessibility, quality, fairness and sustainability of the sector.

Institutional objectives include:

a. Strengthening SEDES Beni administration to fulfill the administrative commitments
b. Initiation of an administrative process and implementation of a municipal health services network
c. Consolidation of the SBS in all the municipalities
d. Execution of the actions planned in the Epidemiological Shield
e. Institutionalization of the departmental and municipal health councils, the ombudsman and indigenous health council

In practice, SEDES Beni is an administrative unit to support that represents at the intermediate administration level of the health system. It constitutes the regulatory entity to maintain the integrity of the system and the appropriate relationship in the centralization/ decentralization process. In consequence, it carries out the following functions:

a. Articulate the service with the general structure of the Prefecture
b. Integrate agreement mechanisms
c. Inter-institutional coordination at the departmental level
d. Service linked with the technical matters of MSPS

The levels of the health administration are organized in:

1) First administration level: In charge of the Area Headquarter
2) Second administration level: Corresponds to the Health District
3) Third administrative level: Corresponds to the Technical Direction
4) Fourth administration level: Corresponds to the MSPS

To develop different activities in the health sector, a "Departmental Health Committee" will be formed and it will consist of:

1) The Director of Social Development from the Prefecture who presides the SEDES Technical Council as the permanent secretary
2) Two departmental committee representatives from the prefecture in charge of channeling the demands from the municipal governments, and
3) Representatives of the following organizations: Social Securities, private sector health organizations, unions, religious organizations, NGOs, armed forces, police, and universities that have the health sector

The committee has the functions to harmonize, coordinate and evaluate the policies, plans, programs and health projects that will be executed in the Department.

Also a district health committee will be formed that consists of:

- District health director as president
- The departmental council member that represents the province
- The subprefect that represents the province
- A representative of the municipal government
- A representative of Social security, health private sector and the NGO association
- A representative of the district surveillance committee
- A representative of the community, elected by the Surveillance committee that works in the district, and that is not already a member of this committee.

It has the function to harmonize the operative programs with the strategic planning; harmonize the views over the heath management by different local institutions; promote the agreement among the public and private sectors through agreements and programs, projects and health activities; promote permanent operative coordination between diverse groups according to their objectives and health goals in the district; evaluate the coverage and impacts of the individual and concurrent management

(3) Municipal Policies

The Law of Popular Participation No. 1551, supplemented by the Supreme Decree No. 24447, regulations the municipal health intervention appoints the Municipal Health Council consisting of:

- Municipal representative as president
- District health director representative
- Surveillance committee representative
- Two representatives, from the neighborhood, rural communities or indigenous communities.

The Council has the following mission:

1) To be informed on the health report of the District health director or directors over the health situations from municipalities, developments on the health management, the human resources allocation and financing, provide recommendations to make a better health index and management.
2) Understand the Operative Plan proposal and budget from the SEDES corresponding to the municipality.
3) To review the proposal of plans, programs and health projects from the private sector in the municipality and agree its inclusion in the programs and projects from SEDES

and the municipal government.

4) To promote the creation of the health duty office *(defensoria de la salud)*, understand their reports and recommendations and coordinate activities.
5) To promote, agree and evaluate the development of a healthy municipality, according to the main health management guidelines.
6) Understand and approve or reject, the periodic report of the SBS execution, recommending appropriate measures.

The same law appoints that the second and third level, district hospital, CS and PS as municipal properties, and mandates municipalities the following responsibilities:

1) Provision of equipment, maintenance and improvement of the immovable of the health services.
2) Provision of consumables, supplies including drugs and food in the health services.
3) Supervision of the work of the authorities, directors in the public health sector.
4) Construction of new health infrastructure and basic infrastructure (*Saneamiento Básico*)

All these should be financed by the co-participation income from:

- Value added tax (VAT)
- Complementary regime of VAT (RC-IVA)
- Business Presumed income tax (IRPE)
- Transaction Tax (IT)
- Specific consumption Tax (ICE)
- Custom Mortgage (GAC)
- Tax to the free transmission of goods (successions)
- Tax to trips to foreign countries

The municipal incomes are tax to the properties, namely:

- Rural properties tax (IRPPB)
- Urban immobile tax (IRPPB)
- Vehicle tax, IRPPB (cars, airships)

The municipalities will coordinate with the OTBs through the Surveillance committee all the activities in the health sector.

4.2.2 Basic Health Insurance (Seguro Básico de Salud)

The *Seguro Básico de Salud (SBS)* is without a doubt the biggest initiative undertaken by the public health system of Bolivia. It was created by the Supreme Decree No. 25265 of 30 of December of 1998 and is put forth by Ministerial Resolution No. 0187. Its objective is to enhance the life conditions for the Bolivian people through guaranteeing their rights to health service.

The SBS has as pillars the universality, fairness, solidarity, and the fight against poverty, malnutrition and the population's illnesses prevalence with emphasis on women and children. The essential benefits are promotional, preventive and treatment and they are guided to reduce the maternal and infant mortality.

The SBS came into effect on January 1, 1999 and began its training phase, supply of inputs

and other preliminary activities; operatively, it came into effect in March 1999.

(1) Benefits

The benefits are detailed according to beneficiary groups:

1) Under 5 Years
   a. Neonatal care
   b. Nutrition and Infant Development Promotion
   c. Prevention of diseases by means of vaccination
   d. Attention of infectious illnesses including acute diarrheal infection, ARI, sepsis and meningitis

2) Pregnant women
   a. Prenatal care
   b. Attention of the childbirth and newborn
   c. Post partum care
   d. Obstetric emergencies transportation
   e. Prevention and attention of the pregnancy complications
   f. Information, education and communication on institutional childbirth

3) Population in general
   a. Diagnosis and treatment of the TB
   b. Diagnosis and treatment of the Malaria
   c. Diagnosis and treatment of the Cholera
   d. Diagnosis and treatment of the STDs, including AIDS
   e. Consultation and services of family planning, with respect to the will of people

4) Extent of the covered benefits
   a. External consultation
   b. Hospitalization
   c. Medications
   d. Auxiliary tests
   e. Diagnosis
   f. Follow-up visits
   g. Cost of periodic visits of health personnel in rural area without health services

(2) Financing

The financing of the SBS is supposed by:

1) Compensatory local fund of health, constituted with equivalent municipal resources to 6.4% of that of 85% of the municipal copartnership tax
   a. Subsidy from central government to municipality (20% of indirect tax collected by central government) x 85% = Compensatory local fund (for municipal government)
   b. Compensatory local fund x 6.4% = FLCS (resources of SBS)
2) Balances of the bills of the Compensatory local fund
3) Resources assigned by the National General Treasure for salaries
4) Resources of the bilateral, multilateral cooperation and others

To effects of guaranteeing the financing and operation of the SBS, the Ministry of Health and

Social Prevision, the Departmental Prefectures SEDES, and the municipal governments should allocate the necessary resources in their operative plans and annual budgets.

(3) Administration:

As for the administration, at the national level the National Unit of the SBS has the function of supervising norms, technical and administrative procedures and of coordination with the SEDES.

At the departmental level, the Planning Unit of SEDES is responsible and has the function to coordinate with the health districts, to oversee the quality of service, the budget execution and give administrative and technical support.

The district level oversees the health service network, reviews the documents of the service provision of the first level facilities to make the request of reimbursement to the municipalities.

Finally, the municipalities supervise the administration of services, investigate, finance and participate in the administration of the Compensatory local fund of health.

In Beni, the implementation of the SBS has faced a series of difficulties at the level of SEDES and the municipalities. One example is the delay in payment of CAPOs on the part of the municipalities to the hospitals and other health facilities, reducing the opportunity and quality of the service. As such, lack of drugs and supplies is common.

(4) Present Situation and the Problems of SBS

1) Since the introduction of SBS, the health indicators of Bolivia have improved. However, according to the survey results of UNICEF, only 53 % of the population in rural areas is familiar with the SBS and 73 % in urban areas. A nationwide promotion of the SBS is much needed.
2) The actual expenditure rate per initial budget of SBS last year was 63 - 64 %.
3) Observed problems include concentration of patients in major cities with larger hospitals makes the SBS funds tight, sometimes deficient. The municipal budget for SBS is allocated according to its population (based upon the census). That is to say, an increase in the number of patients from outside the municipality causes shortfall of SBS resources. Therefore, it is necessary to enable the SBS to cover a wider area.
4) SBS resources are used for other purposes than health care.
5) The request of hospitals for SBS disbursement is not met due to ineffectual communication between hospitals and municipal governments.
6) Problems with SBS are summarized as below.
   a. SBS is underutilized (some municipalities do not use the resource because of the ineffective IEC on SBS).
   b. Municipalities' administrative capacity is inadequate.
   c. The hospitals are not well trained in the use of SBS (e.g., a hospital has requested disbursement for only four out of ten actual surgery cases).
   d. The beneficiaries are not well informed of SBS.
   e. The actual disparity in the size of municipalities (from 80 inhabitants to one million) is not well reflected in the application of SBS. A larger unit than a municipality may need to be established for SBS operation.

4.2.3 Institution, Administration, Human Resources and Financial Resources

(1) Administration

1) National Level

Implementation body for medical and health administration is the MSPS in Bolivia. Main activities of the Ministry are formulation of national health policy, programs, allocation of personnel expenses for medical staffs and surveillance. For the policy of decentralization and PRSP, the actual activities for planning and implementation of health administration have been transferred to local governments.

2) Prefecture Level

SEDES, responsible for the health sector of the Department, is subordinate to the Prefecture of Beni. The organization chart of Beni Prefecture is shown in Figure 4.1.

SEDES is authorized to design health programs, implement health administration and supervise the medical facilities under SEDES. The organization chart of SEDES Beni is shown in Figure 4.2

Main activities of SEDES are shown below;

a. Malaria training and surveillance
b. Yellow fever control and surveillance
c. Human resources training in the health sector
d. Municipal health institutional enforcement
e. Different surveillance activities
f. SBS in all Beni Department
g. Execution of the different actions conveyed in the epidemiological shield

SEDES Beni has eight health districts:

- District I (Trinidad): constituted by Cercado and Marbán.
- District II (San Ignacio): constituted by Moxos
- District III (Magdalena): constituted by Iténez
- District IV (San Joaquín): constituted by Mamoré
- District V (Santa Ana): constituted by Yacuma
- District VI (Reyes): constituted by Ballivián
- District VII (Riberalta): constituted by Riberalta
- District VIII (Guayaramerín): constituted by Guayaramerín

The health service network is comprised of the public sector (the most important), social security, private sector and NGOs. The facilities of the SEDES are distributed this way:

- Puestos de Salud: 64
- Centros de Salud 63
- Hospitals of second level 7

The health facilities in Beni are listed Table 4.4.

3) District Level

SEDES has eight (8) health districts (Trinidad, San Ignacio, Magdalena, San Joaquin, Santa Ana, Reyes, Riberalta and Guayaramerín) which do not correspond with administrative districts. The district level organizations of SEDES and municipal government are shown in Table 4.5 and 4.6. District directors of SEDES are responsible for implementation of health programs and supervision of medical facilities. On the other hand, allocation of the running cost, operation and maintenance of medical facilities in each municipalities, distribution of finance by SBS and provision of medicine to medical facilities are implemented by the municipal government. SEDES and the municipal government coordinate the health administration and activities through the Municipal Health Committee and District Health Committee. The activities and objectives of Municipal Health Committee and District Health Committee are shown below;

1) To implement the final coordination of the operative program with the strategy
2) To promote agreement among each sector, through the project, health activities programs
3) To promote permanent operative coordination among different execution bodies in function to the objectives and goals
4) The committee is consists of District Director of SEDES, departmental advisor from district, a municipal representative, private health sector and NGO, surveillance representative, OTB representative that will meet every 60 days

The municipal health committees are organized by representatives of themunicipal government, district director of SEDES and representatives of OTB and Surveillance Committee. The number of municipal health committee planned is shown below;

a.	Trinidad Municipality	Mayor and 11 advisors
b.	San Javier Municipality	Mayor and 5 advisors
c.	San Ignacio Municipality	Mayor and 5 advisors
d.	San Ramón Municipality	Mayor and 5 advisors
e.	San Joaquín Municipality	Mayor and 5 advisors
f.	Puerto Siles Municipality	Mayor and 5 advisors
g.	Riberalta Municipality	Mayor and 6 advisors
h.	Guayaramerín Municipality	Mayor and 5 advisors

However, those health committees do not always function adequately, for the recent transfer of health administration from the central government has not yet allowed the capacity of the organization and personnel to develop fully up to the task. Therefore, it is necessary to implement guidance, education and training for organizational strengthening and improvement of health operation and management.

The organization charts of San Ramón, Santisima Trinidad and Guayaramerín District SEDES are shown in Figures 4.3 to 4.5.

(2) Human and Financial Resources

1) Human Resources

The availability and allocation of the human resources in the health sector in Bolivia is very inconsistent, specially the ratio of doctors and nurses to population. As a

matter of fact, in the 1990's, a great decrease in this resource was seen; for example, in the year 1991 there was a ratio of 10.5 doctors per 10,000 inhabitants, in 1997 the ratio decreased to 3.1 doctors per 10,000 inhabitants. The details are shown in Table 4.7.

The Ministry of Health has the Human Resources Development Unit, which establishes the training guidelines. The weakness exists due to the Ministry programming which establishes its own training actions without any interactions with the other institutions/ organizations.

The number of doctors and nurses in Beni Department is shown in Table 4.5.

The personnel/human resources are assigned and distributed by the MSPS through ITEMs. The staff position, qualification and place of the medical facility is assigned and described in the ITEM. The Ministry assigns the human resources based upon SEDES' request. However, the effect of ITEM system tends to be weaker in the rural areas, as the allocation of human resources does not satisfy the supply/demand balance of doctors, nurses, auxiliary nurses, and other personnel. There exists an even lower level of distribution of human resources in poverty and rural areas. As such, the Ministry should place preference on poverty and rural areas, introduce and enhance the ITEM execution along the requirement of Departmental SEDES and introduce a staff distribution monitoring system. The central government in the 2000 dialogue law (ley de dialogo 2000) emphasizes the medical personnel, and the reason why the ministry must assign the personnel following the law. Also, there is another reason for a rural urban imbalance: even when the Ministry has assigned the human resources for the area, the professional are able to reject the nomination on the basis of the lack of strong incentive to stay, lack of equipment/medical facilities, less training opportunities, more poverty and inaccessibility. Therefore the doctors assigned to those districts should receive some kind of encouragement to overcome such constraints.

Meanwhile, the Ministry has formulated the Second Health Reform Program. The plan includes the following three items that affect health human resources.

a. Increase of 2,209 ITEMs within 10 years from 2002 (by HIPC II fund)
b. Improvement of quality and capability of human resources
c. Employment of incentive measures to health personnel in rural and poverty areas

There will be a change in the ITEM procedure from 2002. The administration for selection and assignment of human resources will be transferred from the central government to the municipal government. As for the personnel of new ITEMs, it will be under the responsibility of the mayor, SEDES district director and representative of medical facilities in each municipality.

In Beni Department, 200 new ITEMs will be assigned in 2002 (see Table 4.6). Among these, about 50 ITEMs are assigned for natural population increase. Therefore, the additional assignment of ITEMs is about 150. The details of new ITEM assignment to Beni Prefecture in 2002 are shown in Table 4.5.

The ratio of doctors to nurses (including auxiliary nurses) is not sufficient. In 2000,

the average is 1 to 1.98 in Beni Department. It means shortage of nurses, even though the average distribution of doctors is not always high. The new ITEM plans to increase doctors and nurses, from 205 to 252 and 406 to 504, respectively. The ratio of the doctor to the nurse will be slightly improved to 1:2. However, it is necessary to increase the number of nurses and implement a retraining program for the existing staff.

2) Financial Resources

The purchase of equipment, operation and maintenance, construction of facilities and other related items became under the control of municipal governments by the Law of Popular Participation in 1996. However, it has not achieved its full-scale implementation due to inadequate capability of each municipal government.

The fiscal resources at the municipal level come from HIPC II, FPS, subsidy and own income. The detail is shown in Table 4.8.

a. Personnel expenses of the education and health sectors: Equitable distribution based upon a new principle combining population and infant mortality will be executed, which will favor rural areas over urban areas.

b. Fund for health service quality improvement: Its distribution depending mainly on poverty indicators will allow a maximum difference of six to one. For example, a larger city which had previously received Bs. 100,000 as subsidy from the central government will only receive 10% of the amount, whereas a small town may increase its receiving from Bs. 10,000 to Bs. 60,000. The items for expenditure of this fund include: i) operation and maintenance of facilities and equipment, ii) transportation, iii) consumables such the medical supplies and fuel, and iv) training.

c. Fund for PRSP priority infrastructure program: The health sector-related application of this fund will be such as CS and PS constructions. The applicable items for health sector are; i) construction, renovation and expansion of facilities, ii) nutrition (mother and child nutrition, school lunch), iii) countermeasures for hydrophobia, the mousing (rat expellant), etc. iv) countermeasures for natural disaster, the environmental pollution.

d. FPS fund: It depends on the DUF fund. The DUF fund distribution requires a counterpart fund proportional to poverty indicators. As some municipalities may find it difficult to apply for the DUF fund, DUF can utilize a portion of the funds for health service quality improvement and PRSP priority infrastructure program.

e. Subsidy: It consists of 20% of the indirect tax which the central government collects and re-distributes to municipalities in accordance with the population ratio.

f. Own revenue of municipalities: It is the tax collected by the municipal government and revenue of medical facilities. Those taxes include automobile valuable tax, the real estate tax and the sales permission tax. The revenue of medical facilities is automatically incorporated into the revenue of the municipal government. In case of health facilities with deficits, the facilities do not turn over to the municipality.

As for other funds, each municipality has received some donor’s fund directly, too.

However, in the future, when a municipality receives a direct assistance, the same amount will be deducted from the municipality budget.

The budget distribution in 2001-2002 in the Beni prefecture is shown in Table 4.9.

(3) Education

1) Education System

The schools of medicine are shown as follows:

a. Public
Universidad de San Andrés (La Paz)
Universidad de San Simón (Cochabamba)
Universidad Gabriel René Moreno (Santa Cruz)
Universidad de San Francisco Javier (Sucre)

b. Private
Universidad UCEBOL Santa Cruz
Universidad Católica (Santa Cruz, Cochabamba y La Paz)
Univalle (Cochabamba)
Universidad de Potosí (Potosí)

The duration of course is six years (the exception is *Universidad de San Simon;* seven years), the students study the first five years in the university and a year in a hospital near the university (intern system, sistema de internación) after the sixth year the student has to practice at a municipal level hospital to obtain the license. Currently abolition of the practice period at a municipal level hospital is being considered.

Currently, the Ministry of Education through the Vice Ministry of Higher Education develops the accreditation process of the private universities. The state universities through agreements with universities from other countries fulfill accreditation process and evaluation using academic partners.

The postgraduate degree on public health (a master's degree) has been offered since 1983 at Universidad Mayor de San Andres (La Paz). Since 1988 courses on public health in other private and public universities have been offered.

In Beni Prefecture, following nursing schools and auxiliary nurse schools are accredited in health/ medical sector.

i) Nursing School

- Nursing Course of Health Science Faculty, Technical University of Beni
  This course was founded in 1984 to train nursing licentiates (5 years' course), and has turned out 135 licensed nurses in total since its foundation (graduation in 2002: 16 persons). This course has a branch in Riberalta (110 students in 2002), and nursing technician (auxiliary nurse) course in Guayaramerín and San Borja (3 years' course: with an option of licensed nurse course that requires 2 more years).

ii) Auxiliary Nursing School

- Auxiliary Nursing School of Trinidad
  This school was founded in 1980 to train auxiliary nurses (18 months' course), and depends on SEDES-Beni administratively now, but originally it was founded as an accredited school of the Bolivian Japanese Public Health School in Cochabamba. It has turned out 328 auxiliary nurses in total since its foundation (graduation in 2002: 16 persons).

The education of nurse and auxiliary nurse has difficulties such as lack of training equipment sophisticated by new technologies, and lack of new teaching methods. Even if all educational programs and curricula meet with national standards, they must be reviewed and modified to be suitable for the needs of each region and new teaching methods. On the other hand, the deployment of teaching personnel is not sufficient. For example, nursing school in Riberalta requires a greater number of teaching staff to conduct education/ training as a normal teaching institution.

2) Training/SEDES Program

SEDES, UNICEF, CARITAS, CIDA and others have implemented training for the personnel and the communities. SEDES has a training program for health personnel, which is a part of the national program. The content of the program includes endemic diseases, maternal and infant mortality, malaria control, TB control and PHC. The number of trained personnel (especially doctors and nurses, and auxiliary nurses) is about 40 persons per year. Trainings are held about twice to three times per year and the number of the training days for one time is about three to four days. Training is mainly implemented at the Hospital Materno Infantil in Trinidad. However, such opportunities of training are limited at all service levels and the theme of training is only about a specific disease. The real need of the health personnel is to have up-to-date knowledge of medical science, epidemiology, medicines, operations and maintenance of new equipment, quality control of examination at laboratories, management of hospitals and PHC.

3) University of Gabriel René Moreno

University of Gabriel René Moreno has a five-year public medical school, which was established in June 2000. It has 552 students in three (3) grades at present (300 students in Grade One, 200 students in Grade Two and 52 students in Grade Three). The number of teaching staff is 52, as for directors, three (3) are biochemistry, one (1) is law and 48 are medicine (the doctors). There are three (3) courses; Social Medical, Bio-Medical and Epidemiological Medical.

The Social Medical course is not offered in other universities. This course fosters doctors who contribute to rural medical improvement. The educational component of this course is digestive system diseases (diarrhea), vaccination, sanitation management, nutrition guide, respiratory diseases, preventive medicine and epidemiology. The University aims to foster family physicians for the improvement of health situation in the country, and do not offer courses for specialized doctors. Students practice in rural areas from Grade Three. Bio-Medical course is the general medical education, which is the same as other universities. Students undertake hospital trainings from Grade Three. Epidemiological Medical course has a focus on medical statistics, medical management, family medical treatment and infectious diseases.

The tuition fee is as follows.

a. The entrance fee: Bs. 80
b. Bs. 1,900/ first year (4 separate installments is possible)
c. Bs. 950/ from second year (3 separate installments is possible)

In the case of private medical schools, some US$ 1,500/year is charged. Also, there are students from abroad such as Argentina, Chile, Paraguay and Brazil that consist 10% of the whole students. This is due to lower tuition fee compared to the neighboring countries.

Academic year starts from August and it is a two-semester system, and a semester has six (6) months. The New Year vacation is from December 20th to January 20th. The classes are from 7 o'clock in the morning to 8 o'clock in the evening. The university has made its own curriculum in February 2000. The ratio of theory to practice classes is approximately one (1) to one (1). The university carries out examinations during each semester, end of the year, at the time of graduation and at the end of internship. A diploma of medicine and medical license are given to those passed.

4) Trinidad Nursing School (for Auxiliary Nurses)

a. The municipality owns the facility, and the school is affiliated to SEDES
b. SEDES and the hospital agreed to use the old building of infectious diseases as nursing school.
c. Staff: 1 director, 1 secretary, 1 professor.
d. Students: 31 (261 graduated in 18 years). The cost is Bs. 180/month.

d-1 The SEDES employees pay Bs. 90 /month, while the other Bs. 90 is withheld from their salaries. During the course, half of their salary, Bs. 1,200 is discounted, paying them Bs. 600. A further deduction of Bs. 90 for tuition leaves a final amount of Bs. 510. The other Bs. 600 is used to fund a substitute while the employee attends the course.

d-2 Most of the time the students have to pay from their own resources the Bs. 90 for which they are responsible.

e. Course duration: 18 months.
f. Assistance given by other institutions
Cochabamba Japanese Technological School assist in the training, but the Technical University from the department is not involved (it is an autonomous university).
g. Job opportunity after completing the course: the jobs of employees from the local SEDES (after completing the course they must go back to their communities) are secured. In the rural areas trained personnel are selected with the SEDES approval from different CSs and PSs, but usually they get a job in the private sector (many of them reported they were not able find a job). Only 50% complete the course, the rest of them leave the course before completing. Comparing the job opportunity between doctors and auxiliary nurses, the nurses have a lower opportunity in finding a job. Hospital Materno Infantil has increased the number of auxiliary nurses since 1980.

4.3 Physical Structure and Operation/ Maintenance of Health Facilities

4.3.1 Legal Definition of Health Facilities

In the “Legal Norms in the Health Sector in Bolivia”, the health services are categorized in a health services network. It is comprised of the facilities structured in complex levels and sublevels. The network is based on the geographical accessibility, population, and resolution criteria. The facilities that constitute the network of services are linked and intercommunicated to each other through a referral system. A network to be developed requires facilities of first and second levels, and they must have quality and service interdependency, required health professional and technological attention, defined by the national health system.

The health facilities depend on SEDES for the planning, organization and human resources, according to the supreme decree N° 25233.

The management, medicine supply, medical consumables, maintenance and medical equipment preservation, infrastructure maintenance of the facilities, building of new facilities, human resources training, were transferred to the municipal government through the Popular participation Law N° 1551, and regulated by the supreme decree N° 24447.

The health facilities are categorized in four attention levels.

(1) First level: Centro de Salud (CS), Puesto de Salud (PS)

1) Definition
It corresponds to the attention modalities whose resolution capacity in health problems is predominantly focused on health self-care, outpatient consultation and referral transit. The facility associated to this attention level is the CS and belonging facilities such as PS, medical office, CS with transit beds and polyclinic.

2) Functions
It gives assistance to all the population inside its coverage area and has the following resolution power:

a. CS
- External consultation (under 5 years, between 5-14, 15-59, over 60 years)
- Referral and counter-referral
- Dental consultation
- Prenatal consultation
- Family planning
- Nutrition and child growth
- Micronutrients (Ferrum salt, Vitamin A)
- Community activities
- Vaccines for children under 1 year (DPT or pentavalent, poliomyelitis and BCG)
- Vaccination for children 12 months or under 5 years (DPT and polio)
- Measles vaccination (12 to 23 months)
- Measles vaccination (24 months to under 5 years)
- Anti-malaria vaccination
- Anti-rabies vaccination

- Tuberculosis
- Serums, injections, cures

b. PS
Same as the functions of CS.

c. Functions restricted to CS
- Malaria
- Chagas
- Laboratory diagnosis
- Childbirth
- Referral transit

3) Administration

a. Carry out the operative program on the established priorities by the attention model, the planning process, and participatory health.

b. Program annually the human resources requirements, consumables, basic services and maintenance.

4) Teaching

a. Identify training necessities and farther personnel education and inform the District headquarters for the corresponding Support.

b. Participate in the training and education of the patients and family.

c. Elaborate and participate in the permanent educational programs for the nursing personnel in the area.

d. Participate in the education of mothers, children and others.

e. Teach in the programs of reproductive health and other health programs.

5) Community health

a. Plan Sunday visits to the families in the coverage area.

b. Participate in the different organizations and follow up their actions in health.

c. Identify and classify patients in the community to refer them to the adequate level of attention in terms of their needs, coordination with the doctors.

d. Promote the community participation in the different health programs in the area.

e. Promote in community educative actions related to the use of the service network.

f. Promote the organization of a local council for the active participation in the health service network.

g. Incorporate traditional personnel to the health team in the area, to assure adequate attention in a safe childbirth.

(2) Second Level (referral hospitals)

1) Definition

It includes the attention modalities that require outpatient consultation of greater complexity and hospital internship in the four basic specialties: Pediatrics, gynecology/obstetrics, general surgery and internal medicine. The facility associated to this attention level is the district hospital.

It has a director responsible for the management, who is also able to assist, supervise the diagnostic and treatment, and responsible for the continuity of the medical attention 24 hours a day.

It has general practitioners, on-duty doctor and specialist must meet in clinical sessions and discuss over the patient's health at least once a week. It manages the norms of referral and counter-referral, in cases that exceed their capacity, to a more complex facility.

It has a waiting room and consultation room for the attention needed, some shifts are open to non-programmed consulting, also there are some statistical data about the different kinds of consultation, and a suggestion box.

It has an emergency room with an on-duty doctor who attends 24 hours a day and a nurse, and the exclusive support of the radiology, blood bank, passive on-duty specialist, general surgery, obstetrics/gynecology and pediatrics, with a reanimation unit.

A means of transportation rented or owned, equipped for critical medical circumstances and an incubator.

At this level, more complex pathologies can be dealt than those at the first level.

2) Functions

Give services to the people in the most efficient way, based on programmed activities considering the prevalent pathologies and the risk population, the human resources and the national policies adequate to the region, with the resolution capacity as follows.

- New and repeated external consultation (ophthalmology, otorhinolaringology, traumatology, neurosurgery, strained proctology, burns, cardiology, nephrology, dermatology, thorax, etc.)
- Hospitalization
- Discharge from hospital
- Pathologic anatomy
- Bed use
- Major and minor surgery
- Anaesthesia
- Laboratory
- Physiotherapy
- Ultrasound
- X-ray
- Emergency

The CSs that are part of the same health network must give services to the assigned population.

3) Administration

a. Execution of preventive and health promotion programs supported by the national and regional authorities.
b. The hospital to fulfill the basic functions should have an appropriate and efficient administration that should permit supervision and evaluate the functioning of the activities in a constant feedback process.
c. Make the operative programming base on the established priorities from the attention model.

d. Program annually the human resources requirements, medical consumables, food, basic services and maintenance.

4) Teaching

a. Contribute to the formation and development of the human resources required in the health sector with or without academic background, including in the public sector the training of the human resources from the community

b. Carry out a rigorous and permanent projection in the community, especially in the education field and an organized mobilization.

5) Research

a. Carry out operative social condition and prevalent pathologies research locally and regionally.

b. Carry out surveys to detect problems that affect the health of the population

(3) Third and Fourth Levels

1) Definition

a. Third level

It incorporates the attention modalities that correspond to a resolution capacity of outpatient consultation of high complexity and of hospital internship of specialties and sub-specialties that are not offered in the second level. The facility associated with this attention level is the general hospital (Hospitals and specialized institutes).

The Hospital director verifies that the medical staff, general practitioners, specialist in full sessions and by sectors meet and discuss the situation of patients with highest relevance at least once a week.

There is a mechanism to follow up derivations, to evaluate the attention quality, and to verify institution through the medical direction or a social service, following up the patients, and interrogating the responsible doctor that derived the patients.

The external consultation staff is comprised of secretaries and exclusive nurses, and the specialized consultation is available in a period no longer than 5 days.

The emergencies have at least 3 minor basic specialists that are organized in duty shift of 24 hours a day.

The clinical laboratory is able to detect gas in blood, quantitative antibiogram, and has a technician and/or biochemist 24 hours a day on active duty.

It has hemotherapy personnel and is on active duty 24 hours a day and a hemotherapy doctor in passive duty.

It has a UTIN conformed by the medical personnel, nurses, own staff, and the administration of consumables and equipment.

b. Fourth Level

The personnel are in charge of highly complex actions, university teaching, research, support and supervision of strategic areas for the health sector.

2) Functions
   a. Plan the attention process of all the hospitalized patients in the institution.
   b. Participate in the appraisal of patients in external consultation
   c. Give integral attention to the individual, the family and the community based on the needs identified.
   d. Watch for patients' health with a specialized team.
   e. The external consultations are programmed; they have the necessary means and specialists to do ambulatory surgeries.
   f. The emergency room has a team of six specialized doctors on active duty, includes the four basic and other specialists on passive duty.

3) Laboratory:
   a. Beside the usual routine analysis they can process the following analysis:
      - Australian Antigen
      - Carcin-embrionary Antigene
      - Estriol
      - Follicle stimulants
      - Luteinizer
      - Prolactin
      - Tiroxin
      - Triyodotironin
      - Tirotrofin
      - Heart profile
      - Division CPK
      - Coagulation Factor 8
      - Fibrin degradation Factors
      - Serologic test (Chagas, Brucelosis, etc.)
   b. It has complex diagnosis such as TAC, Gamma camara, RMN.
   c. It has a hemotherapy service.
   d. The surgery rooms are different and equipped for various specialities, there is an exclusive surgery room for emergency services and the surgery accidents are investigated.

4) Administration
   Planning and execution of activities for the attention of services.
   a. Elaborate the budget with a health team.
   b. Periodic meetings of counselling, planning and organization of the services.
   c. Supervise the health personnel in the execution of their assignment in the different programs.
   d. Program annually the requirements of human resources, consumables, food, basic services and maintenance.

5) Teaching
   a. Organize, develop and evaluate the education and services program.
   b. Participate actively in the teachers' integration in the human resources training.
   c. Participate in workshops, congress and other actions of permanent education.

6) Research
   a. Elaborate the research proposal.
   b. Carry out the research base in the community services necessity.

c. Elaborate a research protocol.
d. Communicate the research results.
e. Look for support for the research on health promotion.

4.3.2 Physical Structure of Health Facilities

Questionnaire survey to health facilities was conducted to understand the conditions of facilities, medical equipment, and operation/ management. 5 hospitals (3 general hospitals and 2 mother and child hospitals) and 38 Health Center (21 CSs and 17 PSs) were selected for this survey in the target study area in Beni Prefecture, namely, Cercado, Moxos, Mamoré and Vaca Diez Provinces (See Table 4.10).

Within the above-mentioned 21 units of CSs, there are 3 health units that were previously designated as the Centro de Salud-Hospital in Moxos and Mamoré. They are quite different from other regular CSs in terms of medical service, personnel allocation and facility scale, therefore in this chapter they are referred to as "ex. Centro de Salud-Hospital (hereinafter referred to as ex. CS-Hospital) ", and the description/ analysis are separated from the other 18 regular CSs. The locations of all the health facilities and their accessibility from Trinidad by transportation mode are shown in Figs. 4.6 - 4.10. Data derived from the questionnaire survey on operation/ management, clients, and facilities/ equipment in these 43 health units are shown in Table 4.11 – 4.16. The outline of 43 health units is shown as follows.

(1) General Hospital (Hospital German Busch, Riberalta, and Guayaramerín)

1) Outline of Hospital Operation

All of these 3 hospitals have the medical service departments of internal medicine, surgery, obstetrics and gynecology, pediatrics, and dentistry (in addition, German Busch has the "traumatic department"). Total bed numbers of German Busch, Riberalta and Guayaramerín are 70, 55, and 38, respectively. Hospital German Busch is the biggest in Beni, and the other 2 hospitals have almost the same scale of personnel allocation. Organization charts of Hospital German Busch, Riberalta, and Guayaramerín are shown in Figs. 4.11 – 4.13. Regarding the total number of the clients in 2000, Hospital German Busch had 5,659 persons of outpatients and 1,853 persons of inpatients, but the data on Riberalta and Guayaramerín are not clear.

2) Building Conditions

Regarding the hospital building of German Busch, Riberalta and Guayaramerín, they are quite aged facilities except German Busch, i.e. their building ages are 22, 55 and 56 years old, respectively. As to the total floor area of the hospital building, German Busch has approx. 2,839 m^2 with 2 stories, and the other hospitals are smaller than German Busch and single-storied. The main structure of German Busch building is the reinforced concrete frame and brick wall, and the other hospitals are supposed to be the brick masonry structure.

- Additional information about Hospital German Busch

Hospital German Busch has approx. 1 ha of hospital site and 2-story building in a typical hospital style with "patio" (patio is utilized for the installation space for the underground water reservoir: 50 tons x 2). The total floor area is approx. 2,839 m^2, and its 1st floor mostly consists of 6 sections, and 2nd is divided into 4 sections shown as follows (Refer to Figs. 4.14 – 4.15).

1st floor (approx. 1,672 m^2):

administration/outpatient (incl. reception, administration office, consulting room, dispensary, casher, registration), emergency, examination (incl. lab, x-ray, pathological anatomy), traumatic ward, medical record/statistics, and service (incl. canteen, laundry, and storage)

2nd floor (approx. 1,167 m^2):

impatient (ICU and ward), operation theater (incl. operation rooms/ supporting and recovery rooms), general surgery, and general medicine

3) Utility Condition

a. Electric Power Supply

Electric power of single phase 220V/50Hz is supplied to all the hospitals, and sometimes these hospitals suffer from electric power failure (e.g., in Riberalta: approx. 4 times/ week), but generally, the hospital staff do no complain about the electric power supply condition. Hospital Riberalta does not have a generator system. Generators of German Busch and Guayaramerín were not confirmed.

b. Water Supply

The cities of Trinidad, Riberalta and Guayaramerín have the city water supply service, but Hospital German Busch uses well/ rainwater without chlorine sterilization treatment (well depth: 80 m). The problem brought by water volume shortage was not observed. Water purification system is not used in these 3 hospitals.

c. Telecommunication System

Regarding the telecommunication system, these 3 hospitals are equipped with telephone line.

4) Waste Water and Garbage Treatment Condition

a. Waste Water Treatment

"Septic tank" and "seepage pit" are dominantly adopted for wastewater treatment.

b. Garbage Treatment

These hospitals use the "public garbage collection service" for garbage treatment, but regarding the treatment for the supposedly contaminated garbage, they do not carry out any specific treatment such as sterilization by autoclave or incinerator.

(2) Maternal and Child Hospital (Hospital Materno Infantil Dr. Jesus Vargas-Trinidad, and Hospital Materno Infantil Reidun Roime-Riberalta)

1) Outline of Hospital Operation

Hospital Materno Infantil Dr. Jesus Vargas-Trinidad, whose facilities were donated by the Japanese ODA in 1984, has the pediatrics department as well as the obstetric and gynecology. Riberalta specializes only in the obstetrics and gynecology. Hospital building of Materno Infantil Trinidad is considerably larger than Riberalta, i.e. total bed numbers of Trinidad and Riberalta are 70 and 14 respectively. The organization Chart of Hospital Materno Infantil Dr. Jesus Vargas-Trinidad is shown in Fig. 4.16.

2) Building Condition

The total floor areas of the hospital buildings of Trinidad and Riberalta are 4,170 m^2 and 620 m^2 respectively. Both of the hospitals have the structure of "reinforced concrete frame and brick wall" with 1 story. Riberalta has a new hospital building at the back yard of existing building, which is funded by the Norwegian ODA.

- Additional information about Hospital Materno Infantil-Trinidad
  Hospital Materno Infantil Dr. Jesus Vargas-Trinidad has approx. 1.7 ha of hospital site and 1-story buildings in the typical style of "pavilion type" (total floor area: approx. (4,170 m^2) connected by a straight passage. It consists of 6 sections, i.e. administration, outpatient, operation/delivery, inpatient (pediatric ward), inpatient (gynecologic/ obstetric ward), service/maintenance (Refer to Fig. 4.17).

3) Utility Conditions

a. Electric Power Supply
   Electric power of single phase 220V/50Hz is supplied to both hospitals, but in case of Trinidad, 3 phase 380V/50Hz is also supplied to the hospital. Serious problem caused by power failure is not observed in Hospital Materno Infantil-Trinidad (power failure: approx. 2 times/ month, generator: 80KVA/ 50Hz), whereas Riberalta suffers from electric power failure (approx. 10 times/ week, the hospital is not equipped with generator).

b. Water Supply
   City water is supplied to both hospitals, and there is no problem as regards the volume supplied. In case of Materno Infantil-Trinidad, it is equipped with deep well (depth: 120m), but the water from the well had not been used because of its high salinity. This problem was solved by the commencement of city water delivery. Neither hospital does not have water purification system.

c. Telecommunication System
   Both hospitals have telephone line system.

4) Waste Water and Garbage Treatment Condition

a. Waste Water Treatment
   Both mother and child hospitals have the wastewater treatment of "septic tank" and "seepage pit".

b. Garbage Treatment
   These hospitals can use the "public garbage collection service" for garbage treatment. Regarding the treatment for the supposedly infected garbage, they do not carry out enough treatment, for example, Hospital Materno Infantil-Riberalta usually burns the supposedly contaminated garbage after separation without incinerator. In case of Trinidad, the treatment condition is not clarified yet.

(3) Ex. CS–Hospital (Ex. CS-Hospitals 3 de Noviembre San Ignacio, Henrry K. Beye San Joaquin, and San Ramon)

1) Outline of Ex. CS-Hospital Operation
   Ex. CS-Hospital 3 de Noviember San Ignacio does not have the specific medical service department, but the other 2 Ex. CS-hospitals have the department of internal medicine, surgery, obstetrics and gynecology, pediatrics, and dentistry. Total bed numbers of San Ignacio, San Joaquin, and San Ramon are 12, 10, and 7 respectively.

2) Building Condition
   Total floor areas of the buildings of Ex. CS-Hospital San Ignacio, San Joaquin, and San Ramon are approx. 270 m^2 with single floor. Regarding the building main structures, San Ignacio has the reinforced concrete frame with brick wall, and the other 2 CS-hospitals are supposed to have the brick masonry structure. In case of San

Joaquin and San Ramon, they will move to the newly built buildings. The building scale of these new ones is not so much larger than the existing ones (San Joaquin: approx. 370 m^2, San Ramon: approx. 248 m^2, refer to Figs. 4.18 - 4.19). The implementation schedule of their medical equipment installation is not determined yet.

3) Utility Conditions

a. Electric Power Supply

The electric power of single phase 220V/50Hz is supplied to the Ex. CS-Hospitals, and in case of San Ramon, 3 phase 380V/50Hz is supplied to the hospital. Henrry K. Beye San Joaquin and San Ramon are equipped with small type generator (3.5KVA/50Hz, and 7.5KVA/50Hz respectively) while 3 de Noviembre San Ignacio does not have a generator system. These 3 Ex. CS-hospitals does not have any serious problem caused by electric power failure.

b. Water Supply

Water supply system is different from each other within these 3 Ex. CS-Hospitals, i.e. 3 de Nov. San Joaquin uses basically the reserved rain water, Henrry K. Beye San Joaquin can use city water, and the San Joaquin is equipped with a shallow well (depth: 8m) too. San Ramon uses city water. Only Henrry Beye San Joaquin is experiencing water shortage, but other 2 CS-Hospitals do not have such a problem. 3 de Nov. San Ignacio and the San Ramon have the water purification system, but Henrry K. Beye San Joaquin is not equipped with such an apparatus.

c. Telecommunication System

Regarding the telecommunication system, only 3 de Nov. San Ignacio has telephone line, but other 2 CS-Hospitals are using radio telecommunication system (BBS).

4) Waste Water and Garbage Treatment Condition

a. Waste Water Treatment

"Septic tank" and "seepage pit" are used as a wastewater treatment system.

b. Garbage Treatment

These 3 Ex. CS-Hospitals are keeping their own "garbage dumping pits" as garbage treatment facilities, and they burn the supposedly contaminated garbage on site without any specific treatment such as sterilization by autoclave or incinerator.

(4) Health Center (CS and PS)

1) Outline of CS and PS Operation

Almost all regular CS and PS do not have the specific medical service department, but a few CS and PS can provide the medical service of dentistry and pediatrics. Usually CS/PS in the urban area are not equipped with beds for inpatient treatment, but it was confirmed that approx. 40 percent of CS/PS are equipped with 1-4 beds in the rural areas in Cercado, Moxos, and Vaca Diez. As to the operation/ management, approx. 37% of CSs/PSs (13 units out of 18 regular CS and 17 PS) are operated by only 1 auxiliary nurse without doctor or nurse mostly in the rural area in Moxos and Mamoré. In such condition auxiliary nurses devote themselves to treating approx. 8 – 700 patients a year. Regarding the facility scale, the biggest health center confirmed in the target study area is CS-Central in Trinidad (Cercado) followed by CS-Conavi in Riberalta (Vaca Diez). Personnel allocations in these 2 CSs are less than an ex. CS-Hospital, but their annual patient numbers are considerably large (CS-Central: 9,815 persons, CS-Conavi: 10,639 persons in 2000). Organization charts of CS in

Trinidad and PS in Guayaramerín are shown in Figs. 4.20 – 4.21.

2) Building Condition

CSs and PSs have various types of buildings (Refer to Fig. 4.22), and mostly their total floor areas are between 70 m^2 to 200 m^2 with 1 floor. But extraordinarily small floor areas were confirmed in PS-Puerto Almacen (37 m^2), PS-Loma Suares (15 m^2), CS-Santísima Trinidad (40 m^2), CS-San Joaquin (in Guayaramerín: 32 m^2), and PS-Candelaria (48 m^2). The "reinforced concrete frame and brick wall structure" or the "brick masonry structure" are dominantly used as the main building structure, but wooden structure is adopted in a few cases (Santisíma Trinidad, and Tumichucua).

3) Utility Conditions

a. Electric Power Supply

It was confirmed that the regional characteristics exist in the electric power supply. In Cercado and Mamoré Province, almost all CSs/PSs units get the electric power of single phase 220V/50Hz, but in Moxos, 80% of CSs/PSs (8 CSs/PSs out of 4 regular CS and 6 PS) are not connected to the electric power supply system, and in case of Vaca Diez, approx. 36% of CSs/PSs (4 units out of 6 normal CS and 5 PS) do not receive the electric power supply. Furthermore almost all CSs/PSs are not equipped with generator, but it was confirmed that the power generation system by "solar panel with battery" is introduced to 8 CSs/PSs at least to operate their "radio telecommunication devises". In most cases, the solar panel size is approx. ^{W}1m x ^{L}1m, therefore its capacity is enough for the radio system, but not for other medical equipment such as refrigerator.

b. Water Supply

Approx. 50% of CSs/PSs is getting water from a well without chlorine sterilization. The average well depth of these CSs/PSs is approx. between 30m to 50m, but there are a few extreme cases, i.e. 7-12m (CS-S. Javier, CS-S. Lorenzo, CS-S. Francisco, PS-Montegrande, PS-S.R. de Vigo, and PS-R. del Yata), 15-20m (PS-P. Almacen, PS-L. Suares, and PS-C. Esperanza), and 89m (CS-Casarabe). Several CS/PS in the urban area of Trinidad (Cercado), Riberalta and Guayaramerín (Vaca Diez) can use the city water. Almost all CSs/PSs are not equipped with "water purification system".

c. Telecommunication System

Several CSs/PSs in the urban area of Trinidad and Riberalta are equipped with telephone, but the "radio telecommunication system" is dominantly used in the rural areas (approx. 40% of all CSs/PSs) especially in Moxos and Mamoré.

4) Waste Water and Garbage Treatment Condition

a. Waste Water Treatment

"Septic tank" and "seepage pit" are dominantly used in CSs/PSs (at least 50%). "Pit latrine" is used at 2 PSs (Candeleria and Peña Amarilla), and 2 CSs/PSs (Santísima Trinidad and Santa Rosa de Vigo) are not equipped with the wastewater treatment facilities.

b. Garbage Treatment

CSs/PSs located in the urban area of Trinidad (Cercado), Riberalta and Guayaramerín (Vaca Diez) can benefit from the "public garbage collection service" (17% of all CSs/PSs), but largely, "dumping to garbage pit" and "burning" are dominantly adopted. "Supposedly contaminated garbage" is usually collected by public service, dumped or burnt in the sites without any specific treatment.

(5) Medical Boat

1) Outline of Medical Boat Operation

CARITAS-Beni and EPARU are operating their medical boats for medical consultation and health management along the Mamoré River. CARITAS-Beni started this type of medical service since 1992 by a 18.5 tons of wooden launch (refer to Fig. 4.23). This service is usually carried out by 7-8 members (1 doctor, 1 dentist, 1-2 nurse/auxiliary nurse, and 4 crew members: now ITEM is allocated to 1 auxiliary nurse) in the shift working of 1 month (20 days' medical service and 10 days' launch maintenance). Sometimes, extension service is conducted by a small boat to the communities where the medical boat cannot directly access. Its health activity includes vaccination (EPI), growth monitoring (weight, height, nutritional assessment, simple internal examination), prenatal care (weight, internal examination, auscultating fetal heart beat), tetanus immunization for pregnant women, yellow fever immunization for all ages. Also, health consultation and diagnosis, simple medical prescription are undertaken. Apart from medical activities, health promotion program is conducted in each community in their covering area by audio-visual apparatus and flip charts, and the program's themes include family planning, infant nutrition (weaning is not introduced), lectures on alcoholism and domestic violence. The medical boat has functions both as medical care extension and public health center. CARITAS medical boat receives approx. 30 patients per day. The doctor's salary is approx. US$ 400/ month, while mechanics are paid approx. Bs. 850/ month.

2) Launch Condition

The outline of CARITAS-Beni medical boat is shown as follows.

1. Date of launching:	May 12, 1992
2. Vessel name:	"CARITAS"
3. Registration number:	CPVD-148/92
4. Vessel body material:	Wood
5. Total length/ Width:	16.00 m/ 3.85 m
6. Height:	3.5 m
7. Tonnage (net):	18.5 ton
8. Total tonnage:	44 ton
9. Engine:	MWV 120 HP.

3) Utilities Condition

a. Electric Power Supply

Diesel generator, portable type generator, and solar power panel with battery

b. Water Supply

Supply network of river water (miscellaneous use, i.e. water closet and shower)

c. Telecommunication System

Radio telecommunication system (SSB)

4) Waste Water and Garbage Treatment

No treatment for wastewater (direct discharge to river). All garbage is packed into plastic bags and transferred to the base office during landing time.

5) Others

Outrigger boat with cabins (approx. ^{W} 3m x ^{L} 10m), Aluminum boat with outboat engine.

4.3.3 Medical Equipment

Existing conditions of the medical equipment in 5 hospitals and 38 health centers were examined on 4 items, namely, i) general medical equipment, ii) laboratory equipment, iii) advance equipment, and iv) washing/ sterilization equipment. Each item includes the concrete medical equipment shown as follows.

i) General medical equipment:
weighing scale, height ruler, stethoscope, sphygmomanometer, examination, table, delivery table, infant incubator, nebulizer, ambulance, motor cycle
ii) Laboratory equipment:
refrigerator, freezer, microscope, centrifuge, blood cell counter, water distillatory, spectrophotometer, hot air oven
iii) Advance equipment:
x-ray apparatus, echo, EEG (electro encephalograph), ECG (electro cardiograph), patient monitor, artificial respirator
iv) Washing/ sterilization equipment:
high pressure steam sterilizer, laundry machine

Before talking about medical equipment kept by hospitals and CSs/PSs, it is worthwhile to note that almost all medical equipment appear to have passed their service life, for instance, it is easy to find equipment manufactured in 1970's. Outline of the existing condition of medical equipment is described in conformity with above mentioned classifications.

(1) Hospital German Busch

Hospital German Busch is abundant with various type of medical equipment, i.e. this hospital is keeping almost all general medical (excl. infant-incubator, delivery table, and motorcycle), laboratory, advance (excl. echo), and washing/ sterilization equipment. Regarding the condition of Hospital Riberalta, it is not equipped with some type of general medical equipment (infant incubator, nebulizer, ambulance, and motor cycle), and it has only refrigerator, microscope, centrifuge, and blood cell counter as their laboratory equipment. X-ray apparatus and echo are kept as its advance equipment. None of the washing/ sterilization equipment exists in this hospital. Equipment data on Hospital Guayaramerín was not confirmed.

(2) Hospital Materno Infantil

Hospital Materno Infantil Dr. Jesus Vargas-Trinidad is the No. 2 hospital in Beni Prefecture, but it does not have some part of the general medical equipment such as nebulizer, ambulance, motor cycle, and a lab equipment (freezer), and some part of advance equipment such as EEG, ECG, patient monitor, and artificial respirator. Hospital Materno Infantil Reidun Roime-Riberalta possesses selected general medical equipment, and refrigerator and echo (lab equipment).

(3) Ex. CS-Hospital

The medical equipment kept by Ex. CS-Hospital is generally limited to some part of "general medical equipment" and "laboratory equipment", i.e. weighing scale, height ruler, stethoscope, sphygmomanometer, examination table, delivery table, vehicle (ambulance or motorcycle), microscope, centrifuge, and blood cell counter. But in case of Ex. CS-Hospital 3 de Nov. San

Ignacio, the hospital has refrigerator, spectrophotometer, hot air oven, and laundry machine with the exception of above mentioned condition. Ex. CS-Hospital San Joaquin and San Ramon are keeping x-ray apparatus, but it is out of order now.

(4) Health Center (CS and PS)

Generally speaking, medical equipment kept by regular CSs and PSs is limited to several items out of the general medical equipment and the laboratory equipment, i.e. weighing scale, height ruler, stethoscope, sphygmomanometer, examination table, and refrigerator. However, approx. 30% of CSs/PSs (8 CSs and 2 PSs) are using a motorcycle for their extension works, and many CSs/PSs in Vaca Diez Province are keeping microscope. Regarding CS-San Francisco in Moxos, it is keeping not only some of the general medical equipment but also freezer, microscope, centrifuge, blood cell counter spectrophotometer, and hot air oven. Furthermore, CS-Conavi in Vaca Diez (Riberalta) has some pieces of general medical equipment, and refrigerator, microscope, centrifuge, and blood cell counter.

4.3.4 Operation and Maintenance of Health Facilities and Equipment

Regarding the maintenance work for the facilities and equipment, all of the hospitals and CS/PS are suffering from difficulties of budget shortage. Therefore, it is necessary to introduce the appropriate financial system, and education/ training system for the maintenance works as mentioned in a later chapter.

(1) Operation/ Maintenance of Facilities

1) General Hospital and Mother and Child Hospital
It was confirmed that only 1 hospital (Hospital Materno Infantil Reidun Roime-Riberalta) allocates 1 personnel to the facilities maintenance works. The budget for the maintenance works is strictly limited (e.g. German Busch: no budget, Materno Infantil Riberalta: Bs. 7,500 in 2000), but these hospitals carry out the following works every year, i.e. "re-painting of exterior/interior wall", "replacing broken window glass", "repair of broken door/ door-hinges", "repair of broken roof", "replacing broken lamp", and "repair of broken faucet or water piping connection". Regarding the annual expenditure for facilities maintenance, it was confirmed that the expenses in Hospital Riberalta and Materno Infantil Riberalta are relatively high in 2000, i.e., Bs. 30,000 and Bs. 22,560 respectively, but these expenses were applied mainly to the expenses for the new hospital building construction or the preparation/ planning for new building.

2) Ex. CS-Hospital
2 Ex. CS-Hospitals (Ex. CS-Hospital Henrry K. Beye San Joaquin and San Ramon) allocate 1 personnel to the facilities maintenance works. The budget for the maintenance works in the Ex. CS-Hospitals are also very limited (e.g. San Ramon: Bs.0, San Joaquin: Bs. 11,000), but they carry out the same maintenance works as hospitals mentioned above every year. In case of Ex. CS-Hospital San Joaquin, as it is mentioned above, its expenditure for facilities maintenance works in 2000 is Bs. 11,000, but this expense included the expense for its new building construction.

3) Health Center (CSs and PSs)
Seven units out of 18 regular CSs and 17 PSs allocate 1 personnel to the facilities maintenance works, but approx. 37% of CSs/PSs cannot carry out such works. The annual maintenance works are limited to "repair of broken door/ door-hinges",

"repair of broken roof", "replacing broken lamp", "repair of broken faucet or water piping connection". It was confirmed that almost all CSs/PSs except a few CSs did not spend any money for facilities maintenance works. The exceptions were CS-San Vicente (Bs. 300), CS-Central (Bs. 2,700), CS-Pueblo Nuevo (Bs. 300), and CS-Conavi (Bs. 1,820) in 2000.

(2) Operation / Maintenance of Equipment

Basically, doctors, nurses and lab technicians do not have enough knowledge on the basic technique on maintenance and repair of medical equipment, and they do not have the capabilities to identify the machine trouble even in case of simple situations. And the scarcity of technically qualified personnel is experienced constantly in Beni not only in the health unit but also in the municipalities. Therefore, once a sophisticated electronic medical machine becomes out of order, it is left idle.

However, in case of general hospital, mother and child hospital, and ex. CS-hospital, they spend some amount of money for the maintenance of medical equipment (approx. Bs. 2,500 – Bs. 5,000). The major part of these expenditures is applied to the maintenance cost for vehicles (ambulance or motorcycle for medical extension). Many CSs and PSs did not spend any money on equipment maintenance, and the maximum amount in 2000 was only Bs. 1,600 (CS-Central).

Regarding Hospital Riberalta and Materno Infantil Riberalta, the total amounts of expenditure for equipment maintenance in 2000 are extremely high, i.e. Bs. 18,000 and Bs. 12,000 respectively. These high expenses are supposed to be the costs for new equipment procurement or procurement preparation.

4.4 Medicine Supply Logistics

(1) Situation Analysis of Drug logistics

Medicine dispensing is operated separately from medical practice in Bolivia. Within the system of medicine dispensing, four main problems are found in the institutional aspect, supply route, marketing system and drug usage in the treatment.

(2) Institutional Aspect

The national pharmaceutical regulation system is not fully developed in Bolivia. Most of the developed countries have a standard medicine list to protect national pharmaceutical products and to stabilize the market. Recently there is a movement to standardize medicine and an official medicine guidebook has been published such as “Formulario Terapeutico Nacional”. However, legal regulations over medicine import from neighboring countries is not strictly followed, and consequently, domestic production of medicine tends to be suppressed. This in turn accounts for difficulty in drug price control.

(3) Supply Route

Sources of drugs are national production, imports, donation (e.g., vaccines, ORS, vitamins) and contraband. In order to proceed with the purchase of drugs for amounts more than Bs. 100,000, the social security system and public sector must hold a public tender. CEASS (the supplies provisioning center of the MSPS) purchases drugs below the ceiling price set forth

by the MSPS. As a result of the decentralization, MSPS and social security reduced their direct purchases from the drug market. By way of direct public tender through CEASS, MSPS makes purchases from local/ international suppliers for the regular activities of specific programs. The CEASS is the MSPS' logistic arm in charge of the procurement and distribution of the drugs needed for throughout the country. Consequently, PSs and CSs generally have a minimum stock of essential drugs. From a quantitative point of view, the drug market represents a sum equivalent to US$ 104 million in 1998, of which the public sector accounts approximately 19% and private sector 81% (see Fig. 4.24).

In general, the quality of storage and transportation of drugs satisfy the international standard. Necessary quantity of medicine supply through the market is fulfilled. The only problem lies in the physical and financial access. Most of CSs/ PSs have a route to supply medicine by the SBS nationally or through donation by NGOs. Revolving fund is practiced by NGOs but this rotation for demand and supply is too small-scale to cover the area. CSs and PSs rely their procurement of medicine on each municipality, for their revenue from patients does not cover the cost. Accordingly, this system depends on the municipality only, and there is no monitoring criteria.

(4) Drug Marketing System

In per capita terms, annual expenditure on drugs was around US$ 13 (1998). The SBS provides free service for target groups such as children under five years of age and pregnant women, and meets the needs of a majority of the poverty group.

Despite the effort according to the national regulation to standardize and to minimize the drug expenditure for households, there is no control of buyers for rising prices in the process of drug purchasing from the market. Especially in rural areas where scarcity of drugs is observed due to long distance from the central wholesalers/ pharmaceutical companies in the city, there are not many options for obtaining drugs of adequate quality and optimal price for end users.

Due to the limited resources or unreasonable purchasing of drugs, not only end users but also first level medical facilities suffer from lack of basic treatment and procurement. Municipality and SEDES have not paid enough attention on the distribution of drugs from SBS and pricing in the pharmacy.

(5) Drug Usage in the Treatment

Selection of drugs is dependent on preference and technical levels of each doctor, though there is an official guideline "Formulario Terapeutico Nacional". In one instance, strong antiviral drug was given to a patient without any confirmation by objective examination after reading an academic article on the appearance on multi-drug resistant virus. Regarding infectious diseases, viral infection is addressed by the EPI program only. The reason for the small consumption of viral medicine is high cost, though bacterial infection is the mainstream for infectious diseases. Diarrhea and ARI show still the highest number of incidents and their treatments are covered by essential drugs recommended by WHO. However, the effort is not made to trace diseases to infectious origins and sensitivity for drug resistance of virus. Hence the prevention strategy for such diseases is weak in case of the appearance of drug resistant virus or exotic infection.

4.5 Community Health

Community Survey, Health Seeking Behavior Survey and Nutrition and Major Illness Survey were conducted in the study area. Twelve communities were selected for this survey: Nueva Trinidad, Casarabe, San Pedro Nuevo (Cercado), Villa el Carmen, San Jose del Cabito, Santisima Trinidad (Moxos), San Ramoncito, Santa Rosa de Vigo, Buena Vista (Mamoré), El Cerrito, Tumichucua, and Cachuela Esperanza (Vaca Diez) (See Fig. 4.25 & Table 4.17). Infrastructure (i.e. eitric power supply, telepheone line, water supply, road, garbage collection service and waste water treatment) conditions in the communities are shown in tables 4.18-4.22.

4.5.1 Community Survey

A questionnaire survey to households was conducted to understand socioeconomic and cultural environment, medical/ health perceptions and practices of the population, and to identify issues and ways to address problems in relation to the community's health and medical situation. Two to three households were interviewed in each community, totaling in 28 samples.

(1) Socioeconomic Aspect

The size of interviewed households ranged from 1 person to 12 persons, the majority consisting of 6-8 persons (50%). The overall monthly household income (Y1) ran between Bs. 100 and Bs. 4,170, with the lowest echelon (Bs. $100 \leqq Y1 < 300$) counting for 18%, the middle (Bs. $300 \leqq Y1 < 700$) for 43%, and an exception of one household earning Bs. 4,170. Per capita income (Y2) has a range between Bs. 13 and 500 monthly. The lowest echelon (Bs. $10 \leqq Y2 < 50$) occupies 25%, or 43% if we add the second lowest echelon of Bs. $50 \leqq Y2 < 100$, the highest (Bs. $400 \leqq Y2 < 500$) is 11%, and the average Bs. 142. According to the Departmental Socioeconomic Development Plan (PDD), the provinces of Moxos and Mamoré suffer higher poverty incidence while Vaca Diez and Cercado have lower poverty rate in the Department. Poverty translates to higher rate of illiteracy, infant mortality, unemployment, houses built with inadequate materials, and lower coverage of basic services, health and education. Sources of income in the 4 provinces are diverse, though agriculture/ fishing/ cattle raising was the most frequently given response (11 households), followed by teaching (8 households). In Beni, 39.8% of the economically active population engage in agriculture/ livestock raising/ hunting/ fishing, consisting the major industry of the Department (*Censo '92 Beni Resultados Finales*, INE, 1992). Other main industries are social and personal services (24.8%, ibid.) and manufacturing (12.6%, ibid.), the configuration of which without a major contribution of the informal sector is somewhat dissimilar to that of a city in a typical developing country.

(2) Sanitary Conditions

With one exception, all households had own latrine facility. It is suspected, however, that this does not automatically translate to universal *use* of the facility. Most latrines were observed to be a simple pit with wooden seat, and waste was not treated. This has both health and environmental implications, and requires further attention. As to concern over water, 64% (18 households) said they did not boil water for cooking, mostly because they do not have the habit (16 households). Considering their consciousness that water and sanitation is critical in maintaining health (see below), however, more complex impediments to water boiling may exist. The impact of this lack of habit can be further clarified by the result of water quality

analysis (see Chapter 6).

(3) Health Conditions

Fifteen households (53.6%) told they had one or more illness case(s) in the past week, 9 out of which resorted to public health service. Reasons not to use health service include high cost, inaccessibility, lack of trust, unavailability of service. Although high cost was given as a hampering factor, the interviewees are not unwilling to pay for adequate services (see below), and this is a point of consideration in designing what services should be available at what cost in a given locality. Lack of trust, on the other hand, implies that a person may not want to see the medical personnel for social, cultural and personal reasons. In Santisima Trinidad, women told that they were reluctant to go to the health facility, for there were no female staff. This may seem highly locally specific, but general consideration on socio-cultural aspects of the population should be given. For example, the attitude of a health facility staff coming from outside of the community needs to be locally adaptive, and the gender of the staff may be reconsidered for ease of access.

When asked who to turn to for consultation in cases of illness, pregnancy and delivery, responses were widely dispersed amongst family members, neighbors and medical personnel. This can largely depend on the local availability, but some tendencies may be inferred. For illness of family members, medical doctor (9 responses), nurse (8) and family members (8) were the most favored choices. As to pregnancy (prenatal care), respondents chose medical doctor (13), nurse (9),TBA (*partera*) (4) and family members (4) over other choices. In case of delivery, medical doctor (20) outnumbered by far, followed by TBA (12) and nurse (5). A closer look at individual choices reveals that rural dwellers opt for TBAs more than their urban counterpart. This is probably indicative of easier access to trained medical personnel (doctors and nurses) in the urban areas. However, choices of traditional and western health services do not exclude each other. For instance, an individual who consults a medical doctor or nurse for illness frequently go for a TBA for pregnancy and child delivery. The difference perceived in urban and rural areas does not seem sensitive to economic factors. Households of all levels of income use traditional and western medicine alternately. It is also worth mentioning that 70% of respondents told that they use traditional medicine, and named extensive varieties of herbs. House remedy (*remedio casero*) is an integral part of people's health resources, and should be taken into account in understanding their health seeking behaviors (See Table 4.23).

Common sickness includes ARI and ADD; the emphasis given in resource allocation to address these diseases must be maintained. Given the prevalence of such sickness, people consider improvement of health conditions requires increase in medical personnel and facilities, improvement of existing facilities and services, improved diet, improved sanitation, potable water availability and improved income.

(4) Food Intake

Most (96%) of the interviewed households have 3 meals a day. Meals are usually cooked by women, i.e., mother/ wife or both mother and daughter. Ten households (37%) out of 27 told that they have problems in preparation of meals. Problems encountered were food quantity (in the household), shortage of food in the community, and lack of fuel. A rough 24-hour food recall was conducted, in which carbohydrate (rice, pasta, and bread) was found to be the mainstay of diet. Thirty-six per cent did not have any protein (meat, fish or eggs), and only

12% had vegetables. Though a closer look at food preferences and accessibility is required, food choices may be nutritionally enhanced within financial limits.

(5) Public Health Services

More than half of the interviewed households (57%) told that they knew SBS, leaving a significant 43% without the knowledge. Most negative answers fall in the rural area. Amongst those who were familiar with the SBS, the sources of information were health facilities, health personnel, and radio/ TV. These can be considered as useful means of communication, but their limitation should be analyzed and overcome by revised or novel means. As to what of the SBS people know, most mentioned services catering either children or pregnant women, or both. The gratuitous nature of the service was also frequently mentioned, but did not suggest universal awareness. For the SBS to be effective to its full extent, the beneficiaries need to be better informed. However, public health service in general is well utilized, though 26% (7 households) said they did not use such service. Reasons for not using include lack of facilities, lack of transportation. The obvious implication is that a wider coverage of public health service can be induced by improved accessibility. The interviewees suggested that the public health service may be improved if the followings are achieved: (a) increased number and quality of health facilities, medicines and equipment, (b) immediate and improved care, and (c) positioning more permanent medical personnel.

People's willingness to pay for public services has been confirmed. With a few exceptions, most are willing to pay for services of consultation, hospitalization, dentistry, medicines, and laboratory tests. For a diarrhea treatment, a majority of respondents (40%) are willing to pay between Bs. 5-10, followed by Bs. 11-20 (24%), more than Bs. 20 (20%), and less than Bs. 5 (16%). It has been observed, however, that payment in kind (products) is very common in rural areas where cash is not an integral part of the economy: Willingness itself does not generate hard currency. This lack of cash should be taken into consideration in the operation of health facilities. Experiences of NGOs and other religious organizations operating in remote areas with more flexible mode of payment may be useful. In brief, people expect public health services to be: (a) within accessible vicinity, (b) with adequately equipped facilities, (c) socially and culturally accessible, (d) with readily available personnel, and (e) financially reasonable.

4.5.2 Health Seeking Behavior Survey

A questionnaire survey to visitors at health facilities was conducted to understand health/ medical knowledge, belief, decision-making, practice and constraints over health resources (KAP) in the 12 communities as in the Community Survey (See Fig. 4.25 & Table 4.17). Some 70 randomly selected visitors were interviewed, 4-5 each at hospitals, CSs and PSs in the communities.

(1) Health Seeking Behavior

When asked what resources to resort to first in case of illness, most common response was home recuperation, followed by visit to health facilities. However, it was discovered that people also utilize home medicine and traditional medicine extensively, and to a lesser extent, rituals. Conditions on which people make choices for use of such health resources are not evident, but assumed to be complex as accessibility and desirability of each option vary in each case. It is useful, however, to note that public health service needs to be situated amongst

multiple options. For the public health service to be optimized in the Pilot Study, analysis of the demand side (health-seeking population) should include (so as to establish the baseline for monitoring):

a. Physical and financial accessibility of health facilities in the community (means, time and cost of transportation)
b. Disease structure of the community
c. Social, cultural and personal accessibility of health facilities (general perception of the available health staff's attitude and aptitude)
d. People's expectation for public health service
e. People's knowledge on what is offered at the health facility
f. Presence of adverse and/or effective health practices

Sixty-six per cent of the respondents told that they stock medicines at home. Commonly reserved drugs are antipyretic, painkiller and first aid kit. Only 3 mentioned ORS. Reasons for not stocking any were (a) preference of on-demand purchase, (b) no habit, and (c) unaffordability. Minimum stock of basic drugs may help prevent complication of common diseases, such as ORS for diarrhea, especially where public health service is not easily accessible. The SBS has the capacity to introduce such home care with free-distribution of its designated medicines. Almost all of those who keep medicines at home asserted that they have the knowledge of their use, and named most frequently doctor and nurse for the source.

Although the question if they prefer traditional remedy to "modern" medicine (without clear definition of either category given) may seem ineffectual when people's perception do not necessarily have the two options incompatible, it has some implications. The answers almost split in half, but slightly more favorable to traditional medicine. Interestingly, "reliability" was the most frequently chosen reason for both choices. Somewhat tangible regional differences were observed, in which Cercado and Moxos were inclined towards traditional medicine, and Vaca Diez and Mamoré the contrary. It is also worth mentioning that in Cercado and Moxos, ethnic identification was more articulated than the other two provinces.

(2) Health Facility Use

Access to the health facility in both dry and rainy seasons was interrogated. A majority of interviewees (81%) walked to the facility at the time of interview (dry season), most of whom (73%) told that they would also walk in the rainy season. Boat and/or canoe users were only found in Mamoré and Moxos. Others used car, motorcycle or horse. Some chose different means of transportation for dry and rainy seasons, most remarkably a few interviewees in Moxos and Mamoré, where walking was replaced by boat/ canoe in the rainy season, raising significantly the cost and time of the journey. Particular health facilities that showed a wide difference of accessibility in rainy and dry seasons are CS San Lorenzo in Moxos, PS Montegrande in Moxos, PS Fatima in Moxos, Hospital Henry K Beye (San Joaquín) in Mamoré, and CS Guayaramerín in Vaca Diez. All these facilities were found to be harder to reach in the rainy season. However, considering that the survey took place in the dry season, most interviewees are assumed to be from areas more accessible in the dry season.

Over 80% spent less than 30 minutes to reach the health facility in the dry season. The proportion remains almost the same for the rainy season, but the composition of the rest change dramatically. In the dry season, 7.4% would spend 30-59 minutes and 9.3% between 1 and 3 hours. None spent more than 3 hours. On the other hand, 2.2% would spend 3-6 hours

in the rainy season and 8.9% more than 6 hours. These data need to be interpreted with caution, however, as the water could be accountable for both ease and impediment of transportation, depending on the region. Also, the interviewees were those who reached the health facilities; it is not understood from this survey how many could not.

Decision making over use of health facilities were undertaken notably more by wife/ mother (77%), than husband/ father (23%). The implication here is that it would be more efficient to direct information related to health services and practices to women.

The purposes of the visit were consultation (73%), purchase of medicines (15%) and re-treatment (12%). Almost all (68 out of 70 respondents) were informed by the medical staff of treatment or drug use. Also a significant majority (66 respondents) were satisfied with the treatment they received. However, when asked of unsatisfactory factors in the service, 79% mentioned waiting time, while 12% referred to the attitude of the staff. It is suggested that for some who spend a significant amount of time simply to reach the facility, it is an additional investment of time to wait before they can accomplish their end of visit. This may refer to the undersupply of services, i.e., shortage of attendance hours or days, or lack or shortage of ITEM (thus of personnel).

As regards referral, 38% of respondents have been referred to an upper level facility in the past, out of whom 48% followed the recommendation. The reasons for not following the referral were transportation cost (71.4%), treatment cost (28.6%); it is obvious that the burden of travelling is a major impediment.

(3) Medical Knowledge

Approximately 38% of respondents reach health-related information through health facilities, followed by radio/ TV (29.4%) and community meetings (18.8%). Eighty-nine per cent make the effort to obtain such information, and 98.5% find them useful for their everyday life. Health communication has much potential if effective channel and targeting are employed.

4.5.3 Nutrition and Major Illnesses Survey

A survey on nutrition and major illnesses was carried out with 550 interviewees in 12 communities of the 4 provinces of the study (See Fig. 4.25 & Table 4.17), with the objective of knowing people's perception concerning illnesses, nutrition and certain health-related habits. Of total, 359 surveys (64%) were carried out in urban areas; the rest in rural areas. Ninety-nine per cent of those interviewed were women; 90% of total knew how to read and to write in Spanish.

(1) Food Consumption

In certain questions, reaching precise conclusions from the quantitative point of view has been met with difficulty. However, more than 90% of the interviewees consume mostly carbohydrates (cassava, banana, rice) and scarce proteins (meat, milk, eggs). Fruits and vegetables are relatively less consumed. Processed products, such as oil, are less consumed, with the exception of sugar, which is consumed in all the households. As for the preparation of food, families prefer cooked or fried; very few consume stewed or baked food. The food is mostly directly purchased, and in less proportion, produced within the household. This is characteristic of poor communities with difficulties of economic and cultural access.

(2) Customs and Habits

Thirty-five per cent of the families consume treadmill water, 31% river or lagoon water, 28% faucet water; a smaller percentage takes water of community connection or other reservoirs. Sixty-three per cent drink the water directly without boiling it or any other treatment. Even when people know about the advantages of healthy boiled water, they prefer to drink water just as they obtain it, because they do not find the taste of boiled water agreeable or because it represents an additional expenditure in firewood, gas or other types of fuel.

As for breastfeeding, 93% of the mothers pointed out that they have breastfed their children. Thirty-five per cent continue for 24 months, 41% for 18 months, and 8% for 6 months. Despite some systematic fault with the investigation, the result manifested that the breastfeeding exists as a cultural habit perceived as positive for the children and for the household economy, beyond the efforts of the health services to promote.

(3) Perception on Medical Treatment and Illnesses

In general, 80% of the interviewees feel that they were treated correctly when they attended the health service, which was translated in an effective resolution of the illness or related problem. Twenty-seven per cent was diagnosed of anemia at some point, and 30% of underweight.

As for the illnesses they perceived they had at the time of the interview, 31% named anemia and 73% said they felt uneasiness. As for other illnesses, chills, diarrhea, fever, severe cold and pain were specifically mentioned. The results are as follows.

a. Chills: 65% of the interviewees, monthly average: 1.4 times
b. Diarrhea: 57% of the interviewees, monthly average: 1 time
c. Fever: 67% of the interviewees, monthly average: 1.4 times
d. Severe cold: 70% of the interviewees, monthly average: 1 time
e. Injury: 63% of the interviewees, monthly average: 1.2 times

The most frequent illnesses were investigated, according to their perception of children under 5 years. Acute diarrheal diseases, acute respiratory infections (flu, coughs, bronchitis, etc.), fever, parasites and vomit predominated. The illnesses mostly perceived in adults were: malaria, diverse pains (especially head and stomach aches), anemia, diarrhea and rheumatism.

4.6 Health Information System (SNIS)

The health information system in Bolivia is called SNIS (Subsistema Nacional de Información en Salud). The SNIS was established by the Ministerial Resolution 1022 (December 6th, 1990), which is the only official informatio system. Because various information systems have been implemented, they should be gradually integrated into SNIS. A division of SNIS was structurally created under the National Planning Direction.

A set of textbooks called “Systematizing Guides” and the first version of software necessary for improving information quality in decision-making was developed from 1990 to 1998.

The SNIS is defined from two points of view:

The SNIS functions as a part of the Statistical National Information System, which is responsible for the development of statistical data regarding Management, Epidemiological Surveillance and Administrative SNIS Registration. And the indicators are as follows.

- For the Management (Input, process, impact of decision makers activity)
- For the Epidemiological Surveillance (Morbidity, mortality and risk factors)
- For the Administrative SNIS Registration (Collecting and processing of data)

In programmatic terms, the SNIS is for systematizing, consolidation, feedback and analysis of the information concerning:

- The administrative and technical processes that are carried out in the health services
- Behavior and risk factors that affect national epidemiological conditions
- The situation of the Bolivian population's health

Currently the Supreme Ordinance 25233, Article 5, Item C, transfers the responsibility of SNIS directly to SEDES. Article 9, Item E, identifies as "Attributions of the Technical SEDES Director", to collect, to process and to diffuse information for the construction of indicators and health standards, for planning, and that it allows to sustain the decision making process at the departmental and national levels, in the frame of the norms and procedure of the National SNIS.

During 2000, the Systematizing Guides and forms for information were redesigned adapting to the current information necessities. In the same way, new Software named SNIS II, more versatile and easier to handle, was developed in its second version.

The implementation of the new instruments of the SNIS has begun in 2001, and together with this implementation of the electronic data processing, previous training of the personnel of SEDES, districts and health facilities were revised.

In Beni the objective of the SNIS is "to have appropriate, reliable and useful information in all the health facilities of the 8 districts." It should be pointed out as main achievement that from the year 1997 to 2001 they have been able to organize new office of the SNIS - statistical unit of the SEDES Beni with computers, telephone line and internet access. There is a professional, hired with PROSIN funds that support the training and functioning of the system. At the moment the eight health districts have data processing teams and they have received training.

Among the specific problems detected in the Department the following were listed:

- Only the consolidation form has been implemented.
- Lack of the computerized package for the electronic data processing. In this moment Trinidad SEDES is implementing SNIS processing with computers.
- Work overload exists at the operative levels.
- Lack of feedback and information use at local level.
- Lack of supervision of the region at local level.
- Low coverage of the Social Security.
- Parallel information systems are still used.
- Lack of use of information in the national levels.
- Lack of computerized equipment in 11 municipalities.

- Lack of supply of communication equipment (e.g. radio).

SNIS has been receiving the support of PAHO and USAID. Surveillance has been implemented at all hospitals, CSs and PSs. In this system, the health information (patient name, gender, age, first medical examination/number of consultation, diagnosis, number of vaccination, number of family planning implementation) is recorded in the SNIS form. It gathers health information from the medical facilities and sends to each district office of SEDES monthly. Health information is reported to the Prefecture SEDES after computation. The data output is sent from SEDES to the Ministry of Health. On the other hand, health information is also calculated by INE. This health information is updated every three (3) months in the official homepage. The gathering of the health information from each PS and CS is done manually and on a regular basis. It is calculated by computer at the district SEDES level and it is sent to the prefecture.

Infectious disease surveillance on 15 diseases (flaccid paralysis, measles, tetanus, dengue fever, yellow fever, malaria, cholera, diphtheria, etc.) is conducted by the Ministry. Also, INE is promoting information collection on births and deaths. The collection of data and information is done in PS and CS. However, due to its ineffective implementation and limited cover area for data collection by the CS and PS, the figures are below actuality. It is estimated that the registration of death accounts only for 20% of actual deaths. Therefore, it is necessary to examine the current conditions of health information management, including the surveillance and registration systems, in order to address problems.

The official examination organizations at the national level on important diseases include CENETROP (Centro Nacional de Enfermedades Tropicales). In the laboratory of each hospital and at the prefecture level, accurate identification of important diseases is difficult due to the problem of inadequate facilities and equipment, and the technical level of the staff. CENETROP has received Belgian aid which concentrated on the service of the inspection system of important diseases. At present, the examination system and examination precision are at a high level. On the other hand, CENETROP has been receiving support from USAID since 2002 and started a program of information network system for important diseases, using the Internet. Problems pertaining to launching this program are inadequate facilities and equipment of laboratories at the district level and poor technical level of laboratory examinations. Therefore, it is necessary to improve laboratories in each prefecture and train staff.

Important diseases for health information network are as follows.

a. Diarrhea, Cholera
b. Pneumonias, Tuberculosis, Influenza
c. Meningitis
d. Malaria, Chagas disease, Leishmaniasis
e. Human and animal Rabies, Pest
f. Eruptive and breathing illnesses
g. Dengue Fever, Bolivian hemorrhagic Fever, Leptospirosis, Hanta virus
h. AIDS
i. Cancer cervical of Uterus, Diabetes, Anemia

4.7 Epidemiological Conditions and Surveillance System

4.7.1 Epidemiological Conditions

The department of Beni, located in the upper reaches of Amazon, has in general a relatively flat land, a good part of which becomes submerged in the rainy season despite its altitude well above the sea level. Also the area has subtropical climate, with the average temperature of 26.5°C which harbors muridae insects and reptiles that may cause sanitation problems, contributing to its unique epidemiological condition. Especially prevalent are malaria, yellow fever, dengue, virus hemorrhagic fever, and Chagas disease that are characteristic of subtropical and tropical climate. Chronic malnutrition and/or under-nutrition caused by poverty accounts for commonly observed complication in infants' digestive diseases, measles, chickenpox, rubella (three-day measles), epidemic parotiditis (mumps) that often result in death. Many children die from diseases related to and/or caused by Salmonella, bacillary dysentery, amebiasis, and parasites such as Giardia, Bacillus typhosus. The number of cases by disease and by age group and the incidence rate are shown in Table 4.1.

The official data on the nutritional state of the Beni population faces serious problems in data registration, such as intrinsic limitations seen in any nutritional study (need of surveys, logistic difficulties, height-weight, etc). Table 4.22 shows the malnutrition rate of children under 2 years and 4 years of age.

Other data are not included (for example the relative nutritional state of the pregnant women). In spite of to the given critical poverty conditions, in which most people live, malnutrition is one of the problems in health and life of the people in Beni, also it has a considerable influence on the appearance of diseases.

4.7.2 Treatment

Within infectious diseases, those induced by virus are basically treated symptomatically. An official drug effect book mentions anti-virus medicine such as acyclovir, though use of such is hardly observed. The main reason may be financial, though it is suspected that bacterial infection is considered a larger issue in infectious diseases, which leaves virus infection to be managed mostly by immunization.

Amongst bacterial infections, more serious are digestive infection consisting mostly of diarrhea, and respiratory infection. Both are easily communicated in the area with poor housing environment, especially in terms of excrement treatment and potable water supply, and can be fatal for mal- or under-nourished infants. Basic medicines for such diseases are stocked in PSs and CSs. For digestive infection, a mixture of sulfameoxatazol and trimetoprim is used for dysentery bacillus, ameba, and Giardia. For respiratory infection, medicines similar to penicillin are used. On one hand these are drugs congruent with WHO recommendation, hence reasonable; on the other hand, prevention of diseases triggered by resistant cells and non-endemic bacteria is not very effective, due to lack of research on etiologic agents and monitoring of sensitivity.

As the 1988 report of WHO warns Bolivia against tuberculosis, countermeasures for the disease are emphasized in the surveillance in Beni. Diagnosis of TB is based on expectoration dyeing test, that is, since cultivation test is not undertaken, emergence of resistance cells is not detected. Additionally, some treatments are notably adverse to basic medical principles, and

may even encourage emergence of resistant cells: four-combination dosage was given at the first prescription because multiple drug resistance bacteria were reported in some medical journal. Especially in times of AIDS threat, clinical training in treating such infectious diseases is highly called for.

4.7.3 Surveillance System

One of the most important health activities is the epidemiological surveillance. It requires the organization of a system that collects, consolidate, analyse and interpret the data, for use in decision making.

In Bolivia, the epidemiological surveillance has been implemented with the support from international cooperation, and during the course of the years some vectors have been exterminated, such as Aedes Aegypty (1948), smallpox (1960-1970), measles (1987), and cholera is under control (1998).

From a strict and pragmatic point of view, Bolivia launched epidemiological surveillance in the 1990s. SEDES register patients, in tandem with its implementation of EPI. It is not sufficient in that the observation is made only at fixed points: nonetheless, certain epidemiological trends are understood, which are analyzed and utilized for designing programs to counteract the epidemics. In Beni, however, patient registration is based solely on clinical diagnosis, and virological or bacteriological examination is not an option. This makes the data unreliable and contingent considerably on the capability of physicians, not to mention the drawback in limitation in the number of institutions and patients included in the surveillance system.

4.7.4 Accuracy of Surveillance

As noted above, diagnosis and treatment of infectious diseases in Beni are restricted to clinical diagnosis, which saps the accuracy. With regard to serological epidemiology, CENETROP, a national research institute based in Santa Cruz, is equipped to carry out laboratory diagnosis including areas of immunology, virology and bacteriology. However, CENETROP has little involvement in the Beni department, and has done little research of the area. CENETROP has begun to conduct progressive research activities such as DNA analysis and epidemiology, and is coordinating with the USA's CDC and Belgian Royal Tropical Diseases Institute in studying tissue culture and viruses using CPR. It also has its own clinical division, in which training of clinician and medical researchers is a possibility for Beni's human resources development with respect to infectious disease control. Cooperation with CENETROP in this direction can be undertaken urgently.

4.7.5 EPI

The EPI program which started in the Beni department in 1979 is subnordinate to the epidemiological unit, and is one of the programs with more resources, in relative terms, due to the MSPS's and international agencys' interest. The coverage has been increased progressively in the 1990-1997 period. The year 1998 a decrease was observed linked to the shortage of supply of consumables and syringe due to lack of resources and administrative problems. However, the years 1999, 2000 and 2001 saw a tendency of increase on the coverage.

There was a breakout of measles in 1999, registering 488 suspicious cases, and 104 confirmed cases, though in 2000 the cases decreased considerably. During the years 1999 and 2000, the actions taken in the Beni department were many and diverse with different impacts, amongst them the Campaña Nacional in November and December 1999, achieved a departmental coverage of 98%.

The impact of the program is considered significant, taking into account its educational component in which those who come for vaccination are briefed on such infectious diseases. As seen in other countries, EPI vaccines are supplied by UNICEF, and cold chain is allegedly established. The problem is, however, energy source of cold storage: usually solar battery or natural gas is employed, but poor maintenance of storage cell and/or deterioration of refrigerator were observed, which may contribute to degradation of immunity despite the increase in vaccination rate. It will be necessary to monitor conditions pertaining to cold chain along with other equipment.

As to the yellow fever, in the Beni department the district of Trinindad, Mamoré, Itenez, and Vaca Diez form the endemic area. The existing geographical conditions above mentioned, which constitute an environment favourable to the appearance of enzootic focus when a susceptible human group comes into contact with viral activities, such as the case of the Brazilian nut and latex collectors, loggers and farmers on the new agricultural frontiers.

5 DONORS AND NGO ASSISTANCE IN HEALTH SECTOR

5 DONORS AND NGO ASSISTANCE IN HEALTH SECTOR

5.1 WHO/PAHO

(1) There is no PAHO office in the Department of Beni (coordination with the Headquarters is necessary).

(2) PAHO will be presenting a health plan of Beni Prefecture (mainly focused on capacity building) in December 2001, with which the Study should coordinate. The contents of the PAHO plan include: a. Comprehensive plan, b. Assistance on decentralization, c. Health education, d. Community assistance, e. Nutritional improvement, f. Maternal and child health, g. Disaster support, h. Information system (MIS only), i. Essential drugs.

(3) WHO/ PAHO has an emphasis on malaria and water (collaboration with IDB).

5.2 USAID

List of participants at the meeting on the study progress with USAID is shown in table 5.1.

(1) The annual budget of USAID for 2002 includes training, equipment provision to 2nd level hospitals, supervision and education, fuel for medical boats, and other training equipment for 9 rivers. PL480 will finance a large boat for River Magdalena, but not River Mamoré.

(2) DDCP (Decentralization Development of Citizenship Participation) is launched (in Beni, a *mancomunidad* association was established in the previous week).

(3) Support to NGOs is continued (CARITAS, CIES, PROSALUD, PSI).

5.3 World Bank

List of participants at the meeting on the study progress with the World Bank Bolivia is shown in table 5.2.

1) Health Reform Project, 1st Project
   a. Finance: US$ 25 million
   b. Coverage: 5 departments in Bolivia, Beni not included
   c. Project: EPI strengthening and capacity building in the SBS management

2) Health Reform Project, 2nd Project
   a. Finance: US$ 35 million (salary not included)
   b. Coverage: Nationwide
   c. Project: Rehabilitation and extension of infrastructure, training
   d. “Extensa” (Extension de Cooperación en Salud): A component of the 2nd project to send health professionals to remote areas. Preceding successful examples in Brazil, Mexico and Peru). Emphasis placed on the cultural and geographic accessibility to health services.
      - Increase in payment (doubling) for health professionals appointed to remote areas
      - Employment of health professionals with ability to communicate in the local language

- Training of health professionals in cultural sensitivity, including joint activities with *curanderos* and the community.
- Pilot departments to be determined by the end of October to start in 2002

5.4 UNICEF

List of participants at the meeting on the study progress with UNICEF is shown in Table 5.3.

a. UNICEF is contacting SEDES-Beni for the cold chain program.
b. Major component of UNICEF's activities is EPI, and provision of equipment includes weight scale, solar panels, refrigerator, delivery bed and other delivery apparatus. Depending on local conditions, medicines for asthma and altitude sickness are provided in some cases.
b. UNICEF recognizes Beni department as one of the poorest areas along with Potosi. Prenatal mortality and infant mortality are high, and activities addressing such situations are considered, based upon target figures for indicators to be achieved. Also, vector diseases such as malaria is prominent in Beni, to which some programs are considered. On the Brazilian border, Guayaramerín and Riberalta are considered to have high rate of STD/ HIV, and sexual education and reproductive health extension are being carried out. UNICEF-Bolivia tailors such training and education programs to the local needs.
c. UNICEF especially made an effort in the past to establish SBS in cooperation with the MSPS, for its preceding insurance program was National Insurance for Mother and Child (Seguro Nacional de Maternidad y Niños), established in 1996.

5.5 CIDA (Canadian Cooperation Office)

List of participants at the meeting on the study progress with CIDA is shown in table 5.4.

a. CIDA plans to implement a Pilot Study in Guayaramerín, through SEDES-Beni until 2002. This Study implements a system that assigns consultants and health volunteers to disseminate health service information: the volunteers, in return, are entitled to receive free health service.
b. This system is functioning well, and will continue into its second phase in which Guayaramerín will be divided into four zones.
c. The Canadian government has 3 pillars of assistance: assistance in health through NGOs, assistance in sanitation and environment, and strengthening of national institutions. Canada also provides goods utilizing counterpart funds, similar to Japan's 2KR scheme, including simple equipment and buildings. The counterpart funds amount to US$ 10 to 12 million, out of which US$ 2 million is used for the health sector.
d. Activities in Guayaramerín as described above will be the substantial work. CIDA has no plan to provide equipment to hospitals in San Ignacio.

5.6 Belgium

The government of Belgium assisted the CENETROP from 1994 to 1999. CENETROP was founded in 1974, and the current director is Dr. Alberto Gianella. Assistance from Belgium may not extend beyond 2002, and the continuation of laboratory testing is questioned (the

government will cover personnel cost, and the operational cost can be recompensed from test revenue). Issues of new equipment, training and research activities need to be considered.

(1) Infectious diseases: Epidemiological surveillance system (tropical diseases) is in place for the past 2-3 years. The survey formats are different for each disease, and have been an impediment in implementation. CENETROP conducts training on sampling and survey method at medical facilities. However, CENETROP's service to Beni Department may be inadequate: A sample suspected of tropic fever was sent from Trinidad, but the cause could not be defined and was sent to CDC (Centers for Disease Control and Prevention) in Atlanta, USA.

(2) INLASA, La Paz, functions in: a. Medical diagnosis; and b. Surveillance system cooperation (national lab-network system, to be launched with PAHO). CENETROP will cover Santa Cruz, Beni, Pando, Tarija in this network.

5.7 COOPI

(1) Financed by the Italian government and EU.

(2) Fifteen years of experience in Bolivia, operation in Beni started 2 years ago.

(3) Project in Trinidad by staff of 3 (1 manager, 15 years in Bolivia, 1 doctor, recently arrived, 1 nurse), in cooperation with SEDES. Rehabilitation, equipment provision, supervision, data collection of 19 CSs/ PSs in the rural areas of Trinidad. A study was conducted in the first year of the project, after which 19 facilities were selected. Supervision is conducted quarterly from September, 2001. One-month supervision is conducted with the District authority. Local staff is to conduct supervision (institutional aspect and data collection) of the last (3rd) phase of the program in October, 2001. Human resources are insufficient in the rural areas. Lack of financial and human resources are attributed for lack of medicines.

(4) Problems: Lack of infrastructure/ equipment, lack of human/ financial resources, inadequate health management, scarce access by users, difficulty in prevention/ health promotion, lack of coordination amongst OTBs, municipal governments and other health implementation agencies, excessive transportation cost to PSs in the rural areas.

(5) Solutions

1) Investigation by Health Committee in each municipality
2) Improvement of accessibility
3) Comprehensive coordination among the municipality, Health Committee and OTBs.
4) Training for the improvement of health services
5) Improvement of financial/ operational resources of health services
6) Promotion of basic health services
7) Re-distribution of CSs/ PSs in accordance with population

(6) Recommendation

1) Improvement of infrastructure/ equipment with sufficient human/ financial resources
2) Formulation of a service network through quality information system
3) Adequate supervision and surveillance of services
4) Expansion/ extension of services

5.8 Norway

The Norwegian government, through the Norwegian Evangelic Mission is expanding the Maternal Child Hospital "Roidun Roine" in Riberalta with support from the prefecture of Beni Department and the Mayor's Office of Riberalta.

The construction cost was US$ 1,200,000 (Norwegian Evangelic Mission); US$ 250,000 (Beni Prefecture – FPS); US$ 70,000 (Riberalta Mayor's Office).

The Management organization is comprised of the Surveillance Committee, Hospital Director (Health Council). The designing and the supervision were undertaken by an NGO (The Swedish Free Mission).

The capacity in the maternal child hospital will be expanded, with the result of:

- 30 specialized hospital beds for pregnant women
- 30 specialized hospital beds for children
- 3 surgery rooms
- 3 childbirth rooms
- 1 unit of UTI
- 1 neonatology unit
- 1 diagnosis resolution department
- 1 administrative department
- 1 general services department
- 1 social department and of extension of coverings
- Specialized human resources in the mother and child field and policies concerning this group

The expansion will be completed in December 2001. The operation is expected to be sustainable. The Norwegian government trained the Riberalta Municipal personnel in La Paz, Santa Cruz, and Mexico. The Bolivian government provided assistance in the policies to be followed and the cost of the medical personnel.

The Norwegian Government estimated a budget of US$ 9 million that will be executed in the year 2000. The Beni Department in an exclusive manner will have access to 15% of the amount for the supply of Hospital launch, motorcycles and jeeps, medicines and other consumables.

5.9 CARITAS

(1) CARITAS is a Catholic organization, and has an office in Trinidad.

1) Objectives: Assistance to poorer population, especially strengthening managerial capability of CSs.
2) Funds: Catholic services and PROSIN
3) Implementation agencies: Catholic churches of Spain and Bolivia
4) Activities: Free distribution of medicines (through public health facilities) in Trinidad, training on malaria prevention in Riberalta and Guayaramerín. All activities are implemented in cooperation with SEDES.
5) SNIS: CARITAS participates in the SNIS system, and sends information through SEDES.

6) Medical boats: There are 2 launches: a. CARITAS health program, b. Leprosy (suspended).

(2) Medical Boat Study

The boat carries agricultural products on the return trip (multiple purpose use). One trip lasts for a month, covering one side of Mamoré river from Trinidad (Puerto Siles, San Joaquín). Another boat operates from Guayaramerín. One trip costs Bs. 23,000, with 6 staff members (1 doctor, 1 nurse, 1 dentist, 1 captain, 1 assistant, 1 cook) for personnel cost, food and fuel. The large-scale flood in 1993 prompted the Bolivian government to purchase a boat and paid for personnel and operation. From 1996 to 1998, Catholic Relief Services assisted in financing 1 doctor, 1 nurse and 1 dentist. PROSIN/ SEDES assisted fuel and food from January to December, 1999. PROCOSI from La Paz financed 1 doctor, 1 nurse, 1 dentist, 1 malaria program counterpart, 1 auxiliary nurse, 2 health workers. The next trip is scheduled to leave on 8 August, 2001. It is possible that JICA cooperates in introducing a new boat and PROSIN covers the operational cost. The construction of 3 launches costs US$ 40,000. The operational and maintenance cost of the boat is financed by the municipalities' resources for SBS, EPI, tuberculosis program, and malaria program. However, a longer-term financial plan is absent, and operational fund for 2002 is not secured. EPARU introduced a new boat this year (2001): the boat was assembled in Guayaramerín and took 4-5 months.

5.10 EPARU

EPARU (Equipo Pastoral Rural) is an institution of the Apostolic Vicar of Beni dedicated to integral evangelization activities including the work in different social areas such as health.

The work of EPARU in Beni is undertaken by a team of lay and religious people that go through different communities, especially indigenous, along the Rivers Mamoré in the municipality of Guayaramerin and Secure in Moxos province.

It is useful to highlight multifarious nature of the work, since it includes catechisation, well perforation, adult education, gender education, agricultural and livestock training and rural development, rural children boarding school, chapel and multi-use centres construction, mechanic and carpentry workshops, bilingual education and health.

In health the operative strategy is based on the health promoters' training who will work on prevention and treatment. For this purpose, the training emphasizes the acknowledgment of the risk factors for health. The promoters are provided with a basic first aid kit, they carry out vaccination campaigns in coordination with EPARU and the regular health services, and they attend the prevalent diseases that are simpler to treat. It is unusual that this team does not rely on a doctor and a professional nurse is responsible the management and execution of health activities.

The activities of EPARU and CARITAS are carried out with coordination and mutual support.

6 WATER QUALITY SURVEY

6 WATER QUALITY SURVEY

To clarify the quality of water (water sources, supplied water to residents) at cities and rural areas in Cercado, Moxos, Mamoré, and Vaca Diez, water quality survey in 15 sites (7 urban and 8 rural sites) was planned in both dry and rainy seasons. The dry season survey was conducted from the end of September to the end of October 2001, and the rainy season survey was carried out from January 7 to February 5, 2002. The total number of water sample planned was 352 samples (dry season: 176 sampling points x 1 sample/ sampling point, rainy season: 176 sampling points x 1 sample/ sampling point), however, the actual total sample number in the dry season was reduced to 146 due to lack of adequate sampling points in/ around the target sites. On the other hand, the actual total sample number in the rainy season was reduced to 161 because of social tension in a specific area and the critical flood condition in/ around the target sites.

6.1 Survey Items

Items of water analysis test for each water sample are shown as follows.
1) Temperature, 2) Alkalinity / pH, 3) Electric Conductivity, 4) Suspended Solids, 5) Biochemical Oxygen Demand, 6) Chemical Oxygen Demand, 7) Bacteria (coliform group), 8) Ammonia, 9) Salinity, 10) Nitrogen compounds, 11) Phosphoric compounds, 12) Ca, 13) Fe, 14) As, 15) F, 16) Hg, 17) Zn, 18) Hardness.

6.2 Target Sites

Outline of sampling points is shown as follows. At each target city or community, water samples have to be taken from a) reservoir tank for potable water supply, b) potable water at the location of faucets in residences, c) public well and/or rain water reservoir maintained by neighbors, d) well and/or rain water reservoir owned by individuals, e) stream (in case residents use stream water for cooking and drinking) (See Fig. 6.1 and Table 6.1).

6.3 Methodology

Water sample collection at each sampling point, and quality analysis at laboratory.

6.4 Result of Survey

Detail data on the result of water quality survey in dry and rainy seasons are attached in the annex. Characteristics and analyses of the drinking water in the surveyed areas are shown as follows.

6.4.1 General Description

The existing raw water sources for the exploration and utilization for the human consumption, their quality of the potability and available quantity differ substantially among the 4 investigated districts. In addition to this general assessment there are local differences which give a complex picture of the drinking water situation of the 7 cities and 8 communities investigated during the present survey.

For understanding the drinking water of every locality and for analysis, it is necessary to

consider the following aspects: The physical, chemical and microbiological characteristics of water in the four investigated provinces determined by specific climatic, hydrologic and hydrogeologic features of the extensive plains of Beni; existence of infrastructure for centralized drinking water supply (only found in the cities of Trinidad, Riberalta and Guayaramerín as well as in the large populations of San Ignacio de Moxos, San Joaquín and San Ramon); social, economic and cultural conditions, as well as certain regional habits that generate specific behaviors regarding the domestic use of water.

Because of the above mentioned points and the varying local conditions, there cannot be a blanket set of recommendations. Additionally, recommendations have to correspond to actual technical framework and feasibility of an extent of time according to local conditions.

For the evaluation of the water portability, the corresponding guidelines of WHO and of the European Community as well as the Bolivian Norm NB 689 were used (see Table 6.2).

6.4.2 Cercado Province

(1) Trinidad

[Dry Season]
None of the 20 samples taken in Trinidad and surroundings meets completely the established criteria of potability. The parameters frequently exceeding the standards for drinking water are as follows (according to frequency): total and fecal colibacteria, COD, suspended solids, iron and ammonium. Two samples contain elevated values of conductivity and salinity, one sample a significant amount of arsenic (TRI-4).

Only seven samples taken from wells of the ‘semi surgente’ type and of the cooperative (Cooperativa de Agua de Trinidad – COATRI) are free of fecal coliforms but with the exception of TRI-13, all the samples contain colibacteria.

The water supplied by the cooperative COATRI differs significantly in its quality from one part of the city to another. This can most probably be attributed to different sources or drainage area of the water extraction.

The private water tanks (*noque**), widespread in the whole urban area, used for the storage of rainwater or of rainwater and public-supply water, as well as the wells of the ‘semi surgente’ type with manual water pumps perforated by PRAS-BENI, contain water with physical-chemical and microbiological characteristics which do not correspond to the criteria of drinking water. The same quality applies to the superficial water from rivers, lakes or ponds.

* The "noque" is a closed tank or deposit from cement, sometimes covered with a layer of paint from the inside. The tank contains either rainwater, water from a public supply, water bought from sources not specified or a combination of all kinds. Usually, wells (noria) actually in use are found outside the city center.

[Rainy Season]
The sampling of drinking water in Trinidad was realized in different quarters of the town and, additionally, in suburban areas with en extension of about 20 km westwards to Puerto Almacén, Puerto Varador (former meander of the river Mamoré) and in the Río Mamoré (community Los Puentes) following the actual course of the river (situated in the Moxos province).

In the Trinidad area 20 water samples were collected. The majority was taken from private

tanks (noque) and wells, which represent the predominant sources of drinking water supply used by the people.
There is a so called ‘semi surgente’ type of wells with a manual water pump installed by PRAS-BENI, which are common in the new suburbs outside the old center of Trinidad.

In small communities along the banks of the river Mamoré the population takes water directly out of the river. The sampling point No. TRI-21 is new because of the inundation of the original place (TRI-2). Instead, the water has been taken directly out of the river Mamoré. In Puerto Varador and in Puerto Almacén ponds (lagoons) are available for the water supply, which have been formed by the former meander of the Mamoré and the Río Ibare, respectively.

In the city of Trinidad it was possible to take three samples directly from the distribution network of the drinking water cooperative.

Analysis

In the city of Trinidad the quality of the drinking water supplied by the public service is about to improve, since new deep wells have already been perforated which will provide the raw water for the drinking water supply. Therefore, there is the possibility that in the near future public drinking water of Trinidad meets the requirements for potability. The actual deficits of the public water need to be resolved in order to fully guarantee the potability of water.

The Noques – a traditional and widespread form for the collection and storage of water in Trinidad – have to be periodically cleaned and disinfected (for instance: chlorine) by the private users. It can be assumed that private vessels for conveying water that are not sufficiently cleaned are an important source of the contamination of water tanks (noque) and open wells (noria).

Because of a generally high degree of salinity of the water from “semi surgente’ wells installed in the suburbs of Trinidad this source is not used by the people as drinking water supply. For that reason and for a greater representativity, only one of those wells has been investigated in Trinidad. The ‘semi-surgente’ wells are not a reliable source for the drinking water supply. The population in peripheric areas use water from existing open wells (noria), water bought from tank trucks or water from their own noques.

A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

(2) San Pedro Nuevo

[Dry Season]
In San Pedro Nuevo, it was determined that all of the water samples, both from rain water tanks and from underground water, qualify for potability.

With the exception of two underground water samples from wells of the ‘semi surgente’ type with manual water pumps (SPN-3 and SPN-6), all samples contain a high degree of COD and fecal coliforms. Additionally, the water of this region presents a high content of iron, colibacteria and suspended solids.

The water of ‘semi surgente’ wells is characterized by a high degree of salinity (above physiologically acceptable value) which is the main reason for the non-use by the population. Likewise, high level of hardness and conductivity result from the elevated salinity degree.

[Rainy Season]
The rainy season eases the critical situation for the population because of the renewed and refilled water reservoirs. Two additional samples (SPN-11 and SPN-12) were taken to complete the originally planned number of 12 water samples.

Two wells installed by PRAS-BENI of the ‘semi surgente’ type with a manual water pump exist in the village. Nevertheless, these wells are very rarely used by the people because of their rather brackish water. The majority takes the drinking water from various ‘wells’ installed in the village. Those artificial wells or water deposits hold the rainwater for several months and contain a variety of aquatic plants with supposedly purifying effects (species of tarope, cañuela, pochi, and other plants commonly called ‘yomomo’ by the population). A fundamental characteristic of these wells is that they are carved in unconsolidated clay and loamy sediments – found in broad area of Beni – which are highly impermeable with a retention of the water during long periods

One sample was taken out of a private water deposit (noque) which was the only one still containing the remainders of rainwater.

Analysis

The situation of the water used for human consumption in San Pedro Nuevo is rather critical in the final period of the dry season. This situation became even worse because of the deteriorated state of the village’s main water tank (noque) of the parish church, which used to store rainwater and diminished the water supply problem. To improve the water supply conditions and to guarantee the quality of the drinking water it is mandatory to repair the noque of the church and to periodically clean and disinfect the tank.

The underground water from the ‘semi surgente’ wells is not appropriate for the human consumption because of its high salinity level.

The seven presently used artificial excavations retaining rainwater are not hermetically enclosed and allow the direct access of domestic animals, which contaminate the water without control. The entrance of animals to these places has to be restrained.

It could be observed that the washing of clothes around those artificial ponds is a considerable contamination source as well. This habit has to be changed and domestic work shifted away from the water source.

A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

(3) San Javier

[Dry Season]
The water samples of San Javier show similar physico-chemical and microbiological results to those of San Pedro Nuevo: none of the samples meets the requirements for drinking water.

With exception of the ‘semi surgente’ wells (SJA-1 and SJA-3), all samples fecal coliforms of differing quantities were detected. Other limiting parameters for the water quality of the typical supply sources: total colibacteria, iron, suspended solids as well as elevated values of COD and salinity.

The least contaminated samples have been taken from the water tank (noque) of the church (SJA-4) and from the open well (noria) of the farm ‘El 7’ (SJA-8), though both sources contain a minor number of colibacteria. The water of the open well (noria) SJA-8 shows good quality for drinking water from the physico-chemical point of view.

[Rainy Season]
The situation of the drinking water supply in San Javier is very much like that in San Pedro Nuevo and equally critical at the end of the rainy season. In this location 8 samples have been taken. Additionally, two samples were collected in cattle farms along the road to Trinidad where a great number of people work and live with their families. One additional sample SJA-10 was taken out of an artificial rainwater deposit.

In San Javier there are various sources used for the supply of drinking water: ‘semi surgentes’ wells with manual water pumps (containing water of the same characteristics as described earlier), artificial water deposits storing rainwater which are filled with aquatic plants, a few open wells (noria), and a huge water tank (noque) containing stored rainwater which is situated on the terrain of the church and an important water reservoir for the population.

Analysis

The water tank (noque) of the church has to be periodically cleaned and disinfected to completely guarantee the potability of the stored water, for it is an important and central source for the water supply.

The water from the ‘semi surgente’ well of the school “Jorge Monasterio’ (SJA-1) and from the noria of the hospital (SJA-7) demonstrated high salinity not suitable for human consumption. The second ‘semi surgente’ well situated in the municipality (SJA-3) also reveals an elevated salinity close to the permitted limit, but for other determined values it is not apt for human consumption. Generally, the ground water of this region is not suitable for consumption because of its content of mineral salts. Water from those sources is useless for the population without further treatment.

The artificial excavations with collected rainwater allow the direct access of domestic animals to the water. Access of animals has to be avoided. The ‘tarope’ and other water plants for purification purposes have to be periodically replaced to conserve their purifying effects.

As described for San Pedro Nuevo, it was observed that the washing of clothes around those artificial ponds is an additional factor to the contamination. This habit has to be changed and domestic work has to be kept away from the water source.

A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

(4) Casarabe

[Dry Season]
The analytical results of the 12 water samples of Casarabe show fair differences, reflecting the distinct origins of the water as well as a distinguished behavior of the users, which could be observed during the sampling. The supply of drinking water comes from water tanks (noque) and artificial excavations, both storing rainwater, and from open wells (noria).

The sample CAS-4 from an open well (noria) of a farm is the only sample with physico-chemical parameters within the established margins for drinking water. Nevertheless, a high temperature and the presence of colibacteria were detected which is endemic almost everywhere in Beni. The sample CAS-9 from a water tank (noque) of the camp of INCO-TERRA-VELKO (road service) is practically clean though showing an undesired presence of suspended solids. For taking out the water, an electrical pump is used.

The remaining samples contain (in the order of to frequency): total colibacteria and fecal coliforms, high concentrations of iron, suspended solids and ammonium. All the ponds with rainwater generally contain a high load of organic contaminants.

[Rainy Season]
The variety of water sources in Casarabe is bigger than those of San Javier and San Pedro Nuevo. Mainly wells (noria), artificial wells and private water tanks (noque) exist in this location. Some families use barrels for water storage. The elevated water tank and the deep well of the village are out of use. During this second phase the former sampling program has been completely repeated.

The water tank in the camp of the INCO-TERRA-VELKO company (road service) is the only one with the installation of an automatic water pump.

Analysis

Probably, in Casarabe there is a ground water reservoir of a very good physico-chemical quality at less than a kilometer from the village (estancia of Mr. Manuel Arias). This area should be explored hydrogeologically and studied carefully. Depending on the results, a supply of drinking water of a good quality is possible, taking advantage of an already existing infrastructure (elevated water tank)

The water deposits (noques) need to be cleaned and disinfected more frequently to avoid the proliferation of bacteria. The organic contaminants originate from the washing of the roofs during rainfall, as well as from insufficiently cleaned vessels. More caution about storage and utilization of water is suggested. Equally important is the installation of materials from PVC or galvanized zinc for the capture of the water from the roof instead of iron tubes, as it is the case of the sampling point CAS-1.

The water of the noque of the road service company (rainwater mixed with water brought from other places) indicates that a successful method to prevent contamination, for instance by fecal bacteria, is to avoid direct contact of persons with the water by use of little electrical water pumps.

The artificial excavations with stagnant rainwater, as described earlier, are not adequately enclosed to prevent the access of domestic animals. Equally, tarope and other water plant have

to be replaced from time to time to preserve their purifying effects.

A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

6.4.3 Moxos Province

(1) San Ignacio de Moxos

[Dry Season]
Four of the samples have been directly taken in San Ignacio de Moxos and the remaining samples in different communities to the west and east of the town. The analyzed water samples coming from ground water, rainwater and superficial water are comparably clean (70 % free of fecal and 40 % free of total colibacteria).

San Ignacio de Moxos actually counts on a distribution system for drinking water, which covers only a part of the urban area. The water comes from the Laguna Iserere, the water pump is not very far from the bank. The lake is frequented by people, who bathe not far from the water extraction point (fecal coliforms). The raw water from the lake (SIG-4) presents a high content of suspended solids, organic load (COD), fecal and total colibacteria. Additionally, a low degree of minerals was detected. After a little treatment, the physico-chemical characteristics of the water remain almost unchanged (SIG-7) before it arrives at the user through the network.

The two samples of Puerto San Borja from different sources show distinct features that do not meet the requirement of drinking water. The river water from Río Ampere is essentially contaminated with fecal coliforms and with a high level of organic contents, whereas the ‘semi surgente’ well (SIG-2) contains water of a high salinity with a limited potability.

In the communities of Monte Grande, Bermejo, Argentina and Fátima, geographically separated, ground water from wells of the ‘semi surgente’ type (PRAS-BENI) are used. In three cases (SIG-3, SIG-8, SIG-10) the water is of a good quality and microbiologically clean. In the fourth case (Bermejo, SIG-9) the ground water contains an elevated concentration of iron, suspended solids and slightly elevated organic load.

It was observed that the water pumped out with manual pumps has a milky appearance. This is attributed to a whirling during the pumping process, which also causes the transport of suspended solids (very fine clay of bright color) and brings about the milkiness. This fine clay settles down after a few days which indicates that the suspended solids are consequence of an inadequate technique (possibly due to construction failures with poorly dimensioned filters and/or filter sand/gravel or due to a wrong design of the manual pump).

[Rainy Season]
The sampling program has not been changed and was entirely repeated. North of San Ignacio de Moxos is the lake Iserere, of which the drinking water is taken and distributed through a network of plastic pipes (white PVC). However, only the old part of the village is connected to this water delivery system.

Other water sources are rainwater tanks (noque), open wells (noria) and, in one case, a well with a manual water pump.

The majority of the old houses have own open wells (noria) of which a certain number is already out of use for the houses being connected to the local water distribution system.

The sampling has been extended to the communities of Puerto San Borja and Monte Grande west of San Ignacio, and to the eastward till Bermejo, Argentina and Fátima. All these localities count on wells of the 'semi surgente' type installed by PRAS-BENI. In Puerto San Borja one sample was taken directly out of the Río Apere, whose water is frequently used by many residents.

Analysis

In San Ignacio de Moxos a new drinking water system will operate very soon with water taken from the Laguna Iserere. The physical treatment of the water by sand and gravel filters and the disinfection with chlorine promise to solve some of the present quality problems of the drinking water.

In Puerto San Borja and in the community Argentina it is necessary to disinfect the water by boiling prior to human consumption.

With regard to the milky water from the 'semi surgente' wells technical solution have to be found by perforation engineers, since that phenomenon is observed in every area with aquifers of very fine clay.

(2) San José de Cabito

[Dry Season]
The samples were taken in four geographically very separated localities. There are well defined sources for the supply of drinking water used by the population of the four localities: open wells (noria), 'semi surgente' wells and the Río Apere that passes through two sampling places.

In the locality of San Lorenzo, the samples SJC-2 and SJC-3 from 'semi surgente' wells are microbiologically clean and besides the elevated iron value and the acidic pH, generally potable. In the open well (noria) of the locality, used by many families, the same problem as in other places can be found with a high number of total and fecal coliforms of an anthropogenic origin. The sample of the noria (SJC-1) which has a brown color contains a great quantity of suspended solids and iron, like the previously described wells.

In the community of Monte Grande only open wells (norias) exist for drinking water supply. The ground water of the two norias (SJC-4 and 6) is characterized by a low pH, a little mineralization degree and an elevated concentration of iron. Microbiological contamination is generally observed.

The two samples taken in Santa Rosa del Apere, one from a 'semi surgente' well (SJC-7) and the other out of the Río Apere (SJC-8) differ regarding their physico-chemical features but both are microbiologically contaminated. The well water contains a very high number of fecal coliforms, the organoleptic characterization during the sampling revealed a foul smell of the water.

The population of San José de Cabito depend on 'semi surgente' wells and the Río Apere for the water supply. The Río Apere, which is widely used by the inhabitants of the community, presents the typical problems of superficial waters with a microbiologic contamination and a considerable organic charge (SJC-9). The two investigated ‘semi surgente’ wells show different qualities: whereas SJC-10 completely conforms to the requirements of drinking water, the second well (SJC-11) contains iron and fecal as well as total colibacteria. The water used in the boarding school (SJC-12) comes from the same aquifer as the water SJC-10 since the physico-chemical properties are evidently identical. However, the fact of the water storage in an elevated tank allows the proliferation of bacteria.

[Rainy Season]
No changes have been made with regard to the previous sampling program. The sampling points in the region called ‘San José de Cabito’ are very scattered and include the following localities: the village San Lorenzo, the communities Monte Grande, Santa Rosa del Apere and San José de Cabito. Of each locality between two to four representative drinking water samples have been taken from rainwater tanks (noria) and wells of the ‘semi surgente’ type.

In Santa Rosa del Apere and San Jose de Cabito the Río Apere is used for the supply of drinking water. In San José de Cabito, additionally, there is a school with dormitory, which owns a deep well with an elevated storage tank and an internal distribution through water pipes.

Analysis

In San Lorenzo there already exists a certain infrastructure for the centralized water supply. Also the quality of the ground water, with an adequate treatment to eliminate iron, is suitable for human consumption. The distribution of drinking water through a network could be realized in a medium period.

In the meantime it is advisable to boil the water prior to consumption, above all the water coming from norias. This measure is especially useful in the community Monte Grande, which apparently depends only on norias seriously contaminated with fecal and total colibacteria.

In Santa Rosa del Apere it is necessary to seal off the ‘semi surgente’ well of the plaza since the quality of the ground water with an extremely high level of fecal coliforms presents a sanitary risk. It is recommended to analyze all of the existing ‘semi surgente’ wells of this community since it cannot be ruled out that there exists a hydrogeologically unfavorable situation as a reason for this phenomenon (the Río Apere borders a great part of the village).

San José de Cabito has a good alternative for the drinking water supply thanks to the quality of the ground water of the ‘semi surgentes’ wells compared to contaminated water of the Río Apere. In case of the use of river water for human consumption the water has to be boiled before drinking.

On the other hand, as shown in the well at the school, San José de Cabito enjoys natural conditions in favor of drinking water supply that could be realized in a medium period of time.

(3) Santísima Trinidad

[Dry Season]
The community of Santísima Trinidad has as the only sources of drinking water the rivers Izacese and Sasasama. In this region, rivers have a strong gradient causing a fast current.

Both waters differ in their geochemical characteristics, but show the same acidic pH, a very little content of mineral salts and a great number of colibacteria. The sample of the Río Izacese additionally contains a slightly elevated value of iron.

[Rainy Season]
The community of Santísima Trinidad, located in the National Park 'Isiboro-Sécure', could not be reached during the actual sampling process in January/February 2002 due to force majeure (social tensions, militarization of the whole 'Chapare' area, high waters of the rivers to cross due to heavy rainfalls). Therefore the samples had been taken in May 2002. The location corresponds to the southernmost point of the survey study and, at the moment, it is only reachable through the Chapare zone of Cochabamba. The drinking water situation during the rainy season is the same as in the dry season. The only sources for the extraction of drinking water for this community are the Ríos Izacese to the north and Sasasama to the south of the village. For that reason only two representative water samples, one of each river, could be taken in the location.

Analysis

Presently, this community does not have alternatives for a supply of drinking water of a good quality. Furthermore, the hydrogeological conditions of the area are unknown. The region of Chapare is known as a zone with high precipitation, therefore it is possible to install a central rain water tank (noque) to collect and use rain water, for instance on the terrain of the church. It is also realistic to search for an underground source for the water supply in a medium period of time.

In the present, the water should be boiled before the consumption because of the considerable quantity of colibacteria.

6.4.4 Mamoré Province

Advancing to the north of the Beni department, particularly in the pampas and savannas of the district Mamoré, the geochemical composition of the superficial as well as ground water changes substantially due to the podzolic soil of these regions.

The soil, generally formed of very fine clay, contain very little minerals, which is also reflected by the characteristics of the water. The water of that region show two specific features: a pH value between 4.11 and about 6.0 and a very low degree of mineral salts, almost similar to that of distilled water.

(1) San Joaquin

[Dry Season]
In San Joaquín there exists an extensive drinking water network which reaches almost every household, but the majority of the population consume the water of their private wells (noria). The water samples contain notable concentrations of nitrite and nitrate. In three cases nitrate

surpasses the permissible limit established by the Bolivian standard.

It was confirmed that the four samples from the water network, supplied by the local cooperative, is disinfected and free of fecal colibacteria and two of them (SJO-3 and SJO-8) also free of total colibacteria.

On the other hand, the water from norias, which is preferentially consumed by the people contains fecal as well as total colibacteria without exception in considerable quantities.

[Rainy Season]
In the present sampling program no changes have been made with regard to the first stage of the project. In San Joaquín there is an extensive network which connects nearly every housing to the local drinking water supply. In the village there are two elevated water tanks, but only one is presently in use. It must be stressed that the actual water supply by the cooperative is not a permanent service for it depends on the function of the electric generator of the village (designated hours of the day).

In spite of the existence of the local distribution network the overwhelming majority of the population uses their own wells (noria) as a water source. There are two reasons for that behavior: on the one hand there is a prejudice that the water of the own open well is ‘sweet water’ and the water supplied by the network is ‘salty water’. On the other hand a great deal of the residents do not take water out of the local network because of economic reasons (the fee of the cooperative cannot be paid). Because of the quoted reasons and to get a more representative result of the actual situation the major part of the samples have been taken from the private water sources (open wells - noria).

Analysis

The population of San Joaquín prefers to consume water from norias by custom, because this is perceived ‘sweet’ compared to that of the cooperative service. However both water types are identical since it comes from the same subsoil, differing only in the chlorination of the network water for sanitary reasons.

In order to guide the population, it is recommended to implement permanent campaigns about the features of the local water and sanitary effects in relation to the risk of water from the noria. The deep-rooted though incorrect habit about the ‘sweet’ water has to be changed gradually.

(2) San Ramon

[Dry Season]
The characteristics of the drinking water and the conditions of use in San Ramón are quite similar to those described for San Joaquín. Though it can be pointed out that the population more frequently use the water from the network supply, which is also distributed by a better and reliable electrical service. The water is completely demineralized, the conductivity is generally about 25 mS/cm and the pH values differ between 5.18 and 5.95.

Two samples contain nitrate in a concentration, which surpasses the limit of 2.26 mg/l. In three samples (SRA-1, SRA-3 and SRA-8) fecal colibacteria were detected, one of them was taken from the cooperative water supply. However, the water taken from the tap is usually

free of fecal and total colibacteria indicating a good effect of the central disinfection (chlorination).

[Rainy Season]
The sampling program of the dry season was repeated in its totality. In this village the situation is similar to that of San Joaquín. Also, the same behavior was found with respect to the consumption of the supplied water by the local network accompanied with the same argument to use private sources. Therefore, the 10 samples of this locality have been taken from the local supply and from the private wells respectively.

Analysis

As in San Joaquín, it is recommended to realize permanent campaigns about the characteristic of the local water and sanitary effects in relation to the risk of water from the noria in order to guide the population and to gradually change the 'sweet' water habit.

Another point of concern is the fact that the raw water as well as the treated water do not contain the essential minerals for human body. A solution to improve the water quality from this point of view should be found.

(3) Buena Vista

[Dry Season]
Buena Vista is a small community, which uses a public and a private open well (noria). The water of the 'semi surgentes' wells installed by PRAS-BENI is very rarely used because of its milky and turbid quality and other undesired characteristics. However, the ground water of the 'semi surgentes' wells as well as of the open wells (norias) comes from the same aquifer. The analysis of the water reveals a complete demineralization with electric conductivities lower than 20 mS/cm and an acidic pH in the range between 4.11 and 4.68. From this point of view the water is almost comparable to distilled water with regard to its chemical contents.

The two open wells (noria) are obviously contaminated by fecal colibacteria, a fact which is not observed in case of the 'semi surgentes' wells. The water samples partly show significant concentration of iron. The elevated values of suspended solids (fine clay) are the result of eddying caused either by the vessels for water withdrawal or by the manual pumps in case of the 'semi surgente' wells.

[Rainy Season]
Buena Vista is a community situated along the eastern banks of the Río Machupo. This location is very difficult to approach during the dry season since it is not connected by a country road. During the rainy season this community is reached via the Río Machupo.

The previous program has been repeated with only six sampling points, which represent the totality of supply sources during the whole year. In this community there are various wells of the 'semi surgente' type installed by PRAS-BENI, which are less used by the population, for the water often has a milky look or a certain grade of turbidity. For this, the majority of the people consume the drinking water from a well which is located at about 150 m to the east of the village. A second open well exists on a private terrain, though the use of the well is not restricted to the public.

Analysis

Currently, there is no alternative to the ground water used by the population of the community. The water completely lacks the essential minerals for the human nutrition.

Since the majority of the population use the water of the public noria it is necessary to maintain a certain hygienic level with a more cautious use of water taking devices (colifecals). It is also obligatory to keep domestic activities, such as washing, away from the actual surrounding of the water source in order to avoid direct infiltration of contaminants through the well walls.

A general recommendation for the water use is the simple disinfection of the water through boiling.

(4) Santa Rosa de Vigo

[Dry Season]
The 12 samples were taken in rather distant places and in ten cases ground water samples were taken from artificial excavations (pauro) or open wells (noria) which serve as drinking water sources.

With the exception of the samples taken in Puerto Siles from the Río Mamoré (SRV-5) and from a private noque (SRV-6), all other samples are ground water samples with the typical geochemical features of the region: very little contents of mineral salts and a low pH between 4.19 and 5.89. Four samples contain slightly elevated iron values. The water is generally very soft with a mainly milky look.

Colibacteria are present in all of the samples, and in ten cases also fecal coliforms have been detected. Only the two samples from ‘semi surgentes’ wells taken in Alejandría (SRV-11, SRV-12) are free of fecal bacteria. The three samples from ‘pauros’ in Santa Rosa de Vigo (SRV-2, 3, 4) contain significant nitrate concentrations probably resulting from animal secretions. It is worth a note that the geochemical features of the river water from the Río Mamoré in Trinidad (TRI-1) and in Puerto Siles (SRV-5) respectively, are practically constant.

[Rainy Season]
The sampling points of the region ‘Santa Rosa de Vigo’ enclose communities situated along the route San Joaquín - Puerto Siles - Santa Rosa de Vigo - Alejandría. All of those locations are geographically rather distant from each other. It should be stressed that in every locality the drinking water supply for the population has specific characteristics. During the present stage there are some variations in Santa Rosa de Vigo and Alejandría, respectively.

In Chaco Lejos two samples were taken, one from a well of the ‘semi surgente’ type, of which a certain number exist in this community. The second sample was taken from an open well (noria), which has a remarkable water output and is very frequented by the population. Alturas de Carmen located about two kilometers before reaching the Río Mamoré in Puerto Siles, has got only open wells (noria) used for the drinking water supply.

Puerto Siles, an important river port, lies on the banks of the Mamoré, whose water is predominantly used as the source of drinking water by the population. However, there are as well deposits and water tanks for either rainwater or water delivered from Alturas de Carmen.

Santa Rosa de Vigo is a community situated on the banks of the Río Mamoré. For the water supply there are two open wells (noria) from which samples have been taken (new: SRV-13). The so-called 'pauros' situated along the slopes of the river bank disappear in the rainy season due to a considerable increase of the water quantity of the Río Mamoré. Therefore, three previous water samples of 'pauros' (SRV-2, 3, 4) had to be substituted. One sample was directly taken out of the Río Mamoré (new: SRV-14).

Analysis

The two samples taken in Chaco Lejos, ground water from a noria and a ‘semi surgente’ well, contain fecal and total colibacteria. It is recommended to investigate the remaining wells to figure out the origin of the contamination (the 'semi surgente' well has a considerable depth of supposedly 37m according to the people's claim). Recently, public latrines have been installed in this community by PRAS-BENI. A general recommendation for the water use is the disinfection of the water through boiling.

In Alturas del Carmen there exist only open wells (noria) for the water supply which are microbiologically contaminated. The water has to be boiled before domestic use.

In Puerto Siles, the Río Mamoré represents the main source for the water supply. However, some families also use water tanks (noques) either filled with rainwater or also with water brought from Alturas del Carmen. Both sources are microbiologically contaminated and requires at least a simple disinfection through boiling.

During the sampling it could be confirmed that it is very probable to find suitable ground water in Puerto Siles, at a depth of about 8m. On the slopes of the Río Mamoré some springs of water exist at this level, similar to the situation in Santa Rosa de Vigo.

The artificial excavations (pauro) of Santa Rosa de Vigo present disastrous hygienic conditions. Domestic animals, specially pigs, have access to the area and to the water itself. This situation needs to be changed immediately. At the same time, the washing of clothes directly beside the water source is to be avoided. In any case, the water must be boiled before consumption.

In Alejandría there exists perhaps an alternative to the presently used demineralized ground water, since there is a lagoon close to the locality. This fact requires a more detailed investigation. A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

6.4.5 Vaca Diez Province

The district Vaca Díez in the north of the Beni department is characterized by tropical or amazonic forests, also called ‘hylea’, with particular species of trees and plants typical for this region. Due to the climatic conditions (precipitation, high temperatures), the soil is lateritic of a red color, or in the laterization process. In some areas, such as Cachuela Esperanza, acidic rocks (granite) of the Brazilian shield is found.

(1) Riberalta

[Dry Season]
Nine out of ten samples taken in Riberalta come from open wells (noria). This reflects that the the noria is the main source for the supply of drinking water, though there exists a central drinking water system in the city but limited to the old city center.

Only the sample RIB-9 was taken from the water system of the cooperative. It is treated water with considerable hardness in addition to a elevated iron concentration surpassing the permitted limit for drinking water. Also total colibacteria have been detected.

The difference of the water quality between the centrally supplied water and the water from the open wells (noria) is distinct. The norias contain, with one exception, high levels of fecal and total colibacteria. The concentration of mineral salts is mainly very low and the values of pH vary between 2.68 and 4.85.

[Rainy Season]
There are no changes regarding the sampling program of the dry season. The city of Riberalta has got a relatively new system of drinking water supply, but limited to the old city center. The suburbs, some of them very recently built, are not served. However, in Riberalta, similar to the previously described San Joaquín and San Ramón, the local drinking water distribution is very rarely used by the residents. On the one hand people perceive the tap water to be 'salty', on the other hand a great deal of the people cannot or do not want to pay for the drinking water service. For these reasons, the majority of the population use water from their wells (noria) and the water supplied by the cooperative for other domestic purposes.

The major part of the collected water samples comes from wells (noria) of the suburbs of Riberalta.

Analysis

In Riberalta it was observed that the inhabitants with access to the central water service do not use the water for consumption and maintain the tradition of using private wells (noria). Practically, every house has its own noria. The habit is based on the perceived ‘saltiness’ of the water of the cooperative.

A recommended measure is an explanation campaign for the population of the whole community about the risks of the consumption of water from norias highly contaminated with fecal and total colibacteria.

The extension of the existing water network to the peripheral parts of the city is a possible measure, which the local municipality has to consider against financial feasibility.

(2) Tumichucua

[Dry Season]
The 8 samples were taken in three communities located to the southeast of Riberalta. However, the three groups of water samples don’t show significant variations with regard to their physico-chemical characteristics. The samples present a conductivity lower than 40 mS/cm, sign for a low mineralization degree, and low pH values between 3.40 and 5.15. All

of the samples contain colibacteria, some also fecal coliforms. In the community of Candelaria the water is slightly ferrous.

[Rainy Season]
The sampling points of the region Tumichucua include the communities located to the southwest of Riberalta: Peña Amarilla, Candelaria and Tumichucua. In the present sampling campaign the program of 12 samples have been completed which includes the new communities 'Bella Flor', 'El Cruce' and Yeneguagua.

In Peña Amarilla there is only one 'pauro' which serves as a drinking water source. There are two more 'pauros' but the water is taken for other uses.

In the community 'Bella Flor' people use the wells of the semi-surgente type and also the custom of taking water from artificial water deposits (pauro). The samples TUM-9 and TUM-10 were taken in 'Bella Flor'. In the small community 'El Cruce' (from here the main road from Riberalta continues to the departments of La Paz and Pando, respectively) one sample was taken from a noria (TUM-11). In the community Yeneguagua one sample was directly taken out of the Río Yeneguagua (TUM-12). In Candelaria there is one well of the 'semi surgente' type and two 'pauros' situated on the slope of the Río Beni.

The community Tumichucua has a central drinking water network with an elevated storage tank, but the system is out of use due to the lack of financial means. The drinking water for the whole population is taken out of the 'pauros' along the slope of bank of the lake Tumichucua, whereby people usually use the nearest 'pauro'. Some of those 'deposits' are quite efficient and contain a good amount of water.

Analysis

In the community of Peña Amarilla, which relies only on an artificial excavation (pauro) for water supply, it is necessary to keep this source and its surroundings clean, in addition to the avoidance of washing clothes close to the place. The water should be boiled before its use.

In Candelaria a ‘semi surgente’ well has been recently installed which produces water of a better quality than the pauros on the slopes of the Río Beni. Additionally, the construction of an open well (noria) close to the sanitary post is almost finished. The ground water should be of the same quality as the water of the ‘semi surgente’ well. A general recommendation for the water use for human consumption is the disinfection of the water through boiling.

The water from the springs, which supply the pauros located along the slopes of the lake Tumichucua differ in their content of fecal coliforms of anthropogenic origin. The water has to be boiled before human consumption. Additionally, sources of contaminations, like domestic activities (washing), have to be kept away from the immediate surroundings.

In the community of Tumichucua exists a rather developed infrastructure for the centralized water supply, but it depends on financial capacities to take advantage of the existing structure.

(3) Cachuera Esperanza

[Dry Season]
The only sample of the community of Cachuela Esperanza (CES-1), which is representative

for this locality, was taken from the two connected water storage tanks (noria). Besides low pH conductivity values (scarce mineralization), the water contains fecal and total colibacteria of a considerable amount.

In the community of Santa Teresita del Yata, three water samples of three different locations have been taken. All of them contain fecal and total colibacteria. Though the quality of the water samples is comparable to the well-known situation of this region (scarce mineralization, acidic pH), there are geochemical differences of the three distinct sources. CES-2 was taken from the Río Yata and contains high concentrations of iron and organic contaminants. CES-3 (creek water) presents the lowest conductivity and temperature measured in Beni and a very low pH value of 2.88. The latter could be explained by a significant presence of humic acids in the creek. The ground water of the noria of the school (CES-4), with exception of the presence of fecal bacteria, presents a relatively good quality for drinking water.

In Santa Rosa two samples were taken, one from a ‘semi surgente’ well (free of fecal coliforms) and one out of a little creek, which is contaminated with fecal and total colibacteria and elevated concentration of iron and organic substances.

[Rainy Season]
In Cachuela Esperanza a new water tower had been constructed, situated on an elevation south of the comunity. Due to the natural gradient of the terrain between the tower and the village, the water supply for the central network is assured by the gravity. Nevertheless, the ground water has to be pumped up to the tower. According to the people, the water supply continues to work irregularly because it depends on the function of the electric generator. At present, people keep using water from two public side-by-side wells (norias) with a reserve of ample drinking water.

The entire program of 12 samples could be completed by six samples, which have been taken directly from taps of the households connected to the local network (new: CES-7, CES-8, CES-9, CES-10, CES-11, CES-12).

In the community Santa Teresita de Yata, located on the way from Cachuela Esperanza to Guayaramerín, water samples were taken from three sources of water supply: the river Yata, the creek Yatorama and the well of the school. The school is situated rather far outside of the community, and the wells are only used by the pupils.

In the community Santa Rosa, also located on the path to Guayaramerín, two water samples were taken, one from a well of the 'semi surgente' type and the second sample from a little stream called 'El Ocho' which borders the community.

Analysis

In Cachuela Esperanza the construction of an elevated water tank and of a new water extraction point is soon to be finished. There already exists the infrastructure for the centralized water distribution. It is expected that the drinking water problems can be solved soon.

For the community of Santa Teresita del Yata, the supply of drinking water for the population from the noria of the school is recommended, since the quality of this water is better than that of the superficial waters. Nevertheless, it is necessary to boil the water before use.

The ‘semi surgente’ well in Santa Rosa is a water source free of fecal colibacteria and it should be recommended to use that water for the human consumption.

(4) Guayaramerín

[Dry Season]
The majority of the population of Guayaramerín is connected to the drinking water system with water from the little river ‘Las Arenas’. The people in the new suburbs use water storage tanks (noria). The drinking water supplied by the cooperative does not meet the actual requirements for potability established by the authority. In addition to low conductivity and pH values, the samples contain elevated concentrations of iron and organic contaminants (COD) that exceed the permitted limits. Moreover, not only coliformes are present but partly fecal colibacteria of a large number. The two samples out of norias (GUA-4 and GUA-5), with exception of fecal bacteria and a pH between 4.53 and 4.81, can be qualified as superior compared to the cooperative water.

The samples taken out of the Río Yata and from a noria in the community Rosario del Yata contain elevated numbers of fecal and total colibacteria in addition to a high iron concentration.

[Rainy Season]
In Guayaramerín the initial sampling program was repeated in its totality. The city Guayaramerín is the only place of all locations visited during the survey study where a complete drinking water system exists which does not only cover the old city center but also the majority of new suburbs recently constructed during the last couple of years.

In some places of the peripheral quarters there are open wells which are used for drinking water extraction. During the sampling in Guayaramerín deficiencies in the local drinking water network have been noticed caused by interruptions of the water supply due to reparations or maintenance of the system.

The sample collection was extended to the community of Rosario del Yata situated along the road Guayaramerín - Riberalta. In this location one source of water supply for the population is the Río Yata. In areas farther away from the river the people also use their own wells.

Analysis

On the day of sampling in Guayamerín problems with the central drinking water network was experienced. This fact can probably explain some ‘anomalies’ of the water supplied by the cooperative. Nevertheless, the scarce mineralization indicates the source of the water supply for the centralized distribution (stream ‘Las Arenas’). The cooperative is obliged to offer drinking water according to the established standard. The stream ‘Las Arenas’ is probably not a suitable source because of its geochemical characteristic. Other alternatives should be sought, and perhaps the Río Mamoré is a source for better quality water.

Anyway, the raw water must be treated in order to comply with the requirements of potability. For the moment it is necessary to boil the water before consumption.

In the community of Rosario del Yata it is strongly recommended to disinfect the water by boiling before consumption.

7 FORMULATION OF M/P OF THE REGIONAL HEALTH SYSTEM

7 FORMULATION OF M/P OF THE REGIONAL HEALTH SYSTEM

7.1 Problems and Constraints of the Existing District Health System

Major problems on health situation will be summarized as follows (See tables 7.1 – 7.5).

(1) Natural conditions

The geographical and meteorological conditions affect the health conditions and transport conditions, by characterizing the disease structure and accessibility from house to health service facilities.

(2) Area coverage of health services

Medical health service area covered by PS/CS and hospitals is limited by lack of road conditions and means of transportation, transportation cost/time and low health service quality level as well as socio-cultural barriers.

(3) Coverage of SBS

Service of medicine distribution by SBS is inadequate because of lack of institutional linkage among hospitals/CSs/PSs, SEDES and municipal governments and limited knowledge of inhabitants.

(4) Municipal Policy and Administration

1) PDM and POA have not yet shown a clear-cut development policy and action plan on health sector reform.
2) The municipalities have little interest in the health sector.
3) Health services to the poverty area have not been well organized or promoted due to lack of poverty alleviation policy at the municipal level.

(5) Coordination System

No effective and active coordination system has been observed among agencies concerned regarding the health sector.

(6) Human Resources

Allocation of ITEM numbers by different professional categories is not adequate to address the imbalance of demand for and supply of health services and to solve inaccessibility and unavailability for inhabitants. The reasons include:

- lack of selection criteria
- poor decision making process
- poor monitoring /evaluation system
- insufficient incentive for medical staff to remote areas

(7) Cost Sharing

1) Supply side: ITEM, SBS and O&M budget is not optimally allocated amongst relevant agencies and its management is inappropriate.
2) Demand side: medical cost is not set considering the beneficiaries' willingness to pay.

(8) Facilities/ Equipment

1) The scale of exisiting facilities is not adequate for the demand.
2) Allocated health staff and the scale of health facilities are unbalanced especially in case of CS/PS.

3) Equipment at health facilities is insufficient or obsolete.
4) No data for existing equipment (inventory, operation manual, etc.) are available.

(9) Hospital Management

1) Management of hospitals as well as CS/PS is still inadequate due to poor quality control of human resources, accounting, medicine inventory and patient data, and lack of education/ training.
2) Hospitals' role for district health management is not fulfilled.

(10) Medicines

1) There is no existence of effective and timely medicine distribution system.
2) There is no control system on stock and use of medicine supplied by SBS and other sources.
3) Inhabitants, health workers and medical-health staff has not well been provided and trained on the knowledge of medicine use.
4) Despite the government effort to control the medicine prices at a low level, the market mechanism raises the prices unaffordable for users.

(11) SNIS

Information system has been introduced to collect, process, and disseminate health information by SNIS. However, institutional capacity at all levels (PSs/CSs, hospitals, municipalities and SEDES) to collect and process data has not yet developed, and SNIS' capability to analyze the data for the identification of major causes of diseases is inadequate. Also, insufficient environment e.g., lack of information processing devices, underequipped laboratories, makes an impediment for efficient implementation.

(12) Referral System

The current referral system is not effective due to lack of coordination amongst health levels, and the health personnel are not interested in coordinating activities with other facilities.

(13) PHC

1) The current PHC model is not effectively enforced due to minimal interest of the health personnel.
2) There is no integrated health management approach (e.g., IMCI) for mothers and children.
3) Coordination amongst different primary health care programs, and between primary health care programs and other health programs is not implemented.

(14) Epidemiological Approach

1) Beni Department has distinct ecological and geographical conditions with different kinds of vectors.
2) CENETROP limits its activities to certain diseases. There is little linkage with CENETROP and health facilities in Beni.
3) The weakness of disease control program lies in technology, equipment and financial and human resources.

(15) Community Health

1) Integration of Western and traditional health services is not optimized for lack of recorded data on traditional practices (home care).
2) TBAs and voluntary organization related to health promotion (e.g. Mother's club) are not integrated into public health services.

3) The people do not apply better practices for social, cultural and economic reasons (e.g., people do not boil water because they cannot afford, they do not like the taste, or do not want to invest the time).
4) IEC (Information, Education and Communication) on sanitation, nutritious control, SBS is not effective.
5) Health has lower priority than education and income generation in communities.
6) Community drug management with microcredit is not widely practiced.
7) Poor social participation in the health sector due to poor organization and activities of local committees and lack of leadership.

7.2 Population Projection

(1) Past trend and Assumption for Projection

The total population of the Beni Department in the target year 2010 was estimated based upon the annual growth rate during 1976 - 2001 (calculated from census data of 1976, 1992 and 2001). As the annual growth rate for the two periods (1976 - 1992 and 1992 - 2001) were stable at 3.1414% and 3.1558% respectively, the mean figure 3.15% was employed for the period between 2001 and 2010, on the assumption that the growth will remain the same. Hence the total population of Beni Department in 2010 will be 483,000 (a rounded figure), which is the control total of Beni Department for further projection.

(2) Total Population of Beni Department

The steady increase of overall population suggests general expansion in health service provision is necessary. More specifically, a higher growth in the urban area (3.2736% annually, JICA Study Team calculation based upon census) compared to that of rural area (2.9222%) is observed between 1992 - 2001, despite apparent larger natural increase rate in the rural area, accounts for social migration from the rural area to urban centers. On the other hand, it is important to note that the growth rate of the urban area during 1992 - 2001 has considerably dropped from 1976 - 1992 (5.2125%), indicating a significant decline in urban migration, i.e., the population absorption capacity of the urban center has passed its peak. Plausible contributing factors to this reduced population flow into the urban area are: decrease in employment opportunities in the city, delay in urban infrastructure development, and migration from the rural area to neighboring countries. This trend in turn directs towards more attention in the rural areas in health resources allocation.

(3) Population of Municipality

The target provinces of Cercado, Vaca Diez, Moxos and Mamoré have all demonstrated steady growth over 2.00% annually from 1992 to 2001, though some municipal discrepancy has been observed. At the low end lies Puerto Siles, with 0.17% growth. The prominent growth rate of 7.22% in San Javier (Cercado) is also worth a remark. The population of each municipality in 2010 is projected for two scenarios: (1) Population ratio of each municipality remains the same as 2001, and (2) annual growth rate of each municipality remains the same as 1992 - 2001 for the period between 2001 and 2010 (see Table 7.1).

7.3 Goals for Health Improvement for Target Years

Demographic and maternal and child health indicators according to their evolution in the

period 1990-1995 and 1995-2000, with estimated tendency for the period of 2000-2005 are presented in Tables 7.6 and 7.7.

In Table 7.8, the expected evolution in some of these and other epidemiological indicators for the target years for project monitoring is illustrated: 2004 (short term), 2007 (medium term) and 2010 (long term). In all cases, figures estimated by the planning department of SEDES Beni are used.

7.4 Basic Principles of Development Strategies for Achieving Goals

(1) Basic Development Principles

1) Effective and equal distribution of the regional health system should be achieved under the decentralization and popular participation policy. This system will contribute to poverty alleviation.
2) Effective allocation and equal distribution of the limited human and financial resources will be indispensable to solve the management problems of hospital, CS-hospital and CS/PS and to contribute to poverty alleviation in each municipality. For this purpose, these resources will be redistributed and/or integrated according to the balance of health service demand and supply.
3) Inter-municipal health service network system will be developed to establish the effective resource allocation and to cover isolated poverty areas based upon the past experience of donors and NGOs.
4) The proposed system should be operated and managed as sustainable development system by various organizations concerned in health services and supported by central and local governments. The proposed regional health system will be piloted in some provinces and later applied to other provinces by selective manners. Donors and NGOs will be expected to participate in the implementation of the proposed system through the well-organized inter- agency committee in Beni.

(2) Development Strategies

The proposed regional health system will be implemented by a stage-wise approach. In the short-term basis, major focus will be placed on strengthening, expansion and upgrading of the institution and infrastructure of the health service system established by MSPS/SEDES, prefecture/municipal governments, NGOs and donors in the past. In the medium and long-term basis, the new organization and construction of infrastructure will be considered.

1) Short term strategies: to improve the operation and management of the existing institution/organization and infrastructure/equipment of the regional health system through the re-allocation and redistribution of the limited human and financial resources.
2) Medium and long-term strategies: to increase and to relocate human and financial resources and to construct new infrastructure and to install the new equipment to meet the balance of demand and supply through the inter- agencies committee in the national and/or international levels.

(3) Area-wise Regional Health System: Horizontal Approach

Beni Department will be divided into several areas for the development of regional health

system. Zoning criteria are a) geographic conditions, b) socio-economic conditions (population, poverty, ethnicity and agriculture/economic structure), c) infrastructure development, d) urban/rural areas, e) health service levels (hospital, CS-hospital, CS/PS), f) OTB/community activities and g) central/prefecture and municipal government policies.

1) Inter-municipal Health Service Network System
The "Regional Health System" should cover wider areas than a municipality in order to cover the accessible service areas (so-called Health Service Area) of health demand and supply.

2) Regional health system within municipality
As part of the accessible area, each municipality will develop a small-scale health service system within municipality (small scale Unit Area).

a. Urban Area
- Main service center: Integration of medical/health functions of hospitals (general and maternal and child hospitals) and/or upgrading of CS-hospitals/CSs for more effective use of limited human resources, improvement of technical and financial management system of human resources, medicine and O&M system of facilities/equipment.
- Poverty area: authorization and strengthening of PHC programs and re-allocation of human and financial resources to CSs/PSs and sanitary control

b. Rural Area
- Developed areas (Large-scale livestock production areas): establishment of viable O&M system
- Poverty area (Poor farming and/or indigenous areas): upgrading of the existing service level by effective use of the existing human resources with their re-education, rehabilitation of the existing infrastructure and basic equipment and medicines supplies.

7.5 Development Issues

(1) Improvement of General Conditions

1) Natural Conditions: strengthening of the river transport system, PHC of isolated poverty areas and inter-municipal linkages among hospitals and CSs/PSs to compensate for poor accessibility

2) Socio-Economic Conditions: health service activities in cooperation with economic sectors, vocational training of employees and farmers on health and organizing of community group

3) Government Policy: formulation of an integrated and comprehensive action plan for prefecture and municipal development, poverty alleviation in the urban and rural areas and development of the pilot models of the action plans

4) Legal and Institutional Conditions

a. Promotion of decentralization: Establishment of a coordination committee, development of institutional models and formulation of development guidelines for municipal governments

b. Human resources allocation: Reallocation of human resources, more distribution to poverty areas, integrated use of limited human resources, monitoring and supervising

of their work activities, re-education of doctors, licensed nurses and auxiliary nurses on management, O&M and PHC. Human resources allocation by ITEM of MSPS is composed of the following kinds of specialities.

- Professionals: medical doctors, dentists, nurses, nutritionists, social workers, biochemistry/ pharmacy specialists, health education officers, other professionals
- Technicians: laboratory technicians, X-ray technicians, environment technicians, research technicians, and other technicians
- Auxiliary personnel: auxiliary nurses, auxiliary laboratorians, auxiliary statistician, other auxiliary personnel
- Administrators: administrators, administrative staff
- Other services: drivers, laborers

c. Health insurance system: action plan formulation for management improvement, institutional coordination, selection and distribution of medicines, preparation of budgeting and distribution guidelines of medicines

d. Coordination among agencies concerned: formulation of an inter-agency committee at prefecture and municipal levels, formulation of regulation and rules for planning, programming, budgeting by municipal governments, hospitals, SEDES and OTBs/municipalities, establishment of a monitoring and supervising committee. For the strengthening and improvement of health services, the establishment of the department, province and municipal health committee is prescribed in Supreme Decree NO. 25233 of November 1998. The main activities are coordination of hospitals, CSs and PSs, formulation of health programs, financial management, arrangement of human resources, among others. However, in actuality, such health committees have not been organized or functioning. Therefore, these committees must be organized according to the law and function effectively. The coordination process among each committee and health facilities is shown in Fig. 7.1

5) Financial Conditions

a. Central government fund: Preparation of implementation guidelines of regional health system for SEDES, prefecture/municipal governments

b. External resources: Authorization of the proposed programs/projects by the Coordination Committee for the use of PRSP/HIPC fund

c. Prefecture government fund: Allocation to municipal governments through the Coordination Committee

d. Municipal government initiatives: Preparation of Annual Operation Plan (POA) considering OTB's request for HIPC fund for PRSP, DUF fund, municipal government's own fund, revenue from other central government support fund

e. OTB/communities: organizing communities into OTBs and preparation of planning guidelines

6) Development of health related infrastructure: Preparation of infrastructure development plan by prefecture and municipal governments, monitoring of O&M conditions of infrastructure such as transport (road, bridge, ferry boat/vessels and river infrastructure), communication, electricity, water and sanitation

(2) Health Service Supply

1) Facilities and Equipment Management

a. Hospital: Establishment of a supervisory committee, education and training of

hospital doctors and management staff, establishment of cost sharing system, preparation of O&M manual of equipment and medicines

b. CSs/PSs/OTBs: Education and training of leaders and technicians of OTB/communities, classification and ranking of CS/PS service levels depending on the accessibility, population and poverty level, establishment of effective linkages among CSs/PSs and medical boats through the river, upgrading of CSs/PSs in case of poor accessibility from houses to the hospital, development of the integrated transport system to improve accessibility from houses to CSs/PSs

2) Medicine: Establishment of a coordination committee, education and training of medicine use for nurses, auxiliary nurses and users, more distribution of medicines to poverty area

3) Medical equipment: Preparation of equipment lists and maintenance conditions of equipment, preparation of O&M manual, fund preparation of O&M and promotion of maintenance contract with the private sector, prioritisation in equipment selection on the basic health services

4) Medical staff (human resources): redistribution of medical staff, doctors, nurses and auxiliary nurses based on the balance of demand/supply, education and training of medical staff, monitoring of medical staff activities

5) Referral system: upgrading of service quality of CSs/PSs (especially medical that of doctors), education and training of community people on KAP and PHC, education and training of effective use of traditional / natural medicines and traditional healers

6) PHC: Development of model programs of PHC as part of the regional health system

7) Epidemiological surveillance system: strengthening of linkages with CENETROP on laboratory test and strengthening of laboratory function of hospitals/CSs, monitoring of sustainable operation of EPI

(3) Health Service Demand:

Organizing of OTB/communities for regional health system, membership of Coordination and Supervising Committee on the management of hospitals, CS-hospitals and CSs/PSs, education and training on PHC, medicine use, management of water and sanitation system and vocational training for income increase.

7.6 Master Plan of the Integrated Regional Health System

The Beni department health system will be designed, managed and financed to address important issues in the next ten years (Fig. 7.2). The regional health system will be developed to establish an area-wise health service network system in the Beni department by 2010. Each level of health facilities and organizations should be closely connected and linked for a health model based upon PHC strategies (including health promotion), and reduction of the prevalent morbidity and emergency cases to improve the health conditions of inhabitants in poverty areas as well as urban centers.

“Mancomunidad” system (an integrated municipality system in coordination with SEDES/DILOS) should be introduced and promoted for the effective use of limited human and financial resources as well as the development of infrastructure/ facilities and equipment supply in the Beni department.

The regional health system will be developed for the following characteristic zones in the target area of the Study. This development method by zoning will be applied to other

provinces of Beni department for the target year of 2010.

Considering the zone characteristics, sector-wise priority programs will be prepared and developed. To meet the zone characteristics, sector-wise priority programs should

1) Minimization of constraints by natural conditions: According to the national program for epidemiological approach, human resources in hospitals, CSs and OTB/ community are re-educated and a system is formed to specify pathogens by laboratory examination. Regarding the improvement of accessibility, due to extended time and high construction cost necessary for road network and water transportation, quality improvement at the CS level, e.g. human resource training, formation and qualitative-quantitative expansion of facility/ equipment and activities, and formation of multilateral service system, such as wireless radio network, is required.

2) Area coverage of health services: Direct/ indirect service coverage of medical staff is expanded by development of transportation and communication network system around CSs. Dissemination of health insurance and timely and adequate care of pregnant women and infants is achieved through promotion by medical staff to OTBs/ communities and inhabitants. Particularly female medical staff are allocated in order to alleviate social constraints among women in poor area.

3) Institution and organization: The formulation of regional health system in Beni requires coordination and cooperation among relative agencies. A coordination and supervision committee at the prefecture level and, for more routine communications, a committee at the municipal level is established. Hospitals/ CSs and a municipal-level committee build close relationship and improve medicine supply and service application through the health insuranc. For smooth progress of these tasks, Annual Operation Plan in the health sector is prepared by municipalities.

4) Human resources: Despite the tight budget condition, ITEM of MSPS was allocated. In addition, additional ITEM by HIPC II, which focuses on poverty alleviation, was allocated in 2002. Details of ITEM usage in Beni should be documented and fair and transparent recruiting system of staff should be established. Standardized labor conditions of medical staff are formed at the hospital/ CS levels and upgrades the quality of health service. Human resource allocation and labor conditions are monitored, the results of which will be the basis of supervision/ re-education of medical staff.

5) Cost sharing: Although the revenue of hospitals/CSs mainly depends on their own medial service and health insurance subsidy, the amount of income from medical services is not stable as more patients are poor and/or bankrupt. In order to augment account balance of the medical service, attracting clients from different socio-economic strata and building patients' willingness to pay are important. The cost of personnel, materials/ consumables and maintenance takes up much of the expenditure. The medical staff's remuneration is almost fully financed by the two types of ITEMs, namely MSPS (SEDES) and HIPC II, which makes it imperative to secure such funds. Medicines, consumables and maintenance are covered by municipalities' budget. A revolving fund to enable well-timed procurement of medicine will be broadly established. This purchasing scheme will be effective in evading delayed payment from municipalities. In an attempt to reduce maintenance

cost for medical equipment, technician's skills for inspection/ repair will be improved and cost sharing of municipalities will be arranged. Securing costs for fuel and foodstuff for the Medical Boat operation requires assistance by donors and NGOs as well as municipal governments. The above financial arrangements will be managed through the preparation of systematic annual and monthly budget and statement.

Note:
Regarding the Health Insurance, Government has newly introduced the expanded public insurance for maternal and infantile health, SUMI (Seguro Universal Materno Infantil: Law of 2426), instead of SBS at the end of 2002. To secure the health service under SUMI, the Government has also organized the Local Health Board named DILOS (Directorio Local de Salud) in each municipality for the health administration instead of District Health. According to the Law 2426, 10% of annual municipal budget and additional 10% from central government will be allocated to DILOS which consists of 3 members, i.e., City Mayor, SEDES representative and OTB (Surveillance Commiittee) representative, and it was newly assigned for the health administration including the operation/ maintenance of health/ medical facilities in each municipal jurisdiction.

6) Facilities/ equipment: Previous medical facilities and equipment supply was concentrated in the urban area while medical facilities and equipment in urban poverty area and rural area is kept at a poorer level. In amending such a gap between urban and rural areas, the physical conditions and use of the existing medical facilities/ equipment of core hospitals in cities, facilities/ equipment of CSs in poverty area are improved. Rather than staffing a permanent technician in each health facility, on-demand repair/ maintenance service by an independent institution (such as a hospital with capacity to deliver such services or the supplier of equipment that includes after-sales service) will be sought.

7) Hospital management: Hospital management will be strengthened through the hospital management committee that centrally makes decisions. Responsibilities of each department will be defined, inter-departmental communication will be reinforced, and efficient/ effective management system for budgeting, auditing, service delivery and administration will be established. It is essential to provide constant education and training so as to achieve the quality to serve as a core hospital in the regional health system.

8) Medicines: Medicines in hospitals/ CSs are supplied by a dual procedure; authorization by SEDES and payment by municipalities. It is proposed that health organizations acquire necessary medicines in a timely manner by a credit system. A series of medicine management system from request, procurement, use, to storage of medicines is formed through enhancing credit system. Constant education and training on medicine use and management is implemented to medical staff as well as inhabitants and health workers.

9) SNIS: Information concerning diseases and mortality at a hospital/ CS much depends on the experience and knowledge of medical staff, but Institutional capacity at all levels to collect and process data for information system has not yet developed. As such, constant re-education and strengthening of laboratory examinations are conducted by SEDES, CENETROP, etc. In rural communities, patients do not visit health facilities or the health facility simply lacks effective means to access information of inhabitants. Thus mortality of pregnant women and infants is difficult to comprehend. Therefore cooperation and coordination between communities and

CS should be enhanced. A system will be established to send back to hospitals and CSs the data SEDES and MSPS collected, to support medical staff and enable effective use of SNIS.

10) Referral system: The hospital staff's consciousness as the core health institution is enhanced through active consciousness-raising and communication with NGOs and other organizations. The hospital should better attend patients referred from a CS/PS. The CS accepts patients as many as possible, publicizes referral system to clients and swiftly refers patients, who need higher-level attention, to a hospital. After operating intensive care, hospital counter-refers patients to a CS based on the counter referral system. This is an ideal referral system between a hospital, CSs and community for effective regional health system.

11) PHC: SEDES has been implementing PHC as a national program. In addition, PHC implementation system is formed under the coordination of CS and NGOs. This arrangement will improve the linkage of PHC activities and overlaps will be eliminated. Constant education/ training for NGOs by SEDES is promoted.

12) Epidemiological approach: With exhaustive national program, the function of examination in a hospital/ CS is intensified. Constant education/ training by CENETROP in Santa Cruz and cooperation system for examination are formed.

13) Community health: Under the initiative of OTBs and communities such as the health committee, mother's club and credit organization, communication between them and medical staff in a CS is strengthened. This enables to coordinate traditional medical skills and modern medical health technology and to employ human/ social resources of both sides effectively. Primary health service, of which the CS bears a central role, is constructed through allocating CS medical staff living near communities, communicating with inhabitants and understanding the local health situation. Annual operative plan for health service at the OTB level is prepared under the supervision of the CS medical staff. Planning and implementing POA enables constant training to inhabitants.

For the achievement of the proposed plan, sustainable monitoring and education/ training system should be promoted under the permanent coordination and execution committees. These committees will be organized and activated for the establishment of effective and equitable health services at various levels such as community, PS/CS, hospital, municipality and department with a legal basis.

(1) North Zone (major area coverage - Vaca Diez province and neighboring Pando department)

Hospitals in Riberalta and Guayaramerin will function as the health service base of this northern part of Beni department and the neighboring Pando department. One of these hospitals will be upgraded to the 2nd level hospital as the top referral in the North Zone. Health centers in the urban and rural areas of this zone will be closely connected and linked with these hospitals.

(2) Central zone (major area coverage - Cercado province and neighboring Yacuma and Marbán provinces)

Hospital services should be integrated and upgraded to be the 2nd or 3rd level hospitals in

Beni department. Trinidad is a major absorbing area of the poor from rural areas not only in Cercado province but the provinces of Beni department as well. For the alleviation of poverty in Trinidad, CS/PS will play important and significant roles. The new CS/PS in the poverty area of Trinidad will be closely connected and linked with the integrated hospital service system of general and maternal/ child health through the establishment of effective health services model, including a referral system. This model and referral system will cover the rural areas in Mamore, Moxos and other neighboring provinces including Yacuma province as well as Cercado province. The integrated hospital in Trinidad will be the top referral linked with hospitals and the upgarded CS/PS of four target provinces and the other hospitals such as Santa Ana inYacuma.

(3) Satellite Zone 1

San Joaquin (or San Ramon) of Mamore province and San Ignacio of Moxos province are at the position to support the major service centers in North and Central zones. These CSs of the two municipalities will function as the satellite bases for the hospitals in the North and Central zones through the “Mancomunidad” system. The existing CSs of San Joaquin, San Ramon and Puerto Siles and in San Ignacio in these provinces should be strengthened as a satellite base of the integrated hospital of Trinidad for the inhabitants of these provinces. This kind of roles and function will be applied to other provinces without hospitals.

(4) Satellite Zone 2

Ethnic groups especially in Moxos are politically and economically in deprived conditions. The establishment and upgrading of the CS/PS, based upon a community health model, will be promoted for the improvement of their living standard as well as health conditions. Community participation for the establishment and management will be to develop the community health system in these ethnic areas. The community health system in this type of zone will be extended to the other areas in which ethnic groups live.

(5) Riverside Zone

The medical boat system will be developed by stages.
In the initial stage, the existing medical vessel systems operated by CARITAS/EPARU will be supported and strengthened by allocating ITEM and health insurance as well as facilities/equipment. This system will provide health services as mobile CSs/PSs. Target municipality of this mobile health service are Riberalta (Vaca Diez), Guayaramerín (Vaca Diez), Puerto Siles (Mamoré), San Joaquín (Mamoré), San Jabier (Cercado), San Ignacio (Moxos), Santa Ana (Yacuma) and Exaltacion (Yacuma). Close cooperation with public authorities and these NGOs is indispensable for effective operation of medical boats and PHC activities to the poor people along the river.

In the second stage, the developed mobile CS/PS system will be upgraded to a higher level of CS along the main route of the river. In addition to such boats, smaller-scale boating system and mobile PS are introduced to cover remote areas in which a larger boat is not able to access communities. In each community center, communication depot and equipment should be supplied for effective and equitable linkage with the CS-type medical boat in the main route.

It is important to establish a permanent monitoring committee for the next ten years with the participation of Bolivian officers based upon the results of the Pilot Study in order to achieve the main goals of the Master Plan.

7.7 Stage-wise Implementation of Master Plan

7.7.1 Stage-wise Implementation Approach

This stage-wise implementation approach will be introduced for the M/P.

(1) Short-term Plan (2003-2004)

Sustainable development of the Pilot Study and preparation of the establishment of the Integrated Regional Health System proposed in the medium-term plan.

(2) Medium-term Plan (2004-2007)

The regional health system for the four provinces will be established. For this purpose, it is recommended that the Prefecture will act as the implementation agency and Mancomunidad will be organized to operate the health network system among municipalities. Basic activities of the development will be the followings:

1) Extension of the developed hospital management model: The management model developed through the education and training by the Pilot Study for German Busch and Materno Infantil hospitals will be applied to all the hospitals and ex-CS hospitals in the four provinces.
2) Extension of the developed model for urban poverty area: The model developed in Nueva Trinidad will be applied to all the urban poverty areas in the four provinces.
3) Extension of the developed model for rural poverty area: The model developed in Santisima Trinidad will be applied to all the rural poverty areas in the four provinces.
4) Extension of the developed model of health services to the poverty area along the river by medical boat: The model developed along the operation route of mobile health services by CARITAS-Beni will be applied to all the riverside poverty areas.
5) Extension of community health model: extension of education and training system of CS and PS staff in community and family health, developed in the Pilot Study programs in Nueva Trinidad, Santisima Trinidad and the medical boat.

Through the above activities, zone-based development programs are proposed.

a. North Zone: Establishing Vaca Diez province as the hub of health service network in the northern part of Beni Department and the neighboring Pando Department

i) Upgrading hospitals: New general hospital and transferring of functions from the existing hospital in Riberalta
   - New hospital facility
   - Upgrading medical equipment
   - Application of the Urban Health Model
   - Education and training for hospital management

ii) Strengthening General Hospital in Guayaramerín
   - New equipment provision
   - Application of Urban Health Model
   - Education and training for hospital management

iii) Strengthening laboratory function for infectious disease control in the Amazon area
   - New laboratory center in Guayaramerín: CAMETROP (Centro Amazónico de Efermedades Tropícales)
   - Establishment of close linkage with CENETROP

- Technology transfer and education/ training for laboratory work

iv) Strengthening PHC: Strengthening health services in the urban and rural poverty areas
- CS facility construction and equipment provision
- Application of the Urban and Rural Poverty Area Health Models
- Education and training in community and family health

b. Central Zone (Cercado Province): Establishing Cercado province as the hub of health services in the target four provinces and the neighboring Yacuma province

i) Upgrading of German Busch and Materno Infantil hospitals to the 3rd level
- Rehabilitation and extension of the two hospitals
- Upgrading medical equipment
- Application of the Urban Health Model
- Education and training for hospital management

ii) Strengthening PHC: Strengthening health services in the urban and rural poverty areas
- CS facility construction and equipment provision
- Application of the Urban and Rural Poverty Area Health Models
- Education and training in community and family health

c. Satellite Zone 1 and 2 (Mamoré and Moxos Provinces): Establishing two of the target provinces, Mamoré and Moxos, as the satellite zone of the above central zone

i) Strengthening PHC: Strengthening health services in the rural poverty area
- CS facility construction and equipment provision
- Application of Urban and Rural Poverty Area Health Models
- Education and training in community and family health

ii) Strengthening ex-CS hospitals
- Upgrading equipment
- Application of Urban Health Model
- Education and training

d. Riverside Zone: Strengthening mobile health service in the riverside poverty area in the Amazon Basin. Target municipalities are Riberalta, Guayaramerín, Puerto Siles, San Joaquín, San Javier, San Ignacio (TIPNIS communities), etc.

i) Medical boat operation strengthening
- Medical boat construction and equipment provision
- Effective use of the NGOs' experiences including CARITAS, EPARU for management improvement, and/or establishment of an operation body for the medical boat by SEDES

ii) Strengthening PHC
- Strengthening PSs in the riverside area as part of mobile health service network: improvement of communication and demonstration functions as well as resource allocation, medical equipment and medicine supply
- Application of the Integrated and Comprehensive Health Model and Rural Poverty Area Health Model
- Education and training in community and family health

iii) Strengthening communication with the Navy boat

Strengthening of communication and referral function between the Navy hospital boat, medical boats and PSs in the riverside area

e. Education and training

i) Hospital management: Hospital Universitario Japonés in Santa Cruz will provide constant training
ii) Medical personnel: Training system in and out of Bolivia will be established for upgrading the technical standard of existing hospitals
iii) PHC: Strengthening human resources provision by the Nursing School and Auxiliary Nursing School to hospitals, CSs and PSs and education/ training to laboratory technicians by CENETROP in Santa Cruz

(3) Long-term Plan (2007-2010):

Integrated Regional Health System will be developed in the Beni Prefecture.

7.7.2 Development Strategies

A stage-wise implementation approach will be introduced to attain the goals and targets. Technical and financial cooperation will be required from donor countries for the first five years in Vaca Diez, Mamore, Cercado and Moxos provinces. The developed sustainable programs/ projects of regional health system will be applied to the whole Beni Department with their own human and financial resources.

(1) Preparatory Stage (2002-2003)

1) Coordination at the national level: At the national level, the Coordination Committee will be organized in order to manage regional health system in Beni and coordination with donors under the chairmanship of MSPS. One possible option is to place this Committee subordinate to the donor meeting at the MSPS. Allocation and management of medical boats, introduction of referral system between hospitals and CSs, and implementation of human/ financial resource allocation including cost sharing by organizations concerned will be decided by the Committee.
2) Coordination and supervision at the Prefecture level: The Steering Committee, established for Pilot Study monitoring, will continue its function as a coordination and supervisory committee for further Pilot Study implementation by the Bolivian side (Beni Prefectural Government). The Technical Committee will be formed under the Steering Committee comparable to the one this Study had. A Project Office will also be established in the Prefecture government in order to support these Committees. The Project Office will prepare a draft implementation plan toward the target year 2010 and the Committees will decide and approve the plan. Based on this implementation plan, required human/ financial resource allocation will be managed. It is necessary to set criteria for each position to select staff of the Committees and Project Office and to monitor their activities.
3) Model development: An applicable model of regional health system for Beni department will be developed based upon the result of the Pilot Study. A plan of a model development will reflected the results of the monitoring and evaluation of the Pilot Study. The Steering and Technical Committees will form implementation system based on the evaluation of activities and achievements of a model development.
4) Continuation and expansion of the Pilot Study: Continuation of the Pilot Study by the Bolivian side and application of the developed model to other areas of Beni.

(2) Short-term Plan (2003-2006)

This is the stage for implementation of the proposed Master Plan, which reflects results of the Pilot Study and feasibility of the model. In this stage, although implementation system is primarily organized under the initiative of the Bolivian side; i.e., MSPS, Prefecture and Municipality, a support system among donors and NGOs is also formed on account of poor conditions of health service in Beni. Introduction of technical/ financial cooperation by donors is an effective measure. This period is the stage for implementation under cooperation among donors and NGOs. Target areas consist of the four provinces, which is investigated in the Mater Plan. Particularly cooperation/ coordination among donors and effective use of resources/ experiences of each donor is required.

(3) Medium-term Plan (2006-2008)

This is the stage for self-effort of the Bolivian side, utilizing human/ financial resources of Bolivia. Target areas are the same four provinces as in the short-term plan.

(4) Long-term Plan (2008-2010)

This is the stage for applying the model to the whole Beni by the initiative of the Bolivian side.

7.7.3 Proposed Organization for Implementation

For further implementation, the Prefecture government should establish a Project Office. This office works for the coordination and supervision of the proposed projects. This office will support the Steering Committee and Technical Committee, continuing from the Pilot Study of the M/P. In addition, the Municipal Health Council which will be reorganized as DILOS in the new policy should lead periodical meetings organized by the representatives of municipal governments, SEDES, OTBs as well as hospitals, CSs and the medical boat in each health service area (zone) (See Fig. 7.3).

7.8 Priority Program

(1) Basic Principles for the Development of Priority Program

1) Development of the model based upon PHC strategies for the regional health system to meet the decentralization and popular participation policy
2) Strengthening of the provincial/municipal management system
3) Strengthening of the existing health service system through the effective allocation of human and financial resources
4) Strengthening of the existing institution/organization and rehabilitation/expansion of the existing infrastructure and basic medical equipment
5) Private sector strengthening: the capacity and role of the private sector, NGOs and municipalities as service providers

(2) Basic Conditions as a Priority Program

1) Legal authorization: by the inter-agency committee for Beni health improvement for human and financial resources allocation

2) Viability: technical and financial viability and sustainability for future

implementation

3) Leadership: existence of suitable human resources
   a. Leadership in supply side: Management capacity of health service organizations (Hospital, CS/PS and SEDES) and municipality
   b. Leadership in demand side: experiences and consciousness for organizing at the OTB / community level

4) Sector-wise approach
   a. Institutional arrangement under decentralization and popular participation policy
   b. Effective and equitable distribution of human and financial resources
   c. Effective use of the health insurance system
   d. Effective development and O&M of health facilities, equipment and medicine
   e. Strengthening of PHC and health promotion as part of regional health system
   f. Epidemiological surveillance system
   g. Education and training

5) Area-wise approach
   a. Urban area (developed area of secondary health services)
   b. Urban poverty area
   c. Rural area (developed area of primary health services)
   d. Rural poverty area
   e. Inter-municipal linkages

6) Effectiveness: Positive and negative effect by indicators and through monitoring
   a. Medical/health indicators: maternal and infant mortality rate, vaccination rate, etc.
   b. Technical viewpoints: Consultancy/ health services offered, O&M
   c. Financial viewpoints: O&M by hospital/CS/PS and by municipal government
   d. Institutional viewpoints: decentralization and coordination among relevant agencies, ITEM, SBS, allocation of DUF
   e. Socio-economic viewpoints: poverty alleviation in relation to urban or regional development, agricultural and industrial development
   f. Effective use of limited human and finance resources

(3) Priority Program

1) Sector-wise approach
   a. Establishment of Coordination and Supervisory Committee: development of the institutional models and formulation of development guidelines for municipal governments
   b. Re-allocation and monitoring model for the new ITEM
      - Professionals: medical doctors, dentists, nurses, nutrition, social workers, biochemicals/ pharmacy, health education, other professionals
      - Technicians: laboratory technicians X-ray technicians, environment technicians, study technicians, and other technicians
      - Auxiliary personnel: auxiliary nurses, auxiliary laboratorians, auxiliary study technicians, other auxiliary personnel
      - Administrators: administrators, administrative staff
      - Other services: drivers, laborers
   c. Model development for the effective use of health insurance system

d. Model development for the effective financial allocation at the municipality, prefecture and hospital/CS/PS levels
e. Model development for inter-municipal health programs / projects
f. Model development for Annual Operation Plan (POA) for municipal government and OTB
g. Model development of health related infrastructure at each service level
h. Medicine supply and distribution model
i. O&M model for medical equipment
j. Model programs of PHC and health promotion as part of the regional health system
k. Model development for epidemiological surveillance system
l. Education and training models for doctors, nurses, auxiliary nurses, health workers and community people

2) Area-wise Approach

a. Urban health model (hospital and CS-hospital development)
   - Development of hospital management model for hospitals, such as the integration of Hospital German Busch and Hospital Materno Infantil, and upgrading of CS in Trinidad
   - Formulation of development plan for the improved operation and maintenance for equipment supply of hospitals in Guayaramerin and Riberalta
   - Formulation of development plan for the improved operation and maintennace for equipment supply of CS-Hospital San Joaquin, San Ramon in Mamore province, and CS-Hospital San Ignacio in Moxos

b. Urban poverty area development model
   The new establishment of PS in the urban poverty area like Nueva Trinidad in Trinidad City

c. Rural health model: Allocation of human and financial resources to PSs in order to reduce health service gap among PSs

d. Rural poverty area development model: Upgrading of the existing low grade CS/PS to the higher level service quality of CS/PS in the rural poverty area as in Santisima Trinidad in Moxos through more distribution of human and financial resources to CSs/PSs in the poverty area in the 4 provinces. The existing CSs/PSs will be categoraized into several types according to the criteria of health service quality shown in 4.3.1. In addition to these criteria, typical model of CSs/PSs will be developed for service quality based upon the location and accessibility for inhabitants to the CS/PS as well as population covered by the CS/PS.

e. Integrated and comprehensive development model: strengthening the regional health network system among hospitals and CSs/PSs in Beni department through the improvement of mobile transport system on land and medical boat through the river. There are several types of the medical boat. The following types of the medical boat will be reviewed on their availability and cost/effectiveness through the Study.
   - Mobile CS/PS type: The existing CARITAS boat has functioned as mobile CS in Beni. Their activities have contributed to the alleviation of poverty in the area where the boat represents the sole means of health service.
   - Mobile hospital type: In Ecuador, the integrated and comprehensive medical boat system have been introduced and operated in recent years through the assistance of UNICEF.
   - Mobile PHC and social service type: EPARU has operated the social service boat system with medical/health services by auxiliary nurses and technological support for agro-industrial production and products sales. This system

functioned to alleviate poverty in an integrated manner.

8 DESIGNING AND IMPLEMENTATION PLANNING OF PILOT SYUDY

8 DESIGNING AND IMPLEMENTATION PLANNING OF PILOT STUDY

8.1 Target Priority Programs for Pilot Study - Major Components of Pilot Study

8.1.1 Regulation (Roles and Functions) of Steering Committee and Technical Committee

Committees were organized at the prefecture and municipality levels. At the prefecture level, Steering Committee meeting was held for the commencement of the Pilot Study, February 2002 and for monitoring and supervising of the Pilot Study results, December 2002. The municipal level committee was held for designing, operation and monitoring of the Pilot Study from a technical point of view along with the Steering Committee in each stage of preparation and monitoring of the Pilot Study. Regulation (roles and function) of Steering and Technical Committee shown as follows was approved by the institutions/ organizations concerned and Study Team in December 2001.

(1) Steering Committee - Prefecture Level

Article 1 Objectives of the Steering Committee

I Steering Committee approves the following outputs:
   a. Mater Plan (M/P) including Priority Programs
   b. Design, implementation, programming, monitoring and evaluation of the proposed Pilot Study based upon the M/P

II Promotion of “mancomunidad of municipalities” method for the integrated district health system

III Implementation agencies concerned, such as prefectural authorities, SEDES, municipal authorities, OTBs. Hospitals and NGOs for the Pilot Study take the necessary action for its implementation, including human and financial resources allocation.

IV Recommendation on further implementation of the proposed projects based upon the result of the Pilot Study.

Article 2 Roles and Functions of the Steering Committee

I Steering Committee approves the M/P, priority programs and selection of programs for the Pilot Study and function as an advisory committee for the Prefecture government, which is the counterpart agency of JICA for the Study.

II Steering Committee coordinates the activities of Technical Committee and Implementing Agencies concerned in the Pilot Study

III ”Mancomunidad of muicipalidades” system for the implementation of the Pilot Study will be developed for the integrated district health system, including the medical boat system covering 4 provinces (Vaca Diez, Mamore, Cercado, Moxos)

IV Designing of the Pilot Study: Components of the Pilot Study such as management system as well as CS/PS facilities, medical equipment and medical boat are designed considering equity and sustainability of medical/health services. Designing is conducted in consideration with the following criteria.

1) Design concept of Pilot Study
   a. Definition of roles and functions of hospitals and CSs/PSs

b. Prioritization of ITEM allocation
c. Prioritization of facilities and equipment
d. Prioritization of medicine supply by health insurance

2) Institutional design: Implementation organization, ownership, management, financial and human resources allocation and cost sharing
3) Physical design of facilities and equipment: CS/PS of Santísima Trinidad and Nueva Trinidad, and the medical boat
4) TOR on the development of the management model on hospital management improvement
5) Financial and human resources allocation based upon the government popular participation and decentralization policy authorized in PDM/POA and HIPC/PRSP.
   a. ITEM allocation
   b. Health insurance fund allocation
   c. Cost sharing on operation and maintenance

V Monitoring of the Pilot Study: Implementation agencies have the responsibility to submit the report of the Pilot Study to the Steering Committee on their implementation progress and effect based upon the design and implementation guidelines or manual on the Pilot Study.

VI Evaluation of the Pilot Study: Evaluation criteria is identified from the technical, economic, financial and managerial viewpoints as well as contribution to the government policy. Technical Committees of the selected municipalities conducts the evaluation of the Pilot Study. The result of the evaluation is submitted to be approved by the Steering Committee.

VII Recommendation of further implementation on
1) Priority programs
2) Ownership: land, facilities and equipment
3) Management organization
4) Cost sharing among agencies concerned

Article 3 Implementation Activities of the Agencies Concerned

The Steering Committee recommends to the agencies concerned on the following matters of the Pilot Study:

1) SEDES: ITEM allocation to CS/PS, hospital and medical boat of the Pilot Study
2) Municipal government: ITEM allocation by HIPC II, budgeting for health insurance/O&M cost and land acquisition for CS/PS and medical boat which are major components of the Pilot Study.
3) Hospitals (Hospital Presidente German Busch and Materno Infantil Dr. Jesus Vargas in Trinidad): Management on hospital, equipment maintenance, medicine use and accounting
4) OTB
   a. Contribution by supply of labor for facilities construction
   b. Supervision of hospital management, CS/PS, medical boat, medicine and equipment
   c. Cost sharing for health services according to willingness to pay
5) NGO: Management and O&M for PSs/CSs and medical boat under contract with governement

Article 4 Members of the Steering Committee

1) Selection and approval of committee members: Prefect has the responsibility to approve the representatives, who are selected by the agencies concerned.

2) Members (See Table 8.1)

a. Area coverage: 4 Provinces of the Beni Department (Vaca Diez, Mamore, Cercado, Moxos)
b. Member municipalities: 8 municipalities (Guayaramerin, Riberalta, San Joaquin, Trinidad, San Ignacio, San Ramon, Puerto Siles and San Javier)
c. Members

- Chairman: Prefect of Beni Department
- Vice chairman: Director of Social Development Division of the Beni Prefecture
- Members: Mayors, SEDES Directors, Medical School, donors (PROSIN), NGOs (CARITAS, EPARU), Dean of the faculty of Nursing School of Trinidad, OTB of Nueva Trinidad, CEPIB for OTB of Santisima Trinidad (Moxos)

(2) Technical Committee - Municipal Level

Article 1 Objectives of the Technical Committee

I Technical Committee prepares the following outputs:
  a. Mater Plan (M/P) including priority programs
  b. Design, implementation, programming, monitoring and evaluation of the proposed Pilot Study based upon the M/P

II Implementation agencies concerned, such as SEDES, Municipal authorities, OTBs, hospitals and NGOs for the Pilot Study take necessary actions for its implementation, including human and financial resources allocation.

III Recommendation on further implementation of the proposed priority programs based upon the result of the Pilot Study.

Article 2 Roles and Functions of the Technical Committee

I The Technical Committee prepares the M/P, priority programs and selection of programs for the Pilot Study and function as an advisory committee for the municipal governments (the implementation agency of the Pilot Study).

II Designing of the Pilot Study: Components of the Pilot Study such as management system as well as CS/PS facilities, medical equipment and medical boat are designed considering equitability and sustainability of medical/health services. Designing is conducted taking into account the following design criteria.

1) Design concept of the Pilot Study
  a. Definition of roles and functions of hospitals and CSs/PSs
  b. Prioritization of ITEM allocation
  c. Prioritization of facilities and equipment
  d. Prioritization of medicine supply by SBS
2) Institutional design: Implementation organization, ownership, management, financial and human resources allocation and cost sharing
3) Physical design of facilities and equipment: CS/PS of Santisima Trinidad and Nueva Trinidad, and the medical boat
4) TOR of the development of management model on the hospital management improvement

III Financial and human resources allocation based upon the government popular participation and decentralization policy authorized in PDM/POA and HIPC/PRSP.
   a. ITEM allocation
   b. Health insurance fund allocation
   c. Cost sharing on operation and maintenance

IV Monitoring of the Pilot Study: Implementation agencies have a responsibility to submit the report of the Pilot Study to the Steering Committee on their implementation progress and effect based upon the design and implementation guidelines or manual on the Pilot Study.

V Evaluation of the Pilot Study: Evaluation criteria is identified from the technical, economic, financial and managerial viewpoints as well as contribution to the government policy. Technical Committees of the selected municipalities conducts the evaluation of the Pilot Study. The result of the evaluation is submitted to be approved by the Steering Committee.

VI Recommendation of further implementation on:
1) Priority programs
2) Ownership: land, facilities and equipment
3) Management organization
4) Cost sharing among agencies concerned

Article 3 Implementation Activities of the Agencies Concerned

Technical Committee clarifies the responsibility of agencies concerned on the following matters of the Pilot Study.

1) SEDES: ITEM allocation to CS/PS, hospital and medical boat of the Pilot Study.
2) Municipal government: ITEM allocation by HIPC II, Budgeting for health insurance/O&M cost and land acquisition for CS/PS and the medical boat (major components of the Pilot Study).
3) Hospitals (Hospital German Busch and Materno Infantil Dr. Jesus Vargas in Trinidad): Management of hospital, equipment maintenance, medicine use and accounting.
4) OTB
   a. Contribution by supply of labor for facilities construction
   b. Supervision of hospital management, CS/PS, medical boat, medicine and equipment
   c. Cost sharing for health services according to willingness to pay
5) NGO: Management and O&M for PSs/CSs and medical boat

Article 4 Members of the Technical Committee

(1) Selection and Approval of Committee members: Mayor has the responsibility to approve the representatives, who are selected by the agencies concerned.

(2) Members (See Table 8.2 – 8.6)

   a. Chairman: Mayor of the municipality
   b. Members: Consejo Municipal, Comité de Vigilancia, District SEDES, donors, NGOs, Medical Doctors' Organization, Dean of Faculty of Nursing School of Trinidad, Hospital Director, FEJUVE, OTB and communities.

8.1.2 Human Resources Allocation for the Pilot Study

SEDES of the Beni Department requested to the MSPS 214 additional ITEMs to be allocated in 2002 for SEDES, Districts (I Trinidad, II San Ignacio de Moxos, III Magdalena, IV San Joaquin, V Santa Ana, VI Reyes, VII Riberalta, VIII Guayaramerin), Rurrenabaque, San Borja, Santa Rosa and the medical boat of SEDES-JICA. The proposed maximum number of ITEMs for the Pilot Study is shown in the Table 8.7. The Steering Committee reviewed and finalized the optimum numbers for the Pilot Study, taking the following into consideration.

1) Demand and supply balance of health services
2) Definition of service level of the PS/ CS and hospital
3) Definition of referral system with PSs/ CSs and hospitals
4) Incentive for medical/ health staff by a) additional salary and allowance for assignment in remote areas, and b) application of work-shift method.

8.1.3 Model Development by Sectoral Purposes

1) Hospital management (quality control of human resources, accounting, patient data and education/training)
2) Effective use of health insurance
3) Effective financial allocation at municipality, prefecture and hospital/CS/PS levels
4) Establishment of inter-municipal health programs / projects
5) Health related infrastructure at each service level
6) Medicine supply and distribution
7) O&M of medical equipment
8) PHC and health promotion program as a part of district health system
9) Epidemiological surveillance system
10) Community participation (especially women's group)

8.1.4 Model Development of Education and Training for the Establishment of District Health System

1) Target group
   Doctors, nurses, auxiliary nurses and hospital management staff

2) Education/training method
   a. Site inspection/ evaluation on the current conditions of hospital management in Trinidad
   b. Lecture/ workshop for hospital management in Santa Cruz

3) Contents of education/training
   - Management
   - Operation and maintenance

4) Number of trainees and duration

- Trinidad	10 person	1 week
- Santa Cruz	10 person	1 week

8.2 Target Priority Programs for Pilot Study - Major Components of Pilot Study

(1) Urban Health Model (Hospital Development)

Development of hospital management model was programmed for Hospitals Presidente German Busch and Materno Infantil in Trinidad.

1) Hospital management (quality control of human resources, accounting, patient data and education/training)
2) Medicine supply and distribution
3) O&M of medical equipment

(2) Urban Poverty Area: Health Service Model

One CS was newly established in Nueva Trinidad.

1) CS management (quality control of human resources, accounting, patient data and education/training)
2) Effective use of health insurance
3) Effective financial allocation at municipality and CS/PS levels
4) Health related infrastructure at each service level
5) Medicine supply and distribution
6) O&M of medical equipment
7) PHC program as part of regional health system
8) Epidemiological surveillance system
9) Community participation (especially women's group)

(3) Rural poverty Area: Health Communitiy Model

The Existing CS was upgraded to the higher quality level of CS in Santisima Trinidad.

1) CS management (quality control of human resources, accounting, patient data and education/training)
2) Effective use of health insurance
3) Effective financial allocation at municipality and CS/PS levels
4) Health related infrastructure at each service level
5) Medicine supply and distribution
6) O&M of medical equipment
7) PHC program as part of district health system
8) Epidemiological surveillance system
9) Community participation (especially women's group)

Administrative status of Santisíma Trinidad was clarified by the Prefect of Beni Department. Santisíma Trinidad was authorized as the target area of the Pilot Study, and there was no boundary issue identified in relation this community.

(4) Integrated and Comprehensive Development Model

The existing medical boat system was strengthened with the introduction of a new boat and institutional support to CARITAS through the Mamore river. This new system was upgraded to a higher quality CS.

1) Medical Boat management (quality control of human resources, accounting, patient data and education/training)
2) Effective use of health insurance
3) Effective financial allocation at municipality and CS/PS levels
4) Establishment of inter-municipal health programs / projects
5) Health related infrastructure at each service level
6) Medicine supply and distribution
7) O&M of medical equipment
8) PHC program as part of district health system
9) Epidemiological surveillance system
10) Community participation (especially women's group)

8.3 Roles and Functions of Relevant Agencies

Agencies concerned with the Pilot Study implementation took action and shouldered responsibility on the following matters under the instruction of the Steering Committee of Pilot Study.

Agencies concerned	ITEM	SBS	Institutional aspect	Physical aspect
Prefecture	Coordination of Pilot Study including organizing for Mancomunidad system /Steering Committee			
Municipality	1) Authorization in connection with POA 2) Budget allocation on medicines, management and O&M of hospitals and CS/PS - HIPC/FPS (by DUF) 3) Human resources allocation on ITEM 4) Supervising of management and O&M of hospitals and CS/PS 5) Monitoring and evaluation after budget allocation			
SEDES	1. Allocation: Human resoureces /budget, 2. Monitoring, 3. Evaluation	1. Allocation of medicines 2. Monitoring 3. Evaluation	1. Planning on ITEM/SBS and PHC/National programs 2. Education and training (1) Own staff (2) Technology transfer to target groups Monitoring and evaluation of Health District	-
Hospitals/ CSs (Medical doctors)	1. Effective and equitable distribution of human resources 2. Own monitoring and evaluation	Same as ITEM	1. Developmnet of hospital and CS/PS management system 2. Development of management system of hospitals and CS/PS: Committee, working rules, medicine stock and use, accounting 3. Development of education and training program	1. Preparation of proposal for facilities and equipment 2. Plannning of management and O&M system of facilities and equipment
Schools for nurses and auxiliary nurses	-ditto-	-ditto-	-ditto-	-ditto-
Donors	1. Education and training 2. Facilities and equipment supply			
NGOs	1. Operation of facilities and equipment 2. Providing the experienced staff for O&M			
OTBs	1. Planning from user side (beneficiaries) 2. Operation:Participation as health workers 3. Supervising monitoring and evaluation from user side 4. Labor supply by their own finance			

8.4 Design Concept

8.4.1 Objectives

Institutional and physical design was prepared for the Pilot Study regarding management as well as facilities construction and equipment supply of CS/PS facilities, medical equipment and medical boat.

8.4.2 Design Criteria

The following criteria was considering in designing:

a. Health services model
b. Definition of roles, levels and functions of hospitals and CSs/PSs
c. Prioritization of human resources allocation
d. Prioritization of facilities and equipment
e. Prioritization of medicine demand/supply by SBS
f. Geographical and environmental conditions

8.4.3 Contents of Design

(1) Institutional design was prepared on implementation organization, ownership, management, financial and human resources allocation and cost sharing for health services

(2) Physical design of facilities and equipment was prepared for CS/PS of Santisíma Trinidad and Nueva Trinidad and the medical boat

(3) Educational training

(4) Cost-effectiveness considerations

8.4.4 Design Components

It was estimated that the Pilot Study would have effect on the human resources allocations, SBS allocations, institutional activities, and physical structure within the limited area selected for the Study (direct contribution of the Pilot Study). After the Pilot Study, the Bolivian side will apply the models developed by the Pilot Study to all the areas in the 4 provinces (indirect contribution of the Pilot Study).

	Human Resources	SBS	Institutional aspect	Physical aspect
1. Direct contribution	The Study Team designed, and conducted monitoring and evaluation through Pilot Study			
(1) Cercado province	Allocation	Allocation of medicines PHC	1. Committees 2. Management 3. Education and training	Land 1. Basic infrastructure 2. Facilities 3. Equipment
1) Trinidad hospitals	Management Team	**********	Hospital workers approval Eduacational training	—
2) Nueva Trinidad	**********	**********	**********	PS
(2) Moxos province	Allocation	Allocation	1. Committees 2. Management 3. Education and training	Land 1. Basic infrastructure 2. Facilities 3. Equipment
1) Santisima Trinidad	**********	**********	**********	CS
(3) Mancomunidad	**********	**********	**********	Medical boat

2. Indirect contribution	1. The Steering Committee will apply the models developed by the Pilot Study to these areas for the preparation of design, and conducting the monitoring and evaluation based upon M/P. 2. Education and training (2002, 2003) were proposed to be included in the component of Direct Contribution			
(1) Cercado	Allocation	Allocation	Education and training	FPS
1) Other urban poverty area				
2) Other rural poverty area				
(2) Moxos	Allocation	Allocation	Education and training	FPS
1) Urban hospital/CS/PS			Direct contribution	
2) Urban poverty area				
3) Other rural poverty area				
(3) Vaca Diez	Allocation	Allocation	Education and training	FPS
1) Urban hospital/CS/PS			Direct contribution	
2) Urban poverty area				
3) Rural poverty area				
(4)Mamore	Allocation	Allocation	Education and training	FPS
1) Urban hospital/CS/PS			Direct contribution	
2) Urban poverty area				
3) Rural poverty area				

Remarks:
1. Direct contribution: financed by JICA with direct technology transfer by the JICA Study Team
2. Indirect contribution: financed by the JICA Study Team with indirect technology transfer and direct transfer by the Bolivian side

8.5 Designing - Preliminary design

8.5.1 Institutional Design

Regarding the human resources allocation, SBS allocation, institutional activities, and physical preparations required for the Pilot Study, these items were compiled by each responsible agency, institution and organization shown as follows.

	Human resources	SBS	Institutional aspect	Physical aspect
Prefecture	Coordination/Counterpart team/Budget allocation			
Municipality	1) Authorization in connection with POA 2) Budget allocation on management and O&M of hospitals and CS/PS - HIPC/FPS (by DUF) 3) Human resources allocation on ITEM 4) Supervising of management and O&M of hospitals and CS/PS 5) Budget execution 6) Monitoring and evaluation after budget allocation 7) Human resources selection			
SEDES	1. Allocation: Human resources 2. Monitoring 3. Evaluation 4. Human resources selection	1. Allocation of medicines and PHC resources 2. Monitoring 3. Evaluation	1. Planning on ITEM/SBS and PHC/National programs 2. Education and training	-

			(1) Own staff (2) Technology transfer to target groups	
Hospita/l/CS/PS	1. Effective and equitable distribution of human resources 2. Own monitoring and evaluation	Same as ITEM	1. Developmnet of hospital and CS/PS management system 2. Developmen of management system of hospitals and CS/PS: Committee, working rules, medicine stock and use, accounting 3. Development of education and training program	1. Preparation of proposal for facilities and equipment 2. Planning of management and O&M system of facilities and equipment
Donors	1. Financial support 2. Education and training 3. Facilities and equipment supply			
NGOs	1. Operation of facilities and equipment 2. Providing experienced staff for O&M			
OTBs	1. Planning from user side (beneficiaries) 2. Human resources selection 3. Operation: Participation as health workers 4. Supervising monitoring and evaluation from user side (Control social) 5. Labor supply by their own finance			

8.5.2 Physical Design

This table designates the outline of physical design for the Pilot Study. The details of equipment list for the three facilities are shown in Table 8.8. Location of the project sites and sketch plan of the facilities are illustrated in Figures 8.1 to 8.5.

	Santisima Trinidad	Nueva Trinidad	Medical boat
Definition of health service level	CS	CS	CS
1. Basic infrastructure	1. Land acquisition and preparation 2. Water supply and sanitation (drainage/ toilet) 3. Electricity 4. Access road/bridge 5. Communication: Telephone line and/ or radio	Same as Santisima Trinidad	Facilities at the landing points
2. Facilities of CS/PS	1. Health center 2. Housing for medical staff	Health center	-
3.Equipment	1. Bed 2. Cold chain- effective use of the donated equipment from JICA to SEDES 3. Solar system, radio 4. Medical equipment 5. Simple laboratory equipment 6. Service equipment for PHC	Same as Santisima Trinidad	1. Same as Santisima Trinidad 2. Boat: Mother boat, small service boat and speed boat 3. Engine

8.6 Implementation Organization

1) SEDES/municipal government: ITEM and SBS allocation to CS/PS, hospital and medical boat of the Pilot Study
2) Municipal government: ITEM allocation by HIPC II, budgeting for SBS/O&M cost and land acquisition for CS/PS and the medical boat (major components of the Pilot Study).
3) Hospitals (Hospital Presidente German Busch and Materno Infantil Dr. Jesus Vargas in Trinidad): Management on hospital, equipment maintenance, medicine use and accounting
4) OTBs
   a. Contribution by supply of labor for facilities construction
   b. Supervision of hospital management, CS/PS, medical boat, medicine and equipment
   c. Cost sharing according to willingness to pay
5) NGOs: Management and O&M for PSs/CSs and medical boat

The structure of Implementation Organization is shown in the Fig. 8.6.

	Human resources	SBS	Institutional aspect	Physical aspect
Prefecture	Coordination			
Municipality	●	●	●	●
SEDES	●	●	●	-
Hospita/l/CS/PS	●	●	●	●
Donors	●	●	●	●
NGOs			●	●
OTBs		●	●	●

8.7 Implementation Program

Major activities of the Pilot Study could be divided into the following five major components. Implementation program of the Pilot Study is shown in the work flow chart in Fig. 8.7.

(1) Study Team, Municipalities, Local Contractor and Consultant

1) February 2002
   a. Explanation of design and implementation guidelines of the Pilot Study
   b. Municipal government provided land for the new construction and expansion of CSs.
   c. Contract with local contractor on detail design and construction of facilities: Budget was prepared by JICA only for detail design and a small part of facilities construction.
   d. Contract with local consultant on monitoring. Budget was prepared by JICA only for preparation on monitoring (design of baseline survey)

2) May/ August 2002
   a. May 2002: Contract with local contractor/ supplier on construction of facilities and equipment procurement: Budget was prepared by JICA for all of facilities construction works and equipment installation.
   b. May 2002: Contract with local consultants on baseline survey, monitoring and education/training for 2 hospitals. Budget was prepared by JICA for this stage.
   c. August 2002: Contract with local consultant on PHC training for 2 CSs (Nueva Trinidad and Santísima Trinidad) and medical boat: Budget was prepared by JICA.

(2) Facilities construction and equipment supply: May - August 2002

Contractor and equipment supplier carried out facilities construction works and equipment procurement/ installation works.

(3) Monitoring and Education/training

1) February - April 2002
   a. Executing agencies concerned prepared the Pilot Study based upon the provided institutional design and guidelines by the Study Team.
   b. Executing agencies concerned prepared questionnaires for the baseline survey.
   c. Executing agencies concerned monitored the impact of the implementation of Pilot Study based upon the institutional design and guidelines using the existing facilities and equipment before introduction of new facilities and equipment

2) May 2002
   a. Implementation of the baseline survey

3) July - August 2002
   a. Analysis of the baseline survey
   b. Education and training: Trainees were the representatives of 2 hospitals in Trinidad (Hospital German Busch and Materno Infantil Dr. Jesus Vargas) and counterparts.
   c. 1st monitoring of the situation before introduction of new facilities and equipment
   d. Preparation and implementation of monitoring after the introduction of new facilities and equipment
   e. Preparation of progress report on the above a. to d.

4) September - November 2002
   a. 2nd monitoring after the introduction of new facilities and equipment
   b. PHC training for 2 CSs (Nueva Trinidad and Santísima Trinidad) and medical boat
   c. Report preparation on monitoring and evaluation

(4) Steering and Technical Committees

1) Steering Committee (SC)
   a. 1st Committee: Dec. 2001 on official launch and finalization for the regulation of SC
   b. 2nd Committee: Jan. 2002 on mancomunidad documents, pre-selection of ITEM assignment and land acquisition for new CSs of Pilot Study
   c. 3rd Committee: Aug. 2002 on 1st monitoring and Pre DF/R
   d. 4th Committee: Jan. 2003 on general evaluation of the results of 1st and 2nd monitoring of the Pilot Study and DFR including "Further Recommendation for sustainable development"

2) Technical Committte (TC)
   a. 1st Committee: Feb. 2002 on official launch, finalization for regulation of TC and the selection for ITEM allocation
   b. 2nd Committee: Aug. 2002 on the first monitoring on the analysis of the baseline data and trial operation of the Pilot Study without new construction and equipment supply, and on effectiveness of education and training for hospitals
   c. 3rd Committee: Dec. 2002 on the second monitoring on operation of Pilot Study with new construction and equipment supply

d. 4th Committee: Jan. 2003 on general evaluation of the results of 1st and 2nd monitoring of the Pilot Study

(5) Reporting by the Study Team

1) Dec. 2001: Interim Report
2) Feb. 2002: Progress Report
3) Aug. 2002: Pre-Draft Final Report (1st Monitoring Report)
4) Jan. 2003: Draft Final Report

8.8 Monitoring

(1) Objective: Progress and effectiveness by the introduction of Pilot Study were evaluated from technical, financial, economic and institutional points of view.

(2) Data and Information for Monitoring

1) Collection of baseline data: Existing conditions and the future possibility without the target priority program of Pilot Study were identified before commencement of the Pilot Study
2) Physical aspect: Construction procedure and effective use of limited resources for construction through supervision
3) Planning and budgeting ability on institutional aspect, including hospital management, of purchasing/storage/use/maintenance on medicine and equipment, accounting and staff management on their work
4) Implementation ability: Decision making and timely action on coordination, management, O&M
5) Progress and effectiveness by sector and by area
6) Collection of data on the result of Pilot Study: Effectiveness and future possibility with target priority program of Pilot Study were identified after completion of the Pilot Study

(3) Responsibility

The following agencies had responsibility to prepare the monitoring and evaluation reports to be submitted to the Steering Committee and Technical Committee.

1) Self-evaluation by implementing bodies (Hospitals, CS/PS and medical boat) of the target priority programs
2) SEDES' evaluation of procedure and effectiveness on ITEM, SBS and sector /area program
3) Municipal government's evaluation of procedure and effectiveness on financial and human resources allocation for SBS and O&M
4) OTB/community evaluation of procedure and effectiveness on participatory approach, benefit/disbenefit, cost sharing including their willingness to pay
5) NGO/donors evaluation on operation and benefit of the medical boat system

(4) Monitoring Procedure

1) 1st Step: Self-evaluation by target priority programs of Pilot Study
   a. Urban Health Model (Hospital Development): 2 hospitals in Trinidad (Hospital

Presidente German Busch and Materno Infantil Dr. Jesus Vargas)
   b. Urban Poverty Area Health Service Model: CS in Nueva Trinidad
   c. Rural poverty Area Health Service Model: CS in Santisima Trinidad
   d. Integrated and Comprehensive Development Model: Medical boat
2) 2nd Step: Evaluation by agencies concerned
   a. SEDES
   b. Municipal government
   c. OTB/communities
   d. NGO/donors
3) 3rd Step: Evaluation by the Technical Committee
4) 4th Step: Evaluation by the Steering Committee
5) 5th Step: Revision of M/P, priority programs, conclusion and recomendation

(5) Beneficiaries

The number of beneficiaries of the Pilot Study was estimated by province, municipality and community shown below.

Projection of Population and Percentage Attended by the Pilot Study by Province

Province	Municipality	Inhabitant (Census)	Beneficiaries	Family	Community	OTB	%
Cercado	2	83,014	3,729	151	4	6	4.49
Mamore	3	12,362	1,296	146	7	0	10.48
Moxos	1	22,038	3,440	591	24	0	15.61
Vaca Diez	2	114,594	1,228	233	9	0	1.07
Grand Total	10	274,758	9,693	1,121	44	6	3.53

Projection of Population and Percentage Attended by the Pilot Study by Municipality

Province	Municipality	Inhabitant (Census)	Beneficiaries	Family	Community	OTB	%
Cercado	TRINIDAD	78,940	3,465	93	1	6	5.026
	SAN JAVIER	4,074	264	58	3	0	6.48
Mamore	SAN JOAQUIN	5,489	434	77	3	0	7.9
	PUERTO SILES	1,035	862	79	4	0	83.28
Moxos	SAN IGNACIO	22,038	3,440	591	24	0	15.61
Vaca Diez	GUAYARAMERIN	40,921	1,228	233	9	0	3

Communities to be Attended by the Medical Boat for the Pilot Study

RIO MAMORÉ

N°	Province	Municipality	Community	Family	Inhabitant	Distance (kms)
1	Cercado	Trinidad	Puerto Barador	93	465	844
2	Cercado	San Javier	Verdúm	13	64	
3	Cercado	San Javier	Las Tejerías	32	139	
4	Cercado	San Javier	Los Bambuses	13	61	690
5	Mamoré	San Joaquín	Bella Flor	25	150	550
6	Mamoré	Puerto Siles	Bolívar	21	105	320
7	Mamoré	Puerto Siles	Santa Rosa de Vigo	79	475	290
8	Mamoré	Puerto Siles	Altura del Carmen	17	82	260
9	Mamoré	Puerto Siles	Alejandría	33	200	240
10	Vaca Díez	Guayaramerín	San Lorenzo	50	326	150
11	Vaca Díez	Guayaramerín	San Francisco	8	54	120
12	Vaca Díez	Guayaramerín	Puerto Coimbra	11	148	110
13	Vaca Díez	Guayaramerín	Rancho Grande	13	56	100
14	Vaca Díez	Guayaramerín	Barranco Colorado	50	206	80
15	Vaca Díez	Guayaramerín	Palmazola	38	90	70
16	Vaca Díez	Guayaramerín	San Roque	17	115	52
17	Vaca Díez	Guayaramerín	Puerto Carrero	16	103	50
18	Vaca Díez	Guayaramerín	Primero de Mayo	30	130	20
	RIO ITENEZ					
19	Mamoré	San Joaquín	Moré Monte Azul	28	168	20
20	Mamoré	San Joaquín	Vuelta Grande	14	116	35
	RIO ISIBORO					
21	Moxos	San Ignacio	San Benito	15	90	
22	Moxos	San Ignacio	Sanandita	15	90	
23	Moxos	San Ignacio	San Miguel de Isiboro	35	210	
24	Moxos	San Ignacio	Limoncito	8	48	
25	Moxos	San Ignacio	Santa Teresa del Isiboro	39	233	
26	Moxos	San Ignacio	Centro de Gestión	3	18	
27	Moxos	San Ignacio	Naranjalito	8	45	
28	Moxos	San Ignacio	Carmen del Isiboro	9	52	
		TOTAL		733	4,039	

Communities of Indigenous Territory in Parque Nacional Isiboro Secure to be Attended by the CS in Santísima Trinidad

N°	Province	Municipality	Community	Family	Inhabitant
1	Moxos	San Ignacio	Santísima Trinidad	100	490
2	Moxos	San Ignacio	Santa Anita	15	90
3	Moxos	San Ignacio	San Pedro de Buena Vista	30	180
4	Moxos	San Ignacio	Fátima	10	70
5	Moxos	San Ignacio	La Angostura	15	90
6	Moxos	San Ignacio	San Antonio	10	60
7	Moxos	San Ignacio	San Jorgito	8	48
8	Moxos	San Ignacio	3 de Mayo Río Ichoa	10	60
9	Moxos	San Ignacio	Buen Pastor	56	336
10	Moxos	San Ignacio	San Ramoncito	40	240
11	Moxos	San Ignacio	Concepción	40	240
12	Moxos	San Ignacio	San Antonio del Imose	30	180
13	Moxos	San Ignacio	Dulce Nombre	15	90
14	Moxos	San Ignacio	Providencia	10	60
15	Moxos	San Ignacio	San José de Patrocinio	20	120
16	Moxos	San Ignacio	Trinidacito	50	300
			TOTAL HABITANTES	459	2,654

(6) Evaluation Criteria

The result of the Pilot Study was evaluated on the extend to which the problems are solved. Monitoring and evaluation of the Pilot Study will focus on the sustainability of problem solution due to the limited duration of Pilot Study (one year). Evaluation criteria for the level of problem solution, which are depicted on the Table 8.9, are a) Impact to the health conditions, b) Institutional improvement, c) Technical improvement, d) Socio-economic effectiveness and e) Financial viability. Contents of problem solution will be categorized as follows:

1) General health conditions: influence in disease structure and causes of death and accessibility

2) Extention of health service coverage: on area-wise coverage (number of beneficiaries by PS/CS and hospitals) and sector-wise coverage (beneficiaries from SBS, consultation, gender, etc)

3) Institution and administration
   a. Municipal policy and administration: action plan on health sector reform, interest in the health sector, poverty alleviation at the municipal level
   b. Coordination system: an effective and active coordination system among agencies concerned regarding the health sector

4) Human resources: allocation of ITEM numbers to address the imbalance of demand and supply of health services and to diminish inaccessibility and unavailability for inhabitants

5) Cost sharing
   a. Supply side: appropriate allocation management of ITEM, health insurance and

O&M budget amongst relevant agencies
b. Demand side: the beneficiaries' willingness to pay

6) Hospital management
a. Management of hospitals as well as CS/PS on quality control of human resources, accounting, medicine inventory and patient data, and education/training
b. Extention of hospitals' role for district health management

7) Facilities/equipment
a. The scale of existing facilities adequate for demand
b. Balance of allocated health staff and the scale of health facilities
c. Sufficient supply of equipment at health facilities
d. Availability of equipment inventory and operation manual

8) Medicines
a. Effective and timely medicine distribution
b. Improvement of control system on stock and use of medicine supplied by the health insurance and other resources
c. Improvement of provision and training on the knowledge of medicine use for inhabitants, health workers and health staff
d. Identification of affordable price for users

9) Referrral system: effective coordination amongst different health levels, and the health personnel

10) Community health
a. Promotion of data recording on traditional practices (home care)
b. Strenghtening of TBAs and health promoters for integration into public health service
c. Application of better practices by overcoming the social, cultural and economic barriers (e.g. boiling water, etc)
d. Effective system of IEC on sanitation, nutritional control, health insurance
e. Promotion of interest on health conditions
f. Promotion of community drug management with microcredit
g. Promotion of social participation in the health sector by organizing local committees and training on leadership

11) SNIS
a. Strenghtening of institutional capacity for SNIS implementation at all levels (PSs/CSs, hospitals, municipalities and SEDES) to collect and process data
b. Clarification of adequate SNIS capability to analyze data for the identification of major causes of diseases
c. Clarification of a sufficient environment e.g., lack of information processing devices, underequipped laboratories for efficient implementation

12) PHC
a. Enhancement of interest of health personnel on PHC
b. Promotion of integrated health management approach (e.g., IMCI) for mothers and children
c. Effective coordination amongst different primary health care programs, and between

primary health care programs and other health programs

13) Epidemiological approach
   a. Strenghtening of linkage between CENETROP and health facilities in Beni
   b. Strengthening of disease control program in technology, equipment and financial and human resources

9 MONITORING AND EVALUATION OF THE PILOT STUDY

9 MONITORING AND EVALUATION OF THE PILOT STUDY

9.1 Evaluation on the First Monitoring of the Pilot Study

The results of the first monitoring of the Pilot Study are summarized in the following tables.

9.1.1 Hospital Presidente German Busch (Condition before Education/ Training, July 2002)

Criteria	Contents
1. General health conditions	- Being the only public general hospital with general/special medical doctors and nurses in Cercado Province, cases of treatment are various such as external injury, infectious and lifestyle-related diseases. * Refer to Table 9.1
2. Health service coverage	- There is confusion over the extent of support by Health District, donor cooperation and the municipal government as well as the definition of roles between the hospital and the Hospital Materno Infantil in obstetrics/ gynecology and pediatrics. - There are services for emergencies, hospitalization and external consultations. - The expected status of the hospital is at the tertiary level. However, the actual level is observed to be primary or secondary in terms of human resources and equipment. * Refer to Table 9.2
3. Institution and administration (1) Policy (2) Coordination (3) System and Institution	- Formal relationship with district health centers is not established. - The hospital depends on the municipal government for infrastructure and on SEDES for human resources. However ITEM of SEDES is not enough for the hospital to hire the necessary number of staff (nurses and support staff). - Insurance for the elderly over the age of 65 by the municipal government is not sufficient to cover the necessities of these people. - The support of the SBS is insufficient. Due to the low rate of payment from poor clients, uncharged service occupies between 50 and 70% of the total. - Although the relationship with the municipal government is developing, more effective financial support from the municipal government and improvement of support system are required.
4. Hospital management	- Hospital Management Committee was established in June 2001 in accordance with the Decentralization Law, but the Committee has not operated due to lack of coordination and responsibility of concerned agencies. - Due to the underdeveloped hospital management system, internal service network is not defined. - POA is not elaborated. However, activities are implemented on the need basis. - There is no updated organization chart of the hospital. Despite being a general hospital, the previous chart was divided into only two sections, health attention and support service. - There is a technical-administrative council among the directors, administrators and chiefs of the hospital. - Individual clinical history is not inspected although the rules for the use of clinical history and records are defined. - There is neither programmed supervision nor internal supervision of the services. - Evaluation of hospital management and follow-up of hospital activities are not carried out. - Due to lack of a personal computer or a calculator, data collection for hospital management is not implemented. - There are no manuals of hospital management, management procedures and cosultation service. - Providing various types of medical services as a general hospital, it is difficult to focus on specified health care and treatment. - There is no active communication between permanent (8 working-hours) and parttime (4 working-hours) medical doctors as their tasks are not coordinated or integrated. - External consultation are offered only in the morning. Consultation is not offered for surgical or other special cases such as urology.

	- Inpatient treatment is available. - A committee for hospital infection is organized but is not active. - As a strategy for human resources development is not elaborated, patient control is not adequate. - Personnel control, i.e., schedule of doctors' work for inpatient/ outpatient treatment, teaching, research activities, etc. is not regulated.
5. Human resources	- Medical staff's professional attitude for health care and medical treatment is not cultivated. - Deficiency in ITEM has resulted in the need for more specialized staff . The chiefs of the internal medicine and the surgery sections are not sponsored by ITEM. - Some technical training has been carried out in the pharmacy, accounting, nursing and laboratory. - The hospital employs neither a professional pharmacist nor a professional business administrator.
6. Financial resources	- The payment for operation and facilities/equipment maintenance is not usually made in time by the municipal government. - Even when the SBS pays for the medicines, the hospital has to cover the consumables for many indigent patients cannot pay their dues. - Some revenues are generated by emergency patients from CSs/PSs. - Budget is not incorporated in the transfer of TGN (National General Treasury). Decisions on the administration and financial control are not based on the previous balance. Expenses are executed on the need basis. - The tariff for medical service was settled many years ago without adjustment since, and does not reflect the current cost. - The hospital is not subject to cost analysis, as its performance is not evaluated despite its status as the only general hospoital in Trinidad. - No cash flow statement was found though raw financial data exist in the form of an unsorted bundle of receipts. A financial statement is not yet prepared or analyzed periodically. - Revenue: The shortfall in the SBS deposit has caused over 80% of revenue to be incurred by hospital service and 20% by pharmacy. The total revenue is comparatively small, half as that of Hospital Materno Infantil. - Expenditure: Around 70-80% of expenditure has been allocated for materials and consumables. * Refer to the financial statement of hospitals.
7. Facilities and equipment	- Due to lack of a professional technician, equipment has deteriorated before its physical life. - The infrastructure is obsolete and inadequate. Maintenance cost for building and facilities is scarcely reimbursed for want of financial resources. - Three rooms are being constructed for echography, radiology and tomography. - The municipal government is responsible for building and O&M of infrastructure and equipment but these duties are not satisfied. - Identification numbers of equipment are not registered. - Surgery room: Filters of radiation do not allow appropriate illumination for a surgical act. Support canister or base of valves in anesthetic equipment is out-of-order. Sensor of finger for FG monitor is also broken. The surgical tables are not in good condition due to lack of parts. - Sterilization: There is a sterilizer for hard material (sterilization stove) and an obsolete autoclave. - ICU: There is one defibrillator. Guarantee period has already expired. - X rays: There is equipment of 200mA, 50-60 KVA without colimator system, transferred from US military. The support services,

	such as oxygen, are used in balls with faulty gauges. - There are several options to improve the conditions: a. To employ technicians as permanent staff by ITEM allocation; b. To contract with the Hospital Japones for periodical maintenance service; c. To contract with the private sector such as equipment suppliers for the periodical maintenance service.
8. Medicines and consumables	- The sales of medicines are deposited in an account of the *"Cooperative Paititi"* (savings organization), not in the general account of the hospital. - A licensed nurse is the only staff responsible for administration in pharmacy. The salary of this staff comes from revolving fund. - The staff purchase medications with the budget authorized by the finance department. - The pharmacy does not contribute to poor clients. They receive medicines mainly from a social worker, volunteer groups and CIESS. - Inventory cards have not been updated for two months at the time of survey. Stock of medicines is not controlled. - Medicine services of different medical sections are organized independently without coordination. A prescription frequently does not reach the pharmacy. Pharmacy depends on patients' verbal requests. - Medicines in the pharmacy are utilized for both essential cure and commercial sales. 10% of the total earnings are devoted for social service of the hospital. Prices of medicine are lower than those of private pharmacies. - Consumables in the pharmacy are procured on the need basis and when the purcahsing means is available. The history of orders and records are not reflected in the procurement. - The shelves of pharmacy are not sufficient for keeping medicines. - There are two officials in the warehouse, who are new with inadequate knowledge of organization and handling.
9. Referral system	- During the period of site inspection by Hospital Universitario Japonés in July 2002, referral system between the hospital and CSs was not confirmed.
10.Community health, PHC	- During the period of site inspection by Hospital Universitario Japonés in July 2002, there was little social accessibility owing to inadequate attitude of medical staff.
11. SNIS	- Although recorded data of morbidity and mortality are available, it is difficult for doctors to identify causes of diseases for the laboratory information is not reliable. - The hospital carries out neither a periodic meeting of CAI (Committee of analysis of the information) nor a meeting of analysis on different services. - SNIS operation is in poor condition, attributable to the lack of a computer or feedback system.
12.Epidemiological approach	- Coordination with CENETROP and their training is not observed. - Due to lack of equipment, technology, human/financial resources, it is difficult for the hospital to develop epidemiological study.

9.1.2 Hospital Materno Infantil Dr. Jesus Vargas (Condition before Education/ Training, July 2002)

Criteria	Contents
1. General health conditions	- ARI and ADD of infants are main cases treated in this hospital. * Refer to Table 9.1
2. Health service coverage	- There is confusion over the extent of support among the Health District, donor cooperation and the municipal government. - The hospital is designated as a tertiary level institution though functions more as the primary level. - After introducing the SBS system, the occupation rate of the hospital jumped up although the rate is still lower than that of mother and child hospitals of Bolivia and Santa Cruz. * Refer to Table 9.2
3. Institution and administration (1) Policy (2) Coordination (3) System and Institution	- The hospital was established by the Japanese grant aid in 1984 with Japanese volunteers for technical cooperation. - The municipal government has no intention to provide education and training to the hospital staff. The municipal government understands that these activities are conducted under SEDES. - The hospital has an important role in the district health system, liaison with health centers is not effective. - The SBS resources have been allocated to the hospital without problems, because the municipal government has an interest in the ownership of the hospital. - The municipal government contributes to stable reimbursement of the SBS. However, the financial resources under the Popular Participation Law is not stable. - There is no efficient coordination between related agencies and the health sector.
4. Hospital management	- The hospital, certified by UNICEF as baby-friendly hospital, is in full operation along with high rate of population growth, introduction of SBS, and improved access through development of trunk road. - Hospital Management Committee was established in June 2001 in accordance with the Decentralization Law, but the Committee has not been operated due to lack of coordination and responsibility of agencies concerned. - The simplicity of having only two departments, pediatrics and obstetrics/ gynecology, is helpful for hospital management. - POA, application protocol, financial statements and clinical cases/histories are recorded. Health service quality has improved due to monthly monitoring activities by the hospital administration. However, the decision making prcedure and organization structure are still underdeveloped. - Manual of functions are not revised nor applied. There are also manuals of SBS, ADD, ARI, EPI and other infections. - The hospital staff participate in the meeting of evaluation held by SEDES and the District. - Emergency services are devided into two lines, pediatrics and obstetrics/ gynecology. A flowchart shows a periodical technical administrative council. Outpatient treatment is available from morning to afternoon. Night duty contributes to the 24 hour-opening of the hospital. In case of emergency, medical staff are called by telephone. - There is an integrated communication system between permanent and parttime medical doctors that is effective for maternal and child care and reduction of diseases in Trinidad though hospital management and administration is not integrated.
5. Human resources	- There is no accounting or administrative staff with suitable qualification. The turnover of staff is high. - ITEM is fundamentally managed with a political approach and its allocation for full time staffs is very limited.

	- There is no ITEM for chief doctor in obstetrics/ gynecology, neonatology, anesthesiology and traumatology. - Services are minimized because almost all medical staff are working only in the morning.
6. Financial resources	- Improvement in the accessibility to the SBS resources potentially enhance financial conditions of the hospital. - SBS covers the cost for child delivery while consumables are shouldered by the hospital service. - "Willingness to pay" is not developed among clients because SBS users do not understand coverage and system of SBS. - TGN (National General Treasury) under the Ministry of Finance is responsible for salaries of ITEM-sponsored personnel. - Although raw financial data are found as an unorganized bundle of receipts, financial statement is not prepared and analyzed periodically. - SBS performs a major source of hospital revenue as well as revenue from hospital service offered. The total revenue is approximately twice larger than that of the Hospital German Busch. * Refer to the financial statement of hospitals.
7. Facilities and equipment	- ITEM-appointed salary is too low to employ a professional mechanical engineer, who charges US$100/day. - The hospital has not kept fundamental information about equipment including the manufacturer, manuals and identification number. - Preventive maintenance is handled incorrectly and operation is not adjusted. - Surgery room: Due to lack of maintenance, equipment has deteriorated. For example, anesthetizer, oxygenator, tables, portable suction equipment, stretchers for childbirths and intercoms. - Sterilization: There are two autoclaves without maintenance. - X-rays: There are two devices of X-ray. The bigger equipment has been in repair for several years. Function and capability of the other, mobile 300 MA, is limited. - Laboratory: Utilization and function of equipment, such as spectrometer, binocular microscopes, centrifugal wall, work camera fume hoods and centrifuges, is seriously limited. As was not well maintained, distiller is not used. - Energy power station: The station is damaged in pre warmer of water and oil. Electricity is not provided as the device is not maintained. - Phone power station: The station is out of service. Patient's bell to call nurses is not working. - O&M system remains underdeveloped due to lack of professional technicians. There are several options to improve the conditions: a. To employ technicians as permanent staff by ITEM allocation. b. To contract with Hospital Japones to provide periodical maintenance service. c. To contract with private sector such as equipment suppliers on the periodical maintenance service.
8. Medicines and consumables	- The pharmacy was founded in 1996 by SEDES grant. Timely supply and effective distribution of the medication provided by SBS is carried out. However a loss of Bs. 28,459 was recorded in September 2002 due to expiration of medicines. - The pharmacy staff, an administration staff by training, is not a qualified pharmacist. The payments of medicine are collected by the pharmacy and totalled at the end of day. Inventory control is not prepared. Selected medicines and consumables need for night duty is controled by nurses. - The procurement of medicines and consumables is not planned and is done whenever necessary. An application is sent from pharmacy to administration when they purchase medications. Medicines not covered by insurance are charged 15% above the hospital's purchasing price. - Inventory cards are updated every day for controlling medications. - General distribution of medicines has been partly practiced. The hospital fulfills the norm of using essential medicines.

	- There are three shelves and a freezer to store medicines. A computer is not installed. - Registration and filing of prescriptions are in accordance with the manual. - Warehouse is not large enough for storage of medicines. - Medicine code in the national therapeutic form and flowchart of pharmacy section has been build up.
9. Referral system	- There is no integrated referral system between hospitals and CSs. However, some cases of referral have been reported between the hospital and CS in Nueva Trinidad.
10. Community health, PHC	- Some programs of primary health care, such as WHO-promoted vaccination and family planning, have been implemented. - Basic preventive care for pregnant women has been developed without updated medical equipment. - Trainings of human resources have been implemented at an auditorium and training center, including; traditional midwife, responsible health volunteers, orientation and promotion for sexual and reproductive health, promotion of information, education and communication (IEC) in external consultation and hospitalization rooms, evaluation of health programs in coordination with SEDEES, education program of breastfeeding and oral rehydration and training for prevention of hospital infections.
11. SNIS	- Although recorded data of morbidity and mortality are available, it is difficult for doctors to identify causes of diseases for the laboratory information is not reliable. - The statistical staff participates in CAI (Committee of Analysis of Information) without medical and administrative staff. - Data production of the hospital is carried out in an optimal way through SNIS, though lack of equipment, facilities and technical support impedes accurate data processing.
12. Epidemiological approach	- The program VALA (Surveillance Alert Action) is developed for the immediate notification of contagious illnesses.

9.1.3 CS in Nueva Trinidad (Condition before Introduction of CS Facilities for Pilot Study, July 2002)

Criteria	Contents
1. General health conditions	- ARI, ADD, anemia and malnutrition are main cases diagnosed in the CS. * Refer to Table 9.3
2. Health services coverage (1) Covered population & area	- For the covered population, accessibility to the CS has been improved in terms of time as is located closer than the Hospital Materno Infantil. But the CS is rather isolated, as the coverage area has been served by a private hospital. - The CS is expected to serve 2,086 persons of 5 communities. But the target population and health service areas by the CS are not defined. - There were people who did not know the CS and others who knew but could not identify the location. This unfamiliarity is attributed mainly to the low coverage of vaccination activity or SBS services. * Refer to Table 9.4
3. Institution and administration (1) Coordination	- There is no coordination among the CS, the municipal government, the Health District and donors on the CS management and operation. For example, while the number of staff at the CS was satisfactory at the moment, the municipal government and SEDES did not work together to provide the CS with required appropriate materials. Lack of coordination was also seen among SEDES/ Health District 1, the municipal government and communities for the promotion of national primary health care program and SBS. - Neither the municipal government nor SEDES provide the CS with necessary supplies to register users and activities of the CS.
(2) Law and institution	- The municipal government is responsible for maintenance of the health service and payment of salaries to an auxiliary nurse and security guard, and it has paid accordingly. - SEDES Beni is the institution directly in charge of community health but implements only EPI and allocates two staff for community health.
4. CS management	- Leadership of the CS management is not yet determined. -There are two medical doctors; one has been assigned by ITEM of SEDES and the other by HIPC II for the Pilot Study. Because responsibilities are not demarcated between them, one reports to SEDES and the other to the JICA Study Team.
5. Human resources	- Human resources to the new CS have been funded by ITEM of SEDES, HIPC II. Budget was financed by the municipal government of Trinidad. Former volunteer staff of the CS were officially appointed in April, 2002, augmenting their motivation. - Medical staff activities will be expanded from the previous service on the voluntary basis as ITEM has allocated more qualified staff. Medical consultation service is available 5 days a week at the temporary CS, increased from 2days by volunteers. The number patients who visit this temporary CS is maintained at around 10 persons per day. On the other hand, some people indicate health promotion activity in the community was not adequate because the staff are undertrained.
6. Financial resources	- Some possible clients cannot afford the CS consultation and do not pay a call at all. - Cost sharing for operation of the CS was agreed upon among agencies concerned (SEDES, DUF, Municipality of Trinidad). - For CS operation, salary payment from HIPC II is delayed in the processing. - O&M cost, which is paid by the SBS fund, is committed by agencies concerned (SEDES, municipality of Trinidad). - Patients pay 5 Bs. for medical consultation, which indicates only 10 % of total expenses. Another 10% was sponsored by Welfare

	Services and 80% by SBS.
7. Facilities and equipment	- Limited equipment isrequired in the CS. Medical doctors and dentist brought their own materials and have paid for consumables by their own pocket money or small revolving fund under CEASS. - The CS is short of medical equipment including that for the laboratory.
8. Medicines	- SBS partly operated but significant progress was not observed until the inauguration of the new CS. - Administrative difficulty has impaired drug supply by SBS and other sources. Health staff are trained in dealing medicines. - Essential drugs are not supplied.
9. Referral system	- Doctors have conducted consultation of reference to hospitals in case of essential treatment. - Though referral system exists, it is not functioning well due to lack of coordination among the CS and upper level hospitals. - The medical staffs refer the patients to upper hospital with a specific form of the SBS, but medical staffs in hospitals usually does not send the patients back to the CS as a counter referral form.
10. Community health & PHC (1) Supply side	- Majority of staff are not familiar with standardized guidelines for community health and PHC issued by SEDES though they utilize their own materials. - Service coverage area and items for PHC are extensive but education and training materials is not sufficient, which would be effective to improve such services by skilled staff.
(2) Demand side	- Community people are extremely poor with high fertility rate, low schooling and literacy. - Auxiliary nurses have conducted house-to-house visits and provided information to inhabitants. The medical staff are accepted by community people. But the participation in health promotional activities is not sufficient in the community. - Community people know about the vaccines and most mothers are able to acknowledge the record on their children's vaccination card. - Community people are familiar with the ARI program, they normally decide to go to the CS when their children coughed and have fevers for many days. - Almost all mothers know the oral rehydration therapy (ORT), however, the ORS was directly identified as a remedy for diarrhea and not rehydration. - Few mothers can relate diarrhea with the incidence of other diseases such as intestinal parasitosis and malnutrition. They rather associate the disease with hygiene conditions, consumption of food and polluted water. - Regarding family planning, most women know some birth control methods, but they do not practice because these methods are not available or their husbands disapprove the use. - Most of the community people know about the SBS. Some of them hold the respective identification card. Nevertheless, most cannot specify the benefits of SBS or the difference between having it or not.
11. SNIS	- It takes much time to fill out the SNIS form due to insufficient instruction from SEDES and complexity of the worksheet. - Although recorded data of morbidity and mortality are available, it is difficult for doctors to identify causes of diseases for the laboratory information is not reliable.
12. Epidemiological approach	- According to VALA works (Program of Alert Surveillance and Action), the CS informs SEDES about suspect cases whose sample is sent by SEDES to CENETROP for diagnosis.

9.1.4 CS in Santisima Trinidad (Condition before Introduction of New CS Facilities for Pilot Study, July 2002)

Criteria	Contents
1. General health conditions	- In addition to ARI and ADD, vector-born disease cases such as malaria and lesishmania have been diagnosed in the CS. * Refer to the Table 9.3
2. Health service coverage (1) Covered population & area	- Service area. is not defined. - The CS covers most of 58 surrounding communities (4,653 persons). The CS is the only public health facility in the area, and has been in service for more than 5 years. - The covered population is concentrated in and around Santísima Trinidad. Remote areas suffer inaccessibility to the CS, as the municipal government of San Ignacio de Moxos does not provide the CS with necessary financial and human resources for outreaching. * Refer to Table 9.4
(2) Health service level	- The CS is trying to improve quality of care through health service network by radio and mobile system provided by PROSIN.
3. Institution and administration (1) Coordination	- Payment for medical staff by HIPC II restricts effective work, because the procedure requires the staff to travel to Trinidad or San Ignacio for receiving salaries.
(2) Law and institution	- Regarding the SBS, the CS has covered 52% of population under 5 years (478), and 24% of women of reproductive ages (732).
4. CS management	- The CS is well managed owing to the past experiences of medical staff.
5. Human resources	- Human resources were appointed to the CS in April,2002. - Activities are to be encouraged and improved by allocating additional HIPC II (i.e. auxiliary nurse and dentist). - Health staff of the CS cannot cover the whole area as the work.load is excessive. Training of inhabitants in remote areas would contribute to their better health.
6. Financial resources	- Cost sharing for the operation of the CS was agreed upon among agencies concerned. - In the media the government announces that the entire population is entitled to SBS, but SEDES only allocates the SBS to mothers and children under five years old. Under such confusion among the government, health staff and users, the health personnel decided to apply SBS to everybody. - Medical consultation fee is 5 Bolivianos, which is used for maintenance of the CS. The Health Committee, organized by the OTB, also operates a revolving fund for maintenance. - The Health Committee manages a revolving fund. The committee request people not covered by SBS to deposit Bs.10 per family per month, which is not affordable to majority of the families.
7. Facilities and equipment	- In spite of the poor conditions of the medical equipment, the CS has been able to supply health services to the whole TIPNIS during the 5 years in service. - The inhabitants are satisfied with the facilities and equipment of the CS.
8. Medicines	- Medicines are usually purchased at the CS, but the CS does not store sufficient amount of essential drugs. - SBS is partly operated but there was no significant progress before inauguration of the new CS. - The Health Committee is responsible for procurement of drugs financed by SBS and the revolving fund for medical consultation. - The system of periodical communication between the CS and communities twice per week improves technical skill of handling drugs

	and knowledge of various types of illnesses.
9. Referral system	- The CS keeps relations with nearby health centers such as Villa Tunari, Shipiriri, and even superior institutions such as Hospital Materno Infantil and Hospital German Busch.
10. Community health & PHC (1) Supply side	- The CS has implemented PHC services by their own strategies such as constant visits to nearest communities, despite lack of essential materials. - Vaccination campaign is the only available health service for the most remote communities though the health staff are expected to provide other health services. - Original staff have trained newly positioned staff such as dentist and female auxiliary nurse. The new staff conducted house-to-house visits to familiarize inhabitants with PHC and themselves. - There is no education and training on PHC activities by SEDES and Nursing School. - There is no practical training for TBAs except an orientation for general information, clean delivery and vaccination. - The medical staff were qualified at the beginning of the year 2001 for the Integral Management of Childhood Illness (IMCI), they also received training in immunizations. And the CS offers integral care to those under 5 years old and to the women of reproductive ages. - The auxiliary nurse from the community can easily communicate with women who do not speak Spanish. Although originally working temporarily in the community only for vaccination under the contract with SEDES in 2001, she has been assigned by HIPC II for all of PHC activities. Thus PHC service level has improved.
(2) Demand side	- Cultural and socio-economic barriers between the CS staff and clients are observed, generated by insufficient coordination between TBAs and CS staff. - OTB has been planning to organize the Health Committee (Defensoria de Salud) and mothers' club for health care as part of its duties. And it also plans to establish a small-scale drug storage system at the community level in cooperation with the CS by introducing a micro-credit system. Some mothers' clubs were organized in different communities, although the community support for the club is very weak and the operation of the club depends on enthusiasm of their female leaders. - The Health Committee was organized in July 2002 through the community meeting with the area director. - *Remedios caseros* was widely used before consulting the CS. When the treatment is not effective, they decide to consult the CS. - Communities are periodically visited by malaria control teams who fumigate the houses and their surroundings. Though the teams also promote the use of mosquito nets, it has not become successful. - Inhabitants know about ORS and some methods of family planning. However, their knowledge are very superficial because they do not know concrete benefits by utilizing these methods and disbenefits without them. It is attributed to low achievement of schooling (in many cases, illiteracy). - Health promoters in rural area, TBAs and health staff have to be trained on a regular basis.
11. SNIS	- Information was reported to the Health District though personnel information was not upgraded and on-line system was not introduced.
12. Epidemiological approach	- Although recorded data of morbidity and mortality are available, it is difficult for doctors to identify causes of diseases for the laboratory information is not reliable.

9.1.5 Medical boat (Condition before Introduction of New Medical Boat for Pilot Study, July 2002)

Criteria	Contents
1. General health conditions	Though various illnesses are treated by the medical boat, infectious diseases like malaria and pneumonia and chicken pox stand out. * Refer to Table 9.5
2. Health service coverage (1) Covered population & area	- Area coverage and scope of service has been expanded. - The medical boat covers 34 communities (4,048 persons) of 5 municipalities (San Javier, Santa Ana, Exaltation, Puerto Siles and San Joaquín) in 3 health districts (Trinidad, Santa Ana and San Joaquín). However, target population and service areas are not clearly defined. * Refer to Table 9.6
3. Institution and administration (1) Coordination	- Human resources were appointed and financed by several agencies by the end of July 2002. - The staff had no chance to participate in the education and training program by SEDES, as no financial support was provided.
(2) Law & Institution	- The medical boat has been financed by related agencies such as municipalities in accordance with the Decentralization law and Popular participation law, EXTENSA/ World Bank and PROSIN/ USAID. The central government's intention to incorportate the activity of medical boat into the centralized structure has generated donors' confusion.
4. Medical boat management	- Before the Study, CARITAS implemented health service by itself. Since February 2002, CARITAS, SEDES, 3 municipal governments, EXTENSA and PROSIN have collaborated in the management of the medical boat.
5. Human resources	- Only one ITEM was allocated for an auxiliary nurse. EXTENSA/ World Bank allocated fund for a medical doctor, dentist, nurses/malaria technicians and pilot. Municipal governments financed the salaries of the pilot, cook and sailor. Almost all the staff were carried over from previous operation before the Pilot Study. Their past experiences were helpful in effective implementation of the Pilot Study. * Refer to Table 9.13.
6. Financial resources	- Cost sharing was agreed upon for the operation of the medical boat among agencies concerned. - The operation cost was decided to be financed by PROSIN, CARITAS and municipal governments in February 2002. However, budget was not disbursed in time. Full disbursement was expected in August 2002. CARITAS' activities were limited before completion of the boat construction and installation of medical equipments. - Because only a limited budget was financed from the relevant agencies due to delay of processing, the period of medical boat operation has been shortened, compared to the operation in 2001. CARITAS paid operation cost including salary and fuel consumption. The operation cost was reimbursed by responsible agencies based upon the agreement signed in February 2002. - SEDES, three municipal governments, EXTENSA and PROSIN contributed to prepare the budget for the second trip in 2002. Compared with the first trip, the implementation of budget execution in the second trip was well-functioned among related institutions. * Refer to Table 9.16.
7. Facilities and equipment	- The boat and their equipment, financed by the Japanese government, will improve the quality of care. It is a significant difference from the old CARITAS boat.
8. Medicines	- Because of high humidity and ineffective cold chain system, vaccines are wasted. Medicines are eaten by rats in the storage.

	- SBS was partly in operation but there has not been significant progress before inauguration of the new medical boat. - CARITAS could not use the revolving fund by CEASS nor SBS and established their own fund for purchasing medicines, totalling around US$8,000-10,000. CARITAS could be reimbursed for SBS expenditure from SEDES. - Payment for medicines covered by SBS are billed to different municipalities according to the patients served in each community. For the rest of the medicines, payment is covered by a revolving fund. The recovery rate of the total value is approximately from 70 to 80%. Though some medicines are donated, in many cases, the users pay for the medicines in kind, not in cash.
9. Referral system	- In serious cases, patients are transferred to hospitals but they do not receive counter reference from referred hospital. It is expected to achieve a more effective coordination with all Health Districts.
10. Community health & PHC (1) Supply side (2) Demand side	- CARITAS has implemented PHC services by their own strategies. - The medical boat offers health care with SBS to all the communities along the Mamore River. It is helpful for the poor families. - After allocation of human resources, the activities have been expanded mainly by house-to-house visits of auxiliary nurses according to the instruction of a medical doctor. - In each trip, trainings to the community in various topics of integral care (i.e., ADD, ARI, TB, social topics, alcoholism, HIV, etc) are carried out with various methodologies such as exhibition of videos, games, and puppets. And home visit is a opportunity to see the livelihood of each family. - Medical staff of CARITAS has taken neither SEDES technical training nor other public seminar. The staff articulated the need for education and training on PHC by SEDES and CENETROP. CARITAS maintains their Catholic-based family planning approach that is different from SEDES. - The medical ship of the Navy carries out visits only twice a year. It does not assist all the communities and it serves little time in each community. However the medical boat of CARITAS goes on a journey between 5 and 7 times a year with house-to-house visits out. The quality of health care provided by CARITAS is good due to their knowledge of local customs and necessities. - It is necessary to train and qualify health volunteers and midwives in each community. - To standardize the training for health promoters with the objective of introducing the health service network, a committee for IEC advised by PROSIN and PATHFINDER of USAID has been set up in Trinidad - The poor have no cash and they paid for medicine with products. CARITAS has purchased medicines and consumables by selling these products at a Trinidad market.
11. SNIS	-Medical staff spent much time and effort to fill out the SNIS form.
12. Epidemiological approach	- Coordination with CRS (Catholic Relief Services) was achieved for the training of malaria team in the handling of ICT (quick diagnosis of malaria), malaria investigation in Puerto Siles, Guayaramerín and Riberalta in coordination with CENETROP. - It is notable that the personnel in charge of epidemiology at SEDES Beni allowed CARITAS staff to participate in the training on the handling of the national system of epidemiological surveillance, during the 2002 administration. - CARITAS health program includes Epidemiological Surveillance System (called Epidemiological Shield), and CARITAS sends a weekly report to SEDES, though no reported disease has been diagnosed this year.

9.2 Evaluation on the Second Monitoring of the Pilot Study

(1) Hospital Materno Infantil Dr. Jesus Vargas and Hospital German Busch

1) Hospital Materno Infantil Dr. Jesus Vargas

After the education/ training by Hospital Universitario Japonés in Santa Cruz, increased motivation was observed among all persons involved. Hospital Materno Infantil offers integral services to women and children. Motivation was generated in the director, chiefs of service and administration who initiated the reorganization of the hospital. Technical administrative committee was organized for the hospital management. The committee meeting was held every first Tuesday of the month and adhoc-committee meeting was organized when necessary. One of the main interests of the Committee was the SBS. The hospital was restructured by the Counseling Committee. Administration sub-system, the computer network system in the direction, secretary, administration, accounting and statistics, was realized by the donation of the Canadian Society. The Support committee (clinical histories, hospital infections, etc.) was restructured under Technical Administrative Committee. Annual Operative Plan (POA) for the year 2003 has integrated all hospital services and included statistics, administration and social work. Although the hospital began registration of patients, it could not carry out a cost analysis. The O&M of medical equipment was still at an elementary level. Medicines were supplied by various local distributors. The Medicine Acquisition Committee examined the institutional purchase of medicines with the use of a revolving fund. This system was yet to take effect for the lack of support of District Health 1 and SEDES.

2) Hospital Presidente German Busch

The hospital was expected to function as the 2nd and 3rd referral during the education/ training by Hospital Universitario Japonés in Santa Cruz. However in Hospital Presidente German Busch, there was still no clear definition of the role of the hospital. Support from superior authorities was not observed. Frequent changes of staff and disturbance of the government impaired the scheduled development of the hospital. The politics between the union and a political party hinders effective deployment of human resources. The staff in directive position did not have appropriate qualifications. There was no support from the Director of the Hospital for managerial decisions. Regular meeting was held by Technical Administrative Council. Due to the lack of leadership of core personnel such as manager, system for hospital management was not established. Many medical staff were working parttime: 3 hours per day from Monday to Friday. Because the hospital did not have a qualified technician for O&M of medical equipment, the Hospital Universitario Japones trained a personnel in this regard. But the performance of this trainee was still at a primary level. Medicines were not managed by qualified staff, and they only checked the storage of medicines in the process of accounting. Referral system was not functioning well. SNIS was functioning by the effort of staff after the education/ training.

(2) CS in Nueva Trinidad

The CS is located in the health area VI (Cipriano Barace) of the Health District I and it has a population of 2,086. The systematic health services of national program offered by the new CS had been enhanced, and various health services have become available. Accessibility to

the CS (transportation time) was adequate. Municipality of San Ignacio paid the electricity and water charges, and the CS had not been affected by political influence. Because the role of the CS was not defined, support from Health District I was still weak. Salary payment by HIPC II was delayed. The relationship between the health staff and the community was adequate. The paid consultations increased. Generally, the medical staff of the CS were using this CS building very well considering the limited space prepared by the Study Team for the CS functions. But it was reported that the building had problems on the wastewater treatment system and the water distribution piping system. The provisioning of the medicines was carried out mainly in the CEASS through a revolving fund. The pharmacy provided essential drugs to the inhabitants at cheaper-than-market prices, therefore the population seemed to be satisfied. The medicines were stored on a shelf in the pharmacy, and the nurses used a registration method for each medicine. They were checked monthly and the expiration date was controlled. Of all the 34 referral cases, 21 cases were covered by the SBS and were referred to the Hospital Materno Infantil. The other 13 cases were referred to the other Hospital. It was remarkable that in the first monitoring the CS did not have any counter-referral but in the second monitoring the CS had 3 counter-referral cases from the Hospital Materno Infantil and another from another CS. The majority of the CS patients were younger than 5 years old or between 15 to 45 years of age. The dental consultation was on the increase, and it became the biggest financial source of the CS. The health personnel were working very hard for the pregnancy care. The auxiliary nurses carried out the family planning orientation in the community. The CS participated in two vaccination campaigns of the EPI. The vaccination coverage was expanded by the cold chain equipment installed in the CS. The house-to-house visits were an effective way to detect pregnant women, diseases of children under 5 years, patients with higher risk, as well as a good opportunity to educate inhabitants and prevent illnesses. The health committee and the OTB collected money, bought medicines and visited different institutions like CARITAS, to secure their cooperation. With respect to the filling of the SNIS forms, the health personnel improved the recording procedure in comparison with the first four months of work, but the medical staff implied that it took much time to fill up the SNIS forms and this kind of work reduced the quality and the time to provide health service to patients. The CS worked with the VALA (Program of Alert Surveillance and Action) for epidemiological activity. The CS informed SEDES about suspected cases, then SEDES sent the respective sample to CENETROP for diagnosis. There is a set of recorded data on morbidity and mortality in the CS.

(3) CS in Santisma Trinidad

The Health committee and Mother's Club were active in pursuing their roles as before the introduction of new CS facilities. The CS expanded the coverage to the other communities (Isiboro, Secure, Ichoa, Imose, Moleto etc.) of TIPNIS and the CS provided the health information to rural communities by means of radio telecommunication system twice a week for the purpose of reducing the morbidity and mortality in children and mothers. The Health committee participated in various community meetings and fostered an excellent relationship between the health personnel in each community, health counsels and municipality. Both buildings of the CS and the dormitory were functioning well, but the dormitory building had problems on the water delivery system. Regarding the medical equipment, a refrigerator and a dental chair had some problems. Free medicines were supplied to children and mothers covered by the SBS. However, there was still difficulty in assisting those older than 5 years and adults. The CS was successful in reducing diseases like ARI, ADD, intestinal worms, etc. between the first monitoring and the second through house-to-house visits. Though the medical staff filled out the SNIS forms, the information flow was one-way to the Health District and SEDES and there was no feedback to the CS.

(4) Medical boat

The medical boat has serves 28 communities of 5 municipalities (3,159 inhabitants) alongside Mamoré River of approx. 400 km. The boat goes down the river from Puerto Almacen near Triniad to Puerto Alejandría at the mouth of Itenez River and returns back to the home port. It takes 45 days for this round trip. The radio communication system was used to coordinate the activities within the community and with other communities. The Health Council and the Health Municipal Committee were not active. The health staff of the medical boat had not been affected by political influence. There were some payment problems as the cost items were individually contracted. EXTENSA did not complete the payment due to the complexity that hampered the reimbursement. The municipalities paid the medicines of the SBS for mothers and children. The Medical Boat had a pharmacy that works with a revolving fund. PHC activities by CARITAS were effective. When the medical boat was absent, health promoters looked out for the health of the community people, and medical staff of the medical boat gave guidance to the health promoters using the radio communication system.

The results of the second monitoring of the Pilot Study will be summarized in the following tables.

9.2.1 Hospital Presidente German Busch (Condition after Education/ Training, November 2002)

Criteria	Contents
1. General health conditions	
2. Health service coverage (Physical and social accessibility)	- The number of covered population has not been clearly identified
3. Institution and administration (1) Policy (2) Coordination (3) Institution	- The hospital is dealt as the 2nd and 3rd referral institution with a capacity to deal common pathologies, though the hospital is not clearly defined on its role and responsibilities. - Support from superior authorities is not observed, especially in the fields of supervision, control and follow-up of standards/ norms and basic mechanisms such as the appointment of necessary personnel. - Frequent changes of staff and disturbance of the government impaired the scheduled development of the hospital in the form of abuse of decision making and personnel rights by officials. - The politics between the union and a political party hinders effective deployment of human resources.
4. Hospital management	- The staff in directive position did not have appropriate qualifications. - The position of administrator was not defined. - There is no support system for the director to take managerial decisions. - The training by Hospital Universitario Japonés attempted at improvement in the regular practices of; Technical Administrative Council, reports of different sections, procurement of donations, personnel control, agreements with institutions, training course and health control to the staff.
5. Human resources	- Staff turnover is high. - After the training, elevated motivation was observed among all persons involved. - Many medical staff are working parttime: 3 hours per day from Monday to Friday. Emergencies on holidays, external consultation and hospitalization have been undertaken according to an agreement. - Full time doctors work more than twice longer than regular working hours due to lack of personnel. They are on duty on weekends and public holidays. Other fulltime staff are the anesthetists and two surgeons whose workload is also excessive. - Administrative personnel are positioned without relevant qualifications and thus reluctant about changes in their responsibilities for overall improvement of the hospital. However, some staff have demonstrated interest and eagerness.
6. Financial resources	- Performance is similar to that observed in the 1st monitoring. Refer to Table 9.14.
7. Facilities and equipment	- Almost all equipment parts have already past their use of life. - The hospital does not have a qualified professional technician to carry out O&M. - Poor technical knowledge has contributed to the low performance of the trainee during the training and follow-up period. - A few pieces of medical equipment are repaired by the staff with what little knowledge they have. A technician with more solid knowledge is necessary to repair sophisticated equipment such as a tomography and X-ray.
8. Medicines	- An institutional purchace of medicine has been established in accordance with the standards required by the MSPS.

	- The Central Cashier has been successful in the management of inventory cards, control of monthly inventories and expiration dates of medicines and collection of money. - Management and rational use of medicines have been improved by the pharmacy staff. - There are some problems in the staff for the training and working in this section. However the centralization of economic reports has been issued. - The purchase of medicines are planned to meet the needs. Medicines directly come from suppliers.
9. Referral system	- A standardized form for referral has been issued though few referral cases are actualized owing to minimal acknowledgement by staff.
10. Community health, PHC	- Although the hospital is designated as secondary and tertiary institution, PHC activities are not carried out.
11. SNIS	- The hospital keeps more detailed information of patients by implementation of simple registration and personalized books by each medical professional, daily registration of inpatients, radiology, laboratory and of all other sections, recording better statistics.
12.Epidemiological approach	

9.2.2 Hospital Materno Infantil Dr. Jesus Vargas (Condition after Education/ Training, November 2002)

Criteria	Contents
1.General health condition	
2.Health service coverage (Physical and social accessibility)	
3.Institution and administration (1) Policy (2) Coordination (3) Institution	- The hospital depends on the MSPS for human resources and on the municipal government of Trinidad for infrastructure and equipment.
4. Hospital management	- The following programs are being executed: IMCI, ARI, ORU (Oral Rehydration Unit), pap smear test, sexual and reproductive health, breastfeeding promotion. - Motivation was generated in the director, chiefs of service and administration who initiated the reorganization of the hospital. - Joint construction of work instruments: Planning Guides, programming, use of indicators on the management of services. - The committee meeting was held every first Tuesday of the month and adhoc-committee meeting was organized when necessary. One of the main interests of the committee is the SBS. - The hospital have re-structured Organization Chart including the Committee. - Administration sub-system, the computer network system in the direction, secretary, administration, accounting and statistics, was realized by the donation of the Canadian Society. - Annual Operative Plan (POA) for the year 2003 has integrated: Pediatry, Obstetrics/ Gynecology, Neonatology, Surgery Room, Main Warehouse, Administration, Accounting, Nursing, Laboratory, X Rays, Pathology, Ecography, Statistics, Food Intake, Nutrition, Economics, Maintenance, Clearing and Medical Residence.
5. Human resources	- After the training, increased motivation was observed among all persons involved. - The staff in the statistics, personnel and social work, were incorporated to the management of the hospital working team.
6. Financial resources	- Although the hospital began registration of patients, it could not carry out a cost analysis. - Performance is similar to that observed in the 1st monitoring. Refer to Table 9.14.
7. Facilities and equipment	- The education of O&M is still at an elementary level.
8. Medicines	- The education of management of medicine supplies is still at an elementary level. - Medicines are brought by different local distributors according to recommendations of the MSPS and with financial support from SBS of the municipal government. - Purchase of medicines is examined at the Medicine Acquisition Committee with the condition of using the revolving fund. The purchase is in accordance with the medicine list.
9. Referral system	- This system does not work because of lack of support from District I and SEDES.

10. Community health, PHC	- The hospital offers integral services to women in prenatal, delivery and postpartum phases, and to children and adolescents in prevention, health care, rehabilitation and orientation in sexual and reproductive health. - Clinical protocols have been elaborated for common pathologies in the departments of: obstetrics/ gynecology, pediatrics and neonatology. - Obstetrics/ gynecology and pediatrics departments are in charge of hospital infections. - In the laboratory, the hospital has implemented 2 bacteriology tests: Uro-cultive and Co-procultive; but does not handle hemo-cultives or bacteria detection tests for the hospital is not capable in terms of human/ financial resources.
11. SNIS	- Integrated Information System has not been implemented.
12.Epidemiological approach	

9.2.3 CS in Nueva Trinidad (Condition after Introduction of CS Facilities for Pilot Study, November 2002)

Criteria	Contents
1. General health conditions	- ADD, ARI/ pneumonia, malnutrition, dermatological diseases, urinary tract infections, STDs, intestinal parasites, anemia, salmonella infections, arterial hypertension, arthritis, endometritis, conjunctivitis, allergies, alimentary transgressions etc. - The prevalence of malnutrition in children under 5 years old is high.
2. Health services coverage (1) Covered population & area	- The CS is expected to serve 2,086 persons in 5 communities. But the target population and health service areas by the CS are not defined.
(2) Health service level	- The new CS started its activity with new equipment donated by JICA on August 8, 2002. Range and quality of the health care offered to the inhabitants of the target area have increased. - The health service offered by the new CS have enhanced with the necessary equipment for the gynecology service, dental service, general medicine, nursing, and laboratory tests. - The health programs that have been implemented in the CS are: - Integral Management of Childhood Illness (IMCI) - Feeding and Nutrition - Integral management for the woman, Sexual and Reproductive Health - Integral management of the Schools and Adolescents - Habits and Healthy lifestyles - Oral health. - The difference from the first four months of work is the increased equipment and infrastructure: the CS now has 70% of the equipment that enables better quality service.
3. Institution and administration (1) Coordination	-The mayor's office of Trinidad, as in the first four months of work, shows interest and collaborates on all CS activities.
(2) Law and institution	-Municipality is responsible for the payment of electricity and water supply (with a reservoir tank). -The largest groups of patients of the CS are under 5 years and between 15 to 45 years old. Clients have increased in absolute number since the first monitoring. This result can be translated to better acceptance of the SBS.
4. CS management	-It is important to highlight the support of the municipality, SEDES Beni and the prefecture; they have assigned ITEMs to the Pilot Study for the health personnel.
5. Human resources	-From September 2002, the CS has hired a lab technician (biochemistry) and a janitor with its own funds. -The number of personnel of the CS is considered adequate.
6. Financial resources	- The CS has been allocated an appropriate number of ITEMs, and the relevant agencies (SEDES, municipality, prefecture) have paidO&M cost duly, though the SBS financial operation has still to improve. - Salary payment by HIPC II is delayed in its processing. - The paid consultations remarkably increased since the beginning of the CS work.

7. Facilities and equipment	- The dentist consultations have increased with new equipment. - It was reported that the building had problems on the wastewater treatment system and the water distribution piping system. Local contractor conducted fixing works to both problems, but in case of the waste water treatment, new equipment installed by the contractor did not function well. Therefore, municipality of Trinidad carried out temporary counter measure. As to the medical equipment, the refrigerator had a problem, but it was fixed by the repair works of supplier.
8. Medicines	- By the middle of August a revolving fund was established for medicines. - The pharmacy provides essential drugs to clients at cheaper-than-market prices, therefore the population seemed to be satisfied. - The medicines are stored in a shelf and the nurses register each medicine. They are checked monthly and the expiration date is controlled. -The community is supported by the SBS and also has a popular pharmacy with a revolving fund at the CS, benefiting the patients for the prices are cheaper than those in the city pharmacies.
9. Referral system	- Of all the 34 referral cases, 21 cases were covered by the SBS and were referred to the Hospital Materno Infantil. The other 13 cases were referred to the other hospital. Though in the first monitoring the CS did not have any counter-referral but in the second monitoring the CS had 3 counter-referral cases from the Hospital Materno Infantil and another from another CS.
10. Community health & PHC (1) Supply side	- The house-to-house visits were an effective way to detect pregnant women, diseases of children under 5 years, patients with higher risk, as well as a good opportunity to educate inhabitants and prevent illnesses.. - The auxiliary nurses have carried out family planning orientation in the community. - The CS participated in two vaccination campaigns of the EPI. The vaccination coverage has increased with the new cold chain equipment. - The Health committee is the main collaborator of the CS in the health promotion activities.
(2) Demand side	- The relationship with the community is adequate; there is mutual acceptance (doctor-patient-inhabitant-organizations). - An increase in the users of oral pills and condoms is observed since the first monitoring period. - The popular health committee and the OTBs have coordinated with health personnel in order to support the sick, especially children. These organizations collect money, buy medicines and visit different institutions, e.g., CARITAS.
11. SNIS	- The health personnel have improved in filling out the SNIS forms, in comparison with the first four months of work. - Data collection is carried out following the textbook called “Systematizing guide”. - The information is analyzed by CAI, (Information Analysis Committee) held every four months. - The medical staff complain the time to fill out the SNIS forms undercuts the quality and the time to provide health service.
12. Epidemiological approach	- The CS works with the VALA (Program of Alert Surveillance and Action). - The CS informed SEDES about suspect cases, then SEDES sent the respective sample to CENETROP for diagnosis. There is a set of recorded data on morbidity and mortality in the CS.

9.2.4 CS in Santisima Trinidad (Condition after Introduction of New CS Facilities for Pilot Study, November 2002)

Criteria	Contents
1. General health conditions	- The CS was successful in reducing diseases like ARI, ADD intestinal worms, etc. between the first monitoring and the second.
2. Health service coverage (1) Covered population & area	- The CS covers rural communities (3,600 inhabitants) around the rivers such as Isiboro, Secure, Ichoa, Imose, Moleto and others.
(2) Health service level	- The new CS utilizesthe modern equipment to offer various health service, like general medicine, maternal and child health, dentistry and clinical laboratory. - At the moment, there is increase in the coverage of the maternal and child programs, especially immunization to children and pregnant women, medical consultations for ARI, ADD and malnutrition. However, it is still necessary to improve the coverage of prenatal control and family planning activities.
3. Institution and administration (1) Coordination	
4. CS management	
5. Human resources	- The health personnel were motivated after the training by CENETROP / SEDES.
6. Financial resources	
7. Facilities and equipment	- Both buildings of the health center and the dormitory are functioning well, except some problems at the dormitory in the water delivery system (water leaking from delivery pipe), hot water shower system, and roof waterproofing (rainwater leaking). Therefore, it was scheduled that local contractor would follow up the problem after the high water level in the neighboring rivers would calm down to the normal level.. - Regarding the medical equipment, as the refrigerator (electric/ gas-absorption type) and the hand-drill part of the dental chair are experiencing some trouble, local equipment supplier carried out the maintenance work and fixed them.
8. Medicines	- The pharmacy has enough medicines such as antibiotics, analgesic and anti-parasites. The director of the CS manages to supply them well. - Free medicines are supplied to the mothers and children covered with SBS. However, it is difficult to assist children over 5 years old and adults (men and women) that are not covered and often have no money to pay for the medicines. In these cases, the CS personnel may give the medicines on credit, though the risk is high of not recovering the cost.
9. Referral system	- The referral system does not always function because of the geographical isolation and the lack of financial means.
10 Community health & PHC (1) Supply side	- The CS provides health service even on public holidays. Although there is regular opening hours, the emergency cases are treated anytime since the medical personnel live near the CS in the community. - The health staff have implemented house-to-house visits, vaccination campaigns and other health promotion activities in rural communities.
(2) Demand side	- The Health committee has participated in different community meetings and it has good relations with health personnel in each

	community, health councils and the municipality. - The rural communities receive training on various health topics for the purpose of reducing the morbidity and mortality rate in children and mothers.
11. SNIS	- Though the medical staff filled out the SNIS forms, the information flow was one-way to the Health District and SEDES and there was no feedback to the CS.
12. Epidemiological approach	- The health staff undertake surveillance and epidemiological control activities, especially anti-malaria activities including vector control.

9.2.5 Medical boat (Condition after Introduction of New Medical Boat for Pilot Study, November 2002)

Criteria	Evaluator	Contents
1. General health conditions	self evaluation	- The most prevalent diseases are ARI, diarrhea, malnutrition, intestinal worms, dermatological diseases. The main causes of death are ARI and diarrhea.
2. Health service coverage (1) Covered population and area	self evaluation	- The medical boat serves 28 communities in 5 municipalities (San Javier, Santa Ana, Exaltación, San Joaquin, Puerto Siles) with a total population of 3,159 along Mamore river. - The main problem is that community people do not know when the boat arrives near their community. As such, the accessibility to medical boat is still very limited. In emergency cases, the patients are taken to Puerto Siles or to Guayaramerín.
3. Institution and administration (1) Coordination	self evaluation	- The radio communication system is used to coordinate the activities within the community and with other communities. In emergency, Health Districts inform SNIS of cases that the health promoter cannot handle, etc.
(2) Law and institution	self evaluation	- The Health Council and the Health Municipal Committee do not function.
4. Medical boat management	JST	
5. Human resources	self evaluation	- At the beginning of the Pilot Study the whole medical staff were very motivated. However, EXTENSA-sponsored staff were discouraged when they found out about their obligation to pay higher social insurance than ITEM-sponsored staff. - The health staff have improved the service after the training at CENETROP. - After a trip, the health personnel hold an informative meeting with topics raised by the necessities of communities.
6. Financial resources	Overview	- There are some problems in payment due to variations in contracts. EXTENSA delays the payment regularly due to difficulty in the procedure.
7. Facilities and equipment	Overview	- All the requirements for living on the river prepared by CARITAS-Beni, the medical boat KENKO-GO did not face any problem now. Regarding the medical equipment, all items were functioning well, except the refrigerator (electric/ gas-absorption type) and the hand-drill part of the dental chair are experiencing some trouble. Local equipment supplier was making the detailed checking work for these equipment.
8. Medicines	Overview	- The municipalities pay the medicines of the SBS for mothers and children. - The medical Boat has a pharmacy that works through a revolving fund. However, cash-poor clients often have difficulty paying for the medicines. In these cases, they pay with farm products (cassava, banana, rice etc.).
9. Referral system	self evaluation	- The medical boat has all the referral and counter-referral forms. In the latest trip the emergency cases were referred to the nearest hospital. But when the medical boat does not stay in the community, patients are not referred for the lack of transportation means.
10 Community health & PHC (1) Supply side	self evaluation	- The house-to-house visit is a good opportunity to understand the reality of each community, to win their trust, to educate the inhabitants. - The midwives are much appreciated in the community, some of whom have received basic training on clean delivery.

(2) Demand side	Community	- When the medical boat is absent, the OTBs and the health promoters look out for the health of the community people. They call either CARITAS or the hospitals of Santa Ana and San Joaquin by radio, so that they can get some orientation in case of a serious illness. - It is required to improve the PHC skills of the health promoters and traditional midwives through training for the period when the medical boat's service is not available. Improving radio communication network will facilitate their activities.
11. SNIS	self evaluation	- After each visit to a community, data is gathered and put into the SNIS form to be sent to each health district.
12. Epidemiological approach	self evaluation	- Epidemiological surveillance has been strengthened with new laboratory kit, mainly in the areas of tuberculosis and malaria.

9.3 Facility Construction and Equipment Supply by JICA

9.3.1 First Monitoring

For the implementation of priority programs, namely: i) urban poverty area health model, ii) rural poverty area health model and iii) comprehensive health model along Rio Mamoré, it was required for the JICA Study Team to build new facilities of the CS in Nueva Trinidad in Trinidad City and Santísima Trinidad in Moxos province, to build a new medical boat, and to procure basic medical equipment for the above-mentioned CSs and the medical boat. These activities were completed through the contract of construction, and periodical supervision and inspection by the Study Team. These arrangements consisted mainly of "selection of local contractor", "contract negotiation", and "periodical supervision and inspection work" A series of such works were carried out from the beginning of February to the middle of August 2002. All the arrangements for the CS construction were carried out by the JICA Study Team. Regarding the building of medical boat and the procurement of medical equipment, JICA-Bolivia Office was responsible with assistance from the JICA Study Team. Regarding the conditions of subcontract work, refer to Table 9.13.

(1) Construction Work of "Centro de Salud" Nueva Trinidad and Santísima Trinidad

The new CS building has the structure of brick masonry wall with concrete lintel and wooden truss with corrugated cement roofing sheet, and it consists mainly of a nurse room, a laboratory, a dispensary, a general consultation room, a dental consultation room, an obstetric consultation room, and a recovery room. Its building scale (total floor area) is 144 m^2 in CS Nueva Trinidad, and 226 m^2 in CS Santísima Trinidad (including 3 dormitory units and a public kitchen).

The JICA Study Team selected ALFA Ltda. as the contractor and entrusted the implementation design and construction work of CS facilities to this contractor. Implementation design, preparatory/ miscellaneous work for the construction work was done from February 20 to March 18 (regarding the implementation design drawings). After gaining approval for the implementation design from the JICA Study Team, ALFA started the main part of the construction work at the end of April 2002 in Nueva Trinidad in Trinidad City, but due to heavy rainfall at the end of rainy season in and around Cochabamba, not until the middle of May 2002, could they start on the major construction works in Santísma Trinidad de Moxos. The construction work in the former site was completed on July 17, 2002, and the latter was finished in the middle of August 2002 (In case of Santísima Trinidad, it was very difficult for the contractor to finish the exterior/ interior painting because of the extremely high humidity in July 2002). The keys to both new facilities were left with the city mayor of Trinidad City and the OTB representative of Santisima Trinidad respectively immediately after the completion of the construction works. The actual work period in both sites was approx. 3 months (regarding the monthly progress report of the construction work).

(2) Ship-building of Medical Boat

The new medical boat is a wooden 3-story boat with a 114 cv diesel engine, with the width of 4.5 m, and length 18 m, and draws 1.2 m of water. The first floor consists mainly of a consultation room, a dispensary, a dental consultation room, an engine room, and shower/ water closet. The second floor consists mainly of 6 units of cabin, a dining room, and a kitchen/ storage. The third floor is occupied only by a rudder room/ captain's room.

The JICA Study Team selected CARITAS-Beni and recommended this organization as the contractor to JICA-Bolivia. During the contract negotiation, CARITAS-Beni claimed that JICA's payment system (2-installment payments: 40% advance and 60% final) was not suitable for this type of shipbuilding work because it is not a simple work as the normal type of equipment procurement but rather complicated and almost similar to the building construction (in case of construction, multiple installment is usually applied), though to no avail. In any case, JICA-Bolivia contracted the implementation design, supervision and shipbuilding work of the medical boat to this organization on March 22, 2002. At the beginning of April 2002, CARITAS-Beni formulated the implementation design, and they started on the shipbuilding work within the shipyard in Guayaramerín after ordering a diesel engine to a Brazilian manufacturer. After finishing the major works of shipbuilding, they moved the "boat" from Guayaramerín to Puerto Almacen at the beginning of July 2002 and finished the painting/ miscellaneous works. Completion date of this ship-building was July 19, 2002, and this medical boat was named "KENKO-GO" (BARCO de SALUD) by JICA-Bolivia.

(3) Medical Equipment Procurement for 2 CSs and Medical Boat

A total of forty-five items of basic medical equipment were selected for the above-mentioned 2 CSs and the medical boat.

The JICA Study Team selected "San Martin de Porres" (medical equipment supplier in Santa Cruz), and recommended this firm as the contractor to JICA-Bolivia. After evaluating the contents of quotations re-collected by themselves followed by the recommendation from JICA Study Team, JICA-Bolivia assign this medical equipment procurement work to the firm mentioned above on July 8, 2002. Delivery, installation, and handling explanation of the equipment was carried out in CS Nueva Trinidad and on the medical boat on August 7-8, 2002, and in CS Santísima Trinidad on August 16, 2002.

9.3.2 Second Monitoring

Regarding the CS buildings, medical boat, and medical equipment for the Pilot Study, each operation body began their activities of the Pilot Study using the facilities and equipment just after the completions of each work of building constructions, ship-building, and equipment installations in August 2002. Generally, these facilities have been functioning very well during the 2nd monitoring stage, but it was reported by each operation body that these facilities had a few problems. Detail conditions of each facility are described as follows.

(1) Medical Boat

All the requirements for living on the river prepared by CARITAS-Beni, the medical boat KENKO-GO did not face any problem now. Regarding the medical equipment, all items were functioning well, except the refrigerator (electric/ gas-absorption type) and the hand-drill part of the dental chair are experiencing some trouble. Local equipment supplier was making the detailed checking work for these equipment.

(2) CS Nueva Trinidad in Trinida City

Generally, the medical staff of the CS were using this CS building very well considering the

limited space prepared by the Study Team for the CS functions. But it was reported that the building had problems on the wastewater treatment system and the water distribution piping system. Local contractor conducted fixing works to both problems, but in case of the waste water treatment, new equipment installed by the contractor did not function well. Therefore, municipality of Trinidad carried out temporary counter measure. As to the medical equipment, the refrigerator had a problem, but it was fixed by the repair works of supplier.

(3) CS Santísima Trinidad in Moxos Province

Both buildings of the health center and the dormitory are functioning well, except some problems at the dormitory in the water delivery system (water leaking from delivery pipe), hot water shower system, and roof waterproofing (rainwater leaking). Therefore, it was scheduled that local contractor would follow up the problem after the high water level in the neighboring rivers would calm down to the normal level. Regarding the medical equipment, as the refrigerator (electric/ gas-absorption type) and the hand-drill part of the dental chair are experiencing some trouble, local equipment supplier carried out the maintenance work and fixed them.

Regarding the above mentioned problems confirmed in CS buildings and medical equipment, Study Team and its counterpart officially requested, on December 10, 2002, the contractor ALFA Ltda. and the supplier San Martin de Porres to inspect the conditions and take appropriate measures for the problems.

10 IMPLEMENTATION OF TECHNOLOGY TRANSFER

10 IMPLEMENTATION OF TECHNOLOGY TRANSFER

10.1 Technology Transfer to the Counterpart Personnel

This Study conducted three types of technology transfer to the counterpart at the time of the study works in Bolivia: a) on-the-job training, b) seminars and workshops, and c) training of the counterpart in Japan. In on-the-job training, weekly meetings were held by the Study Team and the Bolivian counterpart. Also, by preparing the reports for each Phase jointly and locally, understanding of the formulated project was confirmed. Aside from the three types of technological transfer mentioned, appropriate medical and technical advise has been provided to health-related personnel.

Little coordination has been achieved between counterpart personnel assigned from the Prefecture of Beni and SEDES. Also, it has been observed that the full-time assignment of counterpart personnel was extremely difficult. Such a situation has hampered effective transfer of technology from the Study Team, which was to be attained from day-to-day operation.

10.2 Technology Transfer to the Personnel related to the Pilot Study

Technology transfer on the project formulation, preparations, planning/ implementation, and monitoring was carried out for the related personnel, such as the central government (MSPS and the Ministry of Finance), the Prefecture government, SEDES, municipal governments, NGOs, and OTBs through the discussions in La Paz and the various activities of the Steering Committee and Technical Committee (Refer to "2. Coordination and Participatory Approach").

10.3 Technology Transfer to the Medical Staff related to the Pilot Study

For all components of the Pilot Study (i. urban health model, ii. urban poverty area health service model, iii. rural poverty area health community model, iv. integrated and comprehensive development model), following types of education/ training were carried out for the medical staff of 2 hospitals in Trinidad, CSs in Nueva Trinidad in Trinidad city and Santísima Trinidad in Moxos, and the medical boat.

a. Education/ training conducted by Hospital Universitario Japonés in Santa Cruz for personnel of Hospital Presidente German Busch and Hospital Materno Infantil Dr. Jesus Vargas in Trinidad for improvement of hospital management/ operation.
b. Primary health care training conducted by CENETROP and SEDES-Beni for personnel of the new health center facilities of Nueva Trinidad and Santísima Trinidad, and new medical boat.

The outline of these education/ training are shown as follows, and their training results are shown in "9. Monitoring and Evaluation of the Pilot Study".

10.3.1 Education/ Training for Personnel of Hospitals in Trinidad

(1) Objectives

1) Problem identification of the management of the two hospitals in Trinidad (Hospital Presidente German Busch and Hospital Materno Infantil Dr. Jesus Vargas) in Beni

Prefecture (hereinafter referred to as the "Trinidad hospitals") and proposal of an education and training system for improvement.

2) Problem identification of the operation and maintenance of medical equipment of the Trinidad hospitals and education/training of the administrative and medical staff for improvement.

3) Problem identification of the management of medical consumables of the Trinidad hospitals and education/training of the administrative and medical staff for improvement.

(2) Contents of Training

1) Hospital management consultation
   - Conduct an interview survey to directors and management staff of the Trinidad hospitals to identify and assess their management problems
   - Review and identify problems regarding facilities and equipment conditions, staff attitude toward patients, technical level of medical staff, financial efficiency, and the efficiency of patient records
   - Develop training programs based upon the facts identified through the above survey
   - Implement training at an advanced hospital in Santa Cruz and the Trinidad hospitals
   - Review the results and impact of training and prepare the respective part of the Progress Report

2) Management consultation of drugs and consumables use
   - Conduct an interview survey to responsible staff of the Trinidad hospitals to identify and assess their management problems
   - Analyze existing data on the execution of SBS for its efficiency
   - Develop training programs based upon the facts identified through the above survey and analysis, especially on the development and updating of the inventory of drugs (purchase, stock, consumption, etc)
   - Implement training at an advanced hospital in Santa Cruz and the Trinidad hospitals
   - Assist Trinidad hospitals staff in compiling a "guideline" for the inventory of medical consumables by the hospital staff themselves
   - Review the results and impact of training and prepare the respective part of the Progress Report

3) Operation and maintenance consultation of medical equipment
   - Conduct an interview survey to responsible staff of the Trinidad hospitals to identify and assess their management problems
   - Analyze existing data on equipment use for its efficiency
   - Develop training programs based upon the facts identified through the above survey and analysis, especially on the development and updating of the inventory of existing equipment (purchase, maintenance, operation record, etc)
   - Implement training at an advanced hospital in Santa Cruz and the Trinidad hospitals
   - Assist Trinidad hospitals staff in compiling a "guideline" for the inventory of medical equipment by the hospital staff themselves
   - Review the results and impact of training and prepare the respective part of the Progress Report

(3) Training Schedule

1) May - June 2002
   - Survey and assessment of the existing conditions of the hospitals
   - Development of the training program in Santa Cruz
   - Implementation of the training of the hospital directors and staff in Santa Cruz
   - 5 trainees per hospital (hospital management 1 person, equipment maintenance 1 person, medical consumables 1 person, and others 2 persons)
2) July 2002
   - Development of the on-the-job training program at the Trinidad hospitals
3) July - August 2002
   - Explanation of the survey of existing conditions and the progress of training to the Technical Committee of the Pilot Study
   - Implementation of the on-the-job training to the directors and staff of the Trinidad hospitals in Trinidad
   - Compilation of "guidelines"
4) November 2002
   - Evaluation of the education and training
   - Explanation of the evaluation to the Technical Committee
   - Preparation and submission of the Progress Report to the JICA Study Team

10.3.2 Primary Health Care Training for Personnel of New Health Centers and Medical Boat

(1) Objective

Implementation of PHC-related training to medical workers and communities for integrating the PHC activities in the medical boat and 2 CSs of the Pilot Study.

(2) Activities

1) Seminar
   - Preparation of guideline of PHC activities on CSs to standardize medical worker’s activities on CSs.
   - Conducting the workshop to medical workers and communities for the introduction of general and specific PHC activities in CSs.
2) Technical training
   - Introduction of effective laboratory examination flow in CSs
   - Preparation of textbook for practices
   - Practice of specific diagnosis methods using equipment
   - Evaluation report of training
3) O&M system for new equipment
   - Preparation of training programs such as inventory and maintenance check list
   - Implementation of the on-the-job training and training at each site
4) Attendance and report to the Technical Committee
   - Submission of the evaluation report on results of education and training

(3) Training Schedule

1) September 2002
   - Preparation of the training program for equipment management
   - Seminar in Trinidad by SEDES-Beni
   - Technical training at CENETROP in Santa Cruz

- Evaluation of the education and training

2) November 2002
   - Development of the on-the-job training program and monitoring at each site
   - Adjustment of the inventory and maintenance sheet

3) December 2002
   - Explanation of the evaluation to the Technical Committee
   - Preparation and submission of the report to the JICA Study Team

11 PROPOSED TECHNICAL COOPERATION

11 PROPOSED TECHNICAL COOPERATION

According to the M/P, the regional health system will be developed by following 4 major zones, namely, i) north zone, ii) central zone, iii) satellite zone and iv) riverside zone. The priority programs for the Pilot Study, the core of the programs formulated in the M/P, were planned to be carried out in the zones of ii), iii) and iv) mentioned above. The programs proposed for the technical cooperation at the present time has a role in support and expansion of the priority programs.

11.1 Program Component

The Program serves three (3) areas of as north, central and south with regard to the efficiency of accessibility, enforcement of referral system network and equity of PHC (vaccination program and maternal health care, etc.). A small referral system network, from primary health care to tertiary health care (although second level in actuality), is completed in each area. Based on the experience of the Pilot Study, expansion of each model of the Pilot Study will be developed considering social, economic and financial feasibility.

(1) Program in Northern Area

Riberalta is the hub in the northern area, covering Vaca Diez District. Riberalta hospital becomes the highest health service facility in this area, and surrounded CS and PS can refer patients to the Riberalta hospital. In addition, the medical boat will serve riverside communities along Beni River.

Riberalta has nurse education programs; a 16-month course for auxiliary nurses and a 5-year course for licensed nurses. In this northern area, malaria is one of the most important endemic tropical diseases. MSPS intends to establish the institute of tropical medicine (CAMETROP) in Riberalta with major donors.

Input	Primary Health Care	Secondary Health Care	Tertiary Health Care
Target organization	OTB/ Community	Nursing Schools	Hospital workers
Target facilities	Puesto de Salud (PS) Medial Boat	Centro de Salud (CS)	Hospital Riberalta

To fulfill the concept, following activities are proposed;

- Training of hospital management for institutional and equipment maintenance
- Technical transfer to health facilities (laboratory and medical workers) with cooperation with CAMETROP
- Education in the auxiliary nursing school and Health science faculty of nursing course in Technical University of Beni in Riberalta

- Medical equipment supply to Riberalta hospital as top referral hospital (secondary revel) in northern area
- Shipbuilding of medical boat and its equipment procurement
- Medical equipment supply to CS/ PS collaborating with FPS

These activities work together to build the referral system network within the northern area.

(2) Program in Central Area

Trinidad is the hub in the central area and Hospital Presidente German Busch and Hospital

Materno Infantil Dr. Jesus Vargas become the highest health service facility in Cercado, Mamoré, Moxos and Yacuma Provinces. Medical boat procured for the Pilot Study operates along Mamoré River to cover riverside communities and CS/ PS covers remote area.

For medical education, Trinidad has nurse education programs of 18-month course for auxiliary nurses and 5-year course of licensed nurses. In Santa Cruz, CENETROP is established for tropical medicine of Bolivia and this center has a long-term experience with Japanese experts for laboratory work and targeted south part of Beni Department. Additionally, Hospital Universitario Japonés assists in capacity building for Hospital Presidente German Busch and Hospital Materno Infantil Dr. Jesus Vargas in the Pilot Study.

Input	Primary Health Care	Secondary Health Care	Tertiary Health Care
Target organization	OTB/ Community	Nursing Schools	Hospital workers
Target facilities	Puesto de Salud (PS)	Centro de Salud (CS)	Hospital P. German Busch Hospital Materno Infantil

To materialize the concept, following activities are proposed;

- Training on hospital management for institutional and equipment maintenance in cooperation with Hospital Universitario Japonés in Santa Cruz
- Technical transfer to health facilities (laboratory and medical workers) in cooperation with CENETROP
- Medical equipment supply to Hospital Presidente German Busch and Hospital Materno Infantil Dr. Jesus Vargas for being top referral hospital (secondary revel) in central area
- Education in the auxiliary nursing school and Health science faculty of nursing course in Technical University of Beni in Trinidad
- Medical equipment supply to CSs/ PSs with assistance from FIS/ FPS

(3) Program in Southern Area

San Ignacio de Moxos is the hub in Moxos and Marbán Provinces in the southern area. The medical boat connects communities through Isiboro River, that include Santísima Trinidad where a comoponent of the Pilot Study is located. This area has no medical institution that is accessible and of quality to have patients referred to. In emergency, the area CSs have options to refer their patients to a hospital in Trinidad, Cochabamba, or Santa Cruz. The Trinidad hospitals do not meet the quality demanded, and are further than the other two cities. Obviously, Cochabamba and Santa Cruz are outside of the department and referral to these cities presents some bureaucratic difficulties. It is suggested that the area strengthens its basic health service as the hub.

Input	Primary Health Care	Secondary Health Care	Tertiary Health Care
Target organization	OTB/ Community	Hub CS workers	-
Target facilities	Puesto de Salud (PS) Medial Boat	Centro de Salud (CS)	-

To fulfill the concept, following activities are raised;

- Training of hospital management for institutional and equipment maintenance with cooperation with Hospital Universitario Japonés in Santa Cruz
- Technical transfer to health facilities (laboratory and medical workers) with cooperation with CENETROP
- Shipbuilding of medical boat and its equipment procurement

- Medical equipment supply (including speed boat) to CS/ PS corroborating with FPS

11.2 Required Technical Assistance

Technical assistance is required in the realms of hospital management of administration, medical service, laboratory service, and operation/maintenance (O&M), and PHC activities.

Hospital management includes training on balance and budgetary management, human resources management and organizational management and is run under the cooperation with Hospital Universitario Japonés in Santa Cruz. Medical service is supported through technical transfer on the introduced medical equipment for effective treatment and management to doctors and nurses in the targeted hospital.

Laboratory service is strengthened in technical transfer on the introduced medical equipment for emergency and routine work, and educational training to laboratory technicians in CS/ PS laboratory for endemic diseases such as malaria, cooperating with CENETROP and CAMETROP.

Operation/maintenance (O&M) component is for hospital engineers who are charged to operate and maintain equipment.

PHC activities are such as training of TBAs, community hygiene and nutrition for OTB/ community.

11.3 Project Cost

Total project cost is approximately US$5,463,000

- Northern area: total cost US$1,810,000
- Central area: total cost US$2,321,000
- Southern area: total cost US$1,332,000

The details are shown as follows.

	Northern Area	Central Area	Southern Area
1. Personnel Expense			
(1) Consultantng Fee incl. direct personnel cost, general/ technical expense, perdiem, and international travel cost	$ 854,000	$ 854,000	$ 854,000
(2) Equipment for Consultants	$ 37,000	$120,000 incl. 4WD vehicle x 2 units	$37,000
(3) Local Expense of Consultants	$ 37,000	$ 37,000	$ 37,000
2. Education/ Training Cost Sub-contract to Japanese Hospital, CENETROP or Others	$ 100,000	$ 100,000	$ 100,000
3. Health/ Medical Equipment Cost			
(1) Medical Boat - Ship building	$ 57,000	-	$ 57,000
(2) Equipment Installation for Medical Boat	$ 30,000	-	$ 30,000
(3) Equipment Installation for Regional Major Hospital	$ 515,000	$ 1,03,000	$ 37,000
(4) Equipment Installation for Health Center (6	$ 180,000	$ 180,000	$ 180,000

CSs)			
Total	$ 1,810,000	$ 2,321,000	$ 1,332,000
Grand Total of Northern, Central, and Southern Areas		$ 5,463,000	

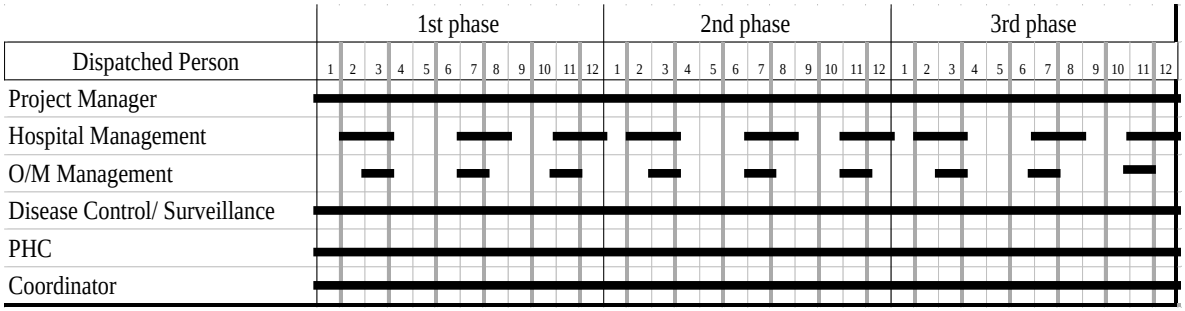
Note: Foreign exchange rate is US$ 1.00 = 135 Japanese Yen in January 2002

11.4 Implementation Schedule

The project is divided into three (3) phases for each area, three (3) years in total. First phase in the first year is the implementation in the central area to continue and expand the activity of the Pilot Study.

Second phase in the second year shifts its focus to the northern area and the project base moves to Riberalta. CAMETROP is established in Riberalta and its training capacity is developed.

Third phase in the final year for the southern area is based in Santa Cruz or San Ignacio.



11.5 Implementation Agency

Expected implementation agencies for this technical cooperation are shown below.
Implementation Agency: Beni Prefecture
Ministry: Ministry of Health and Social Welfare
Vice Ministry of Public Investment and External Finance, Ministry of Finance

11.6 Related Activities by Third Countries or International Organizations in the Same Sector

USAID/PROSIN, UNICEF, CIDA, WHO/PAHO and UNFPA.

11.7 Benefit and Effects of the Project:

(1) Beneficiaries

1) Cercado Province
   - Trinidad: population 78,940
   - San Javier: population 4,074
2) Mamoré Province
   - San Joaquin: population 5,489
   - Puesto Siles: population 1,035
3) Moxos Province
   - San Ignacio: population 22,038

(2) Benefit and Effect

Sustainable regional health system will be developed for poverty alleviation with the following benefits and effects

a. Strengthening of institution and management body
b. Effective health service through regional health system
c. Effective use of the limited human and financial resource
d. Promotion of inter-municipal organization (mancomunidad) system
e. Sustainable education and training system

It is estimated that more than 10,000 Japanese Bolivians reside in Beni Department. This technical cooperation project will contribute to the benefit of Japanese Bolivians, and they are expected to play an important role in the operation of the project together with the other people in Beni.

11.8 Method of Technical Assistance

(1) Project Type

1) Development Survey, Phase II: "The Study of Enhancement of District Health System for Beni Prefecture in the Republic of Bolivia" will be completed by the end of March 2003. This Study is at the stage of M/P development and initial operation of the proposed priority projects as the Pilot Study for the model development of the Regional Health System in Beni Department. This stage will be identified as the Stage I of the Development Survey.

The developed model will be transferred and expanded to the four provinces and the other related areas of Beni Department. For this purpose, the development survey as Stage II will be proposed. Major purpose of this Stage II survey is to establish the effective institution and organization of Regional Health System including sustainable "mancomunidad" system and transfer the technology developed in the Development Survey Stage I to the relevant organizations.

Appropriate consultants will be assigned for this development survey domestically or from neighboring countries as well as donor countries.

2) Technical Cooperation Project
Purpose of the Project is the same as 2) Development Survey but with more focus on the project implementation rather than investigation. A consulting firm will work jointly with NGOs and/or Universities for Technical Cooperation.

(2) Qualification of Dispatched Persons

1) Roles of project staff

Position	Project Manager	Hospital Management	O/M Management	Disease Control/ Surveylance	PHC	Coordinator
Project manager	●					●
Donor coodination	●					●
Institution/ Organization	●	●				
Human resources	●	●	●	●	●	
Financial resources	●	●	●	●	●	
Administration		●				
O&M of facility and equipment		●	●			
Drug management		●		●		
Referral system	●	●		●	●	
Community health system					●	
SNIS		●		●		
PHC					●	
Infectious disease control				●		

2) Required qualification for project staff

	P. Manager	Hospital management	O/M of facility and medical equipment	Infectious disease control	PHC	Coordinator
International consultants	Experience of PM in relevant area.	Sufficient experience of the position in South America.	Experience of the position.	Experience of the position in Bolivia or South America.	Experience of the position in Bolivia or South America.	Experience of the position in relevant area.
Local consultants						

12 PROJECT COST AND EVALUATION

12 PROJECT COST AND EVALUATION

12.1 Project Cost

12.1.1 Master Plan and Improvement Project for Health/ Medical Facilities

Zone-based development programs for the integrated district health system are described in the chapter 7.7.1 - (2) as Medium Term Plan (2004 - 2007) of the Master Plan. Regarding the total cost estimation for the improvement project of health/ medical facilities, following major items were selected from the zone-based programs mentioned above.

A. North Zone: (major coverage - Vaca Diez Province and Pando Prefecture)
   a) Upgrading hospitals: New general hospital and transferring of functions from the existing hospital in Riberalta
      - New hospital facility
      - Upgrading medical equipment
   b) Strengthening General Hospital in Guayaramerín
      - New equipment provision
   c) Strengthening PHC: Strengthening health services in the urban and rural poverty areas
      - CS facility construction and equipment provision

B. Central Zone (major coverage – Cercado and Yacuma and Marbán Provinces)
   a) Upgrading of Hospitals German Busch and Materno Infantil to 3rd level
      - Rehabilitation and expansion of the two hospitals
      - Upgrading medical equipment
   b) Strengthening PHC
      - CS facility construction and equipment provision

C. Satellite Zones 1 and 2 (major coverage: Mamoré and Moxos Provinces)
   a) Strengthening PHC
      - CS facility construction and equipment provision

D. Education and training
   a) PHC: Strengthening human resources provision and education/ training by the Nursing School and Auxiliary Nursing School

12.1.2 Details of the Improvement Project for Health/ Medical Facilities, Total Project Cost, and Maintenance Cost

Details of the improvement project is shown as follows, and its total cost is estimated to be approx. US$ 21,470,000.00 (Refer to Annex 2 "3.1 Required Financial Assistance for Improvement Project"), on the assumption that the international prices of equipment and construction work be adopted. Regarding the annual maintenance cost of facilities and equipment improved by this project, it is estimated to be approx. US$ 764,000.00 per year (approx. 4% of total project cost) on the assumption that the average life span of the facility and the medical equipment are 50 years and 15 years respectively.

(1) Facilities Renovation/ Construction and Equipment Supply:

1) Equipment Supply and Facilities Renovation:

Target facilities and their addresses:

Hospital Materno Infantil Dr. Jesus Vargas (Address: Av. Japón, Trinidad) and Hospital Presidente German Busch (Address: C. Bolivar entre Carmelo Lopez y Jose Natusch, Trinidad)

Contents of the works:

Health/ medical equipment supply and interior/ exterior renovation of hospital buildings for both hospitals

2) Facilities Construction and Equipment Supply:

i) New Facilities Construction and Equipment Supply for Health Centers

a. Cercado, Yacuma and Marbán Province

Contents of the works:

Construction of new facilities of CS with total floor area of approx.104 m^2 and PS with total floor area of 74 m^2 and health/ medical equipment supply

Target facilities and their addresses (7 CSs and 3 PSs):

Centro de Salud (total floor area: approx. 104 m^2)

- CS Mangalito (Trinidad/ Cercado, establishment of new CS)
  Address: Calle 24 de Agosto, entre Estudiante y 1ro de Mayo
- CS San Vicente (Trinidad/ Cercado, renewal of existing CS)
  Address: Machetero s/n, Trinidad
- CS Villa Vecinal (Trinidad/ Cercado, renewal of existing CS)
  Address: Calle Principal, Villa Vecinal, Trinidad
- CS San Javier (Cercado, renewal of existing CS)
  Address: C. Principal, frente a la escuela, San Javier
- CS Exaltación (Yacuma, renewal of existing CS)
  Address: Zona 16 de Julio
- CS Loreto (Marbán, renewal of existing CS)
  Address: Municipio de Loreto
- CS San Andrés (Marbán, renewal of existing CS)
  Address: Municipio de Loreto

Puesto de Salud (total floor area: approx. 74 m^2)

- PS El Carmen (Trinidad/ Cercado, renewal of existing PS)
  Address: Motacú (SEDES-junta vecinal), Trinidad
- PS Puerto Almacen (Cercado, renewal of existing PS)
  Address: Av. Trinidad, Puerto Almacen
- PS San Pedro Nuevo (Cercado, renewal of existing PS)
  Address: Calle Principal, San Pedro Nuevo
- PS Villa Báncer (Marbán, establishment of new PS)
  Address: Municipality of San Andrés

b. Moxos and Mamoré Province

Contents of the works:

Construction of new facilities of CS with total floor area of approx.104 m^2 and PS with total floor area of 74 m^2 and health/ medical equipment supply

Target facilities and their addresses (1 CS and 2 PSs):

Centro de Salud (total floor area: approx. 104 m^2)

- CS Puerto Siles (Mamoré, renewal of existing CS)
  Address: Puerto Siles, Mamoré

Puesto de Salud (total floor area: approx. 74 m^2)

- PS San Miguelito de Isiboro (Moxos, establishment of new PS)
  Address: Comunidad San Miguelito del Isiboro
- PS Santa Rosa de Vigo (Mamoré, renewal of existing PS)
  Address: C. Pedro Ignacio Muiba esq. 6 de agosto, Santa Rosa de Vigo

c. Vaca Diez Province

Contents of the works:

Construction of new facilities of CS with total floor area of approx.104 m^2 and PS with total floor area of 74 m^2 and health/ medical equipment supply

Target facilities and their addresses (2 CSs and 4 PSs):

Centro de Salud (total floor area: approx. 104 m^2)

- CS Los Tajibos (Vaca Diez, establishment of new CS)
  Address: Municipality of Riberalta
- CS Rosario del Yata (Vaca Diez, renewal of existing CS)
  Address: Municipality of Guayaramerín

Puesto de Salud (total floor area: approx. 74 m^2)

- PS Warnes (Vaca Diez, renewal of existing PS)
  Address: Municipality of Riberalta
- PS Peña Amarilla (Vaca Diez, renewal of existing PS)
  Address: Municipality of Riberalta
- PS Buen Distino (Vaca Diez, renewal of existing PS)
  Address: Municipality of Riberalta
- PS Villa Bella (Vaca Diez, renewal of existing PS)
  Address: Municipality of Guayaramerín

ii) New facilities construction and equipment supply for education/ training organization

a. Laboratory

Target facility and its address:

Nursing Course, Health Science Faculty, Technical University of Beni (Address: Calle Cochabamba # 675, Trinidad)

Contents of the works:

Construction of new laboratory facility with total floor area of approx. 200m^2 and health/ medical equipment supply

b. Auxiliary Nursing School

Target facility and its address:

Auxiliary Nursing School of SEDES-Beni Trinidad (Address: Avenida Japón s/n, Trinidad)

Contents of the works:

Construction of new facility of auxiliary nursing school with total floor area of approx. 600 m^2 and health/ medical equipment supply

iii) New facilities construction and equipment supply for hospital

Target facility and its sddress:

Hospital Riberalta (Address: Riberalta City, Vaca Diez)

Contents of the works:

Construction of new hospital facilities with total floor area of approx. 3,200m^2 and health/ medical equipment supply

3) Equipment Supply to Existing Health Centers

a. Cercado, Yacuma and Marbán Province

Contents of the works:

Health/ medical equipment supply to existing health centers

Target facility and its address (1 PS):

Puesto de Salud

- PS Coquinal (Exaltación, Yacuma)
  Address: Municipality of Exaltación

b. Moxos, Mamoré and Iténez Province

Contents of the works:

Health/ medical equipment supply to existing health centers

Target facilities and their addresses (18 CSs and 7 PSs):

Centro de Salud

- CS Desengaño (Moxos)
  Address: Municipality of San Ignacio
- CS San Lorenzo (Moxos)
  Address: Municipality of San Ignacio
- CS El retiro (Moxos)
  Address: Municipality of San Ignacio
- CS Mercedes del Cabito (Moxos)
  Address: Municipality of San Ignacio
- CS Litoral (Moxos)
  Address: Municipality of San Ignacio
- CS San Ignacio (Moxos)
  Address: Municipality of San Ignacio
- CS Santa Rita (Moxos)
  Address: Municipality of San Ignacio
- CS San Juan de Cuberene (Moxos)
  Address: Municipality of San Ignacio
- CS Florida (Moxos)
  Address: Municipality of San Ignacio
- CS Monte Mae (Moxos)
  Address: Municipality of San Ignacio
- CS Villa Esperanza (Moxos)
  Address: Municipality of San Ignacio
- CS San Miguel del Cabito (Moxos)
  Address: Municipality of San Ignacio
- CS Algodonal (Moxos)
  Address: Municipality of San Ignacio
- CS Chontal (Moxos)
  Address: Municipality of San Ignacio
- CS Chanequere (Moxos)
  Address: Municipality of San Ignacio
- CS Villa Brisa (Moxos)
  Address: Municipality of San Ignacio
- CS Mercedes del Apere (Moxos)
  Address: Municipality of San Ignacio
- CS Remanzo (Baures, Iténez)
  Address: Municipality of Baures

Puesto de Salud
- PS Puerto San Borja (Moxos)
  Address: Municipality of San Ignacio
- PS Santa Rosa del Apere (Moxos)
  Address: Municipality of San Ignacio
- PS Monte Grande del Carmen (Moxos)
  Address: Municipality of San Ignacio
- PS Fatima (Moxos)
  Address: Municipality of San Ignacio
- PS San Jose del Cabito (Moxos)
  Address: Municipality of San Ignacio
- PS Argentina (Moxos)
  Address: Municipality of San Ignacio
- PS El Cairo (Baures, Iténez)
  Address: Municipality of Baures

c. Vaca Diez Province

Contents of the works:

Health/ medical equipment supply to existing health centers

Target facilities and their addresses (6 CSs and 2 PSs):

Centro de Salud
- CS San Isidoro (Vaca Diez)
  Address: Municipality of Guayaramerín
- CS San Joaquín (Vaca Diez)
  Address: Municipality of Guayaramerín
- CS 1 de Mayo (Vaca Diez)
  Address: Municipality of Guayaramerín
- CS Alto Ivon (Vaca Diez)
  Address: Municipality of Riberalta
- CS Nazareth (Vaca Diez)
  Address: Municipality of Riberalta
- CS La Esperanza (Vaca Diez)
  Address: Municipality of Riberalta

Puesto de Salud
- PS Cachuela Esperanza (Vaca Diez)
  Address: Municipality of Guayaramerín
- PS More Monte Azul (Vaca Diez)
  Address: Municipality of Guayaramerín
- PS San Lorenzo (Vaca Diez)
  Address: Municipality of Guayaramerín

4) Equipment supply to existing hospital

Target facility and its address:

Hospital Guayarameín (Address: Guayaramerín City, Vaca Diez)

Contents of the works:

Health/ medical equipment supply to the existing hospital

12.1.3 Management Cost of Facilities and Equipment

(1) Hospital Materno Infantil

Total operation cost for this Hospital in Trinidad is estimated at Bs. 916,000 comprised of Bs. 146,000 for salaries and Bs. 770,000 for other operation cost based upon the financial statement of the Hospital in 2002.

(2) Hospital German Busch

Total operation cost for this Hospital in Trinidad is estimated at Bs. 450,000 comprised of Bs. 80,000 for salaries and Bs. 370,000 for other operation cost based upon the financial statement of the Hospital in 2002.

12.1.4 Education and Training

According to Chapter 11 "Proposed Technical Cooperation", education/ training of the hospital management of administration, medical service, laboratory service, O&M, and PHC service is requested to be realized by the technical assistance to maintain strong relations among Hospital Universitario Japonés in Santa Cruz, CENETROP and other agencies.

Total cost of education/ training is estimated to be US$ 300,000.00 including the transportation/ lodging cost of trainees, and it is estimated on the assumption that these education/ training effort will be delegated to Hospital Universitario Japonés, CENETROP and others.

12.2 Future Demand and Requirement for Human Resources

Requirement of human resources by 2010 is shown in the table below, assuming that No. of medical staff will be kept at the same level of 2001. Financial resources to health sector is limted in Bolivia as well as Beni. ITEM allocation should take into account effective resource use.

Province	Population		Medical staff (2001)			Medical staff (2010)		
	2001	2010	Medical doctor/dentist (per 1,000 population)	Nurse/auxiliary nurse/lab. technician(per 1,000 population)	Total	Medical doctor/dentist (per 1,000 population)	Nurse/auxiliary nurse/labo technician (per 1,000 population	Total
1.Vaca Diez	115	152	59(0.5)	138(1.2)	197(1.7)	83	180	263
2.Cercado	83	110	84(1.6)	147(1.8)	231(3.4)	119	192	311
3.Mamore	12	16	10(0.8)	14(1.1))	24(1.9)	14	18	32
4.Moxos	22	28	9(0.4)	22(1.0)	31(1.4)	13	29	42
Sub-total	232	306	162(0.7)	321(1.4)	483(2.1)	229	419	648
5. other provinces	133	177	43(0.3)	85(0.6)	128(1.0)	61	112	173
Beni total	365	483	205(0.6)	406(1.1)	611(1.7)	290	531	821

Remarks 1: Future population in 2010 was estimated based upon 1992 and 2001 Population Census.

Remarks 2: Number of medical staff per 1,000 population is in average 0.6 for the medical doctor and dentist, 1.1 for nurse/auxiliary nurse and lab. technician, and 1.7 for all medical staff in Beni in 2001. This unit rate was applied to projection for 2010. Share of medical staff number by province was kept at 2001 level.

12.3 Project Evaluation

The economic evaluation method is not applicable in the social sector like health improvement. Therefore, in this chapter, Pilot Study projects were evaluated in terms of equitable distribution of limited human and financial resources to beneficiaries. The effectiveness in the use of limited human and financial resources will be enhanced by centralizing these resources to the hospital rather than diversifying them to CSs. On the other hand, resource allocation to the CS, which is more accessible for clients than the hospital will be more effective to the poor in its contribution to the improvement of social welfare. Effective or equitable use of limited resources highly depends on the strengthening of legal and institutional environment. The legal aspect pertains to the central control of resources by the hospital while the institutional refers to the transfer of health service functions to the community by strengthening PHC.

12.3.1 General Evaluation by Sector Plan

(1) Solution of Constraints by Natural Conditions

This sector plan is included the implementation of the following sector plans.

(2) Area Coverage of Health Services

1) Area coverage (improvement of accessibility)
Cost/time savings by using radio without high investment cost for introducing transport network, e.g., bridge/road and river transport system

2) SBS coverage
Decrease of maternal and infant mortality rates through sensitizing more women to practice preventive care and through eliminating gender issues to raise their trust in the consultative service at the CS (more effective SBS)

(3) Institution and Organization

1) Administration at the prefecture and municipality
Cost/time savings of health administration by defining responsibilities of each administrative organization and equitable distribution of health services

2) Institution and administration at health facilities
Cost/time savings at the hospital and CS levels to enable more efficient and better quality service within the facility and without (outreach to communities)

(4) Human Resources

1) Distribution of human resources
Fair distribution of limited health human resources without political intervention

2) Effective use of human resources
Effective use of the allocated human resources to enable more efficient and better quality service within the facility and without (outreach to communities)

(5) Financial Resources and Cost Sharing

1) Revenue
Revenue increase by enhancing clients' willingness to pay and securing SBS fund

2) Expenditure
Better financial management by securing ITEM and HIPC II for medical staff salaries and SBS for medicines

3) Funding
Effective health service and health improvement by timely fund arrangement for medicine and O&M cost

4) O&M cost saving
Cost saving and better health service by better maintenance of medical equipment

5) Cost sharing among agencies concerned
Inter-municipal effort on the medical boat operation for health improvement of inhabitants

6) Annual plan
Establishment of sustainable financial management

(6) Facilities/ Equipment

1) Facilities construction / equipment supply
Increased distribution of health service and benefit to the poorer areas

2) O&M of medical equipment
Effective use/enhanced benefit for patients and cost saving on facilities and equipment

(7) Hospital Management

Effective use of limited human and financial resources for increased benefit to patients

(8) Medicines

Cost/time saving and effective use of medicine

(9) SNIS

Effective disease control by accurate selection of medical treatment method

(10) Referral System

Effective resource use and reduction of diseases and mortality rate through activating referral and counter-referral system

(11) PHC

Cost saving by reduction of overlapping of health services among agencies concerned and expansion of beneficiaries.

(12) Epidemiological Approach

1) National program
Effective implementation through integrating human and financial resources of SEDES, hospital and CS

2) Laboratory support
Appropriate treatment enabled by accurate identification of the cause of disease by laboratory test

(13) Community Health

1) OTB/Community
Cost saving by the government and increase of employment opportunity in the communities

2) Primary health care services by CS
More effective use of CS by reducing social barrier for inhabitants

3) Annual plan
Systematic request by communities to relevant agencies (municipality, SEDES, etc.)

to be incorporated in annual plans.

12.3.2 Economic and Financial Evaluation

(1) Beneficiaries and Medical Staff Supply

Directors of the 2 hospitals of Trinidad consider that beneficiaries are the whole population of Beni Department. However, majority of the patients come from Trinidad city. Coverage of beneficiaries in Trinidad depends on the level of integrated service of hospitals composed of i) service level in quantity and quality of medical staff, ii) accessibility, iii) development of infrastructure and equipment supply, iv) managerial capacity of the hospital.

Beneficiaries total 83,014 as is the population of Trinidad in 2001. The ratio of medical staff to population is 1.1/1,000 population (0.3 medical doctors/dentist, 0.8 nurse/auxiliary nurse/labo technician) for Hospital Materno Infantil and 0.8 (0.3 medical doctors/dentist, 0.5 of nurse/auxiliary nurse/lab. technician) for Hospital German Busch. In CS Nueva Trinidad for the Pilot Study, beneficiaries is 3,465 in 2001. The ratio of medical staff to population is 2.0/1,000 population (0.9 medical doctors/dentist, 1.2 nurse/auxiliary nurse/lab. technician). In CS Santisima Trinidad, beneficiaries will be 2,653. The ratio of medical staff to population is 2.3/1,000 population (0.8 medical doctors/dentist, 1.5 nurse/auxiliary nurse/lab. technician). In the medical boat, beneficiaries will be 4,048. The ratio of medical staff to population is 1.2/1,000 population (0.5 medical doctors/dentist, 0.7 nurse/auxiliary nurse/lab. technician). Human resources allocation can be described ample in the two CSs compared with the two hospitals in Trinidad and the medical boat.

(2) Contribution of Operation Cost to Economic Benefit

Operation cost of Hospital Materno Infantil is Bs.3,796,000 per year (Bs.3,026,000 for salary, Bs.770,000 for other operation cost. Cost per beneficiary is Bs.45.7/year (Bs.36.5 for salary, Bs.9.2 for other cost). In Hospital German Busch, it is Bs.3,330,000 per year (Bs.2,960,000 for salary, Bs.370,000 for other operation cost). Cost per beneficiary is Bs.40.1/year (Bs.35.7 for salary, Bs.4.5 for other cost). In case of CS Nueva Trinidad, total operation cost is Bs.162,000/year (Bs.156,000 for salary, Bs.6,000 for other operation cost). Annual cost per beneficiary is Bs.46.8/year (Bs.45.0 for salary, Bs.1.7 for other cost). Regarding the medical boat, total operation cost is US$70,000 for 5 trips (Bs.48,000 for salary, Bs.22,000 for other operation cost). Annual cost per population is US$17=Bs.127.55 (US$11= Bs.82.5 for salary, US$6= Bs.45.0 for the oher cost). Cost effectiveness to beneficiaries by medical boat is sigificantly lower than hospitals, a major contributing factor of which is the salary. From an economic point of view, human resources are more efficient when centralized to hospital and allocated to the medical boat on a request basis without permanently employing for exclusive work on the medical boat. With respect to equity, hospitals should be able to employ staff that concentrate on treatment while the medical boat focuses on PHC or preventive side with exclusive staff.

Model projects	Beneficiaries (population in 2001)	Medical staff (No.of person)			Operation cost (1,000Bs)		
		Medical doctor/ Dentist	Nurse/Auxiliary nurse/Lab. technician	Total (No./1,000 population	Salary	Other operation cost	Total (Bs/beneficiary)
1. CS Nueva Trinidad	3,465	3(0.9)	4(1.2)	7(2.0)	Bs.156,000 (Bs.45.0)	Bs.6,000(Bs.1.7)	Bs.162,000 (Bs.46.8)
2. Medical boat							
(1) Required budget for Pilot Study (5 trips per year)	4,048	2(0.5)	3(0.7)	5(1.2)	$48,000 ($11=Bs82.5)	$22,000 ($6= Bs45.0)	$70,000 ($17= Bs127.5)
(2) Required budget for Pilot Study (per trip)	4.039	2(0.5)	3(0.7)	5(1.2)	$4,000 ($1= Bs7.5)	$1,800 ($0.4= Bs3.0)	$5,800 ($1.4= Bs10.5)
(3) Actual cost of Pilot Study (per trip) = 2nd trip cost by CARITAS)	4.039	2(0.5)	3(0.7)	5(1.2)	$7,815 ($1.9= Bs14.3)	$3,240 ($0.8= Bs6.0)	$11,055 ($2.7= Bs20.3)
3. Hospital Materno Infantil Trinidad (for 1 year)	83,014	25(0.3)	64(0.8)	89(1.1)	Bs 3,026,000 (Bs36.5)	Bs 770,000 (Bs9.2)	Bs 3,796,000 (Bs45.7)
4. Hospital German Busch (for 1 year)	83,014	26(0.3)	44(0.5)	70(0.8)	Bs 2,960,000 (Bs35.7)	Bs 370,000 (Bs4.5)	Bs 3,330,000 (Bs40.1)
Beni Department	365,281	205(0.6)	406(1.1)	611(1.7)	—	—	—

Remark 1: Beneficiaries of Trinidad hospitals were assumed to be total population of Trinidad.
Remark 2: ( ) shows the number of medical staff and operation cost per beneficiary.
Remark 3: Operation cost of medical boat shows total amount in the following cases.
a) Salary will be paid as fixed cost per year.
b) Other operation cost will be paid for 5 trips per year.
Remark 4: Operation cost of the hospital per year estimated based upon the average cost during January and Februay in 2002.
1) Hospital Materno Infantil: Total cost for 6 months (Salary of ITEM =estimated to be the almost the same amount of Hospital German Busch, salary excluding of ITEM = Bs.72,989 (16%), other operation cost = Bs.385, 088 (84%), total cost = Bs.458,077(100%))
2) Hospital German Busch:Total cost for 6 months (Salary of ITEM = Bs.240,000/month x 12 = Bs.2,880,000, salary excluding of ITEM= Bs39,902 (18%), other operation cost = Bs184,993 (82%), total cost = Bs.224,895 (100%))
Remark 5: Operation cost of CS Nueva Trinidad is Bs.13,500/month for salary and Bs.500/month for other operation cost in average during the 2nd monitoring.
Remark 6: Foreign exchange rate is $1＝Bs.7.5 in January 2003.
Source: Pilot Study for 4 priority projects in 2002 and provided information from SEDES on departmental total in 2001.
Source: Population Census in 2001 and estimate by the JICA Study Team in 2002 and 2003

(3) Equal cost sharing (by minicipalities depending upon the number of beneficiaries for the medical boat)

Operation cost for the medical boat is around US$ 2 to US$5 per beneficiary (covered population) for each municipality. This unit cost per benficiary should be allocated by fair

contribution of municipalities.

COST SHARING OF MEDICAL BOAT OPERATION BY MUNICIPAL GOVERNMENT

Province/ Municipality	Beneficiaries (Population)	Covered area (square kirometer)	Sharing of operation cost			Operation cost / beneficiaries
			Salary	Other operation cost	Total	
1. Cercado						
a. Trinidad	465	844	—	—	—	0
b. San Javier	264	690	—	—	—	0
2. Mamore						
a. San Joaquin	150	550	—	2,100	2,100	$2.6/person
b. Puerto Siles	862	1,110	2,600+ Social Benefit(550) =3,150	800	3,950	$4.6/person

Remark: Amount of this table shows the budget to be prepared by municilapal governments for medical boat operation, based upon the agreement among concerned municipalities in February 2002
Source: Data provided by CARITAS in 2002

(4) Financial Evaluation

1) Hospital

Financial conditions were evaluated for the Hospitals Materno Infantil and German Busch in Trinidad, excluding ITEM.

a. Revenue: Monthly average revenue is Bs.67,685 at Hospital Materno Infantil and Bs.40,474 at Hospital German Busch. Major sources of revenue at Hospital Materno Infantil are subsidies from the municipal government and payment from patients for hospital services. Major source of Hospital German Busch is mostly payment from patients for hospital services. Regarding expenditure, total expenditure is Bs.76,346 at Hospital Materno Infantil and Bs.37,483 at Hospital German Busch. Hospital Materno Infantil is more active than German Busch in their operation because of its favorable condition regarding financial support from the municipal government, mainly as the SBS fund. Major items of expenditure are materials and consumables in both hospitals. Personnel cost occupies 18 % of total expenditure at both institutions. Improvement of hospital service will bring about better management while expenditure of materials and consumables can be a limiting factor.

Financial Statement for Hospital Management

Unit: Bs.

	Hospital Materno Infantil		Hospital German Busch	
	Total (Jan.-June 2002)	Monthly average	Total (Jan.-June 2002)	Monthly average
1. Revenue				
Hospital service	169,275	28,213	198,695	33,116
Teaching	0	0	0	0
Pharmacy	46,123	7,687	44,149	7,358
Other incomes	0	0	0	0
Account receivable from Bank	0	0	0	0
Transfer from National General Treasury	—	—	—	—

Transfer from municipal government	190,713	31,786	0	0
Total	406,111	67,685	242,844	40,474
2. Expenditure				
Personnel cost	72,990	12,165	39,902	6,650
Non personnel cost	11,542	1,924	4,744	791
Materials and consumables	342,838	57,140	179,880	29,980
Real asset	2,177	363	370	62
Financial asset	0	0	0	0
Loan and other asset	28,530	4,755	0	0
Total	458,077	76,346	224,896	37,483

Remark 1: US$ 1=Bs.7.5

Remark 2: Revenue of thisTable did not not include Transfer from National General Treasury (Salary by ITEM) and unpaied service cost from patients. Expenditure did not include Salary covered by ITEM. Salary by ITEM is about Bs.232,000/month,

Source: Data provided by Hospital Materno Infantil and Hospital German Busch in 2002

2) CS

a. Nueva Trinidad

Major sources of revenue are SBS and dental service. CS is increasing income (profit) through its operation. Supervising and monitoring of revenue and expenditure should be conducted by the Technical Committee to attain optimum cost sharing among CS management, municipal government and inhabitants.

	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Revenue										
Consutation	80	150	105	175	280	284	305	133.5	263	1775.50
Inyectables sueros, curaciones	2	12	22	10	66	50	128	44	36	370.00
Dentist service	0	0	0	82.5	45	317	255	300	650	1649.50
S B S	0	217.5	316.5	428.5	729	574	895	428	691	4279.50
Others	0	0	0	0	0	36	58	0	0	94.00
TOTAL	82	379.5	443.5	696	1120	1261	1641	905.5	1640	8168.50
Expenditure										
Consumables	35	33.5	0	0	39	222.5	38	28.5	145	541.50
Servicies	0	15	36.5	22	69	95	138	60	80	515.50
Materiales	47	64	85.5	25.5	323.7	208	257.1	158.9	190	1359.70
Others	0	49.5	0	17	119.8	0	409.5	51	83	729.80
TOTAL	82	162	122	64.5	551.5	525.5	842.6	298.4	498.0	3146.50

Source: Provided data from CS of Nueva Trinidad in Jan. 2003

Salary of Medical Staff in CS in Nueva Trinidad (Bs)

Personnel	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dec	Total (Bs.)
Medical doctor	3021	3021	3021	3021	3021	3021	3021	3021	3021	27189
Medical doctor	0	2899	2899	2899	2899	2899	2899	2899	2899	23192
Dentist	1415	1415	1415	1415	1415	1415	1415	1415	1415	12735
Nurse	0	1925	1925	1925	1925	1925	1925	1925	1925	15400
Auxiliary nurse	0	1335	1335	1335	1335	1335	1335	1335	1335	10680
Auxiliary nurse	0	1260	1260	1260	1260	1260	1260	1260	1260	10080
Bio-chemistry	0	0	0	0	0	1456	1456	0	0	2912
Guard man	0	0	0	0	1300	1300	1300	1300	1300	6500
Cleaning	0	0	0	0	0	80	80	80	80	320
TOTAL	4436	11855	11855	11855	13155	14691	14691	13235	13235	109008

Source: Provided data from CS of Nueva Trinidad in January 2003

b. SantisimaTrinidad

Health service provided by the CS are expanded through the Pilot Study implementation with the support of SEDES and PROSIN.

1ST MONITORING OF THE PILOT STUDY

Revenue	Amount	%
C/S Services	-	-
Pharmacy SBS	1.000	67
Municipality of San Ignacio.	-	-
Laboratory	-	-
Revolving Fund	500	33
Others	-	-
PROSIN	(3.556)	
TOTAL	1.500	100

Expenditure	Amount	%
By prescription	800	67
Medicine Reposition	400	33
Vaccination Campaigns	(3.556)	
TOTAL	1.200	100

Source: Data provided by CS Santisima Trinidad

2ND MONITORING OF THE PILOT STUDY

Revenue	Amount	%
Services C/S	2.130	9
Pharmacy SBS	2.859	11
Municipality	3.307	13
Laboratory	75	0
Revolving fund	790	3
Others	5.952	24
PROSIN	9.760	39
TOTAL	24.873	100

Expenditure	Amount	%
Medicine and consumables	298	1
By prescription	1285	6
Lab consumables	3.307	17
	0	0
Medicine reposition	790	4
Leishmaniasis Program Assitance	4.524	23
Vaccination Campaigns	9.760	49
TOTAL	19.964	100

Source: Data provided by CS Santisima Trinidad

3) Medical boat

Medical boat conducted 3 trips though service was limited on the first trip due to delay in the financial support of EXTENSA and PROSIN. There were some difficulties on financial arrangement caused by difference in budgeting and disbursement procedure among concerned agencies. Annual Operation Plan (POA) of each agency should be punctual and adjusted according to the schedule of health service and payment. Medical boat operation cost of the 3rd trip is similar to the required budget per trip; US$ 11,050/trip and it will be a model for financial allocation for boat operation in the future.

Financial Cost for Medical Boat Operation

Unit:US$

	Required budget		Actual expenditure (dsbursed)			
	2002 (year total)	Per Trip	1st Trip	2nd Trip	3rd Trip	Total
1. Salaries						
EXTENSA	28,250	5,650	0	4,200	6,300	10,500
SEDES	2,600	520	379	758	379	1,516
CARITAS	5,850	1,170	728	1,455	941	3,124
Municipalities	10,996	2,199	722	1,401	1,000	3,124
Sub-total	47,696	9,539	1,829	7,814	8,620	18,264
2. Operation cost						
PROSIN	10,043	2,009	0	1,829	1,591	3,421
CARITAS	4,118	824	1,824	449	312	2,585
Municipalities	7,563	1,513	1,278	962	525	2,765
Sub-total	21,674	4,346	3,102	3,240	2,430	8,772
Total	69,370	13,876	4,931	11,055	11,050	27,036

Remark: Required budget is for one year for 5 trips/year as agreed among concerned agencies in Feb. 2002 at the Technical Committee of Pilot Study.

Source: Data provided by CARITAS in 2002 and 2003

13 CONCLUSION AND RECOMENDATION

13 CONCLUSION AND RECOMMENDATION

13.1 Conclusion

Beni Department is located in the Amazon basin which is affected by drastic changes of natural conditions between dry and rainy seasons and inaccessibility due to low population density. Also, inhabitants suffer difficulties in accessing hospitals and other health facilities. There are various types of tropical diseases with high mortality rate, especially for pregnant women and children below 5 years old.

(1) Various types of projects have been implemented in this area. However, there is little coordination among projects. Therefore, effectiveness of each project is limited and not expanded to a wider area.

(2) There is no integrated Regional Health System under consensus among agencies concerned. Consequently, human and financial resources are not utilized effectively, and benefit to the poor is not optimal.

(3) Major issues of Regional Health System in Beni are i) improvement of institution and administration, ii) Effective allocation of human and financial resources, iii) upgrading of health service quality, iv) Promotion of participatory approach for PHC

13.2 Recommendation

(1) M/P

The integrated regional health system will be developed for the health improvement of pregnant women and children below 5years old in the poverty areas. For this purpose, this system will be programed by developing various types of area models to meet the regional characteristics of provinces and municipalities.

1. Urban health model (hospital and CS-hospital development)
2. Urban poverty area development model
3. Rural poverty area development model
4. Integrated and comprehensive development model (medical boat system)

(2) Stage-wise implementation of M/P

A regional health system will be proposed based upon the national policy, such as decentralization and popular participation. The establishment of the proposed system requires capacity building of the human resources and institutions at the prefecture and municipal level, and is expected to take a considerable period of time. To accelerate the process, sustainable and stage-wise education and training programs are recommended.

(3) Implementation organization in Bolivia

Based upon the stage-wise implementation plan, sustainable support system of the proposed programs/projects should be organized for the human resources allocation and budget preparation at the prefecture and municipal levels as well as at the national level. The proposed organizations are i) Coordination Committee at the national level, ii) Steering Committee at the prefecture level and iii) Technical Committee under DILOS at the

municipality level.

(4) Sustainable development of Pilot Study by Bolivian side

Sustainable development of the Pilot Study on the four priority programs proposed by the M/P is a basis for further implementation of stage-wise plan of the M/P. The counterpart agency of Beni Prefecture will be responsible for managing and operating the new facilities and equipment which will be donated by JICA to the Bolivian side and apply the transferred technology to the Bolivian administrative and medical staff. The Bolivian side should take necessary measures on the following points for donation of the facilities and equipment from JICA.

1. ITEM allocation by MSPS and HIPC II.
2. Budget preparation by donors (EXTENSA, PROSIN, etc.), municipalities and NGOs for salaries of the other staff which are not covered by 1.
3. Operation cost for medical boat contributed by municipal governments and necessarily assisted by donors and NGOs.

Donors should monitor and follow up the activities and effectiveness by the Bolivian side's operation and management of the Pilot Study based upon the provided data and information by the Bolivian side.

(5) Implementation of Technical Cooperation

Technical cooperation will be expected from donors for the purpose of education and training of medical and administrative staff of the regional health system. Major purposes of the cooperation are; i) Education and training for strengthening of hospital management and PHC operation, ii) Technology transfer for O&M of the medical facilities and equipment, iii) Education and training of nurses and auxiliary nurses, etc. It is required to use experiences and know-how developed in the Hospital Universitario Japonés, CENETROP in Santa Cruz and SEDES in Beni. Types of Technical Cooperation are Development Survey Stage II or Technical Cooperation Project.