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STAFF APPRAISAL REPORT

BOLIVIA

RURAL WATER AND SANITATION PROJECT

DECEMBER 15, 1995

Country Department III
Environment and Urban Development Division
Latin America and the Caribbean Regional Office

Currency Equivalents

Currency unit = Boliviano
US$1 = 4.74 Bolivianos (March 31, 1995)
All figures in U.S. dollars unless otherwise noted

Weights and Measures

Metric

Fiscal Year

January 1 - December 31

Abbreviations and Acronyms

DINASBA	National Directorate of Water and Sanitation
IDB	International Development Bank
NFRD	National Fund for Regional Development
NSUA	National Secretariat for Urban Affairs
OPEC Fund	Fund of the Organization of Petroleum Exporting Countries
PROSABAR	Project Management Unit within DINASBA
UNASBA	Departmental Water and Sanitation Unit
SIF	Social Investment Fund
PPL	Popular Participation Law
UNDP	United Nations Development Programme

Bolivia
Rural Water and Sanitation Project
Staff Appraisal Report

This report is based on the findings of an appraisal mission that visited Bolivia from March 27 to April 7, 1995. The mission was comprised of Messrs./Mmes. Abel Mejía, Caroline van den Berg, Eid Nouhra, Miriam Vásquez (LA3EU); Jennifer Sara, Phillipe Auffret, Marco Quiroga (TWUWS); Mary L. González (LATEN); Wendy Quarry, and Roger Young (Consultants). Gianni Brizzi and Jennifer Sara were responsible for project preparation until October 1994. José Decker (Coordinator), Alfonso Alvéstegui, Lourdes Elena Ruíz, Victor Moscoso, and Abraham López comprised the project preparation team in Bolivia. Vijay Jagananathan (TWUWS) and Alex Bakalian (LA1EU) are peer reviewers. The Sector Division Chief is Eugene D. McCarthy, the Project Advisor is Robert Crown, and the Department Director is Paul Isenman.

Annexes

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Credit and Project Summary

Borrower:	Republic of Bolivia.
Benificiary:	Small rural communities throughout the country.
Executing agency:	The National Directorate for Water and Sanitation (DINASBA), the main institution for the water sector, will be responsible for overall project implementation. DINASBA will also manage the institutional component of the project. The Social Investment Fund (SIF) will manage the investment component of the project.
Amount:	SDR 13.4 million (US$20 million equivalent) including up to SDR 1.13 million to be financed retroactively.
Terms:	Standard International Development Association (IDA) terms, with 40 years' maturity and 10 years' grace.
Service charge:	0.75 percent, less any waiver.
Commitment fee:	0.50 percent on undisbursed credit balances, beginning 60 days after signing, less any waiver.
Financing plan:	See para. 37.
Poverty category:	Since poverty alleviation is the main goal of the project, it targets the poorest rural Bolivians, those in the highlands of the *Sierra* and Andean *Valles*, where the population is entirely indigeneous totaling baout 3.7 million (either *Aymara* or *Quechua*). The project will focus on the mobilization of communities involved and on the active particiaption of women in the planning, execution, and operation of water and sanitation facilities in all departments of the country.
Rate of return:	The internal economic rate of return of the project is estimated to be 13 percent.
Staff Appraisal Report:	No. 14490-BO
Maps:	IBRD 27093
Project Identification Number:	BO-PA-6206

I. Background

A. *Socioeconomic setting*

1. Bolivia's poor have borne the burden of the economic austerity programs of the past nine years. The economic growth of the past five years, with per capita income increasing by one percent a year, has not reduced poverty levels—more than 70 percent of the population still lives below the poverty line. Despite the economic reforms made since the adoption of a new constitution in 1985, the country remains one of the poorest in Latin America. Inequalities persist within the overall population and between urban and rural dwellers. Health, nutrition, literacy, and water and sanitation indicators, among others, are still very low. A recent report from the United Nations International Fund for Agricultural Development found that 97 percent of the rural population—more than 3 million people—is living below the poverty line.

2. The current administration supports the sound macroeconomic policies initiated by previous administrations to accelerate growth and to reduce poverty, but it recognizes that high growth will not reduce poverty unless its benefits are distributed equitably. Reforms were introduced in April 1994 to achieve short-term improvements in the living standards of the poor, particularly in rural areas. The Popular Participation Law is changing dramatically the allocation of resources among municipalities—an unprecedented step toward more equitable and efficient use of fiscal resources.

3. But the economy remains fragile. In 1994 the fiscal deficit—at 3.2 percent of gross domestic product (GDP)—was significantly lower than in 1993. Yet, the external position is not strong, with the trade balance recording a large deficit in 1994—the twelve-month current account deficit was 10 percent of GDP at the end of 1994. The economy is also vulnerable to exogenous factors. Adverse changes in international commodity prices and external aid had a severe impact on the economy, and this impact is felt mostly among the poor, particularly in rural areas. Economic hardships and widespread poverty continue to induce urbanization. Population growth in rural Bolivia has stagnated, while the urban population grows by 4 percent a year. As a consequence, the rural population comprised 41 percent of the country's total population in 1993, from 59 percent in 1970.

B. *Legal and institutional framework*

4. A major institutional restructuring of the water and sanitation sector was initiated in 1991. The government removed itself from service delivery functions, previously under the *Corporacion de Aguas* and the Directorate of Environmental Sanitation of the Ministry of Health, by transferring most activities related to construction, human resources development, and service administration to the private sector and nongovernmental organizations. In 1993 the government consolidated the responsibility for leading the sector into the National Directorate for Water and Sanitation (DINASBA) in the National Secretariat of Urban Affairs, under the Ministry of Human Development. At the department level, regional development corporations, to be replaced by departmental governments as of January 1996 when the new Decentralization Law enters into effect, created local water and sanitation units.

5. DINASBA, created in November 1991, is the main institution for water, sewerage, and solid waste services. Its responsibilities include prioritizing projects at the national level, preparing national plans and

investment programs, coordinating regional and local programs, issuing and implementing government financial policies, overseeing standards and norms, and promoting institutional development. DINASBA is a weak institution and lacks the resources to formulate policies and to coordinate sector entities. It has fourteen employees comprising two managers who are financed by the United Nations Development Programme (UNDP) and other professionals with short-term contracts at salaries averaging US$300 to US$400 a month. The project will support technical assistance to strengthen DINASBA, leading to its integration into the civil service program of the Government of Bolivia.

6. The current administration has considerably reduced the investment financing role of the regional development corporations, designating the provision of technical assistance to local governments through *Unidades de Saneamiento Básico* (UNASBA). The corporations have been strengthening these units so that they can implement national policies and sector strategies, formulate and prioritize plans and programs at the department level, assist municipalities and local communities in designing and implementing investment projects, and assist local organizations in the operations and maintenance of water and sanitation facilities.

7. Most government funding of water supply and sanitation programs is handled through two financial intermediaries, the Social Investment Fund (SIF) and the National Fund of Regional Development (NFRD). The SIF is responsible for administering government transfers to communities with fewer than 5,000 inhabitants. These transfers mainly originate from external resources and are generally in the form of grants, consistent with the fund's mandate of promoting socioeconomic development through social investments, including health, education, water, and sanitation. The NFRD is responsible for financing investment projects in urban areas by providing loans to municipalities and municipal utilities, with possible backing by the corresponding regional development corporation, or departmental government after January 1996, when the municipalities lack creditworthiness. NFRD loans are often combined with government matching grants for investment projects responding to specific priorities. Both funds are supported by the International Development Agency (IDA).

8. Bolivia launched a second-generation reform program in 1994. Capitalization and popular participation underpin an ambitious strategy to remove the remaining structural constraints and to achieve more rapid and equitable economic growth. These two elements represent a fundamental change in the regulatory framework of public services, and the mandate of DINASBA and other sector entities should be revised accordingly.

9. A Sector Regulation Law was enacted in October 1994. This law proposes the creation of independent sectoral regulatory institutions, under the Ministry of Economic Development, to promote the competitiveness of key economic sectors and public utilities. The regulatory entity for water and sanitation services, still to be created, could represent a major step toward modernizing the sector, since it will provide a legal framework for a more efficient operation and allocation of resources, including private sector participation. According to the law, the main responsibilities of the regulatory institutions will be to oversee the quality of service provision, to approve service rates according to specific sector regulations, to grant concessions for the provision of water and sanitation services, to process complaints from customers and apply fines to utility operators, to advise the government on sector laws and decrees, and to prepare, for executive approval, regulations, and technical norms.

10. The Popular Participation Law (Ley 1551), passed in April 1994, to decentralize financial resources and political power, is radically altering the powers and responsibilities of local governments. As a result of the enactment of this law more than 200 new municipalities in rural areas were created for the purpose of participating in the benefits of the revenue-sharing agreement provided by the law. This law also

sets forward procedures for communities to obtain legal status as *Organizaciones Territoriales de Base,* through which communities are organized according to their social and cultural heritage. Prior to the law, there were only 100 municipalities. The law also transferred 20 percent of fiscal resources to municipalities, to be spent according to an annual operating plan cleared by the regional development corporations, approved by the central government, and under the supervision of *Comites de Vigilancia* comprising representatives of the *Organizaciones Territoriales de Base* in each municipality.

11. Nongovernmental organizations play an important role in the poor and rural areas of Bolivia. These organizations manage about US$200 million a year from bilateral agencies and the government—a considerable sum compared with the annual public investment budget of about US$500 million to US$600 million. About 400 nongovernmental organizations are organized in three networks: UNITAS (the National Union for Social Work), ERBOL (*Escuela Radiofonica de Bolivia*), and AIPE (the Association of Educational Institutions). These groups are coordinated by the national *Coordinadora de Redes*. There are also about eighty nongovernmental organizations grouped in the *Instituciones para el Desarrollo Social* (Institutions for Social Development) that are attempting to distinguish themselves from other nongovernmental organizations by applying rigid professional standards, including external audits, and by seeking sustainable development instead of charity.

C. *Rural water and sanitation*

12. *Coverage*. Water and sanitation coverage in Bolivia is low. According to the 1992 census, coverage for the rural population is 24 percent for water and 17 percent for sanitation, compared with 81 percent for water and 63 percent for sanitation in urban areas (annex 3). Rural coverage has increased slightly over the past decade, but it remains far below government targets and behind the rural water and sanitation coverage of other Andean countries. In smaller communities and dispersed populations—80 percent of the rural population lives in communities with fewer than 250 inhabitants—water and sanitation coverage has actually declined. Such communities represent more than 35 percent of the country's total population. Even rural towns with water supply systems have poor service quality and unenforced sanitary standards. Sewerage systems, where they exist, are unreliable, and sewage is often discharged into the natural drainage system without any control. Most water sources, even in small, remote communities, are highly polluted. A sample of 400 small water supply subprojects studied during project preparation found that 85 percent had fecal contamination and required disinfection to meet Pan-American Health Organization standards for safe human consumption (annex 5).

13. The dismal state of water and sanitation services causes waterborne disease, the most frequently reported illness in Bolivia. Enteric diseases are the second leading cause of death among all age groups, and Bolivia has the second highest rate of infant mortality in Latin America—75 per 1,000 live births, according to the 1992 census—with intestinal infections as the leading cause. In rural areas the lack of adequate water supply facilities forces households to devote substantial time and energy to fetching water from distant sources, which often are unfit for human consumption. This burden falls disproportionately on women and children.

14. *Investment*. The 1992–2000 National Water and Sanitation Plan gave priority to rural services and to correcting the imbalance between water and sanitation coverage. The plan targeted public investment of US$769 million for the eight-year period, with 70 percent coming from external financing. The plan also proposed policy changes and capacity-building efforts to improve utility performance and the use of resources. The plan was overly optimistic in evaluating the sector's capacity to absorb such investment, and investments for 1992 were US$48.7 million and for 1993 US$56.4 million—consistent with historical

investment patterns. The 1994 budget allocated 9 percent of public investment to water and sanitation, about US$51 million. Of this, US$15 million went to expenditures in areas other than the departmental capitals, including about US$10 million to rural communities with fewer than 5,000 people (annex 3).

D. Lessons learned

15. The rural water supply and sanitation sector has seen a multitude of projects with different policy agendas and objectives driven by different donors and nongovernmental organizations. IDA financed water and sanitation investments through four social investment projects, two with the now-defunct Social Emergency Fund and two through its successor, the Social Investment Fund. Investments focused on poor, rural and peri-urban areas. Since 1991 the UNDP-World Bank Water and Sanitation Program has implemented a pilot project costing US$3 million to benefit about 60,000 people in the poorest communities of the Department of Potosí. The project tested low-cost water and sanitation technologies, developed innovative approaches to community participation, and implemented an extensive hygiene education program. The experience gained in Potosí provides a sound basis for the proposed project, as well as for the sustainability of future efforts (annex 2).

16. The most important lessons learned from past projects are that:

- Communities should play a decisionmaking role over the life of the project, from planning to operations.
- Community decisions should be based on the willingness to pay for different levels of service.
- Even the poorest communities are willing to pay up to 30 percent of the capital investment cost.
- Communities can be trained to administer and operate facilities with appropriate technology.
- Sustainability is improved when communities finance and operate their facilities.
- Rural water and sanitation projects should pay more attention to such activities as demand generation, community mobilization, and training.
- Training and hygiene education in the health, education and social sectors are essential to the effective and sustained use of services.
- Nongovernmental organizations seem to be effective in working at the grassroots level and in most cases they have demonstrated efficiency and reliability in undertaking rural water and sanitation programs.
- Economic efficiency dictates that per capita investment ceilings for water supply and sewage disposal be used as a selection criteria for individual subprojects.
- Economies of scale can be achieved when subprojects are grouped, and when water supply and sanitation is provided at the same time.
- The participation of women must be actively encouraged, since they are usually the main users of water, and to a large extent are responsible for hygiene practices within the family.
- Technical support to operation and maintenance is required at the community, municipal, and department levels.

II. The Project

17. The current project originated in 1993 when the government asked IDA to finance the rural component of the national sector plan. Project preparation has been funded through three Project Preparation Facility advances totaling US$1.7 million. The first advance was approved in July 1993, the second in August 1994, and the third in July 1995. The UNDP contributed an additional US$150,000. The staff of the project preparation team, paid for by the facility, was recruited by DINASBA in August 1993, when project preparation activities officially started. In September 1994, sixteen nongovernmental organizations were contracted to undertake all preparation activities at the municipal and department levels, through a participatory process involving the authorities of local and regional water and sanitation units. National and departmental workshops were held to ensure a collaborative process.

18. The proposed project would be Bolivia's first large-scale, sector specific, rural water and sanitation project. It would support the current administration's reform efforts in the areas of decentralization, popular participation, policy formulation, and public management. It is consistent with IDA's strategy for Bolivia, which focuses on alleviating poverty and on improving the economic potential of marginal populations, as stated in the Country Assistance Strategy discussed by the Board on February 8, 1994. The government is committed to an expeditious and effective implementation of the project. IDA assistance is sought mainly because of IDA's experience in policy formulation and project implementation in the water and sanitation sector. Advice is particularly needed for the coordination of the numerous multilateral and bilateral agencies operating in Bolivia.

A. Objective

19. The project's goal is to alleviate poverty in rural areas by enhancing productivity through improved health conditions and a more efficient use of the time saved collecting water. Specific objectives include increasing the coverage and sustainable use of water and sanitation services in rural communities and muncipalities, assisting the local water and sanitation units in developing the capacity to provide technical assistance to municipal governments and local communities, supporting the sustainability of water and sanitation services through extensive training of community-level operators and administrators, and strengthening the capacity of DINASBA to formulate policies, prepare technical standards, and mobilize financial resources.

B. Description

20. While the project aims to strengthen the institutional capacity of Bolivia to manage and develop rural water supply and sanitation, investment activities initially will be targeted to four departments: La Paz, Cochabamba, Chuquisaca, and Potosí. These departments were chosen by the government, assisted by the project preparation team. These departments have large rural populations—totaling 2.4 million—and poor water supply and sanitation coverage (annex 3). Their regional development corporations have been actively involved in rural water and sanitation programs and have been committed to financing subproject preparation from their own budgets, and have been assisting municipal governments and local communities in sustaining and expanding these programs. As of January 1996, the departmental governments will assume this responsibility according to the *Decentralization Law*, passed by Congress in July 1995. Project design features, summarized in annex 6, include:

- strong community participation for improving economic efficiency and sustainability;
- five-year municipal plans and annual operating budgets to ensure that the proposed investments are a high priority for the community and the society;
- low per capita grants to pursue least cost projects;
- high financial contribution from municipalities and beneficiaries to ensure demand-driven investments;
- full cost recovery to attain long-term sustainability of services; and
- flexibility in project design and implementation to accommodate community demand.

21. Focusing the first year of project implementation on a few geographic areas within each of the four departments was critical to avoid dispersion of human and financial resources, to improve the effectiveness of project preparation, and to ensure disbursement of funds early in the project implementation cycle. From the second year of implementation, the project's investment activities will be expanded to other departments (paragraph 20), that have eligible rural water supply and sanitation projects, that are willing to finance subproject preparation, and that can assist municipalities and communities in executing and operating the projects (annex 12).

22. The proposed project consists of a rural water and sanitation infrastructure program and an institutional capacity-building program. The infrastructure component (74 percent of total project costs) has two subcomponents. The first will provide water supply facilities—both gravity-fed and pumped—as well as shallow wells with hand pumps and rainwater catchments. The second subcomponent involves small-scale wastewater collection facilities, treatment and disposal systems, and latrines (annex 5).

23. The technical assistance component (17 percent of total project costs) has three subcomponents. The first component will finance project management to assist the institutions in charge of project implementation. This component will provide up to 400 staff-months for project management, including consultant services, equipment, and logistical support to DINASBA and the various departmental water and sanitation units (UNASBA) throughout Bolivia.

24. The second subcomponent will finance technical assistance to strengthen sector institutions and communities in their capacity to provide safe, reliable and sustainable water and sanitation services. This subcomponent finances capacity building activities that range from technical advice on operation and maintenance, management issues, and financial planning to project dissemination and the promotion of behavioural changes through hygiene and environmental education programs. It contains a number of studies to strengthen the sector such as the design and implementation of a cost recovery study. It also will finance the design and construction of low-cost technologies and community mobilization approaches for specific rural water and sanitation pilot projects. In addition, this subcomponent will fund a number of impact evaluation studies, workshops and a management information system to provide feedback so that project implementation can be adjusted if necessary.

25. The third subcomponent is a training program that will fund training to stakeholders and institutions responsible for backstopping water and sanitation services. Municipalities and communities will receive training for the administration, operation and maintenance, including tariff setting, and water quality control. This subcomponent will also finance the training of operators and administrators in the beneficiary communities to administer, operate and maintain water and sanitation services, including a certification program that will test each trainee who has benefited from training, so as to ensure the quality

and consistency of the training. Moreover, it will finance training to professional and manufactureres associations to strengthen the human resources that work in the rural water and sanitation sector.

26. The project will also finance the repayment of the Project Preparation Facility (PPF) advance, and the pre-investment studies of the infrastructure program (8 percent of total project costs).

C. Costs

27. The total project cost is estimated to be US$48 million (table 1). The foreign exchange requirement is estimated to be US$6.9 million. Costs are based on end-1994 prices and do not include specific allowances for inflation or physical contingencies because of the programmatic nature of the activities related to all project components—only the first-year activities have been fully determined. Cost estimates for infrastructure components are based on per capita investment for a wide variety of technology options and service levels obtained from engineering designs and similar works in Bolivia (annex 5). Institutional development estimates are based on the terms of reference for each subcomponent and on current consultant fees.

Table 1: Project cost summary (millions of U.S. dollars)

Component	Cost	Percentage
Infrastructure		
Water supply	26.1	54.4
Sanitation	9.6	20.0
Subtotal	35.7	74.4
Institutional		
Project management	1.4	2.9
Sector strengthening	5.8	12.0
Training	1.1	2.2
Subtotal	8.3	17.1
Other		
Project Preparation Facility advance	1.7	3.5
Pre-investment	2.3	4.8
Subtotal	4.0	8.3
Total	48.0	100

D. Economics

28. The economic justification for this project is based on the benefits it would generate in the form of time savings, health benefits, productivity increases and insitutional benefits. Because water no longer has to be carried over large distances, rural populations can achieve substantial savings of time. Access to clean water, the use of adequately designed sanitary facilities and the adoption of improved hygiene practices will have a positive impact on health. In addition, the project will also increase rural productivity through the use of increased consumption of water for productive purposes, such as horticulture. The project would also foster a number of benefits that are more difficult to quantify. These benefits include the increased reliability of water supply, improved water quality, and the greater privacy of decent sanitary facilities. The project would also generate long-run institutional benefits as community-based organizations and municipalities learn to operate and maintain water and sanitation infrastructure.

29. Time savings will be substantial as drinking water does not have to be hauled over large distances. The time savings are converted into money terms by using an hourly wage rate. However, this technique has its weaknesses as it is often women and children hauling water, whereas wage employment may not be readily available in the rural communities that are targeted to be the beneficiaries of this project. Therefore the time savings associated with carrying water will be converted into an adjusted wage rate that is equal to only 60 percent of the rural wage rate. The major health benefits that are related to adequate water supplies and sanitation are diarrheal diseases that primarily affect children under five years old. The health benefits include cost savings as a result of reduced mortality, a reduction of the number of cases of diarrhea that have to be treated in hospitals and health posts, and the medical costs of diarrhea that are cured through informal treatments, such as ORS (Oral Rehydration Salts) or similar type of treatments. Productivity benefits arise because part of the households use the increased availability of water for horticultural purposes. The size of the plot used for horticulture, and hence the productivity benefits it will generate, is dependent of the technology and service level chosen. In addition, some of the insitutional benefits have been captured as the training of the certified operators will have a positive impact on their income generating potential.

30. The project offers various technologies for the provision of water supply and sanitation facilities. As a consequence, the investment and operation and maintenance costs of the various technology options will be different. In addition, due to the different service level that is offered, the benefits will also differ per technology option. Therefore, an economic evaluation has been made for the different technology options. The results are summarized in table 2.

Table 2: **Results of Economic Analysis for Water Supply Projects for Different Technology Options and Service Levels (excluding SIF service fee, and institutional benefits)**

Technology Option	Population density	Service Level	Net Present Value (Bs)	Internal Rate of Return	Cost-Benefit Ratio
Gravity Systems	concentrated, with treatment	house connections	1,619	10.0%	1.00
	semi-dispersed	house connections	14,333	13.4%	1.19
	semi-dispersed	standpipes	2,228	10.8%	1.04
Pumped Systems	concentrated	house connections	11,352	10.6%	1.03
	semi-dispersed	house connections	-22,486	7.5%	0.88
Spring protection	(semi)-dispersed	tap/standpipe	4,913	155.5%	11.07
Handpumps	(semi)-dispersed	YAKU handpump	2,186	29.6%	2.05
	(semi)-dispersed	SOGA handpump	2,997	50.2%	3.38
	(semi)-dispersed	BALDE handpump	3,102	53.9%	3.68
	(semi)-dispersed	INDIA MARK III handpump	1,920	14.8%	1.29
Spring protection	(semi)-dispersed	no tap/ no standpipe	-261	n.a.	n.a.

31. All water supply options except for a pumped system with house connections in semi-dispersed areas and spring protection without tap (or standpipe), are viable projects at the individual level (table 2). They all generate high internal rates of return, especially the low-cost technology options handpumps.

32. The total project consists of a large number of subprojects, both at the community and the individual household level (annex 5). The total cost of this project amount to US$48 million (including the institutional strengthening component). Based on the experiences of the pilot project and the SIF-financed water and sanitation projects, a distribution of the total investment funds over the different

technology options has been made. The project investments will be implemented over a period of six years. The base case scenario includes the benefits of time savings, health benefits, increased productivity and are included. The net present value of the total project is Bs.31 million, the internal rate of return is 13 percent and the benefit-cost ratio is 1.19.

33. With the proposed tariff (i.e., the tariff based on operation and maintenance cost) all options are viable from the point of view of ability to pay. In general, households using low-cost technologies will spend up less than 3 percent of their income on water if the full cost of investment, operation and maintenance would be charged. However, the more sophisticated technology options (such as those with house connections) could eat up more than 10 percent of the monthly cash income of households. It is not recommended to introduce these technology options in poor dispersed rural communities as it is likely that these investments are not sustainable in the long run.

E. Financing

34. An IDA credit equivalent to US$20 million—including Project Preparation Facility funds of US$1.7 million—will help finance foreign and local costs amounting to 42 percent of total project costs (table 3). IDA will finance 100 percent of the institutional component and 28 percent of the infrastructure component. SIF will provide US$10 million for parallel financing the infrastructure component of the project from a specific allocation set for rural water and sanitation investments of a US$60 million IDB loan to SIF, approved in May 1995. The OPEC Fund will provide US$5 million to cofinance the investment component of the project. SIF and the OPEC Fund will provide the financing of the infrastructure component against the same conditions as that of the IDA credit.

35. The international donors will finance 70 percent of total investment costs (i.e., direct construction costs plus the SIF fee), which are estimated at US$ 35.7 million. Municipalities will provide 30 percent of the investment costs, of which 5 percent will be paid to the municipalities by the communities in cash. Each community and its municipality will enter into an agreement, that stipulates the financial terms and conditions of their contributions to the project. This agreement between community and municipality will include an additional commitment for in-kind contributions (such as unskilled labor, and provision of local materials valued against the rural wage rate) by the community to the municipality, equivalent to 15 percent of investment costs. Municipalities will treat the total investment as a municipal asset. The departmental governments will finance the preparation of subprojects; these costs will equal to about 6.5 percent of direct construction costs.

36. *Municipal finances*. Since the adoption of the Popular Participation Law in April 1994, population size serves as the basis for the distribution of intergovernmental transfers—*fondos de coparticipacion*—increasing the municipal share of national revenue from 10 to 20 percent. In most municipalities, except in department capitals, co-participation revenue has had a dramatic impact on financial capacity. This revenue increased the average municipal revenue from US$2,500 in 1993 to US$75,000 in 1994. Responsibilities also increased, to include the expansion and maintenance of physical infrastructure for education, health, irrigation, and local roads. The redistributed revenue is earmarked for public investment—only 10 percent may be used for current expenditures. The personnel costs of operating transferred infrastructure continue to be borne by the central government. A revenue forecast for all municipalities for the 1995–98 period is included in annex 11.

37. *Departmental Governments*. Under the financial policy adopted for the project, regional development corporations, to be replaced as of January 1996 by departmental governments (paragraph

20), do not bear a share of the investment cost. But they will fund all pre-investment expenses, which may amount to 6.5 percent of the construction cost. Pre-investment decisions by departmental governments and municipal investment priorities are consistent because departmental governments require prior approval from municipal governments to make pre-investments in their jurisdiction. Therefore, pre-investment should be included in the five-year municipal development plan and the corresponding annual operating budget (paragraph 10). The role of the regional development corporations, according to the *Decentralization Law*, will change drastically. As of January 1996, when the law enters into effect, it will eliminate the regional corporations, absorbing their current functions into a restructured department-level government. Pre-investment responsibilities will then be assumed by the departmental government; similarly, the institutional functions and personnel assigned to the UNASBAs will be transferred accordingly.

Table 3: Project financing (millions of U.S. dollars)

Component	IDA	OPEC-Fund	SIF/IDB	Dept. Govt's.	Municipalities	Communities
Infrastructure						
Water supply	7.30	3.65	7.30		6.51	1.30
Sanitation	2.70	1.35	2.70		2.41	.48
Subtotal	10.00	5.00	10.00		8.91	1.76
Institutional						
Project management	1.40					
Sector strengthening	5.80					
Training	1.10					
Subtotal	8.30					
Other						
Pre-investment				2.30		
PPF	1.70					
Subtotal	1.70			2.30		
Total	20.00	5.00	10.00	2.30	8.91	1.76

38. *Social Investment Fund.* The Social Investment Fund initiated operations in June 1991. The creation of the fund followed the elimination of the Social Emergency Fund, created as a safety-net institution to generate employment for the poor during the first stage of structural adjustment (1985–89). Employment generation through the Social Emergency Fund did not achieve the fund's objectives, but an effective institution for social spending, managed by a cadre of motivated and well-paid professionals, was created. In 1994 SIF's investments totaled US$24.6 million, and its operating cost was US$3.5 million, or about 14 percent of investment costs. There is room for efficiency improvements at the fund, and productivity should be stressed. Based on negotiations between the fund and several donors—including the Netherlands, Sweden, Switzerland, and multilateral institutions—projections were prepared for 1995–98 assuming an increase in investments to US$45 million to US$50 million, and operating costs of about US$4.5 million per year, which results in an operating cost of less than 10 percent of its investment costs.

F. Environment

39. The project is classified as category "B" under IDA's environmental guidelines. The only foreseeable adverse impact is related to increased wastewater from small sewage collection systems, particularly in communities with populations above 2,000. Similarly, minor sewage discharges into border

rivers are envisaged as potential adverse impacts. In such cases a simplified environmental impact assessment would be conducted following procedures included in the Project Implementation Manual (annex 14). Mitigation measures, including stabilization ponds where physically feasible and financially viable, would be included into subprojects as a condition for financing. In such cases, investments in wastewater disposal facilities might be treated as independent projects.

G. Risks

40. The project faces three main risks. The first risk relates to the speed of implementation of the Popular Participation Law. The law, which legally recognizes and empowers local communities, was a major reform with social and political consequences that are only now unfolding. This risk is minimized by strengthening the institutional capacity of municipalities and communities to operate and maintain water and sanitation services, and by fostering the participation of municipalities and communities in the planning, design, administration, operation and maintenance of water supply and sanitation projects, a goal that also is supported by the recently approved Rural Communities Development Project (Cr-2772-BO).

41. The second risk concerns the institutional weakness of the project entities. In terms of the sector's institutions, DINASBA is weak. In addition, DINASBA has not assumed its policymaking responsibility for the sector, instead concentrating its efforts on coordinating specific programs financed by international agencies. The regional corporations, which will be replaced by departmental governments as of January 1996, have only recently been given the responsibility of providing technical assistance to local governments. The corporations have acted mainly as project implementing agencies and have limited experience in program planning, coordination, and supervision. This risk is minimized by devoting adequate resources to strengthening DINASBA and the UNASBAs; this includes establishing specific project units within each organization, and specific credit conditionality linked to progressive incorporation of sector institutions, particularly DINASBA, into the Public Service Law.

42. A third risk relates to the changed role of the municipality. The Popular Participation Law has radically altered the powers, responsibilities and fiscal resources of the local governments. The increased authority could result in the municipalities setting their own, politically motivated, agenda with regard to the provision of rural water and sanitation services. However, this risk is minimized because of the use of eligibility criteria for municipalities and communities to qualify for financing, which assures that the project has to reflect the needs and preferences, and the willingness to pay of the community.

III. Project Implementation

43. The borrower will be the Republic of Bolivia. The overall project execution will be under the responsibility of the National Directorate of Water and Sanitation (DINASBA). The project will be managed by a project management unit within DINASBA. The project management unit will be responsible for overall management of the project, and will ensure compliance with the credit and project agreement conditions.

A. Arrangements

44. DINASBA will be responsible for guiding, coordinating, and monitoring the implementation of the overall project, and for managing the institutional component of the project. The Social Investment Fund (SIF) will be responsible for managing the investment component of the project. Prior to credit effectiveness, SIF and the Borrower shall enter into a subsidiary agreement under terms and conditions satisfactory to IDA. As of January 1996, the departmental governments will assume the role of the regional development corporations and be responsible for financing pre-investment of subprojects. A project committee comprising representatives of the National Secretary of Popular Participation, acting as chairman, the Under Secretary of Urban Affairs, the Under Secretary of Rural Development, the Social Investment Fund, and each departmental government will oversee implementation of the project to ensure proper coordination of implementation strategies and to monitor project performance. Terms of reference for this committee, satisfactory to IDA, will be included in the implementation manual (annex 14). During negotiations it was agreed that this project committee would be established not later than September 30, 1996.

45. *Project management.* The project preparation team will be transformed into a project management unit to implement the project. This unit, responsible for overall project execution, will be composed of a project manager, an engineer with experience in rural water supply and sanitation, a community mobilization specialist, and an information specialist. The infrastructure component will be managed by the Social Investment Fund according to procedures satisfactory to IDA. The institutional component will be managed by the project management unit through an agreement with the UNDP to be entered into not later than two months after credit effectiveness. Terms of reference for the project management unit was agreed on before credit negotiations. The main duties of the project management unit and the project committee should be outlined in the implementation manual (annex 14).

46. *Legal documents and institutional agreements.* Legal documents include a Development Credit Agreement between IDA and the Republic of Bolivia (represented by the Ministry of Finance). The Government would transfer to SIF the proceeds allocated to the investment component through a subsidiary agreement. A model for the institutional agreement between DINASBA, the Social Investment Fund, and each regional development corporation, or Department government in 1996, to execute the project, was discussed and agreed during negotiations (annex 4).

47. *Special account.* A special account will be established in U.S. dollars in the Central Bank of Bolivia. The initial allocation—sufficient for about four months of expenditures—will be US$1.2 million. The authorized allocation shall be limited to US$600,000 until the combined credit withdrawals have reached US$5 million. Funds from the account will be available only for IDA's share of project costs. IDA

will replenish the special account as requested on receipt of evidence that expenditures made were eligible for financing from the credit proceeds.

48. *Annual project review*. A project review involving the government and IDA will be held each year, not later than January 31, starting in 1997. This review is essential for project implementation. Draft terms of reference for the review will be included in the implementation manual (annex 14). Moreover, the project will finance a number of studies and a monitoring and evaluation system (annex 7), that will assist PROSABAR , the rural water and sanitation sector in Bolivia and IDA in reviewing the project's performance. In addition to the annual review, two workshops will be held. The first, to be held within ninety days of Board presentation, will explain IDA procedures. The second will be at the beginning of the third year of project implementation, to review and update the implementation manual and technical standards. Outline terms of reference for the project review are included in annex 16.

B. *Selection criteria*

49. Investments for the first year of project implementation have been selected based on the demand for water and sanitation services from communities, and municipalities and the departments have been selected based on the total number of households without access to these services. The distribution of the different technological options, service levels and community sizes of the first-year program is shown in annex 5. Focusing first-year implementation efforts in departments in the Altiplano was critical for efficient use of human and financial resources, and for applying the lessons learned from the Potosí pilot project. For subsequent years (1996-2000) all departments and municipalities could be eligible for financing if they meet the criteria presented in annex 12. These criteria will be revised annually to incorporate adjustments.

C. *Supervision*

50. The project management unit will supervise the project, including compliance with project and institutional agreements. The project implementation manual (annex 14) will contain basic project management procedures. The implementation manual should be formally adopted before credit effectiveness. Annual reviews and supervision will be based on well-defined and measurable indicators developed during appraisal. The project's performance will be measured against a number of well-defined and measurable monitoring indicators as well as a number of indicators which due to the demand-driven character of the project can not be determined beforehand (annex 18).

51. The supervision requirement for the project is estimated at fifty staff-weeks from credit effectiveness to credit closing (four years). The professional expertise required to supervise the project include an engineer with experience in rural projects, a sociologist or community development specialist, and an institutional development expert. Supervision requirements will be intense during the first two years of project implementation, when at least twelve staff-weeks will be needed annually (annex 16).

D. *Procurement*

52. Procurement for the institutional component will involve recruitment of national and international consultants to provide training services and technical assistance, and small purchases of goods and equipment. Implementation of the rural water and sanitation infrastructure program will consist of contracts for civil works and for the procurement of goods and equipment. International competitive

bidding (ICB) will be used for civil works contracts financed by subgrants exceeding US$1 million, and for goods and equipment financed by subgrants exceeding US$100,000. To the extent practicable, contracts for goods and works financed by subgrants shall be grouped into bid packages estimated to cost more than the equivalent of US$1 million for works and US$100,000 for goods.

53. All other procurement activities will be carried out through national competitive bidding (NCB), with the exception of contracts for civil works financed by subgrants costing less than US$50,000 and for goods and equipment financed by subgrants costing less than US$25,000. NCB procedures will be used to the aggregate limit of US$5 million for civil works financed by subgrants and US$750,000 for goods, equipment, and vehicles financed by subgrants.

54. Contracts for small civil works financed by subgrants costing less than US$50,000 could be awarded on the basis of at least three price quotations, or if only one quote can be obtained under direct contracting, up to an aggregate amount of US$1 million. Contracts for works other than those financed by subgrants will be procured under lump sum, fixed price contracts awarded on the basis of at least three price quotations. If only one quote can be obtained, works not financed by subgrants may be procured under direct contracting up to an aggregate amount equivalent to US$200,000. National shopping can be used for goods financed by subgrants estimated to cost less than US$25,000, up to an aggregate amount of US$250,000. Goods other than goods financed by subgrants will be procured under contracts awarded on the basis of national shopping procedures.

55. The Social Investment Fund, responsible for procurement of the investment component, has had a well documented experience with IDA financed projects. Standard bidding documents already approved by IDA under the Second Social Investment Fund project (C2532-BO) will be used for NCB procurement under the proposed project. Since Bolivia's legislation with respect to NCB defers in part with IDA's principles and rules of procurement, during negotiations agreement was reached with the Borrower on principles and rules of procurement which shall expressly govern all procurement of goods and works under NCB. IDA issued documents will be used for ICB procurement. Procurement for the institutional capacity building program will be managed by the UNDP, under a management agreement with the Bolivian Government. Supervision of procurement will be managed by the IDA's Resident Mission in La Paz; a procurement assistant has been relocated to La Paz to assist the Project Implementation Manager during the first year of project execution.

Table 4: Project cost by procurement method (millions of US dollars)

Project Element	ICB	NCB	Other	Total
Civil Works	3.0	24.0	3.0 a/	30.0
	(1.0)	(5.0)	(1.0)	(7.0)
Materials and Equipment	3.0	2.0	0.7 b/	5.7
	(2.0)	(0.75)	(0.25)	(3.0)
Consulting Services			12.3	12.3
			(10.0)	(10.0)
Total	6.0	26.0	16.0	48.0
	(3.0)	(5.75)	(11.25)	(20.0)

Figures in parenthesis are amounts financed by the IDA credit
a/ Small works procedures (3 quotations) and direct contracting
b/ national shopping

56. In addition to reviewing the investment subprojects and associated community development programs for the first year of project implementation, IDA will review ex-ante procurement documents for contracts for civil works and goods financed by subgrants under ICB procedures and for civil works contracts financed by subgrants costing more than US$250,000. Documentation for the other subprojects will be available at the Social Investment Fund for IDA staff and auditors. IDA will review ex-ante all procurement documents for goods and equipment contracts not financed by subgrants exceeding US$50,000. IDA also will exercise prior review of the documentation and steps for the procurement of consulting services costing US$25,000 or above for firms and US$5,000 or above for individuals. For all other contracts and documentation, the Social Investment Fund will maintain those involving the rural water and sanitation infrastructure program, and DINASBA and the UNDP will maintain those relating to procurement of the institutional capacity building program to IDA's satisfaction, making them available for inspection by IDA staff and auditors. The proposed review thresholds provide for prior review by IDA of approximately 75% of the total value of IDA-financed contracts.

E. Disbursement

57. The IDA credit will cover up to 100 percent of the amount disbursed under subgrants which will finance contracts for the construction of water supply and sanitation systems under the rural water and sanitation infrastructure program, including discrete or bulk procurement of the related equipment; 100 percent of foreign and 100 percent of local expenditures (ex-factory cost) for procurement of office equipment, vehicles, and similar items related to the operations of the project implementing agencies; 85 percent of civil works for pilot projects that test and develop low-cost water and sanitation technologies and/or methodologies for community mobilization in investment subprojects; 100 percent of contracts for consulting services; 100 percent of travel costs for the institutional strengthening program; and 100 percent of the UNDP fee.

58. Disbursements for (i) civil works contracts financed by subgrants of less than US$250,000; (ii) and goods contracts financed by subgrants of less than US$100,000; (iii) goods not financed by subgrants costing the equivalent of US$50,000 or less; (iv) works other than works financed by subgrants; (v) consulting contracts with firms and individuals costing less than US$25,000 and US$5,000 respectively; and (vi) training, travel costs and the UNDP fee, will be made under the statement of expenditures procedure. Advance contracting—about US$3 million—will be permitted, in accordance with the disbursement categories and percentages as established in the legal agreement and provided that it follows IDA's procurement guidelines. It is a condition of disbursement for the payments on account of a subgrant that SIF and the corresponding eligible municipality have entered into a subgrant agreement under terms and conditions satisfactory to IDA.

59. *Retroactive financing.* Reimbursement of up to US$1.7 million will be permitted for expenditures made in accordance with procurement procedures agreed to under the project from August 1, 1995, provided that the credit is signed no later than July 31, 1996. If the credit is signed at a later date, the date for eligibility of expenditures for retroactive financing will be modified so that the period covered by retroactive financing is no longer than one year. Retroactive financing is recommended to ensure timely provision of technical assistance for project management and procurement of investments already negotiated with communities and approved by IDA during appraisal. The UNDP has offered the Government of Bolivia bridge financing of up to US$3 million, to be reimbursed before December 15, 1996.

60. *Closing date.* Project implementation is expected to last four years. Based on the assumption that the credit will become effective in June 1996, the credit closing date will be December 31, 2000.

F. Audits

61. DINASBA/PROSABAR, UNASBAs, the UNDP, the Social Investment Fund, and the other entities concerned will maintain separate accounts for all project expenditures involving the use of IDA credit proceeds. These accounts will be audited annually by external independent auditors acceptable to IDA. The audits will include the special account and project account. All audit contracts will be awarded prior to the end of the calendar year and the audit should be submitted to IDA for review and comment no later than June 30 of the following year. All audit costs will be financed by Bolivia.

G. Reporting

62. DINASBA/PROSABAR will prepare a quarterly evaluation on the status of project implementation (annex 15), based on monitoring indicators (annex 18), a summary of relevant statistical and financial data for each project component and activity, major project achievements, possible issues with remedial actions, and fulfillment of covenants. These evaluations will be consolidated in a report which will be submitted to IDA for review and comment no later than November 30 of each year of project implementation, starting in 1996. This report will be formalized in standard formats which were defined and agreed during negotiations (annex 15). Each local unit also will prepare an annual operational plan for the execution of activities under their auspices during each year of project implementation, including guarantees of budget allocations for pre-investment financing. This plan will be submitted by DINASBA to IDA for review and approval no later than December 15 of each year, starting in 1996.

IV. Agreements and Recommendation

63. During negotiations, assurances have been obtained from the government that:

(a) The policy framework for rural water and sanitation investments is set forth in Ministerial Decree, dated September 11, 1995.

(b) The technical manual for the design of rural water and sanitation projects has been adopted by means of a directive of DINASBA.

(c) Project implementation agreements between the National Secretary of Urban Affairs, the Social Investment Fund, and each departmental government, all satisfactory to IDA, have been signed.

(d) A project implementation manual, satisfactory to IDA, has been adopted by DINASBA.

(e) The management team of PROSABAR, satisfactory to IDA, has been officially appointed.

64. In addition, agreement was reached on UNDP financing—about US$320,000 in four years—of independent monitoring and evaluation of the project, managed by the UNDP-World Bank Water and Sanitation Program based in La Paz (annex 7).

65. Prior to credit effectiveness, the Government of Bolivia should confirm that:

(a) A project implementation manual, satisfactory to IDA, has been adopted by DINASBA.

(b) At least three project accounts (UNASBA Accounts) have been opened.

(c) A subsidiary agreement between SIF and the Borrower has been signed.

66. During negotiations, the following agreements have been reached:

(a) UNDP and the Borrower shall enter into a management service agreement not later than two months after credit effectiveness.

(b) Prepare quarterly evaluations on the status of project implementation, which will be consolidated in an annual report not later than November 30 of each year, starting in 1996.

(c) Prepare an annual operation plan, not later than December 15 of each year, starting in 1996, which includes the activities to be carried out during the calender year following the date of presentation of such plan.

(d) Establish a project committee that will oversee the implementation of the project by September 30, 1996.

(e) Complete the design of a proposal to incorporate DINASBA's personnel in the Borrower's Civil Service System by December 31, 1996.

(f) Prepare and furnish an action plan, which shall include, inter alia, a timetable, for the purpose of implementing the proposal to incorporate DINASBA's personnel in the Borrower's Civil Service System by March 31, 1997.

(g) Complete the design of a new cost recovery policy, not later than June 30, 1997;

(h) Take or cause to be taken all necessary actions to adopt the cost recovery policy not later than March 31, 1998.

(i) SIF and the corresponding eligible municipality have entered into a subgrant agreement under terms and conditions satisfactory to IDA.

Recommendation. Subject to the above conditions, the project is suitable for an IDA credit of US$20 million equivalent, to be repaid over forty years, including ten years' grace, at IDA's standard rate.

BOLIVIA

RURAL WATER AND SANITATION PROJECT

STAFF APPRAISAL REPORT

ANNEXES

Annex 1
Bank Loans /IDA Credits to Bolivia Water and Rural Sectors (1976-94)
As of January 1, 1995

Year	L/C no.	Original L/C Amount US$	Disbursed	Cancelled (percent)	Borrower	Project Title	Comments
1976	L1211-BO	$9.5m	$6.43m	32	GOB	Ingavi Rural Development	The project benefited 10,000 families by establishing an autonomous unit to provide production services, agricultural credit, and construction of 20 deep wells for land irrigation and drinking water.
1976	L1324-BO	$11.5m	$4.72m	59	GOB	Urban and Rural Communities Water Supply and Sewerage	Despite a five-year over-run, the project was successful in expanding and improving water supply services in rural areas at a reasonable cost during political and economic difficulties. (OED Unsatisfactory)
1979	C0933-BO	$3.0m	$1.99m	34	GOB	Omasuyos-Los Andes Rural Development	Technical services operated in the early years of the project, including farmer training. Male, female extension agents provided homemaking programs. The health infrastructure reached 4% of targets, the forestry component was a failure.
1979	C0948-BO	$9.0m	$9.0m	0	GOB	Santa Cruz Water Supply and Sewerage	Most components were completed five years later than the targeted completion date due to hyperinflation and other economic problems during 1982 - 85.
1987	C1829-BO	$10m	$10.0m	0	GOB	Emergency Social Fund	The projects were successful in mobilizing international support and providing finance to income-generating projects. (OED Satisfactory)
1988	C1882-BO	$27m	$25.0m	0	GOB	Second Emergency Social Fund	The credits financed 351 projects in the water and sewerage sectors totaling US$27 million benefiting 609,000 people. (OED Satisfactory)
1988	C1842-BO	$15m	97%	0	GOB	La Paz Municipal Development	Delays, due to frequent changes in administration, that plagued implementation of the institutional, administrative, and financial components, have been resolved. The project has been extended one year to allow for closing studies.
1990	C2119-BO	$35m	57%	0	GOB	Eastern Lowlands Natural Resource Management and Agricultural Production	Social infrastructure implementation is progressing at a satisfactory rate. The issue of concern is the major problems with land demarcation for the indigenous population.
1990	C2127-BO	$21.5m	93%	0	GOB	Social Investment Fund	Assists the government in its efforts to improve the coverage of basic services, including the financing of projects in the water and sanitation sector.
1990	C2187-BO	$35m	42%	0	GOB	Major Cities Water and Sewerage Rehabilitation	The project aims at improving and expanding the water and sanitation services as well as the water utility in La Paz, Sta. Cruz, and Cochabamba.
1993	C2532-BO	$40m	33%	0	GOB	Second Social Investment Fund	Finance sub-projects in basic water supply and sanitation infrastructure combined with training of the communities in O&M and basic hygiene.
1994	C2565-BO	$42m	8%	0	GOB	Municipal Sector Development	The project aims to promote efficient municipal management in support of decentralization; improve resource mobilization and allocation for municipal investment projects; and alleviate urban poverty and encourage balanced regional development.

Completed projects

Annex 2
Experience from Previous Projects and Lessons Learned

1. Few projects and institutions have had an active presence in water and sanitation projects in dispersed rural areas, which are the most deprived areas of Bolivia. IDA has financed water and sanitation investments focusing on poor periurban areas through four social investment projects, two with the now-defunct Social Emergency Fund (SEF) and two through its successor, the Social Investment Fund (SIF). From 1991 to 1994, the Dutch government—through the UNDP (UNDP)-World Bank Water and Sanitation Program—financed the implementation of a pilot project to benefit people in the poorest communities in the Department of Potosí. The experience accumulated in the Potosí project, which included strong NGO participation, provided a sound conceptual basis for the preparation of PROSABAR. NGOs like CARE, CCH, and PROANDES-UNICEF also have been successful in implementing projects in rural Bolivia.

Yacupaj

2. Yacupaj means "for the water" in the Quechua language. The Yacupaj pilot project began in 1991 with the objective of designing and testing strategies for the provision of sustainable water and sanitation services to the dispersed rural population of the Altiplano. The project, which cost US$2.8 million, was executed in four provinces of the Department of Potosí by the UNDP-World Bank Water and Sanitation Program. In three years the project worked in 520 communities and trained 190 rural teachers, 200 infirmary assistants, 290 builders, and 600 operators. The project built and installed 220 water systems, 750 manual pumps, and 2,400 sanitation facilities, and benefited 31,000 inhabitants with water services and 30,000 inhabitants with sanitation services. Furthermore, 85 percent of the population use and keep their lavatories clean, 60 percent of women know how to treat illnesses like mange, diarrhea, and cholera, and 30 percent of the users have varied their water use. They water orchards, use solar tents, and provide their animals with water.

3. *Project implementation.* The promotion stage began with NGOs visiting the communities to explain the scope and benefits of the project, emphasizing the economic benefits of the project in terms of health improvements and time savings. Once the communities had agreed to participate in the project the process of demand generation was initiated. NGOs and community promoters organized hygiene education activities. The promoters and NGO staff trained community members to identify their needs for basic sanitation. Then, the communities were organized to initiate the work and the people elected representatives to the water committees that were created. The community had to buy construction materials from local shops, paying 30 percent of the costs. They also contributed labor and local materials to the scheme, with the project paying the remaining 70 percent for non-local materials and cost of the mason. The average per capita cost of water infrastructure investment has been US$12, demonstrating the feasibility of low-cost, sustainable projects. During building of the works, the community elected people to be trained in operations and maintenance. Once the construction was completed the project periodically monitored the use of the works for three months. Project maintenance, water quality control, women's participation, promoter's work, spare parts availability, and changes in hygiene habits were reviewed and modified when necessary.

Lessons learned

4. The most important lessons learned from the above experiences and, in particular, from the Potosí pilot project are:

- Communities should be the final decisionmakers throughout the life of a project, from planning to operations.
- The process of community mobilization, training, and demand generation is key to ensuring conscious, active, and permanent participation of the community throughout and after project completion.
- Even the poorest communities are willing to provide labor and contribute up to 30 percent of the capital investment costs in cash and in kind.
- The active participation of women, who are the principal water users, at all stages of the project was key in ensuring the project's success.
- Community members, especially women, can be trained to undertake management operations and service maintenance activities.
- Simple, low-cost, and easy-to-maintain technologies are key to the success of rural water and sanitation projects.
- The communities' contribution to the investment cost is key to creating a sense of belonging and ensuring sustainability.
- Training and hygiene education in the health, education, and sanitation sectors are essential to the effective and sustained use of the services.
- Technical support for operations and maintenance is required at the community, municipal, and department levels; and, at the end of the project, the region must have adequate institutions to assist in maintaining and expanding the systems.
- NGOs seem to be effective in working at the grassroots level and in most cases have demonstrated efficiency and reliability in undertaking rural water and sanitation programs.

Annex 3
Water and Sanitation Sector

Coverage

Department	Population			Water %			Sanitation %		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Chuquisaca	453,756	147,401	306,355	42.86	18.15	90.87	29.8	7.47	73.2
La Paz	1,900,786	1,193,821	706,965	62.18	23.69	87.44	36.97	15.09	51.34
Cochabamba	1,110,205	580,188	530,017	48.82	26.08	71.57	45.45	21.81	69.08
Potosi	645,889	216,835	429,054	43.36	21.67	90.09	21.63	7.2	52.71
Oruro	340,114	222,018	118,096	65.06	23.35	92.1	22.09	6.16	32.42
Tarija	291,407	159,438	131,969	62.77	25.4	92.02	49.52	19.16	73.3
Beni	276,174	182,748	93,426	37.19	3.98	54.62	65.54	41.25	78.3
Santa Cruz	1,364,389	982,396	381,993	71.94	33.65	86.44	67.75	37.25	79.26
Pando	38,072	10,001	28,071	25.59	5.92	76.96	48.36	33.27	87.76
Total	6,420,792	3,694,846	2,725,946	57.52	23.82	84.17	42.82	17.48	62.86

Base 1992

Investments US$ '000

Department	Total	Urban		Rural	
		Total	%	Total	%
Chuquisaca	414	213	51	210	49
La Paz	22,145	19,081	86	3,064	14
Cochabamba	15,876	12,208	77	3,668	23
Oruro	12,243	10,656	87	3,064	13
Potosi	3,973	2,724	69	1,250	31
Tarija	6,464	4,096	63	2,368	37
Santa Cruz	15,547	14,565	94	982	6
Beni	552	354	64	198	36
Pando	510	158	31	352	69
Totals	77,724	64,055	82	15,156	18

Base 1994

Annex 4
Institutional Arrangements
Organization Matrix

Government Administration	Authority Level	Institutions				
National	Presidency					Presidency
	Ministry	Human Development		Presidency	Finance	
	Secretary	Popular	Participation	SIF		
	Under-Secretary	Urban Development	Rural Development		Public Investment	
	Directorate	DINASBA				
		PROSABAR				
Department	Departmental Government					Prefectura
						UNASBA
	Regional Entities			SIF		
Local	Municipality	Municipal Government				
		W&S Unit				
	Community	Community Government/OTB				
		W&S Users Association				

Policy Formulation
Project Implementation

* Once Decentralization Law is passed

Annex 4
Institutional Arrangements
Functional Matrix

☐ Leadership
O Primary Responsibility
X *Shared Responsibility*
☒ Concurrent Responsibility

* No objection (according to ceilings)
\+ Support

Institutions

Function	National																	International				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Policy Formulation	O	X	X	☐	☐	X	X	X		☐		☒											
Project Implementation									X	O	☐		X	X									
Investment									☐		O	X	X	X	X								
Pre-investment									☒		☒	☐	☐	☒	☐		☐						
Evaluation									☐					X									
Approval									☐											*			
Bidding									O			X	X	X	☐					*			
Supervision									☐					X									
Follow-up									☐		☒		☒	☐									
Technical Assistance											☐	X	X										
Prepare Terms of Reference											☐		X										
Approval											☐		X						X	*			
Bidding and contracts											X		☐							*			
Supervision											X		☐										
Follow -Up											☐		☒										
Monitoring and Evaluation											☐		☒						X	X	X		
Training											☐		X		X	X	X	X			+		
Reporting				☒			☒				☐		X										
Auditing							O				O	O	O						O				
Accountability of Expenses							O				O	O	O						O				
Project Coordination				☒	☐	X			X			X											

Institutions

National Level		Departmental Level		Local Level		International Level	
Min. Human Development	1	Departmental Governments	12	Municipal Government	15	UNDP	19
Min. of Sustainable Development	2	UNASBA	13	W&S Unit	16	World Bank	20
Min. of Finance	3	Regional FIS	14	OTB/Community Govt.	17	UNDP-WB Program	21
Secr. of Popular Participation	4			W&S Users Association	18		
Under Sec. of Urban Development	5						
Under Secr. of Rural Development	6						
Under Secr. of Institutional Development	7						
Under Secr. of Public Investment	8						
SIF	9						
DINASBA	10						
PROSABAR	11						

Annex 5
Technology Options Description

Water supply

Technical option		Population density	Service level indicated	Population range	System ownership a/	Responsibility for O & M b/
Piped water supply	Gravity fed system	Concentrated	-House connection w/ w/o water meter or regulator -Multi-family stand pipe	Large 2000 - 5000	Municipal Government	Municipal Government
		Semi-dispersed	- House connection w/ w/o regulator. - Multi-family stand pipe -Combination (house connection / stand pipe).	Medium 500 - 2000	Municipal Government	Community
		Dispersed	-Multi-family stand pipes	Small < 500	Municipal Government	Community
	Pump fed system	Concentrated	-House connection w/ water meter or regulator	Large 2000 - 5000	Municipal Government	Municipal Government
		Semi-dispersed	-House connection w/ water meter or regulator	Medium 500 - 2000	Municipal Government	Community
				Small 350-500	Municipal Government	Community
	Spring protection w/ multi-family stand pipe	Semi-dispersed/ dispersed	-Multi-family stand pipes	5-25	Communal or family	Communal or family
Non-piped water supply	Manual pumps with excavated wells Spring protection	Semi-dispersed	- Multi-family - Family	5-25	Communal or family	Communal or family
		Dispersed	- Multi-family - Family			
	Rain water	Semi-dispersed	- Family - Communal	Not defined	Communal or family	Communal or family
		Dispersed	- Family			

Sanitation

Technical Option	Population density	Level of service indicated	Population range	Water service	System ownership	Responsible for O & M
Conventional	Concentrated	House connection	More than 1000	House connection	Municipal Government	Municipal Government
Reduced diameter	Concentrated	House connection	More than 1000	House connection	Municipal Government	Municipal Government
Latrine (pour-flush latrine)	Concentrated	Family	Per Latrine: 2 - 10	House connection, standpipe, handpump	Family	Family
	Semi-dispersed	Family				
	Dispersed	Family				
VIP Latrine	Concentrated	Family	Per Latrine: 2 - 10	House connection, standpipes and handpumps	Family	Family
	Semi-dispersed	Family				
	Dispersed	Family				

a/ Investments are always registered as municipal assets; but ownership can be delegated.

Annex 5
Technology Options
Cost Structure

Technology option	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Service type	Water Supply											Sanitation		
System	Gravity w/ treatment	Gravity w/o treatment	Gravity stand pipe	Pumps deep well w/ disinfection	Pumps deep well	Manual pumps (YAKU)	Manual pumps (SOGA)	Manual pumps (BALDE)	Manual pumps (INDIA MARK III)	Spring protection w/ stand pipe	Spring protection	Sewerage & treatment	Latrines wet	Latrines dry (VIP)
Connection type	House	House	Stand pipe	House	House	Individual	Stand pipe	Stand pipe	Stand pipe	Stand pipe		House		
Density	High	Semi *dispersed*	Semi *dispersed*	High	Semi *dispersed*	Semi *dispersed*	Semi *dispersed*	Semi *dispersed*	Semi *dispersed*	Semi *dispersed*	Semi-disp. / *dispersed*	High	Semi *dispersed*	Semi *dispersed*
Ownership *	Municipality	Municipality	Community	Municipality	Municipality	Family	Family	Family	Family	Family	Family	Municipality	Family	Family
Investment Percent														
Local material	2	3	3	1	2	4	6	9	4	4	4	5	17	15
Non local materials	56	53	50	58	58	54	46	41	64	61	29	39	36	29
Unskilled labor	11	13	15	10	8	9	14	14	7	4	4	15	13	16
Skilled labor	3	2	2	1	2	6	5	5	2	7	6	5	5	7
Tools & equipment	2	2	2	5	7	1	1	1				6	1	1
Fringe benefits	8	9	9	7	5	8	10	11	5	6	5	11	9	13
Overhead	13	13	13	13	13	13	12	12	13	13	7	13	12	12
Tax	5	6	6	5	5	5	6	6	4	5	3	6	6	7
US$/beneficiary	75	63	46	69	74	16	10	10	28	4	2	75	24	22
O& M Percent														
Operation	19	84	75	67	69							42		
Administration	19	3	4	3	3							21		
Maintenance	62	13	21	30	28	100	100	100	100	100	100	37	100	100
US$/beneficiary/yr.	2.5	2.1	1.2	3.1	4.1	1.3	0.6	0.6	2.4	0.2	0.1	0.9	1.3	1.3
Estimated demand %	10	10	23	1	4	14	4	1	1	4	1	3	12	12

Note:
* Investments will be registered as municipal assets; yet, ownership can be delegated.

Annex 5
Technology Options
Water Quality Standard

Substance	Units	Max recommended	Max acceptable
Physical properties and organicleptides			
Color	mg/pt/l	5.00	20.00
Odor		none	acceptable
Flavor		none	acceptable
Turbidity	N.T.U.	5.00	25.00
Total solids	mg/dm3	500.00	1500.00
Conductivity	Ohms	—	—
Chemical properties			
Alcaline hydroxide	mg CO3Ca/l	0.00	120.00
Alcaline carbonate	mg CO3Ca/l	0.00	250.00
Alcaline bi-carbonate	mg CO3Ca/l	100.00	800.00
Total hardness	mg CO3Ca/l	-0.5/+0.5*	—
Saturation index		7-8.5	6.5-9.2
pH range (min - max)			
Chemical substances			
Arsenic	mg As/l	0.00	0.05
Barium	mg Ba/l	0.00	1.00
Cadmium	mg Cd/l	0.00	0.01
Calcium	mg Ca/l	75.00	200.00
Cyanide	mg CN/l	0.00	0.05
Residual free chlorine	mg Cl 2/l	0.20	1.00
Chlorides	mg Cl/l	200.00	500.00
Copper	mg Cu/l	0.05	1.50
Crome	mg Cr+6/l	0.00	0.05
Florides	mg F/l	1.00	1.50
Total iron	mg Fe/l	0.30	1.00
Magnesium	mg Mg/l	30.00	150.00
Manganese	mg Mn/l	0.05	0.50
Mercury	mg Hg/l	0.00	0.00
Nitrates	mg NO3/l	0.00	45.00
Nitrites	mg NO2/l	0.00	0.05
Lead	mg Pb/l	0.00	0.10
Selenium	mg Se/l	0.00	0.01
Sulphate	mg SO4/l	200.00	400.00
Zinc	mg Zn/l	5.00	15.00
Bacteriological Quality			
Total coliform	NMP/100 ml	0.00	10.00
Fecal coli	NMP/100 ml	0.00	0.00

*Desirable

Based on PAHO standards

A. Trenching

Activity	hr/m^3
Soft soil, 0 -1 m	3.00
Semi-hard soil, 0-1 m	3.50
Semi-hard soil, 0-2 m	5.00
Semi-hard soil, 2-4 m	7.00
Hard soil, 0-1 m	5.00
Hard soil 0-2 m	7.00
Rock	8.00
Structures, semi-hard soil, 0-2 m	4.50

B. Filling

Activity	hr/m^3
Loose soil	1.5
Machine compacted	1.6
With meshed soil (not supplied)	4.5
Manual compacted	3.5

C. Lying pipe m/hr

Pipe dimension	PVC (B&S)	PVC (Threaded)	PE	G.I.
1/2"	29	26	42	14
3/4"	29	26	40	14
1"	25	24	33	10
1 1/2"	25	29		5
2"	17	20		3
2 1/2"	10	12.5		2.7

Glossary	
PVC	Polyvinyl chloride pipe
G.I.	Galvanized iron pipe
PE	Poly ethelyn pipe, high density
B&S	Bell & spigot, cement joints
FC	Fast coupling

Annex 6
Project Design

1. Most rural water and sanitation investments in Bolivia have been selected almost entirely for their technical merits, with limited consideration of their sustainability or economic efficiency. The assumption underlying such projects is that people have basic needs for water and sanitation that should be met, independent of the actual demand and willingness to pay for such services. Investment decisions often are based on poorly defined poverty assessments, which has led to low service coverage, inefficient investment, and inadequate sustainability of services.

2. In the absence of a policy framework for rural water and sanitation, many institutions make investments based on their own experience and policy agenda. This approach results in externally determined levels of service that do not reflect local desires. For instance, non-governmental organizations like CARE favor gravity-fed water supply systems and individual connections with per capita costs ranging from US$50 to US$200. But the UNDP-World Bank Potosí project chose more cost-effective technologies, generally shallow wells and hand pumps shared by three to five families, with per capita construction costs ranging from US$15 to US$40 (annex 2). The Social Investment Fund is more concerned with the transparency and speed of the procurement process and the quality of supervision for social spending projects. The fund pays little attention to sustainability, and its per capita costs for rural water supply range from US$70 to US$120, including a management fee of 6 to 15 percent. Few projects receive cash contributions from beneficiaries, but in-kind contributions of unskilled labor and local material normally are provided, particularly in smaller communities. Regional corporations financed up to 25 percent of investment costs until 1993, and municipalities have done so since 1994.

3. *Design principles*. Community participation is the primary design principle for improving sustainability and economic efficiency. Participation should go beyond the traditional community-based participation model, narrowly defined as the mobilization of local groups to ratify decisions made by outsider planners, to include ownership of, responsibility for, and decision making about water supply and sanitation services. The proposed project will make full use of the participatory planning process devised in the Popular Participation Law, through which communities—organized through the *Organizaciones Territoriales de Base*—express their demand for water and sanitation services, take responsibility for the management of such services, and are willing to invest in capital and recurrent costs.

4. A second design principle is to ensure that the proposed investments are a high priority for the community and the society. The project relies on the five-year municipal development plans and annual operating budgets prepared by each municipality in collaboration with their *Organizaciones Territoriales de Base* and *Comites de Vigilancia*. These plans, cleared by the regional corporations and approved by the national public investment secretariat, allow the use of funds transferred to municipalities (paragraph 10). The 1994 plans gave high priority to water supply and to a lesser extent to sanitation, second only to production infrastructure and rural roads. In addition, the selection process for municipalities and departments now allows for departments to be replaced if they lack sufficient funds to finance pre-investment or have a history of poor performance, according to simple and transparent rules of the game (annex 12).

5. Least-cost and demand-driven investments can be ensured by defining low per-capita investment grants and by maximizing the financial contribution of municipalities and communities to the project. Grant caps also help to rectify allocative distortions of scarce public subsidies to the water and sanitation sector. These grants were established based on the analysis of 227 rural water projects financed by the

Social Investment Fund from 1990 to date (table 1), and on engineering estimates obtained of about 300 small water projects during project preparation (table 2). According to the analysis of PROSABAR water projects which were prepared under the technical criteria aiming at least-cost and demand-driven investment, a grant cap for water supply of US$ 50 per-capita was initially established. However, after numerous discussions with the SIF, grant caps to initiate project implementation were set at US$ 70 per-capita for water supply, based primarily on the analysis of SIF's projects. For sanitation systems and for latrines, values of US$ 65 per-capita and US$ 65 per-unit were set respectively. The actual investment subsidy received by the beneficiaries will be probably lower as the project will finance either the grant cap or 70 percent of investment costs whatever is the lower value. It is expected that in he second year of project implementation a lower value, prepared by the PROSABAR team, will be adopted for water systems because better cost information will become available, while at the same time higher efficiency will result in a reduction of investment cost and hence a lower investment ceiling. The financial contributions of municipalities and communities were established by analyzing their actual payments to recent projects, and by their willingness to accept the project's financial rules. Willingness to pay for water is high—a January 1994 survey of 604 households in peri-urban areas of Cochabamba found that households without connections to public water systems pay water vendors US$3 per cubic meter, compared with US$0.34 per cubic meter for households connected to the water network. Families that depend on water vendors spend, on average, 8.2 percent of their disposable income on water.

6. To attain long-term sustainability of water and sanitation services, even in rural areas, full cost recovery should be pursued. Otherwise, operations and maintenance of infrastructure assets will not be possible. This is a difficult issue for most water and sanitation projects. Communities often assume that social infrastructure automatically will be replaced--after it has consumed its useful life--with government support and financing. But during appraisal it was demonstrated that the long-run marginal costs of a wide range of low-cost technologies could be afforded even by the poorest rural communities—even those with an annual per capita cash income of US$96 (annex 10). The project will support the development of a cost recovery policy for rural water and sanitation services, including the operational and institutional arrangements that will be required to implement this policy. Field studies should be conducted during the first two years of project implementation to complete the analysis made during project appraisal. Willing municipalities and communities should test operational arrangements before the policy is launched for the entire country.

7. A third important element of project design emerges from the highly dispersed nature of rural communities in Bolivia and the large economies of scale which can be achieved by grouping together communities into packages for service delivery. This not only substantially reduces project preparation, bidding, implementation and supervision costs, but it also promotes investment sustainability as neighboring communities are trained together with the municipal government, thereby creating a mutual support and technical assistance system which they can draw upon at a later date. The need for project efficiency must be compatible with the demand-responsive nature of the project. Community, municipality and departmental eligibility criteria have therefore been established which will bring into balance these two concerns (see Annex 12).

8. *Project rules and the adaptive approach.* Because it is difficult to predict community demand, the financial policy and the eligibility criteria will require flexibility in project planning and implementation. The project will rely on lessons learned in earlier phases of project execution to guide the planning and implementation of subsequent activities. To support this "learning by doing" approach, an effective monitoring and evaluation system will monitor project implementation. In addition, special process and impact evaluation studies will verify if the desired incentives are in fact created by the project rules. Lessons will be analyzed and applied to adjust project strategies and policies.

9. *The Social Investment Fund.* The SIF will be responsible for administering the investment component of the project. SIF established itself as an effective institution to manage social spending, with an excellent record in IDA-financed projects. It uses IDA-approved procurement procedures and is quite familiar with the IDA requirements for disbursement of funds, reporting and auditing. SIF also attracts qualified personnel through competitive consulting contracts. Although political interference is common through changes in top management, it is apparently less frequent than in most public offices in Bolivia. The Board of SIF meets three times a week, and is accountable for the approval of all investment projects, through simple and transparent rules. Moreover, SIF has been instrumental in policy formulation in social sectors, especially in rural areas, because of the structural weaknesses of most sectoral institutions in Bolivia.

10. Until recently the cost of running SIF has been funded by the same credits and grants designed to finance social investments, through specific components for institutional building and strengthening. Since the approval of the Popular Participation Law, SIF is proposing to finance its operations by accounting 90 percent of investments from grants and credits from the central government and 25 percent from municipal contributions. The excess 15 percent will finance operational cost, overhead, and a preinvestment fund.

11. For this project, the SIF will continue to operate under this procedure. However, agreement was reached during appraisal between the SIF, the National Secretary of Urban Affairs, the National Secretary of Policy and Social Investment, and IDA to monitor operational costs and overhead based on productivity indicators which introduce clear efficiency incentives and accountability (annex 18). This agreement is also designed to a progressive decentralization of the operation of SIF, and a closer interaction with sectoral institutions, by clearly separating policy formulation functions from investment implementation (annex 13).

12. The gross cost of SIF was estimated at 6.3 percent of investment (US$32.0 million) distributed into operational cost 3.5 percent, overhead 2.0 percent and logistic cost 0.8 percent. However, SIF claims that its actual operating costs is closer to 13%. Operational cost includes direct personnel cost for evaluation of investment proposals, management of bidding process including preparation of tender documents, follow-up of construction execution, and quality assurance of the overall procurement process. Logistic cost includes per-diem fees inside Bolivia, communication expenses, and vehicles.

Annex 6

Analysis of Cost per Capita for Bolivian Water Supply Projects

Table 1

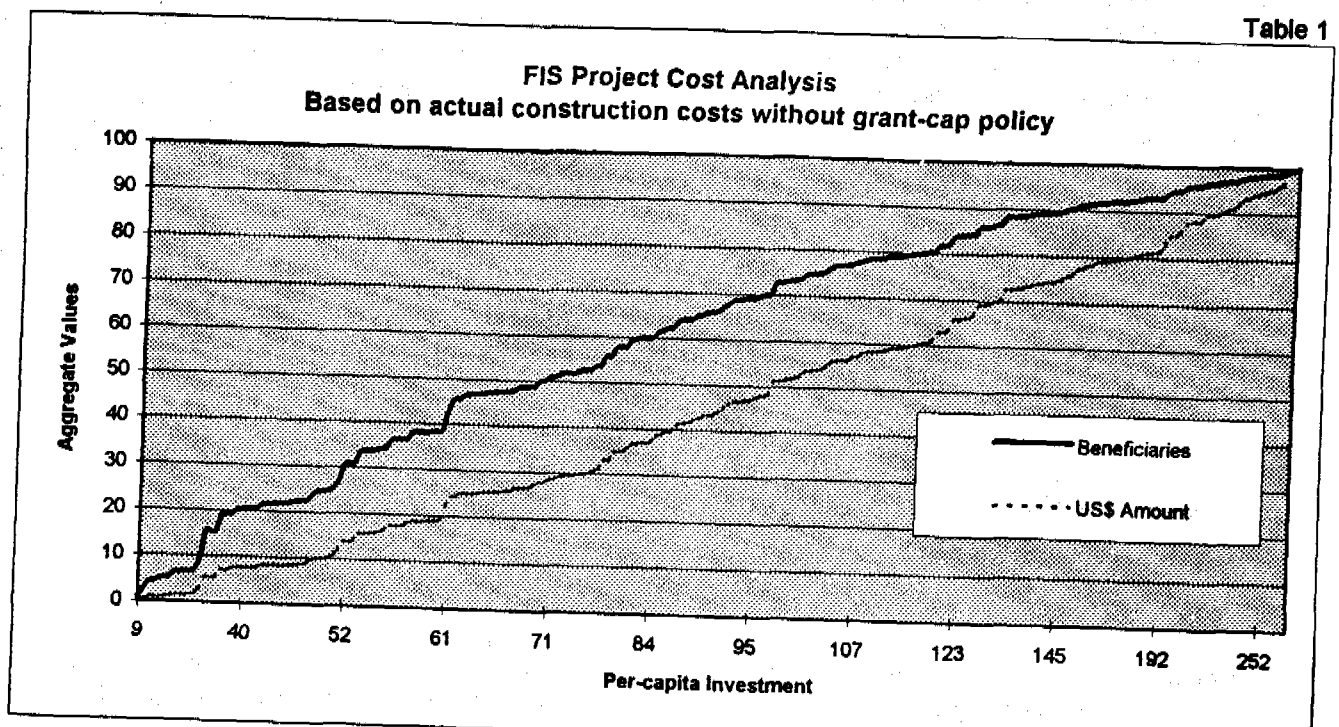
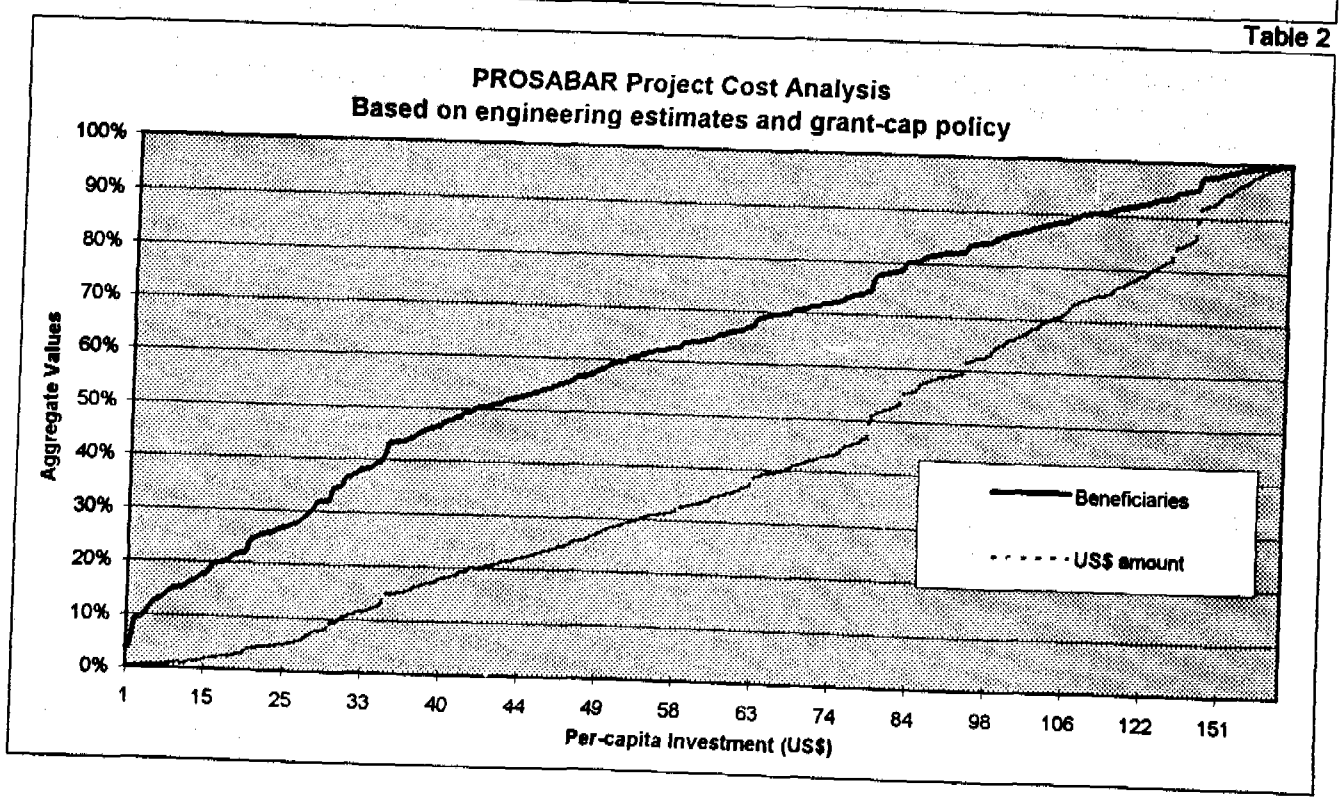


Table 2



Annex 7
Technical Assistance

A. Project Management

A.1 Support to DINASBA/PROSABAR (US$1,125,000)

1. The PROSABAR staff assigned to the central project office in DINASBA will be funded through credit proceeds, and will include the following professional and support staff: a coordinator, a community mobilization specialist, a technical and engineering advisor, an administrator, a computer assistant/monitoring specialist, two secretaries, and a messenger. An advisor will also be recruited for one year to assist in project start-up activities, as well as other short-term consultants to be hired according to specific demands approved by IDA. Office operating expenses and a small amount of equipment will also be included in the technical assistance component. DINASBA will provide office space, furniture, and equipment (most of which was procured through PPF funds) and pay all utilities as an input to project management. Terms of reference for all consultants will be included in the project implementation manual.

A.2 Support to the United Nations Development Programme (US$275,000)

2. *Justification and design.* The UNDP has a large and effective operation in Bolivia. It participated the Potosí pilot project (annex 2) and managed the two PPFs for project preparation (paragraph). The Government of Bolivia and the UNDP had agreed to a bridge financing for about US$3.0 million to initiate project implementation. Moreover, during appraisal agreement was reached between the Government of Bolivia, UNDP and IDA to request UNDP's assistance as a disbursement agent for the institutional component of the project, under similar arrangements used for management of the PPF advance. The administrative cost for UNDP--calculated for four years--will be funded by the project, including one full-time project officer--equivalent to about US$40,000 a year--and 50 percent of a administrative assistant.

B. Sector Strengthening

B.1 Capacity Building (US$1,400,000)

3. The bulk of support to project management at the department level will be provided as of January 1996, by the departmental governments. In addition to office space, furniture, a four-wheel drive vehicle, and operating expenses, each departmental government will provide the following full-time staff in the UNASBA unit: one director, one engineer, one social scientist, one computer specialist, one administrator, two drivers, and one secretary.

4. Credit proceeds will fund a technical advisor and a social advisor in each UNASBA for three years and will provide resources for the purchase of a four-wheel drive vehicle, water-quality testing equipment, a computer , a printer, and a telephone and fax for each UNASBA. These advisors will be jointly recruited by the departmental government and the DINASBA/PROSABAR team and will report to the departmental government. Terms of reference will be included in the project implementation manual.

B.2 Project Dissemination (US$170,000)

5. Public relations and emphasizing stakeholder consultation and dialogue contribute greatly to the potential for sustainable implementation and demand generation. This is particularly true for projects that require attitude changes on the part of beneficiary groups and implementation agencies. PROSABAR is a participatory project that involves attitude changes at two levels: civil society and institutional. The civil society (beneficiaries) must take on new responsibilities: they must participate in project design in a democratic and participatory way, and they must assume responsibilities for deciding technical options and assume (sustainable) responsibility and ownership for service administration, management, and operation. At the institutional level PROSABAR, UNASBA, municipalities, and community organizations must understand the concept of community participation and facilitate its implementation.

6. Recognizing this, communication inputs for PROSABAR have three types of implementation: communication for public relations, communication for consultation, and communication for change in attitudes, ideas, and beliefs. Communities must change from being passive beneficiaries to active and responsible managers of water systems, and project implementation agencies at the institutional level must learn to become facilitators of the community participation process.

7. Implementation of these different types of communication will take place in two phases (roughly corresponding to the phases of the project cycle). The first and second levels, involving communication activities for public relations and awareness raising, will begin at project start-up in each department and will last for six months. The third level of developing communication activities for changes in attitude will begin after six months of raising awareness in each department. This will include communication packages for communities in hygiene education, decision making, civil responsibilities, and so on, as well as communication initiatives with project implementation agencies at the institutional level.

8. Public relations. This initiative will develop a logo for PROSABAR (through a competition involving communities and municipalities, as a way of starting ownership); prepare printed pamphlets and posters on PROSABAR conditionalities; distribute material to institutions (UNASBAs, municipalities, and communities); and hold launching workshops with stakeholders on PROSABAR and its conditionalities.

9. Consultation. This will involve surveying communication initiatives of other organizations (United Nations Children's Fund, Johns Hopkins, ERBOL, and so on) for lessons learned and deliver public relations material for inclusion in their communication activities; and developing a relationship with local radio in each province (or municipality) and preparing public service messages on PROSABAR and its conditionalities for broadcast. This effort will be coordinated with each municipality since the broadcast also will contain the time and date of a follow-up meeting for community leaders. In addition, the project will prepare cassettes on PROSABAR for use at markets and health posts, and will distribute public relations material at the same time.

10. Changing attitudes. Attitudes will be changed by identifying target audiences at the community and institutional levels. Using rapid appraisal methodology—and information from other project intermediaries—this will assess the knowledge, attitudes, and practices of each group. At the community level this initiative will develop four pilot radio packages through the association of local educational radio stations (ERBOL), making use of soap operas and dramas to involve communities in the design for hygiene education, project management, the role of women, and so on. At the institutional level this initiative will develop discussions with stakeholders to assist their understanding of the community participation model and to learn their fears and constraints. Finally, the initiative will use hand-held camcorders to film group

discussions at all levels and play them back to the groups to promote further discussion.

B.3 Community Development (US$3,300,000)

11. The lessons learned, particularly over the past decade, indicate that the sustainability of water and sanitation services is contingent on a careful balance between resource allocation for service delivery and development of local capacity. Consequently, a major focus for PROSABAR is technical assistance for community development. This capacity-building goes beyond technical advice on operations and maintenance, management issues, and financial planning, moving into the realm of behaviors and attitudes.

12. The community development program will be dedicated to funding activities at the community level that will ensure the quality, sustainability, and effective use of the infrastructure. Intermediary organizations (annex 9) will be contracted at the department level by the UNASBAs to assist the communities in implementing the following activities:

- analyzing and selecting the desired level of service;
- collecting baseline socioeconomic and water resource data;
- ensuring the full participation of all community members;
- developing a financing plan for both capital and recurrent costs;
- organizing a water committee for construction and operations and maintenance;
- undertaking hygiene and environmental education and promoting behavior change;
- where appropriate, assisting in self-construction or community supervision of the contractors during works construction;
- establishing a tariff structure and financial management scheme for water and sanitation;
- training community operators in operations and maintenance and in the importance of a water quality control system;
- ensuring links between the community and municipal government, through the semiannual completion of water system monitoring sheets.

These activities require interventions in the communities before, during, and after system construction, and require the establishment of trust and confidence between the community and the intermediary.

13. Ideally, one large intermediary would be contracted per department, on an annual basis and for a defined number of communities and municipalities. This intermediary could use several smaller intermediaries for the implementation of project activities in smaller geographical areas. Given that there are few qualified intermediaries in Bolivia and that this type of scattered work may not be financially attractive to international firms, in some instances intermediaries will have to be hired to implement smaller packages, of a minimum fifteen communities. Terms of reference for selecting the intermediary will be agreed to before credit negotiations, and will be included in the project implementation manual.

B.4 Management Information System (US$100,000)

14. Following a programmatic approach, whereby lessons learned during early stages are fed back into project implementation, the project will require a powerful management information system (MIS), to track investments and contracts and to analyze data relating processes and costs to physical results and impacts.

15. The MIS for the project, which is being developed during project preparation, will build on the system used by the Social Investment Fund to track investments and contracts (this system is being evaluated and probably will be upgraded during the next six months), and will incorporate a few additional indicators that are required for IDA's and PROSABAR's reporting requirements (annex 15, 18). The system needs to be as simple as possible and each indicator needs to be justified in terms of who will input the data and who will use it. Additional community-level baseline and impact assessment data will be collected during project implementation and used for impact evaluation, however, this will be maintained at the UNASBA level in order to reduce the amount of information contained in the project's MIS.

16. The MIS will be installed in each UNASBA and users manuals produced. Programmers will be trained, including those assigned from the UNASBAs. In addition, the MIS will need to be evaluated and improved after the first two years of project implementation.

B.5 Water Quality (US$150,000)

17. The water quality program of the project will involve the monitoring of the quality of drinking water through the collection and analysis of water samples in the project communities. This program is designed in two phases the first is under the responsibility of the UNASBAs and municipalities; the second under the municipalities and the communities. Collection of samples will be a responsibility of municipalities and communities with guidance, coordination, and quality control of the UNASBAs. Laboratory analysis of water samples will be financed through the project for a maximum of two years in each municipality. Municipalities will assume the cost of analysis after two years. Private labs and universities will be selected on a competitive basis to perform the analysis. The project will supply field water testing equipment to each UNASBA qualified to the program (component B.1). Sampling procedures including frequency are included in the Project Design Manual. Water standards are included in annex 5. It is estimated based on recent experiences in Bolivia that analysis will cost about US$15 per sample, on the average.

B.6 Research and Development (US$200,000)

18. A limited amount of resources is available for testing and developing low-cost water and sanitation technologies and/or the design of methodologies and training materials for the participation of communities in investment subprojects. The results of these pilot activities will be disseminated and eventually mainstreamed into the investment package. Examples of pilot projects include low-cost deep well technologies, hygiene and environmental education classes in municipal school districts as a complement to the PROSABAR investment program, water quality testing directly by the municipal government, educational field days at local markets using women's groups, and so on.

19. The funds will be available from DINASBA/PROSABAR based on proposals submitted by the UNASBAs, although proposals also may be prepared directly by municipalities or intermediaries. Each pilot project will have the following steps: project design and proposal preparation, agreements reached with the relevant partner agencies (for example, the National Secretary of Education, the National Secretary of Rural Development, and so on), project implementation, result evaluation, documentation and dissemination, and a proposal for scaling up.

B.7 Impact and Process Evaluation (US$200,000)

20. Given the programmatic nature of PROSABAR and the wealth of experience that will be acquired through the decentralized implementation model—which will make use of a wide array of intermediaries

from the private and non-governmental sectors—funds will be allocated to undertake special impact and process evaluation studies to identify and share best practices.

21. Three categories of evaluation will take place: institutional performance, project rules and policies and impact on beneficiaries. The first will evaluate the adequacy, incentives and dynamics of key institutions to provide/support water and sanitation services, including DINASBA, PROSABAR, UNASBA, regional and municipal government, and community organizations. It will evaluate the decision making process for effective implementation of the project and for sustainability of services, and will include specific impact indicators of process efficiency at different stages of the project implementation cycle (annex 18). The second will monitor the application of the project rules: the financial policy, eligibility and prioritization criteria to ensure a demand-driven approach and the integration of training and community development with the investments. Based on the results achieved, the rules may be modified during project implementation. The third will evaluate impact on beneficiary communities: time used in hauling water, water consumption patterns, hygiene and health improvements, etc. Independent consultants-auditors would be hired in a competitive basis to perform impact evaluations, with results presented on public hearings.

B.8 Studies (US$280,000)

22. The three primary studies will be to: (i) assist the government in developing a regulatory framework for the sector (linked to the SIRESE - law on sector regulation- initiative); (ii) elevating the importance of the water and sanitation sector within the executive structure and integrating the lead sector agency (DINASBA) into the civil service reform process; and (iii) developing a cost recovery policy for rural water and sanitation (annex 6). These activities will be implemented by national and international consultants. Although the NSUA will be directly responsible for preparing the terms of reference and contracting and supervising the work, DINASBA/PROSABAR will administer the funds as part of the project's technical assistance component.

B.9 Monitoring and Evaluation

23. The monitoring and evaluation activities of the project have three clients: IDA, to measure project performance; PROSABAR, to learn lessons from experience and feedback for improved project implementation; and the water and sanitation sector as a whole, to elevate project results to national policy formulation. PROSABAR will have primary responsibilities for project monitoring and evaluation. The resources allocated and the activities performed in the Management Information System (B.4), the Impact Evaluation (B.7) and Workshop (C.5) subcomponents of the project will all contribute to the monitoring, evaluation and result analysis of the project. Furthermore, the activities relating to project monitoring and evaluation will benefit from direct technical assistance provided by the UNDP-World Bank Water and Sanitation Program, based in La Paz. UNDP is providing $320,000 over four years to support this assistance.

C. Training

C.1 Municipal and Departmental governments (US$400,000)

24. Although the municipal governments will receive initial training from the contracted intermediary in facility administration, operations, and maintenance as part of the community development program (see section B.3), it is important that long-term institutional links be established between the municipal

governments and the UNASBA in order to ensure the sustainability and monitoring of state-funded sectoral investments. In addition to the UNASBA being able to provide a technical assistance and backstopping function, the following areas of long-term support need to be provided to the newly emerging municipal governments: tariff setting, water quality control, sector information system and monitoring of municipal and community system functioning, and assistance in investment and replacement planning and financing.

25. This technical assistance program is designed to be demand responsive to both the UNASBAs and the municipal governments. A fixed sum will be set aside in DINASBA/PROSABAR, and will be available upon request from the UNASBAs through the submission of short proposals for specific interventions. Funds will be available to finance consultancy services, equipment (such as for water quality testing, computer software, and training materials), and seminars and workshops. The demand eventually will have to come from the municipal governments, who will be required to share costs and to buy into this technical assistance.

C.2 Community Organizations (US$270,000)

26. Although most rural water supply projects in Bolivia contain intensive programs for training community water committees and system administrators and operators in simple operations and maintenance tasks, these are short-term, one-shot courses implemented during the construction period. Furthermore, no program exists in Bolivia that tests, certifies, and registers system operators.

27. Not only would a certification program be a first step toward ensuring that staff being trained through any investment activity (government-sponsored or non-governmental) has developed the required skills to perform their tasks, a testing program of this nature could be used to evaluate the quality and guarantee the consistency of the training imparted by the wide range of intermediaries hired throughout the project implementation phase.

28. An initial consultancy, estimated at US$15,000, would undertake three principal tasks: defining the skills required for operators and administrators for different technology options and population sizes, identifying key indicators that would be used to test and certify trainees (these should be practical); identifying institutional options for implementation of the program, specifying one coordinating agency at the national level (possibly the Association of Water Utilities), determining the role of the UNASBAs and municipal governments, identifying potential institutions that could deliver the training and certification, and developing a specific workplan and budget for the certification program. It is expected that one national agency would undertake testing and certification programs within each of the departments participating in PROSABAR.

C.3 Professional and Manufacturers Associations (US$70,000)

29. With the objective of strengthening the human resources that work in the sector, PROSABAR will promote at least two courses a year, each lasting three days, with internationally recognized professors. Participants will pay the full cost of the course, and the course will be certified by the World Bank. Planning of these courses will be on an annual basis, in accordance with the identified demand of Bolivian sector professionals and manufacturers associations. The course contents will respond to themes such as management of rural water and sanitation projects, appropriate technologies, participatory approaches leading to sustainability, monitoring and evaluation of projects, and wastewater treatment.

C.4 Implementing Agencies (US$150,000)

30. At the institutional level, planners and decision-makers (DINASBA) should be trained on sector problem analysis, solution identification, policy formulation, and strategy development. Other institutional actors (UNASBA, municipal governments,and communities) require sensitization to PROSABAR and community participation issues, understanding of participatory methodologies and interpersonal communication skills, adult education techniques, and appreciation of the complexities of PROSABAR implementation and the Popular Participation Law. The intermediaries also need exposure to participatory rural appraisal, participatory training (such as the SARAR techniques developed in the Potosí pilot project), and rapid rural appraisal methods.

C.5 Workshops (US$210,000)

31. Workshops are an effective tool to coordinate and exchange experiences in development projects. In demand-driven projects this is an essential feature of the design to incorporate lessons learned in earlier phases of project execution to guide the planning and implementation of subsequent activities. Three kinds of workshops will be organized, as follows:

- General evaluation. At the end of each year, but before presentation of annual consolidated report to IDA, a workshop will be held to evaluate project performance and proposals for adjustments.
- Specific evaluation. Workshops will be organized on-demand to review specific topics, including among others: the financial policy, approaches to community mobilization, the design manual, etc.
- Lessons learned. Annual workshops might be organized for project entities, consultants, and NGOs, to exchange experiences and lessons learned.

All workshops will be documented and summary reports will be distributed upon request. A small fee will be charged to cover publication expenses.

Annex 8
Detailed Project Cost
Project Investment Plan

Component	US$	%	1993	1994	1995	1996	1997	1998	1999	2000	Total
I. Infrastructure Component											
A. Water Supply	26,061,000	54.3			292,000	5,110,000	7,300,000	7,300,000	3,869,000	2,190,000	26,061,000
B. Sanitation	9,639,000	20.1			108,000	1,890,000	2,700,000	2,700,000	1,431,000	810,000	9,639,000
Component sub total	**35,700,000**	**74.4**			**400,000**	**7,000,000**	**10,000,000**	**10,000,000**	**5,300,000**	**3,000,000**	**35,700,000**
II. Institutional Component											
A. Project Management											
A.1 DINASBA/PROSABAR	1,125,000	2.3				300,000	250,000	250,000	250,000	75,000	1,125,000
A.2 U.N. Development Program	275,000	0.6			25,000	50,000	50,000	50,000	50,000	50,000	275,000
Sub total	1,400,000	2.9			25,000	350,000	300,000	300,000	300,000	125,000	1,400,000
B. Sector Strengthening											
B.1 Capacity Building	1,400,000	2.9				670,000	365,000	365,000			1,400,000
B.2 Project Dissemination	170,000	0.4			50,000	30,000	30,000	30,000	30,000		170,000
B.3 Community Development	3,300,000	6.9			100,000	750,000	1,100,000	650,000	400,000	300,000	3,300,000
B.4 Management Information System	100,000	0.2				40,000	10,000	10,000	10,000	30,000	100,000
B.5 Water Quality	150,000	0.3				50,000	25,000	25,000	25,000	25,000	150,000
B.6 Research and Development	200,000	0.4				20,000	30,000	50,000	50,000	50,000	200,000
B.7 Impact Evaluation	200,000	0.4				40,000	40,000	40,000	40,000	40,000	200,000
B.8 Studies	280,000	0.6				50,000	150,000	40,000	40,000		280,000
Sub total	5,800,000	12.1			150,000	1,650,000	1,750,000	1,210,000	595,000	445,000	5,800,000
C. Training											
C.1 Municipal and Regional Government	400,000	0.8				60,000	100,000	80,000	80,000	80,000	400,000
C.2 Community Organizations	270,000	0.6				30,000	40,000	50,000	70,000	80,000	270,000
C.3 Professional and Manufacturers Associatio	70,000	0.1				30,000	10,000	10,000	10,000	10,000	70,000
C.4 Implementing Agencies	150,000	0.3				50,000	50,000	50,000			150,000
C.5 Workshops	210,000	0.4				50,000	50,000	30,000	30,000	50,000	210,000
Sub total	1,100,000	2.3				220,000	250,000	220,000	190,000	220,000	1,100,000
Component sub total	**8,300,000**	**17.3**			**175,000**	**2,220,000**	**2,300,000**	**1,730,000**	**1,085,000**	**790,000**	**8,300,000**
III. Preinvestment	**2,300,000**	**4.8**			**400,000**	**400,000**	**600,000**	**600,000**	**300,000**		**2,300,000**
IV. PPF (Project Preparation and Start-up)	**1,700,000**	**3.5**	**200,000**	**700,000**	**800,000**						
Total	**48,000,000**	**100**	**200,000**	**700,000**	**1,775,000**	**9,620,000**	**12,900,000**	**12,330,000**	**6,685,000**	**3,790,000**	**48,000,000**

Annex 8
Detailed Project Cost
Sources of Financing

Component	Project Cost US$	%	IDA	%	OPEC Fund	%	Parallel Funds (SIF-IDB)	%	Departmental Governments	Municipalities (25%)	Communities (5%)	NSUA / DINASBA	Regional Governments
I. Infrastructure Component													
A. Water Supply	26,061,000	54.3	7,300,000	36.5	3,650,000	73.0	7,300,000	73.0		6,507,950	1,303,050		
B. Sanitation	9,639,000	20.1	2,700,000	13.5	1,350,000	27.0	2,700,000	27.0		2,407,050	481,950		
Component sub total	**35,700,000**	74.4	**10,000,000**	**50.0**	**5,000,000**	**100**	**10,000,000**	**100**		**8,915,000**	**1,785,000**		
II. Institutional Component													
A. Project Management													
A.1 DINASBA/PROSABAR	1,125,000	2.3										40,000	
A.2 *U.N. Development Program*	275,000	0.6											
Sub total	1,400,000	2.9	1,400,000	7.0								40,000	
B. Sector Strengthening													
B.1 Capacity Building	1,400,000	2.9											3,000,000
B.2 Project Dissemination	170,000	0.4											
B.3 Community Development	3,300,000	6.9											
B.4 Management Information System	100,000	0.2											
B.5 Water Quality	150,000	0.3											
B.6 Research and Development	200,000	0.4											
B.7 Impact Evaluation	200,000	0.4											
B.8 Studies	280,000	0.6											
Sub total	5,800,000	12.1	5,800,000	29.0									3,000,000
C. Training													
C.1 Municipal and Regional Government	400,000	0.8											
C.2 Community Organizations	270,000	0.6											
C.3 Professional and Manufacturers Associations	70,000	0.1											
C.4 Implementing Agencies	150,000	0.3											
C.5 Workshops	210,000	0.4											
Sub total	*1,100,000*	*2.3*	*1,100,000*	*5.5*									
Component sub total	**8,300,000**	**17.3**	**8,300,000**	**41.5**								**40,000**	**3,000,000**
III. Preinvestment	**2,300,000**	**4.8**							**2,300,000**				
IV. PPF (Project Preparation and Start-up)	**1,700,000**	**3.5**	**1,700,000**	**8.5**									
Total	**48,000,000**	**100**	**20,000,000**	**100**	**5,000,000**	**100**	**10,000,000**	**100**	**2,300,000**	**8,915,000**	**1,785,000**	**40,000**	**3,000,000**

Counterpart Expenses, not included in project cost

Annex 9
Indigenous and Gender Issues
Strategies to Facilitate Community Participation

1. Information and understanding of communities is the first step toward achieving demand generation and sustainable use of water and sanitation systems. The information gathered also establishes baseline data for further work on designing technical assistance and capacity-building components. Efforts to facilitate community participation in indigenous communities are constrained by the lack of a comprehensive definition of indigenous peoples to clarify the different ethnic groups that reside within project communities. To address this issue, this annex provides an overview of the indigenous peoples in Bolivia. The annex analyzes whether the needs and perspectives of communities, particularly indigenous communities, have been taken into account in project design. It also outlines the project's strategy for bringing about community participation and demand generation.

2. The definition used to identify indigenous peoples determines the quality of data. Although Bolivia has large indigenous communities, the definition used in recent censuses (1988 and 1992) and household surveys is superficial. First, because language is the key indicator to identify whether a person belongs to an indigenous group. Second, because it only covers people over six years of age. Third, because the term *campesino* has been used in Bolivia as synonymous with indigenous peoples, thus transforming an ethnic concept into an occupation and class category.

3. An operational definition must be composed of a set of indicators that captures the socioeconomic characteristics and cultural uniqueness of an ethnic group. The Popular Participation Law defines indigenous peoples as the descendants of populations living in a geographic region before or during colonization and that currently live within the national territory. They have their own history, social organization, language, and culture, identify themselves as members of an indigenous group, and may retain all or part of their social, economic, cultural, and political institutions. This more comprehensive definition must be taken into account by the Bureau of Census.

4. *Demographic and socioeconomic assessment.* Bolivia is a multiethnic, multilingual, rural country. There are more than thirty vernacular languages. Most of them are versions of Quechua and Aymara; other linguistic families include Arawakan, Chapacuran, Uru-Chipaya, Mataco-Maca, Paonan, and Tupi. According to the 1992 census, about 63 percent of the population is rural. Indigenous peoples account for about half of the total population and 65 percent of the rural population. Quechua (58 percent) and Aymara (40 percent) are the predominant indigenous ethnic groups. The Quechua monolingual-speaking peoples account for 28 percent of the total population; Aymaras monolingual-speaking account for 19 percent. About 38 of the rural population is Quechua monolingual, about 23 percent is Aymara monolingual.

5. Beginning in July 1995, PROSABAR will operate in the departments of La Paz, Chuquisaca, Cochabamba, and Potosi, covering 33 percent of the national territory. It also will cover most of the rural population. In Chuquisaca, for instance, 67.5 percent of the population is rural. Although population density is very low in Bolivia (6 persons per square kilometer), PROSABAR will deliver services to the most highly populated departments, such as Cochabamba (20 persons per square kilometer) and La Paz (15 persons per square kilometer). PROSABAR will be implemented in the most indigenous departments of the country. Potosi, Cochabamba, and Chuquisaca are Quechua territories; La Paz is basically an Aymara territory. In Potosi 76 percent of the total population is indigenous, 67 percent are Quechuas, and 85 percent live in rural areas. In Cochabamba 66 percent of the population is indigenous, 61percent are Quechuas, and 79 percent live in rural areas. In Chuquisaca indigenous peoples account for 54 percent and

are mainly rural Quechuas (51 percent). The Aymaras live on the Antiplano, the Andean highlands, a geographical zone of about 170,000 square kilometers at medium elevation of 4,000 meters above sea level, spread out over Lake Titicaca, extending into the south of the country. In the department, La Paz, 59 percent of the population is indigenous, 51 percent is Aymara, and 70 percent reside in rural areas next to the lake.

6. The lack of water and sanitation systems are crucial social problems in Bolivia. Only 24 percent of the rural populations have access to clean water and just 18 percent have latrines. The water and sanitation systems are particularly weak in the four PROSABAR departments. In Chuquisaca, for example, 56 percent of the population is rural and only 18.2 percent has access to clean water and 7.5 percent has latrines. In La Paz only 24 percent of the rural population has clean water and 15 percent has latrines. The situation is worse in Potosi—only 7 percent of rural people have latrines and 22 percent have a water system. The child mortality rate in rural areas is 100 per 1,000 live births in Chuquisaca, 129 per 1,000 in Potosi, 94 per 1,000 in Cochabamba, and 81 per 1,000 in La Paz.

7. Twenty percent of the total population and thirty-seven percent of the rural population is illiterate. PROSABAR will be implemented in departments with the highest illiteracy rates. Illiteracy in Chuquisaca is 54 percent, and in Potosi it is 51 percent, representing the highest illiteracy rates registered in rural areas in the entire country.[i]

8. IDA and PROSABAR agree that it is critical to understand the culture and forms of social organizations of indigenous groups, and that it is key to understand the role of women in indigenous societies and in the PROSABAR project. In the Aymara communities 40 percent of the population are women, is the Quechua population 58 percent is female. In indigenous societies leadership and participation in decisionmaking processes are activities confined to males. Although women play the primary role in resolving water and sanitation needs for their families, they play no role in decisionmaking. Women are responsible for disposing child feces, implementing proper hygiene practices, carrying and using water, and deciding how best to use their time and energy. Male migration and absence during harvests mean that women and children remain in villages by themselves, adversely affected by inadequate water and sanitation systems. Despite these circumstances, they have no formal representation in local water and sanitation committees. Since women migrate less than men, they are the key stakeholders for institutional and management sustainability. National counterparts and local NGOs should be encouraged to involve women in decisionmaking processes to improve project sustainability and economic efficiency.

9. Several water projects show that there is a cause and effect relationship between participation and project performance (Isham and Narayan 1995). Encouraging beneficiary participation through active local NGOs brings to the vanguard such key issues as the importance of incorporating indigenous culture and the role of women into the design and management of a project.

10. The skills of the users, predominantly women, at the local level have to be expanded and upgraded. Women should be trained in planning, implementation, management, and monitoring of sanitation, hygiene, and water services. Additional training for community organization also is needed. At the national level government planners and decisionmakers should be trained on sector problem analysis, solution identification, policy formulation, and strategy development. Gender awareness needs to be promoted at the local level.

11. *Community participation.* PROSABAR has successfully incorporated communities' views and preferences into project design. Umbrella and local NGOs have played a key role in promoting beneficiary participation and in creating water and sanitation local committees in charge of identifying and selecting

appropriate technical options. PROSABAR will continue strengthening popular participation, building up the capacity of NGOs to promote active beneficiary participation. The objective is to stress community ownership to ensure long-term institutional sustainability once the project is finished. PROSABAR organized a workshop with thirty NGOs that are evaluating the effectiveness of participatory approaches to determine ways of improving them, and to disseminate the approach to be used in PROSABAR for community mobilization.

12. Since data and specific information are needed to understand the culture of indigenous groups and the role of women in their societies, PROSABAR should work with NGOs to build up local information systems. By organizing surveys, PROSABAR will systematically consult, monitor, and evaluate the effectiveness of beneficiaries' involvement. The results will be used to strengthen the institutional capacity of NGOs to work with communities. A series of short workshops and seminars will be organized to ensure that ethnic minorities and women are represented in local committees and that their voice is taken into account in all phases of the project. The evaluation of their participation will contribute to the capacity of NGOs to promote beneficiary involvement.

13. As the *Secretaria Nacional de Participación Popular* (SNPP) has expressed—and IDA and PROSABAR concur—that the biggest challenge to promoting community participation involves building consensus among stakeholders, particularly among local institutions such as municipalities and UNASBAS, in the meaning and development of participation and ownership. Changing the mentality of these institutions, which have been steeped in centralist, top-down approaches for decades, is a major challenge.

14. A clear understanding of the meaning of community participation and its importance is crucial to the success of the project. The process of defining community participation within the project will begin with training the PROSABAR team. All stakeholders (including PROSABAR) must share the same conceptual and methodological framework. Workshops will be organized among PROSABAR officials and local stakeholders to discuss community participation and what it means and to participate in SARAR techniques to get a feel for the methodologies used in the field to help bring about community decisionmaking.

15. The Government of Bolivia has recognized that effective community participation requires giving back to people and communities their right to make decisions that affect their lives. The Popular Participation Law outlines a participatory planning process through which *Organizaciones Territoriales de Base* (OTBs) can express their demand for services in health, education, sports, and infrastructure (roads). About 20 percent of funds normally allocated to regional development corporations have been sent to municipalities to implement this participatory process, which PROSABAR strongly supports.

16. Relationships between PROSABAR and local organizations (OTBs, UNASBAS, municipalities, regional development corporations) will be assessed and strengthened. PROSABAR will help to build the capacity of local organizations, organizing seminars and workshops to provide technical assistance in such areas as community participation techniques (including social and cultural assessment, social behavior, consultation meetings, gender issues, and ethnic and gender participation in local committees) and management skills (including administration, finance, and maintenance). Even though the regional development corporations have started providing courses on administration, accounting, and so on, there is a major need to assist municipalities in changing attitudes, to help them respect indigenous knowledge, to learn skills in communication planning, and to fully understand the community participation process. This same type of capacity-building is required for the UNASBAs, who will be playing an increasingly important role in PROSABAR (annex 7).

17. PROSABAR has recognized the need to work through intermediaries such as NGOs or private consultants to strengthen community-based organizations and to mediate between community groups and government. Although this is a widely recognized model that has worked for a variety of Bank-financed development programs, it is still a critical issue. In the selection of NGOs it is always necessary to evaluate which sectors are included or excluded. For PROSABAR it is important to work with NGOs that are legally established, that maintain mature relationships with the government, that have equal gender representation, and that take ethnic issues seriously. It is crucial to work with NGOs that have a great deal of accountability and that democratically consult beneficiaries (attachment 1).

18. The role of intermediaries is to serve as interlocutors between IDA, PROSABAR, and the beneficiaries. Intermediaries should contribute to strengthening the ability of communities to control health aspects of their lives by making informed choices on water systems and sanitation interventions. The relationship that must be built between communities and intermediaries cannot be rushed, nor does it necessarily conform to an external schedule. For this type of relationship to develop it is important that the same intermediary be involved with the community from the beginning of the project through the post-investment phase (attachment 2).

19. Experience in other projects has led to the understanding that the use of communication methods for awareness raising, consultation, and public hearings contributes greatly to the potential for sustainable implementation. This is particularly true for projects that require behavioral change on the part of beneficiary groups and implementors.

20. It is recommended that the social component of PROSABAR be strengthened by the addition of one staff member with a social focus. A team of two people strengthening the social process is much more effective than one person working alone. Moreover, the technical assistance component of PROSABAR focusing on the social component requires additional staff to coordinate workshops, backstop intermediaries responsible for training, prepare terms of reference, and so on.

Table 1:
Percentage of Ethnic Group and Gender Indigenous Population, 1992

Total Population	Total Indigenous Population	Quechua	Aymara	Guarani	Others
Total	49.0	28.1	19.3	0.8	0.5
Males	48.0	28.0	20.0	0.8	0.5
Females	49.0	28.4	19.3	0.7	0.4

Gender Composition within indigenous population by ethnic group, 1992

Indigenous Population	Quechua	Aymara	Guarani	Others
Total	58.0	40.0	1.6	0.4
Males	58.0	40.0	1.7	0.3
Females	58.0	39.0	1.5	1.5

Percentage of Indigenous Groups by Urban and Rural Area

Indigenous Population	Urban	Rural
Total	37.4	62.6
Quechua	55.0	45.0
Aymara	43.5	56.5
Guarani	1.0	99.0
Others	0.5	99.5

Criteria for Intermediary Selection

Experience	The potential intermediary will have been actively and demonstrably effective in at least one of the following fields over the period of one year: • community development and social mobilization; • provision of water supply, sanitation, or related facilities (such as education, health, and so on); or planning and project development at the grassroots level.
Legal status	Intermediaries would be duly registered.
Affiliation	Intermediaries would not have partisan political affiliation or be subject to the directions of any foreign government.
Membership	Except in gender-specific organizations, membership would be open to men and women.
Financial management	Potential intermediaries would have a bank account (current) in sound operation, an adequate and open accounting system, and a record of sound financial management and stability.
Management and administrative capacities	The intermediary would have proven management and administrative capabilities sufficient to plan, supervise, and monitor activities pertaining to social mobilization.
Accountability	The executive of the organization will have been elected by the membership through an open process and will have demonstrated accountability through verifiable reports.
Technical competence	Ideally, the intermediary will have sufficient technical know-how or experience to assist the community when interacting with the contractor over project design
Deployment	The intermediary will be able to deploy field staff to rural areas for extended and intensive community level work.

Social Strategy Matrix

Dissemination	To begin generating demand, PROSABAR should initiate public relations and awareness raising for PROSABAR (and conditions) and communication through printed material and mass media (local radio). Community interest in PROSABAR could be generated by announcing local consultation meetings between municipal government and community leaders to explain PROSABAR and its conditionalities.
Community request	The capacity-building process begins by strengthening municipal governments' ability to facilitate the consultative process through participatory meetings and interpersonal communication skills. After the participatory consultation meetings between municipal government and community leaders on PROSABAR conditionalities, the community leaders should go back to the community to explain PROSABAR conditionalities. The communities can then decide whether to continue; if so, they submit a written request. The municipalities consolidate the requests, analyze their potential, and send the requests to UNASBA. UNASBA contracts an intermediary to work with communities under clear terms of reference.
Pre-investment	The intermediary works with communities to establish: • baseline data (social and demographic); • community organization (gender awareness); • technical choice and cost recovery mechanisms; • agreement between communities and municipal governments on coparticipation; that the community contributes 5 percent of costs and the municipal government contributes 25 percent of costs; Municipal governments send the package to UNASBA and the Social Investment Fund, and the fund contracts construction.
Investment and construction	Construction begins with 30 percent (community and municipality) of total costs according to technical options. Construction is supervised by the community and intermediary. The intermediary continues the process of capacity-building by performing management, administration, and accounting duties, as well as hygiene education. The communication pilot project on attitudinal change begins.
Post-construction	• Municipal government and UNASBA approve the scheme after three or four months. • The intermediary continues capacity-building with the community, providing financial management, operations and maintenance, and supervision of scheme operators. • Pilot communication initiative continues.

Annex 10
Economic Analysis: Methodology and Results

A. Introduction

1. The economic rate of return was calculated by comparing the costs and benefits of household water and sanitation services in two scenarios: one in which the project is implemented and one in which the project is not implemented. All costs and benefits used in the analysis are expressed in constant prices of April 1995. The financial prices were converted into economic prices by adjusting them for the impact of taxes and subsidies. In addition, shadow prices for unskilled labor was estimated at 0.70. The shadow price of the exchange rate was calculated at 0.95.

2. One of the main characteristics of the PROSABAR projects is its demand driven character. The rural population is given the choice to select from different technological options. Moreover, even in those cases where technology options for water supply are completely dictated by the available water resources, communities will have the possibility to choose from different service levels, which include house connections, standpipes and handpumps. For all these technology options and service levels, costs and benefits were calculated. Because each technical option has its own economic characteristics, and the mix of subprojects to be financed under the project will be demand-driven, calculating the overall costs and benefits of the total project is difficult. However, based on the experience gained in the Yacupaj pilot project and the SIF-financed rural water supply and sanitation projects, we have developed a possible configuration of the different technology options and service levels, which has been used to calculate the costs and benefits of the total project.

3. The demand for sanitary facilities appears to be more limited than that for water supply, especially in low-density, small rural settlements. Although there are substantial health and environmental benefits associated with the improvement of sanitary facilities, it is quite likely that demand for this type of services has to be generated through an extensive process of education and information. In the calculation of the costs and benefits of the total PROSABAR project, the costs and benefits associated with the different sanitary options have been included.

B. Calculation of Project Benefits

4. The economic justification for the project is based on the benefits it would generate in the form of time savings, health benefits, productivity and institutional benefits. The implementation of the PROSABAR project will make water available closer to where households need it. Thus, households can substantially reduce the time needed to travel to and from water resources. These time savings from improved water supplies are a major benefit, especially for the women as hauling water is primarily their responsibility. Distances to water sources vary considerably. In the Yacupaj project, rural dwellers had to haul water over distances up to 9 km. Currently, rural households spend on average almost one hour per day on fetching water. It is obvious that time savings vary considerably depending on the service level that the communities will select. One of the major problems in estimating time savings is the lack of reliable data with regard to the consumption of water. This problem is aggravated by the fact that water consumption patterns in Bolivia substantially differ between climatic zones. In the Altiplano, water consumption could be as low as 5 lcd, whereas in the milder valleys water consumption could be close to

20 to 25 lcd. It has therefore been assumed that households consume on average 15 lcd. The value of time savings for the economic analysis is based on the assumption, that women can use the time savings by diverting their time to productive activities. Economically productive work, such as farming, livestock maintenance and cottage industries is valued at the wage rate in rural communities which is given at Bs.10 per day. This wage rate is adjusted as it is assumed that only 60 percent of the time savings can be used productively against the prevailing rural wage rate. Subsequently, this wage rate is converted into an economic rural wage rate.

5. There are also health benefits associated with improved water supply and sanitation. The major disease related to inadequate water supplies and sanitation are diarrheas that primarily affect children under 5 years old. The health benefits which have been calculated only involve the health benefits that affect young children. The impact of improved water supply on the number of episodes of diarrheaic diseases of children under 5 years old will depend on the service level chosen. In the case of standpipes and handpumps, the number of episodes will decline, but the decrease will be limited because water still has to be hauled over a certain distance. Based on the results from an evaluation study of the Yacupay pilot project, episodes of diarrhea will decline by about 50 to 55 percent for handpumps and standpipes. The number of episodes will decrease by about 90 percent in the case of house connections[1].

6. The first health benefit relates to saved lives. Each year, about 15,000 children under five years old die of diarrhea[2]. For each technology and service level, infant mortality due to diarrheal diseases has been calculated. A second benefit relates to the cases of diarrhea which are registered in hospital and health posts and are subsequently treated. The number of cases actually treated in hospitals and health posts is low. The costs associated with this treatment is calculated at Bs.60. These costs do not include transport cost to and from the hospital or health post, and therefore underestimate the actual health benefits. A third benefit relates to the costs of diarrhea that do not receive formal treatment, but involve medical costs anyway. According to the already-mentioned evaluation study that took place in a number of communities that were served by the Yacupaj pilot project, about 68 percent of the households used ORS (Oral Rehydration Salts) or similar type of treatments to cure diarrheas. The costs of ORS are estimated at about Bs.1.50 per episode.

7. In the Yacupaj evaluation study, 12.7 percent of the households used the increased availability of water for horticultural purposes. The size of the plot used for horticulture, and hence the productivity benefits it will generate, is dependent of the technology and service level chosen. The produce has been valued against financial product prices that have been converted into economic prices.

8. The institutional strengthening program would generate long-term institutional benefits as communities and municipalities learn to operate and maintain water and sanitation infrastructure. A large number of community operators would be trained and certified (annex 18). It is assumed that these operators will benefit individually from this training program as their position in the rural labor market would improve. It is assumed that the average income of these certified community operators is 50 percent higher than that of unskilled rural labor.

9. The project would also foster a number of non-quantifiable benefits. The unavailability of reliable data, however, has precluded a quantitative estimation of these benefits. They include improved water quality, and benefits associated with the institutional strengthening of the capacity of communities and

[1] This figures is consistent with the average incidence of diarrheal diseases in areas with high piped water supply coverage.
[2] Instituto Latinoamericano de Investigaciones Sociales y Centro de Estudios para el Desarrollo Laboral y Agrario, Informe Social Bolivia: Balance de Indicadores Sociales. La Paz, 1994.

municipalities to plan and manage their water supply and sanitation services. Increased water quality does not only relate to quality in terms of taste, clarity and odor, but also refers to the increased reliability of water supply services. Moreover, the institutional strengthening program could also have a positive impact on the implementation of other rural development projects.

C. Project Cost

10. The investment costs of water supply and sanitation schemes include domestically and internationally produced materials and equipment, unskilled and skilled labour, overhead cost and the cost of pre-investment. The latter includes amongst other the costs of technical designs and community mobilization. The investment costs of the different technology options have been adjusted in view of the experiences of NGOs involved in the sector and the Social Investment Fund. The investment costs vary for each technology option, whereas the population density of the area in which the project will be implemented is also a major determinant of the operation and maintenance cost (Annex 5). In the investment cost a service fee for the Social Investment Fund is also included, which will cover the costs for the technical and financial evaluation of the pre-investments, and the technical supervision of the investments. This fee has been estimated at 10 percent of construction costs. In addition, the investment cost for the institutional strengthening program has been included.

11. Operation and maintenance costs have been based on engineers' estimates. These costs include operational costs, administration costs and maintenance costs. In gravity systems, operation and maintenance costs are about 3.3 percent of investment costs, but for standpipes the operation and maintenance costs are only 2.6 percent of total investment costs. Pumped systems are in general more expensive due to the high cost of electricity. In concentrated areas, operation and maintenance costs make up 4.5 percent of total investment costs. In semi-dispersed areas, the lack of economies of scale becomes obvious and operation and maintenance costs increase to 5.5 percent. Handpumps are a low-cost technology and operation and maintenance costs (excluding replacement of pumps) are less than 1 percent of total investment costs.

D. Internal Economic Rate of Return

D.1 Individual Projects with Different Technology Options and Service Levels

12. The evaluation of the economic viability of the project includes benefits from time savings, health benefits and productivity increases, the total investment costs (including the institutional strengthening program), and operation and maintenance costs projected for the period under review. A discount rate of 10 percent is used to calculate the net present value resulting from the project. To reflect true costs and benefits, financial prices have been transformed into economic prices. Investment and operation and maintenance costs are adjusted for the impact of subsidies and taxes, and shadow prices have been used.

13. All water supply options, except for pumped systems with house connections in semi-dispersed areas and spring protection without tap or standpipe, are viable projects at the individual level.[3] Hence, pumped systems with house connections in semi-dispersed areas and spring protection without a tap or standpipe are not recommended to be used as they are in general not economically viable. In all other

[3] It should be noted however, that pumped systems with house connections under a different set of assumptions, e.g. with regard to the distance to the original water source, could become a viable option, whereas spring protection without a tap includes some health benefits which could not be estimated due to lack of data.

cases, the options generate high internal rates of return. The results also indicate that handpumps generate very high levels of return, especially the locally manufactured handpumps.

Table 1: **Results of Economic Analysis for Water Supply Projects for Different Technology Options and Service Levels (excluding SIF service fee)**

Technology Option	Population density	Service Level	Net Present Value (Bs)	Internal Rate of Return	Cost-Benefit Ratio
Gravity Systems	concentrated, with treatment	house connections	1,619	10.0%	1.00
	semi-dispersed	house connections	14,333	13.4%	1.19
	semi-dispersed	standpipes	2,228	10.8%	1.04
Pumped Systems	concentrated	house connections	11,352	10.6%	1.03
	semi-dispersed	house connections	-22,486	7.5%	0.88
Spring protection	(semi)-dispersed	tap/standpipe	4,913	155.5%	11.07
Handpumps	(semi)-dispersed	YAKU handpump	2,186	29.6%	2.05
	(semi)-dispersed	SOGA handpump	2,997	50.2%	3.38
	(semi)-dispersed	BALDE handpump	3,102	53.9%	3.68
	(semi)-dispersed	INDIA MARK III handpump	1,920	14.8%	1.29
Spring protection	(semi)-dispersed	no tap/ no standpipe	-261	n.a.	n.a.

D.2 Total PROSABAR Project

14. The total project consists of a large number of subprojects, both at the community and the individual household level (i.e., latrines). The total cost of this project amounts to US$48 million (including the institutional strengthening component). Based on engineer's estimates, a distribution of the total investment funds over the different technology options has been made. Before project implementation, it is assumed that 27 percent of total infrastructure investment funds will be directed to sanitation. The remainder will be aimed at improvements in water supply. It is obvious, that the application of investment funds over the different technology options and service levels could change due to the demand exercised by the communities. The project investments will be implemented over a period of six years. It is obvious that a cost-benefit analysis that will include all the costs related to water supply and sanitation investments and the institutional strengthening program, but only captures part of the benefits will result in relatively low values of net present value and internal rate of return. Such a calculation can therefore be seen as a minimum or base case scenario.

15. The net present value of the water supply component of the project is Bs.77 million, while the internal rate of return is 23 percent, and the benefit-cost ratio 1.74. The net present value of the overall project (including sanitation investments and institutional strengthening program) is Bs.31 million, the internal rate of return is 13 percent, and the benefit-cost ratio is 1.19.

D.3 Sensitivity analysis

16. In the sensitivity analysis the impact of a number of variables has been tested. These variables comprise the impact of cost overruns, project delays, lower time savings, the impact of health benefits, and the impact of productivity benefits, the impact of the service fee for the Social Investment Fund.

17. *Impact of cost overruns.* The project's sensitivity to cost overruns has been tested. The switch value (i.e., value when the project turns not viable) for cost overruns of total investment is about 19 percent. If investment costs increase by more than 19 percent, the project will turn out to be not economically viable.

18. *Impact of project delays.* When the project is delayed by one year, the net present value will decrease to Bs.24 million, the internal rate of return will be 13 percent, while the benefit-cost ratio will be 1.16.

19. *Impact of changes in time savings.* One of the uncertainties in the calculation of the time savings is the wage rate of women in rural communities. In the base case scenario, it is assumed that 60 percent of the time savings could be used productively against the prevailing wage rate. The switch value for daily rural wages for women is Bs.4.67. Hence, if less than 47 percent of the time savings can be valued against the rural wage rate, the project loses its viability.

20. *Impact of lower health benefits.* Data on the direct relationship between morbidity and mortality reduction and improved water supply services are rather scattered. For the sensitivity analysis , it has been assumed that the incidence of diarrheal diseases is not affected by improved water supply and sanitation and hence no health benefits are generated. Without health benefits, the net present value is Bs.16 million. The internal rate of return is 12 percent, and the benefit-cost ratio will be 1.10.

21. *Impact of lower productivity benefits.* Data on the productive use of water for horticultural purposes has been only documented in the evaluation study of the Yacupay pilot project. However, when none of the households will use the increased water consumption for productive purposes instead of the 12.7 percent found in the Yacupaj evaluation study, the project still maintains its validity. In the absence of productivity benefits, the net present value is Bs.11 million, the internal rate of return is 11 percent and the benefit-cost ratio is 1.07.

22. *Impact of SIF service fee.* The service fee for the Social Investment Fund has been estimated at 10 percent of the direct construction cost. However, if the SIF could increase its efficiency in carrying out its services to a level comparable to that of more efficient social investment funds, the project feasibility would increase significantly. The most efficient social investment funds charge service fees of 5 percent of investment cost. In the case of a service fee of 5 percent, the net present value of the project would increase to Bs.41 million, and the internal rate of return would rise to 14 percent.

23. *Impact of changes in institutional benefits.* When the income of trained community operators increases by 100 percent, the net present value of the project increases to Bs.48 million, and the internal rate of return will be 15 percent.

24. *Impact of consumer surplus.* Little is known about the current water consumption pattern in rural areas that have already been provided with water supply systems. Data are scattered, and usually more based on impressions than actual investigations. Because of the problems with data accuracy, results have been tested in a different way too. A constant price-elasticity demand curve for the different types of

technologies and service levels was estimated using data from other countries. The price elasticity of demand for house connections has been estimated at -0.30, for spring protection and/or standpipes at -0.40 and for handpumps at -0.70[4]. Based on this methodology, the net present value of the project is Bs.35 million, the internal rate of return is 14 percent and the benefit-cost ratio is 1.22. Table 7 shows the results of this methodology. The cash payments of the rural dwellers have been used as a proxy for direct-use benefits. These cash payments include the operation and maintenance costs. In addition, the consumer surplus has been calculated. This methodology results in a higher net present value than the base case scenario. The difference is due to the fact that the base case approach does not cover all benefits of the project but is limited to time savings, health benefits and productivity increases, while the calculation based on the demand curve should include all project benefits.

E. Cost Recovery

E.1 Long-Run Average Incremental Costs

25. Incremental costs in water supply and sewerage systems result from new investment and the operation and maintenance of this additional capacity. Investment or capacity costs for water supply consist of investments for institutional development (including community mobilization), and the construction of piped and non-piped water systems. In some cases, old systems will be rehabilitated. Rehabilitation investments are considered equivalent to investments in water intake. Systems which require rehabilitation are characterized by rationing. Rehabilitation will therefore result in increased water supply. For sanitation, capacity costs include investments for the construction of sewerage systems in concentrated areas and the construction of latrines in semi-dispersed and dispersed areas. Total capacity costs are equal to the sum of capacity investment costs and incremental operation and maintenance costs. The net present value of these costs is calculated using an assumed opportunity cost of 10 percent.

26. Long-run average incremental costs have been calculated as the ratio of the sum of the present value of capacity costs, plus incremental operating and maintenance costs to the sum of present values of the incremental volume of water. The long-run average incremental costs are computed based on incremental water consumption. For sewerage and latrines, the average incremental costs are calculated at an annual basis on a household level.

[4] In a study in Nepal, the price elasticity for gravity (or spring protection) schemes was estimated at around -0.40; whereas for handpumps, price elasticity ranged from about -0.60 to -0.72. The price elasticity for house connections is based on earlier studies for urban water supply in Latin America. However, as this service level shall only be provided in peri-urban areas, the use of this price elasticity value seems justified.

Table 2: Long-Run Marginal Cost of Water
(in Bs per m^3 of water consumed)

Technology Option	Population density	Service Level	LRAIC	Proposed (O&M) Tariff a/	Percentage of cost recovery b/ (including communities' contribution to investment)
Gravity Systems	concentrated	house connections, with treatment	2.32	0.55	40.9%
	semi-dispersed	house connections	1.96	0.46	40.8%
	semi-dispersed	standpipes	2.99	0.62	38.8% c/
Pumped Systems	concentrated	house connections	2.25	0.68	46.2%
	semi-dispersed	house connections	2.65	0.89	48.7%
Spring protection	(semi)-dispersed	with tap	0.27	0.07	44.4% c/
Handpumps	(semi)-dispersed	YAKU handpump	1.41	0.82	74.5% c/
	(semi)-dispersed	SOGA handpump	0.86	0.37	60.5% c/
	(semi)-dispersed	BALDE handpump	0.79	0.35	62.0% c/
	(semi)-dispersed	INDIA MARK III handpump	2.24	1.49	84.4% c/
Spring protection	(semi)-dispersed	without tap	0.24	0.08	54.2% c/

Note:

a/ Proposed tariff is the tariff that at least covers the operation and maintenance cost of the technology option selected. It does not include the cash and in-kind contribution to investments.

b/ Cost recovery index includes the operation and maintenance cost plus the communities' contribution to investment (i.e., 20 percent of investment, of which 5 percent in cash and 15 percent in kind). The better performance of low-cost technologies in cost recovery is due to the definition of the proposed tariff. For the pumped systems and handpump options, the proposed tariff does not include only operation and maintenance costs, but also the replacement of the pump which is a major determinant in the total cost.

c/ This figure does not include the cost of hauling for these alternatives.

27. Table 2 shows that in none of the water supply options is full cost recovery being implemented. The customary proposed tariffs meet the operation and maintenance cost of the systems. However, the tariffs do not generate sufficient resources to enable communities and/or municipalities to replace investments after their useful life. It is evident, that the lack of cost recovery will jeopardize the long-term sustainability of the water supply systems. Lack of cost recovery has two major drawbacks. First, if only operation and maintenance costs are charged, communities will choose piped water systems which have in general low operation and maintenance cost systems. Although table 2 shows, that operation and maintenance costs for handpumps are lower than that of piped systems, this calculation does not include the costs associated with hauling water. If these costs are included, the price per cubic meter water could increase by Bs.2 to 3. In addition, if only operation and maintenance costs are taking into account the communities with handpumps pay a higher proportion of the total cost of water services than communities with piped systems as is shown in table 2. Because it is likely that communities that opt for handpumps are

poorer than those selecting more capital-intensive water supply systems, this approach has some equity implications. Hence, the importance the project assigns to full cost recovery (Annex 6).

Table 3: Long-Run Marginal Cost of Sanitation in Bs per household per year

Technology Option	Population density	Service Level	LRAIC	O&M Tariff	Percentage of cost recovery (include. communities' contribution to investment)
Conventional sewerage	concentrated	house connections	163.65	21.00	32.9%
Latrines with hydraulic seal	semi-dispersed	household latrine	119.61	30.00	36.3%
VIP-latrines	semi-dispersed	household latrine	173.19	30.00	29.8%

28. Table 3 shows that cost recovery in conventional sewerage is a major problem with the proposed tariffs. The proposed tariff, that comprises the operation and maintenance cost, covers only 13 percent of the total costs. The performance of latrines in cost recovery is significantly better. If the investment contribution is included, the difference between low- and high-cost technologies is considerably smaller. Just as has been previously observed in water supply projects, the communities which opt for low-cost technologies end up paying a higher proportion of total cost than the communities which select conventional sewerage.

E.2 Cost Recovery and Ability to Pay

29. It is difficult to determine the capacity to pay for water and sanitation services, especially in rural areas. Income data are only scarcely available. In addition, the seasonality of income and the importance of subsistence income further complicate the estimation of the ability to pay. The latter will require flexibility with regard to the payment of tariffs.

Table 4: **Ability to Pay for Water and Sanitation**
(as a percentage of cash household income)

Technology Option	Population density	Service Level	Percentage of income spent on water, based on LRAIC	Percentage of income spent on water, based on O&M tariff
WATER SUPPLY				
Gravity Systems	concentrated, with treatment	house connections	11.2% 1/	2.6%
	semi-dispersed	house connections	9.4% 2/	2.2%
	semi-dispersed	standpipes	6.0% 2/	1.2%
Pumped Systems	concentrated	house connections	10.8% 1/	3.3%
	semi-dispersed	house connections	12.7% 2/	4.3%
Spring protection	(semi)-dispersed	with tap	0.5%	0.1%
Handpumps	(semi)-dispersed	YAKU handpump	2.3%	1.4%
	(semi)-dispersed	SOGA handpump	1.4%	0.6%
	(semi)-dispersed	BALDE handpump	1.3%	0.6%
	(semi)-dispersed	INDIA MARK III handpump	3.6%	2.4%
Spring protection	(semi)-dispersed	without tap	0.3%	0.1%
SANITATION				
Conventional sewerage	concentrated	house connections	8.7% 1/	0.9%
Latrines with hydraulic seal	(semi)-dispersed	household latrines	2.8%	1.3%
VIP- latrines	(semi)-dispersed	household latrines	2.6%	1.3%

Note:

1/ The actual income in these concentrated areas that are likely to be small urban towns, is probably higher than the assumed monthly household income of US$ 40 per month. In these areas, monthly household cash income could be closer to US$ 100. In that case, the percentage of income spent on water is far less than the figure presented in the table.

2/ These options are not recommended for areas where the assumed monthly household income is only US$ 40 per month as they are not sustainable in the long-run.

30. In table 4, the ability to pay for the different technology options has been determined using an average cash income of US$ 40 per month per household -- equivalent to an annual per capita cash income of US$ 96.

31. With the current proposed tariffs, the operation and maintenance costs customary for the different options do not differ substantially. Especially not, when for handpumps and standpipes the economic cost

of hauling water are included. Rural communities have the ability to pay for all technology options and service levels offered if only the operation and maintenance costs of these services are charged. As ability to pay is lower than the often used rule of thumb of 5 percent (i.e, households should not spend more than 5 percent of their cash household income on water and sanitation services), possibilities exists to increase the proposed tariffs accordingly. The table also shows that full cost recovery can be achieved for low-cost technologies. However, subsidies will be needed to ensure the sustainability of piped water systems.

Policy Implications

32. Cost recovery in rural water and sanitation projects is a key issue. If users of water and sanitation investments do not pay the full cost of these services, the long-term sustainability of these services is jeopardized. Therefore the project will pursue a full cost recovery. The project finances a study that will develop a cost recovery policy for the rural water and sanitation sector based on field studies that will be conducted during the first two years of project implementation. Table 5 shows the policy options for cost recovery in the rural water and sanitation sector. It suggests that there are two policy options with regard to cost recovery: full or partial cost recovery. It indicates the implications of each policy option, and assesses the respective roles of central government, municipalities and user communities.

Table 5: Policy Matrix for cost recovery for rural water and sanitation projects

Policy Options	Implications	Strategy
Full cost recovery	• individual projects are expected to fully recover investment and operation and maintenance (O&M) costs over the expected life of the project • investment and O&M cost are met through user fees and/or taxes, which are adjusted for inflation • full cost recovery will generate more funds than is needed for operation and maintenance; therefore an investment fund has to be set up • full cost recovery may exceed the ability and willingness to pay for water and sanitation services, especially for capital intensive water supply and sewerage systems	• municipalities and user communities must be informed, and committed to full cost recovery at the start of the project • municipalities must set tariff rates based on full cost recovery principles • municipalities must adjust tariffs regularly in line with inflation • municipalities must set aside the additionally generated revenues in an investment fund, that has to be separate from the general municipal budget • in case, the central government is setting aside an investment fund, this fund could become a revolving fund resulting in increased coverage
O&M cost recovery	• tariffs will be set at a level that will at least cover O&M cost • partial cost recovery will generate insufficient funds for the replacement or rehabilitation of the investment when its useful life has been exceeded, thus jeopardizing the long-term sustainability of the project • recovery of only O&M cost will result in distortions as it disfavors technology options with high O&M cost (handpumps) • recovery of only O&M cost will have equity implications as poorer communities opting for low-cost handpumps will pay a higher proportion of total cost	• municipal government must decide on the tariff, that has at least to cover O&M cost • tariffs have to be regularly adjusted in line with inflation • municipal, regional or central governments have to take responsibility for the replacement of investment through subsidies/grants

BOLIVIA
RURAL WATER AND SANITATION PROJECT
Table 6: Results of the Economic Analysis
Base Case Scenario
In constant prices of April 1995 (in Bs)

Year	Time Savings	Health Benefits	Productivity Benefits	Institutional Benefits	TOTAL BENEFITS	Investment Cost	Institutional Investment	O&M Cost	TOTAL COST	NET BENEFIT
1995	0	0	0	0	0	3,146,370	4,621,500	0	7,767,870	(7,767,870)
1996	499,852	67,464	70,387	36,000	673,703	29,103,920	10,522,800	97,596	39,724,316	(39,050,613)
1997	5,164,470	696,494	727,236	642,000	7,230,200	41,689,399	10,902,000	1,000,359	53,591,758	(46,361,558)
1998	11,935,217	1,609,616	1,680,659	1,476,000	16,701,492	41,689,399	8,200,200	2,293,506	52,183,105	(35,481,613)
1999	18,813,964	2,155,531	2,649,291	2,280,000	25,898,786	22,024,588	5,142,900	3,586,653	30,754,141	(4,855,355)
2000	22,576,757	2,586,637	3,179,150	2,691,600	31,034,143	11,798,886	3,744,600	4,254,658	19,798,145	11,235,999
2001	24,708,003	2,830,815	3,479,261	2,917,200	33,935,279	0		4,480,346	4,480,346	29,454,934
2002	24,905,667	2,853,462	3,507,095	2,917,200	34,183,424	0		4,279,379	4,279,379	29,904,045
2003	25,104,912	2,399,757	3,535,152	2,917,200	33,957,021	45,170		4,078,413	4,123,583	29,833,439
2004	25,305,752	2,418,955	3,563,433	2,917,200	34,205,340	402,813		3,958,054	4,360,867	29,844,473
2005	25,508,198	2,438,307	3,591,941	2,917,200	34,455,645	740,336		3,769,938	4,510,275	29,945,370
2006	25,712,263	2,457,813	3,620,676	2,917,200	34,707,953	2,180,932		3,581,949	5,762,881	28,945,072
2007	25,917,961	2,477,476	3,649,642	2,917,200	34,962,279	2,638,319		3,393,959	6,032,278	28,930,001
2008	26,125,305	2,497,295	3,678,839	2,917,200	35,218,639	2,516,125		3,294,644	5,810,769	29,407,870
2009	26,334,308	2,517,274	3,708,270	2,917,200	35,477,051	1,222,323		3,241,439	4,463,762	31,013,288
2010	26,544,982	2,537,412	3,737,936	2,917,200	35,737,530	675,675		3,241,439	3,917,115	31,820,415
2011	26,757,342	2,557,711	3,767,839	2,917,200	36,000,092	238,120		3,241,439	3,479,559	32,520,533
2012	26,971,401	2,578,173	3,797,982	2,917,200	36,264,755	679,200		3,241,439	3,920,639	32,344,116
2013	27,187,172	2,598,798	3,828,366	2,917,200	36,531,536	842,106		3,241,439	4,083,545	32,447,991
2014	27,404,669	2,619,589	3,858,993	2,917,200	36,800,451	(3,923,771)		3,241,439	(682,331)	37,482,782
Net Present Value	143,837,508	15,162,970	20,254,501	16,585,864	195,840,844	109,764,181	31,996,639	22,609,426	164,370,246	31,470,598
									Net Present Value	31,470,598
									Rate of Return	13.4%
									Benefit-Cost Ratio	1.19

BOLIVIA
RURAL WATER AND SANITATION PROJECT
Table 7: Results of the Economic Analysis
Base Case Scenario based on Demand Curve Estimation
In constant prices of April 1995 (in Bs)

Year	Direct-use benefits in cash	Consumer surplus	Institutional benefits	TOTAL BENEFITS	Investment Cost	Institutional investment	O&M Cost	TOTAL COST	NET BENEFIT
1995	0	0	0	0	3,146,370	4,621,500	0	7,767,870	(7,767,870)
1996	152,329	484,107	36,000	672,436	29,103,920	10,522,800	97,596	39,724,316	(39,051,880)
1997	1,573,862	5,133,989	642,000	7,349,851	41,689,399	10,902,000	1,000,359	53,591,758	(46,241,907)
1998	3,637,234	12,170,285	1,476,000	17,283,519	41,689,399	8,200,200	2,293,506	52,183,105	(34,899,586)
1999	4,911,447	19,467,248	2,280,000	26,658,695	22,024,588	5,142,900	3,586,653	30,754,141	(4,095,447)
2000	5,893,737	23,360,697	2,691,600	31,946,034	11,798,886	3,744,600	4,254,658	19,798,145	12,147,889
2001	6,450,105	25,565,947	2,917,200	34,933,252	0	0	4,480,346	4,480,346	30,452,907
2002	6,501,706	25,770,474	2,917,200	35,189,381	0	0	4,279,379	4,279,379	30,910,002
2003	5,527,601	25,976,638	2,917,200	34,421,439	45,170	0	4,078,413	4,123,583	30,297,856
2004	5,571,821	26,184,451	2,917,200	34,673,473	402,813	0	3,958,054	4,360,867	30,312,606
2005	5,616,396	26,393,927	2,917,200	34,927,523	740,336	0	3,769,938	4,510,275	30,417,248
2006	5,661,327	26,605,078	2,917,200	35,183,605	2,180,932	0	3,581,949	5,762,881	29,420,725
2007	5,706,618	26,817,919	2,917,200	35,441,737	2,638,319	0	3,393,959	6,032,278	29,409,459
2008	5,752,271	27,032,462	2,917,200	35,701,933	2,516,125	0	3,294,644	5,810,769	29,891,164
2009	5,798,289	27,248,722	2,917,200	35,964,211	1,222,323	0	3,241,439	4,463,762	31,500,448
2010	5,844,675	27,466,712	2,917,200	36,228,587	675,675	0	3,241,439	3,917,115	32,311,472
2011	5,891,433	27,686,446	2,917,200	36,495,078	238,120	0	3,241,439	3,479,559	33,015,519
2012	5,938,564	27,907,937	2,917,200	36,763,701	679,200	0	3,241,439	3,920,639	32,843,062
2013	5,986,072	28,131,201	2,917,200	37,034,473	842,106	0	3,241,439	4,083,545	32,950,928
2014	6,033,961	28,356,250	2,917,200	37,307,411	(3,923,771)	0	3,241,439	(682,331)	37,989,743
Net Present Value	34,714,109	148,524,528	16,585,864	199,824,501	109,764,181	31,996,639	22,609,426	164,370,246	35,454,255
								Net Present Value	35,454,255
								Rate of Return	13.9%
								Benefit-Cost Ratio	1.22

Table 8
Regression Analysis between
Diarrheic Episodes of Children Under Five Years Old and
Water Supply Coverage

Department	Population	Population < 5 years	Episodes (in '000)	Episodes per child
Beni	194,817	29,807	227	7.62
Chuquisaca	499,297	76,392	250	3.27
Cochabamba	1,221,630	186,909	157	0.84
El Alto	446,189	68,267	121	1.77
La Paz	1,645,368	251,741	114	0.45
Oruro	374,249	57,260	170	2.97
Pando	41,893	6,410	136	21.22
Potosi	577,861	88,413	345	3.90
Santa Cruz	1,501,325	229,703	196	0.85
Tarija	320,654	49,060	185	3.77
TOTAL	6,823,283	1,043,962	1,901	47

Note:
The departments of Riberalta and Tupiza with a total population of 240,000 are not included in this calculation.

Regression Output:

Constant		21.29316
Std Err of Y Est		4.237516
R Squared		0.58262
No. of Observations		10
Degrees of Freedom		8
X Coefficient(s)	-31.8545	
Std Err of Coef.	9.532332	
	-3.34174	

Annex 11
Revenue Projection
Fiscal Transfers to Municipalities
Actual and Projected (US$ ' 000)

Department of La Paz

Province	Municipality	Population	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
MURILLO	La Paz	723,750	14,566	21,802	25,113	18,092	18,428	19,559	23,057	26,935
	Palca	4,808				53	109	130	153	179
	Mecapaca	7,605				83	173	206	242	283
	Achocalla	15,447				170	335	417	492	575
	El Alto	405,492	59	477	549	4,737	9,204	10,958	12,918	15,090
INGAVI	Viacha	54,761		5	5	602	1,243	1,365	1,545	1,733
	Guaqui	5,810				64	132	145	164	184
	Tiahuanacu	13,151				144	299	328	371	416
	Desaguadero	4,315		7	8	48	99	108	122	137
CARANAVI	Caranavi	43,093		2	3	473	978	1,074	1,216	1,364
AROMA	Sica-Sica(V.Aroma)	19,582				214	444	469	534	603
	Umala	6,605				72	150	167	190	214
	Ayo-Ayo	6,407				70	145	162	184	208
	Calamarca	9,716				107	220	245	279	315
	Patacamaya	15,546		11	13	171	353	392	447	505
	Colquencha	5,850				64	133	148	168	190
	Collana	2,024				23	46	77	88	99
INQUISIVI	Inquisivi	15,195				167	345	370	414	459
	Quime	7,395				81	168	180	202	224
	Cajuata	9,228				101	197	225	252	279
	Colquiri	17,052				187	387	415	465	516
	Ichoca	6,685				73	152	163	182	202
	Licoma	1,790				20	53	44	49	54
OMASUYOS	Achacachi	44,866		4	4	493	1,018	1,116	1,262	1,415
	Ancoraimes	23,837				317	654	717	811	909
LARECAJA	Sorata	16,073				178	328	451	527	611
	Guanay	27,319				300	620	726	848	982
	Tacacoma	6,881				75	156	183	214	247
	Tipuani	13,708				150	311	364	426	493
	Quiabaya	2,212				24	50	59	69	80
	Combaya	2,569				27	95	44	51	60
MANCO KAPAC	Copacabana	13,573		1	1	149	308	337	381	426
	San Pedro Tiquina	5,490				60	125	136	154	172
	Tito Yupanki	1,491				16	34	37	42	47
MUNECAS	Chuma	8,605				94	195	212	239	266
	Ayata	5,140				56	117	127	143	159
	Aucapata	4,075				45	93	100	113	126
PACAJES	Coro Coro	11,915				132	209	308	344	381
	Caquiaviri	5,978				71	248	245	274	303
	Calacoto	7,144				78	162	173	194	214
	Comanche	5,008				55	95	121	136	150
	Charana	2,473	106	83	96	51	56	60	67	74
	Waldo Ballivian	1,336				15	30	32	36	40
	Nazacara de Pacajes	4,258				41	3	3	4	4
	Santiago de Callapa	5,239				57	180	108	121	133
CAMACHO	Puerto Acosta	33,560				369	624	818	915	1,015
	Mocomoco	18,844				207	428	460	514	571
	Pto.M.C.-Chaltapata	1,083				12	163	26	30	33
FRANZ TAMAYO	Apolo	12,520				137	284	319	365	415
	Pelechuco	4,861				53	116	124	142	161
LOAYZA	Luribay	8,591				94	195	212	239	266
	Sapahaqui	5,865				97	201	219	246	275
	Yaco	6,756				74	146	167	188	209
	Malla	1,938				21	51	48	54	60
	Cairoma	9,653				106	219	238	268	299
SUR - YUNGAS	Chulumani	11,101		2	2	122	252	285	328	373
	Irupana	11,929				136	271	306	466	531
	Yanacachi	4,059				45	92	104	120	137
	Palos Blancos	12,643				134	287	226	260	296
	La Asunta	12,198				134	277	313	360	410
LOS ANDES	Pucarani	23,608				259	447	596	680	768
	Laja	15,391				169	349	389	443	500
	Batallas	19,983				220	443	505	576	650
	Pto. Perez	3,198				35	172	81	92	104
NOR YUNGAS	Coroico	9,478		2	2	104	231	248	287	330
	Coripata	10,276				113	233	268	311	357
ITURRALDE	Ixiamas	3,366				37	82	90	106	124
	San Buenaventura	5,095				56	105	137	161	187
B.SAAVEDRA	Gral.Perez (Charazani)	8,406				92	191	212	242	273
	Curva	1,589				17	36	40	46	52
G.VILLARROEL	S.Pedro de Curahuara	3,659				40	124	89	99	110
	Papel Pampa	6,827				75	114	166	185	205
	Chacarilla	1,199				13	27	29	33	36
G.J.M.PANDO	Santiago de Machaca	3,735				41	85	91	101	112
	Catacora	842				9	19	20	23	25
TOTAL		1,892,750	14,731	22,396	25,797	31,322	43,143	49,931	58,067	66,940

Department of Cochabamba

Province	Municipality	Population	Actual				Projected			
		1994	1991	1992	1993	1994	1995	1996	1997	1998
CERCADO	Cochabamba	412,917	3,768	5,392	6,933	8,551	9,404	11,207	13,299	15,639
QUILLACOLLO	Quillacollo	69,027	322	408	524	759	1,567	1,871	2,219	2,608
	Sipe Sipe	30,007				220	454	814	965	1,134
	Tiquipaya	13,371		6	8	147	303	362	430	505
	Vinto	20,573		2	3	226	467	558	661	777
	Colcapirtua	22,219	98	218	280	262	504	602	714	840
CAMPERO	Aiquile	20,795		2	2	228	472	517	588	662
	Pasorapa	4,612				51	105	115	130	147
	Omereque	4,951				54	112	123	140	158
AYOPAYA	Independencia	28,548				314	648	712	810	913
	Morochata	26,049				286	591	650	739	833
CHAPARE	Sacaba	69,517	26	50	64	764	1,546	1,908	2,276	2,691
	Colomi	13,425				147	305	368	440	520
	Villa Tunari	50,175				551	1,139	1,377	1,643	1,942
PUNATA	Punata	23,134		2	3	254	698	601	698	803
	Villa Rivero	5,718				63	135	149	172	198
	Villa J.Q.Mendoza	16,176				178	194	420	488	561
	Tacachi	422				5	10	11	13	15
	Villa G. Villarroel	1,952				21	39	51	59	68
ESTEBAN ARCE	Tarata	8,406		4	5	92	191	211	241	272
	Anzaldo	10,088				111	223	253	289	327
	Arbieto	7,816				86	177	196	224	253
	Sacambe	3,407				37	84	86	98	110
GERMAN JORDAN	Cliza	15,838				174	360	400	458	520
	Toco	6,380				70	145	161	185	210
	Tolata	5,287				80	120	134	153	174
CAPINOTA	Capinota	15,721	30	105	136	173	357	396	452	512
	Santivanez	6,332				70	144	159	182	206
	Sicaya	2,391				26	54	60	69	78
TAPACARI	Tapacari	19,202				211	436	471	531	594
CARRASCO	Totora	14,087				155	320	376	443	516
	Pojo	5,612				62	403	150	176	206
	Poroma	12,799				141	290	342	402	469
	Chimore	6,519				72	194	174	205	239
	Pto. Villarroel	38,797				426	559	1,036	1,219	1,422
ARANI	Arani	13,159				145	299	345	402	464
	Vacas	10,172				112	231	266	310	359
ARQUE	Arque	6,820				75	155	168	189	212
	Tacopaya	11,429				125	259	281	317	355
BOLIVAR	Bolivar	7,081				78	161	174	197	220
TIRAQUE	Tiraque	31,315				344	711	820	956	1,104
MIZQUE	Mizque	20,176				222	458	517	603	696
	Vila Vila	4,170				46	95	107	125	144
	Alalay (Ayopampa)	3,613				40	82	93	108	125
TOTAL		**1,120,205**	**4,243**	**6,190**	**7,958**	**16,250**	**25,199**	**29,792**	**35,018**	**40,802**

Department of Tarija

Province	Municipality	Population	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
CERCADO	Tarija	106,241	438	584	609	1,896	2,457	2,971	3,531	4,160
ARCE	Padcaya	13,616				150	309	359	418	483
	Bermejo	31,097	155	286	299	348	706	820	955	1,103
GRAN CHACO	Yacuiba	45,892	104	142	149	519	1,072	1,245	1,472	1,724
	Caraparí	7,816				86	177	212	251	294
	Villa Montes	20,904	4	9	9	230	444	567	670	785
AVILEZ	Uriondo	9,596				105	244	249	288	329
	Yunchara	6,614				73	124	172	198	227
MENDEZ	San Lorenzo	18,568				204	421	482	557	638
	Tomayapo (El Puente)	11,300				124	256	293	339	388
O'CONNOR	La Moreta (Entre Rios)	17,763				195	403	460	531	608
TOTAL		**289,407**	**701**	**1,022**	**1,066**	**3,930**	**6,614**	**7,831**	**9,210**	**10,739**

Department of Oruro

Province	Municipality	Population	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
CERCADO	Oruro	197,672	831	1,218	1,278	3,184	4,487	5,234	6,090	7,023
	Caracollo	10,175				112	231	269	313	361
	El Choro	5,908				65	134	156	182	210
ABAROA	Challapeta	20,882				229	526	526	597	671
P.DALENCE	Villa Huanuni	19,674				216	447	482	539	598
	Machacamarca	5,218				57	119	128	143	159
POOPO	Villa Poopo	5,856				65	134	148	167	187
	Pazna	8,068				88	183	202	229	257
	Antequera (Bolivar)	1,483				38	79	87	99	111
TOMAS BARRON	Eucaliptus	5,045		3	3	55	114	134	155	179
SEBASTIAN PAGA	Santiago de Huari	9,977	138	213	224	109	175	251	285	321
S.PEDRO TOTORA	Totora	4,040				57	92	100	113	126
CARANGAS	Corque	6,184				67	140	143	159	175
	Choquecoca	1,746				19	40	42	47	52
SAJAMA	Curahuara de Carangas	4,092	11	18	19	52	93	102	115	128
	Turco	3,799				42	86	94	106	119
LITORAL	Huachacalla	983				11	22	24	27	30
	Escara	446				5	10	11	12	13
	Cruz de Machacamarca	190				2	4	5	5	6
	Macaya	92				1	2	11	13	14
	Esmeralda	376				4	9	9	10	11
SAUCARI	Toledo	5,569				61	126	137	153	170
SUR CARANGAS	Andamarca	3,003				33	68	24	27	30
	Belen de Andamarca	1,021				12	23	32	35	39
LADISLAO CABRE	Salinas de G.Mendoza	5,761				63	131	139	155	171
	Pampa Aullagas	1,602				17	36	39	43	48
MEJILLONES	La Rivera	751				8	17	19	21	24
ATAHUALLPA	Sabaya	2,074	64	101	106	95	47	52	58	65
	Coipaza	406				16	34	28	31	35
NOR CARANGAS	Stago. de Huaylla	4,900				54	111	118	132	145
TOTAL		336,993	1,044	1,554	1,631	4,836	7,719	8,746	10,062	11,477

Department of Pando

Province	Municipality	Population	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
NICOLAS SUAREZ	Cobija	10,001	59	453	26	120	227	266	312	361
	Porvenir	4,645				50	105	124	145	168
	Bolpebra	1,129				12	26	30	35	41
	Bella Flor	2,672				29	61	71	83	97
MANURIPI	Puerto Rico	3,679				40	83	92	104	117
	San Pedro (Conquista)	1,347				15	31	34	38	43
	Filadelfia	2,334				25	53	58	66	74
MADRE DE DIOS	Pto.G.Moreno	3,659				40	83	91	104	116
	San Lorenzo	2,421				47	55	60	69	77
	Sena	2,017				22	46	50	57	64
ABUNA	Buena Vista	1,245				24	28	31	35	39
	Humaita	1,407				15	32	35	40	44
GRAL. P. ROMAN	Nueva Esperanza	555				6	13	14	15	17
	Loma Alta	961				10	22	23	26	29
TOTAL		38,072	59	453	26	456	864	980	1,128	1,287

Department of Santa Cruz

Province	Municipality	Population	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
A.IBANEZ	Santa Cruz de la Sierra	711,205	5,750	7,798	12,030	15,489	16,143	20,100	24,233	28,953
	Cotoca	19,631		1	2	216	446	555	669	799
	Porongo (Ayacucho)	8,272				91	188	234	282	337
	La Guardia	21,988	27	52	80	259	499	1,005	1,211	1,447
	El Torno	23,582				242	535	283	342	408
WARNES	Warnes	38,285		29	45	421	869	993	1,147	1,313
VELASCO	San Ignacio	28,292		1	2	311	717	766	905	1,058
	San Miguel	8,423				93	191	228	270	315
	San Rafael	6,210				68	66	168	199	232
ICHILO	Buena Vista	10,784				118	245	282	327	375
	San Carlos	6,594				72	416	172	200	229
	Yapacani	32,106				353	462	839	973	1,117
CHIQUITOS	San Jose	14,372		1	1	158	326	396	472	556
	Pailon	12,901				142	293	356	423	499
	Robore	15,246				167	346	420	500	590
SARA	Portachuelo	20,359		3	4	224	462	517	590	668
	Santa Rosa	9,248				102	210	235	268	303
CORDILLERA	Lagunillas	2,230				24	96	60	70	82
	Charagua	13,495				148	421	362	426	496
	Cabezas	22,168				243	389	596	701	816
	Cuevo	3,210				35	73	86	101	118
	Gutierrez	4,966				55	230	133	157	183
	Camiri	39,128	58	79	122	430	725	1,051	1,235	1,439
	Boyuibe	3,431		3	5	38	78	92	108	126
VALLEGRANDE	Vallegrande	15,573		2	3	171	353	387	438	490
	Trigal	2,891				32	66	72	81	91
	Moromoro	3,863				42	88	96	109	122
	Postrer Valle	4,846				20	42	46	52	58
	Pucara	2,571				28	58	64	72	81
FLORIDA	Samaipata	9,142				100	207	233	266	302
	Pampa Grande	6,389				70	145	163	186	211
	Mairana	5,712				63	130	145	166	189
	Quirusillas	1,507				17	34	38	44	50
OBISPO SANTIST	Montero	58,569	52	67	103	644	1,329	1,534	1,780	2,047
	Gral.Saavedra	11,639				128	264	305	354	407
	Mineros	34,452		5	8	378	782	902	1,047	1,204
NUFLO CHAVEZ	Concepcion	15,006				165	341	424	511	610
	San Javier	8,039				88	183	227	274	327
	San Julian	37,963				417	862	1,072	1,293	1,544
ANGEL SANDOVA	San Matias	10,695				117	243	280	325	374
MANUEL CABALL	Comarapa	11,846				130	269	307	354	406
	Saipina	4,228				46	96	110	127	145
GERMAN BUSCH	Puerto Suarez	17,494	407	555	856	212	397	482	574	677
	Puerto Quijarro	7,932		41	63	91	180	219	260	307
GUARAYOS	Ascencion de Guarayo	11,137				122	253	315	379	453
	Urubichi	4,738				52	107	134	161	192
	El Puente	5,603				55	114	142	171	205
TOTAL		**1,367,961**	**6,294**	**8,637**	**13,325**	**22,687**	**30,968**	**37,625**	**44,832**	**52,963**

Department of Beni

Province	Municipality	Population No. Habit.	Actual				Projected			
			1991	1992	1993	1994	1995	1996	1997	1998
CERCADO	Trinidad	57,328	245	355	121	769	1,301	1,799	1,830	2,141
	San Javier	5,800				67	132	156	185	217
YACUMA	Santa Ana	25,068	4	12	4	275	569	644	800	936
VACA DIEZ	Riberalta	52,774	53	75	26	580	1,198	1,357	1,685	1,971
	Villa Bella	31,877	44	77	26	46	94	107	133	155
	Guayaramerin		11	8	3	305	629	715	885	1,035
ITENEZ	Magdalena	16,300				179	370	419	520	609
GRAL. JOSE BALL	Reyes	6,153		1		76	156	177	220	257
	Rurrenabaque					99	206	233	289	338
	San Borja	24,251		5	2	266	550	623	774	906
	Santa Rosa	7,212				82	164	191	230	269
MARBAN	Loreto	3,679				40	83	94	117	137
	San Andres	8,271				91	188	212	264	309
MAMORE	San Joaquin	4,285				47	97	110	137	160
	San Ramon	4,713				52	107	121	151	176
	Puerto Siles	1,057				12	24	27	34	40
MOXOS	San Ignacio	17,602				207	400	485	562	657
TOTAL		**266,370**	**357**	**534**	**181**	**3,191**	**6,269**	**7,470**	**8,816**	**10,313**

Annex 12
Eligibility Criteria

1. Investment for the first year of project implementation, 1995, was selected during project preparation in specific municipalities of the departments of Potosi, Chuquisaca, La Paz, and Cochabamba. These departments and municipalities were chosen based on poverty indicators, including a five-year infant mortality rate above 80 per 1,000 live births and an illiteracy rate above 50 percent. Focusing the first year of project implementation on departments located in the Altiplano was critical for efficient use of human and financial resources, and for applying the lessons learned from the Potosi pilot project.

2. For the subsequent years of the project, 1996-2000, all departments and municipalities could be eligible for financing if they meet the following criteria. These criteria will be revised annually during project review by DINASBA/PROSABAR, the project committee, and IDA, to incorporate adjustments if they are required following the flexible approach to project design outlined in paragraph 20 of the Staff Appraisal Report.

Departments

3. *Entry criteria*. Eligibility of new departments will be decided during the annual project review. From the second year of project implementation any department is eligible for financing if the corresponding departmental government complies with the following criteria:

- The organization of the UNASBA and the appointment of the minimum staff required to manage the PROSABAR under stable labor conditions, and with qualifications satisfactory to DINASBA/PROSABAR. Staff includes a manager, one engineer, one social worker, and support staff.
- The signing of an agreement with the Sub-Secretariat of Urban Affairs, the Sub-Secretariat of Public Investment and External Financing, and the Social Investment Fund for project implementation.
- For 1995, the commitment of at least US$100,000 in the approved budget from the previous year to finance pre-investments, normally scheduled for September of each year. These funds should be deposited in a separate bank account managed by UNASBA, and are subject to project auditing procedures.
- Starting in 1996, pre-investment activities will be financed by Regional and Municipal Governments and external resources (NGOs and others). These funds should ideally be deposited into the UNASBA account in order to ensure standardized project preparation procedures and quality control.

4. *Exit criteria*. During project review compliance with these criteria will be revised as follows:

- A minimum staff, equivalent to at least fifty staff-months a year, has been allocated to PROSABAR subprojects.
- A satisfactory amount has been contracted out to prepare subprojects.
- A satisfactory statement on the use of the project account has been prepared.

5. If performance at the department level is not considered satisfactory by DINASBA/PROSABAR and IDA, the financing of additional subprojects in the department and the provision of technical assistance to UNASBA could be stopped, after consultation with the project committee. In such an event PROSABAR would withdraw from the department after concluding projects whose implementation already had started. PROSABAR would withdraw with the staff it had assigned and the equipment it had allocated to the UNASBA.

Municipalities

6. After the first year of investment, all municipalities will be eligible for financing under the following criteria:

- Presentation to UNASBA of a batch of subprojects for at least 10 communities.
- Subprojects have been included in the municipal operating plan for the year.
- The plan has been cleared by the department and the central government.
- Pre-investment funds are available.
- The municipality agrees to a cash contribution of at least 20 percent of project cost, according to the financial policy for the sector.
- There are assurances that cash contributions from the community will be obtained on time.

7. If performance at the municipal level is not considered satisfactory by DINASBA/PROSABAR and IDA, the financing of additional subprojects and the provision of technical assistance to the municipality could be stopped, after consultation with the project committee. In such an event PROSABAR would withdraw from the municipality after concluding projects whose implementation already had started.

Communities

7. Communities would be eligible according to the following criteria:

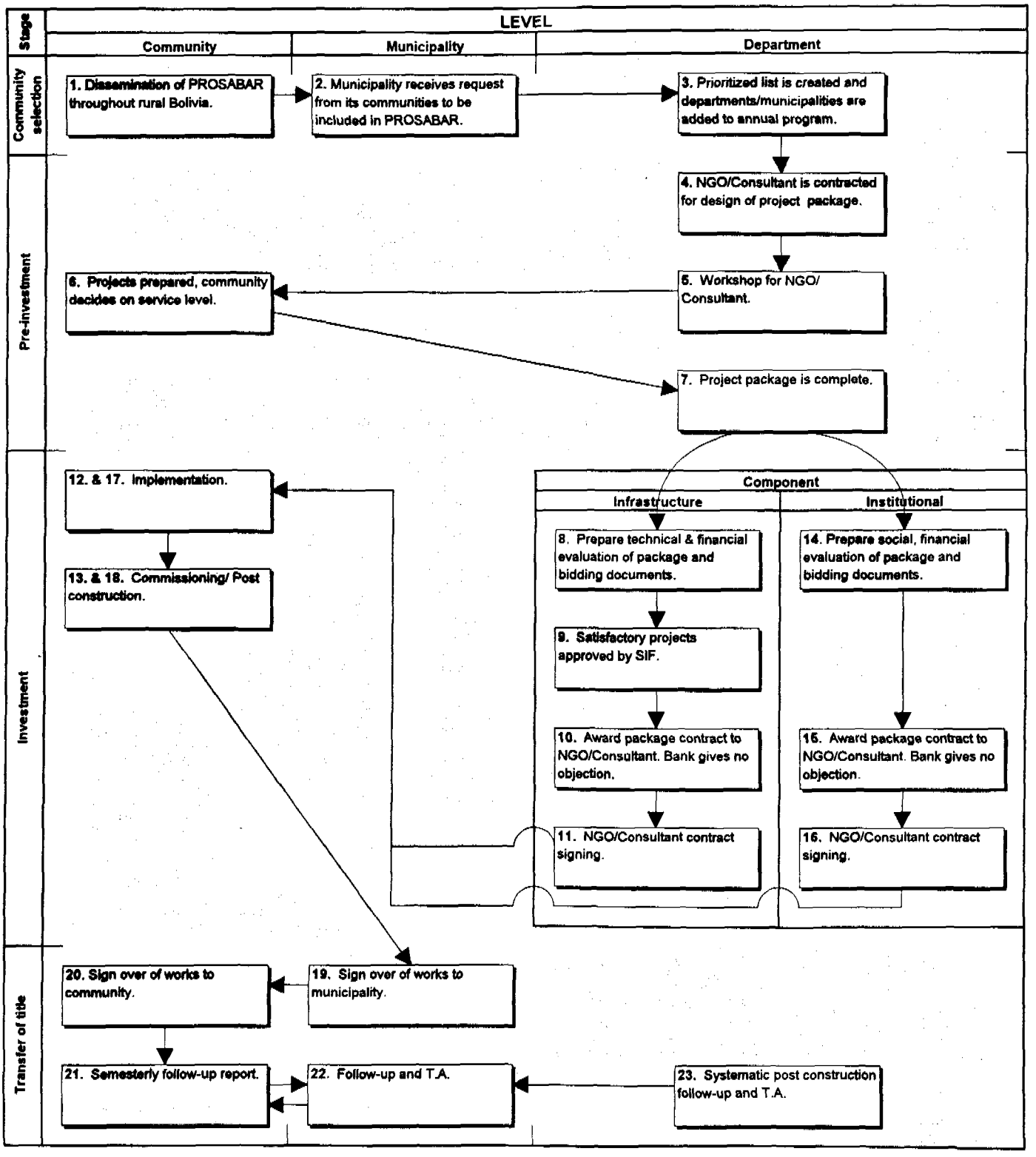
- The total population of the community is below 5,000.
- Priority has been assigned to a specific community by its corresponding municipality, and it has been included in the municipal operating plan.
- A subproject has been prepared or funds to finance pre-investment have been identified.
- The community has selected the technology and service level, and is fully aware of cost implications and financial contributions.
- The community is willing to contribute in cash with at least 5 percent of the project cost and 15 percent in unskilled labor and local materials to the municipality.
- An agreement has been reached between community leaders and municipal authorities regarding project implementation and financial contributions.
- The community knows the government policy for rural water and sanitation.

Subprojects

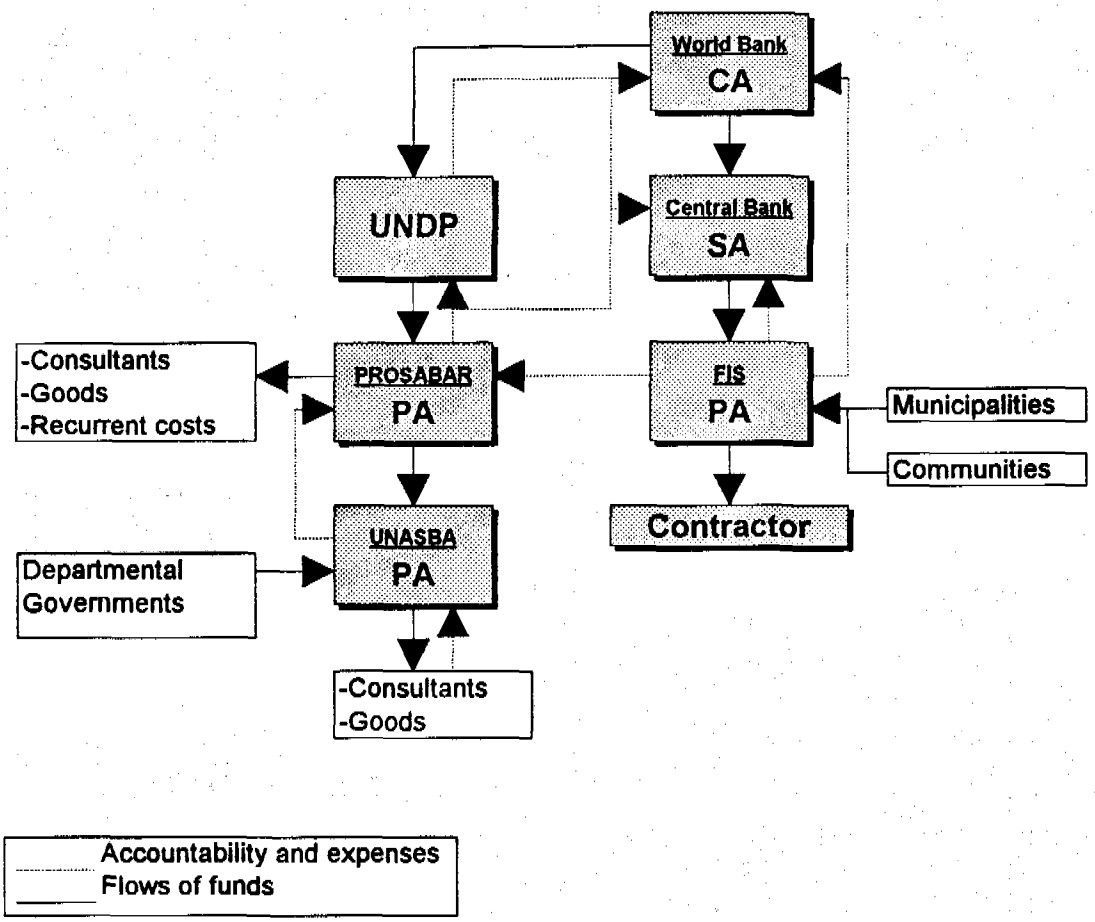
8. A project is eligible if it:

- Meets all previous criteria.
- Follows the participatory process established by the Popular Participation Law.
- Is demand oriented, that is, reflects the desires and willingness to pay of the community.
- Is accompanied by a community training and education process, developed by UNASBA and funded by the technical assistance program.
- Has been prepared based on the design manual of DINASBA for rural water and sanitation projects.
- Has been satisfactorily evaluated by the Social Investment Fund.
- Has been approved by the Board of the Social Investment Fund.

Annex 13
Project Flows
Implementation



Annex 13
Project Flows
Disbursement



Implementation
Detailed Procedures

Community selection stage

Box 1. PROSABAR, UNASBAs, and NGOs disseminate PROSABAR project concepts and policies throughout the Bolivian rural communities (Annex 9) triggering a communal demand.

Box 2. Interested communities which agree to follow the guidelines established under PROSABAR can request at the Municipality level, through their OTBs, that they be included in PROSABAR. Incoming requests are consolidated and prioritized under the guidelines of the *Ley Popular de Participacion*. Municipal governments must then include PROSABAR projects in the Annual Operational Plan (AOP).

Box 3. The municipalities submit to their respective UNASBAs, the prioritized list of communities requesting to participate in PROSABAR and which have been included in their AOPs and approved by the Subsecretary of Public Investment. PROSABAR, the SIF and the UNASBAs add the departments and their municipalities into the annual project program at the departmental level.[1]

Pre-investment stage

Box 4. UNASBA/PROSABAR bids, evaluates, and contracts NGO/consultant services for the design of the package of projects for both the investment and Community Development components. IDA provides no-objection.

Box 5. NGO/Consultant, prior to implementation, participates in a three day workshop sponsored by PROSABAR to fully understand project implementation methodology.

Box 6. Implementation. The consultant presents feasible technical options to the communities and explains the associated financial responsibilities and procedures for O&M, based on the concepts of community management. The communities decide on the technical option and service level. A package of communal projects is assembled.

Box 7. The package, proposing the detailed engineering work for the investment and the social content for the Community Development components for the communities involved, is submitted to UNASBA-PROSABAR for each selected department.

Investment component

Box 8. The preinvestment packages are submitted to the SIF for a technical and financial evaluation. If the evaluation is unsatisfactory, the NGO/Consultant is responsible for reformulating a satisfactory plan for re-evaluation. Preparation of bidding documents begins.

Box 9. The Board of Directors of the SIF approves the satisfactory packages. SIF verifies that the counterpart funds from the municipality and the community, 25% and 5% respectively have been placed in its account.[2]

Box 10. A bidding committee represented by the Municipality, Departmental Governments (as of January 1996), UNASBA-PROSABAR, SIF (as a proctor), bids, evaluates, and awards the contract[3]. IDA gives no-objection to contracting, if above ceiling.

Box 11. SIF signs contract with contractor verifying guarantees and other formalities and disburses an initial 20% of the contract value upon signature. Disbursements are made based on the NGO/Consultant's proposed disbursement schedule.

Box 12. Investment implementation begins by establishing a coordinating mechanism with the Community Development NGO/consultant.[4] Throughout the implementation stage, the community is actively involved. The NGO/Consultant reports both to SIF[5] and UNASBA-PROSABAR. SIF is responsible for investment supervision and follow-up *Timing: 2 months after the Community Development NGO/consultant begins.*

Box 13. Commissioning. Provisional reception of the works by UNASBA-PROSABAR/SIF/Municipality begins after the physical works have been completed by the NGO/Consultant. During this post-construction period, the system is fully tested. The Community Development NGO/Consultant, is responsible for the final transfer of the works to UNASBA-PROSABAR, SIF and the Municipality. At that point, the NGO/Consultant is fully paid. Duration for the commissioning period is anticipated at 3 months.

Community Development component

Box 14. UNASBA-PROSABAR receives NGO/Consultant's proposal (standard format), evaluates the package. If the evaluation is unsatisfactory, the NGO/Consultant is responsible for reformulating a satisfactory plan for re-evaluation. Preparation of bidding documents begins. *Timing: 2 months before evaluation of the investment proposals are evaluated.*

Box 15. UNASBA-PROSABAR[6] bid, evaluate, and contract the NGO/Consultant. IDA gives no-objection.

Box 16. DINASBA-PROSABAR[7] signs contract with NGO/Consultant verifying guarantees and other formalities and disburses an initial amount of 20% of contract value upon signature. Disbursements are made based on the NGO/Consultant's proposed disbursement schedule.

Box 17. NGO/consultant implements the social works with the community by establishing a tie with the community and setting up the ground work for the construction of the system. *Timing: 2 months before the investment NGO/Consultant begins implementation.* The NGO/Consultant reports to UNASBA and SIF periodically.

Box 18. Post construction. NGO/Consultant is responsible for: assisting the community and municipality in verifying the quality of the works during the guarantee period and makes sure that they are registered in the municipal cadaster. Capacity of operators, and sanitary education are strengthened to promote sustainability. *Timing: It is expected that the consultant will remain on the site for 2-3 months after works are completed.*

Transfer of title

Box 19. SIF/UNASBA-PROSABAR sign over the works to the municipality.[8]

Box 20. The municipality delegates its obligation to administer, operate and maintain basic sanitation infrastructure to the community, thereby making the community responsible for the works.

Box 21. The community's Administration/O&M committee submits to the municipality a semesterly follow-up and system monitoring report.

Box 22. The municipality conducts follow-up and provides technical assistance to the community.

Box 23. UNASBA-PROSABAR conducts long-term systematic post-construction follow-up and provides technical assistance to the municipalities.

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1. Following the first year of project implementation.
2. Total counterpart funding is 30% deposited into a central SIF account.
3. When the amount of the package is above US$250,000, the bidding will be conducted through a separately contracted procurement agency.
4. The Community Development NGO/Consultant is responsible for the technical supervision for the Investment NGO/Consultant and reports directly to UNASBA-PROSABAR.
5. SIF is responsible for follow-up and financing for investment component.
6. UNASBA-PROSABAR is responsible for supervision of the Community Development NGO/Consultant.
7. DINASBA-PROSABAR is responsible for follow-up of the Community Development NGO/Consultant.
8. As per the PPL, municipal governments have the obligation to administer, operate and maintain, and renew basic sanitation infrastructure.

Annex 14
Implementation Manual Outline

I. Legal Framework

A. Institutions

Describe participation in project implementation of each agency according to the Staff Appraisal Report and credit agreement. Include organizational charts and institutional responsibilities.

I.A.1 DINASBA
I.A.2 PROSABAR
I.A.3 SIF
I.A.4 Departmental government (each department)
I.A.5 UNASBA (each department)
I.A.6 Municipalities and communities (list of communities and key officials)
I.A.7 Entities participating in Project Committee: NSUA, NSSI, SNRD, SIF, Departmental Governments
I.A.8 UNDP
I.A.9 IDA

B. Regulations

Include all relevant regulations and agreements for project implementation.

I.B.1 List of regulations applicable to rural water and sanitation in Bolivia (copies should be kept in separate binder)
I.B.2 Staff Appraisal Report
I.B.3 Credit agreement
I.B.4 Institutional agreement: NSUA, SIF, each Departmental Governments
I.B.5 Agreement between the Government of Bolivia and UNDP
I.B.6 Sample model agreements: municipality-community, municipality-Departmental Governments, municipality-SIF
I.B.7 Aide-Memoire from supervision missions
I.B.8 Minutes from project review

II. Project Rules

A summary of project rules as established in the Staff Appraisal Report, Aide-Memoires from supervision missions, and minutes from project review. It also refers to specific arrangements with SIF and UNDP. Identify and clarify specific responsibilities of each project entity.

A. Eligibility criteria
II.A.1 Departments
II.A.2 Municipalities
II.A.3 Communities
II.A.4 Subprojects

B. Procurement

II.B.1 Pre-investment
II.B.2 Investment component
II.B.3 Institutional component

C. Pre-investment
II.C.1 Terms of reference
II.C.2 Qualification criteria
II.C.3 List of consultants and subprojects

D. Evaluation

E. Approval

F. Bidding

G. Supervision

H Follow-up

I. Commissioning

J. Operations and maintenance

K. Ownership

III. Implementation Procedures

Include a detailed description of all project implementation arrangements outlined in the Staff Appraisal Report.

A. Procurement
III.A.1 Investment component
ICB
NCB
Shopping
III.A.2 Institutional component
Selection of firms
Individual consultants
Equipment

B. Disbursement
III.B.1 Special account
III.B.2 Statement of expenditures

C. Auditing

D. Reporting
III.D.1 Content
III.D.2 Frequency and distribution

E. Monitoring and evaluation
III.E.1 Indicators
III.E.2 Evaluation

F. Environmental evaluation

G. Project review
III.G.1 Terms of reference

H. Implementation manual
III.H.1 Content
III.H.2 Update

IV. General Management

A. Correspondence

B. Filing

C. Project documents

D. Distribution lists

E. Accounting of expenses

F. Work programming

G. Administrative functions

H. Assets management

V. Personnel

A. Key officials

B. Consultants

C. Terms of reference

D. Contracts

E. Reports

F. Policies

G. Training

VI. References

A. List of references

B. DINASBA manual

C. SIF manual

VII. Formats

Annex 15
Reporting

1. Reporting is a key feature for any project to formalize communications to interested parties and stakeholders. It should include, as a minimum: (i) the progress of the project measured by pre-established indicators; (ii) explanations regarding deviations from original project conception; and, (iii) alternative courses of actions and decisions to adjust project implementation when required and justified. Reporting will be responsibility of PROSABAR, that will collect the necessary information from all of the participating institutions (UNASBAs and SIF).

2. This project has been designed to be responsive to community demands for different technology options and service levels. There are therefore no blue-prints for detailed project execution--except for the first year--but project implementation procedures and policies that should be followed and principles for selecting sub-projects, which in turn might be reviewed periodically. Project design relies on the lessons learned in the earlier phases of project execution to guide the planning and implementation of subsequent activities (annex 6). In such a project, reporting becomes an essential feature for project design and decision making.

3. The guidelines for report preparation are the following:

- **Frequency and timing**: annual reports to be presented by November 30 of each year, starting in 1995.
- **Preparation**: stand-alone reports based on the quarterly evaluations prepared by February 28, May 31, and August 31. Quarterly evaluations should be made available to IDA upon request.
- **Review and approval**: reports should be reviewed by the Project Committee and approved by the Head of the PROSABAR.

4. Content of the annual report:

I. **Project description**. Summary of the project in 2 pages.
II. **Monitoring indicators**. Quarterly comparison of indicators--proposed vs. actual--discussion and proposed adjustments. Tables and accumulated graphs should be developed, comparing actual and planned performance.
III. **Institutional component**. Progress of each component indicating funds committed, disbursed, and results to date.
IV. **Next year planning**. Based on actual commitments from municipalities and communities, and the inventory of pre-investment, a forecast for the following year activities should be presented, including detailed budgets for institutional support to PROSABAR and UNASBAs.
V. **Critical activities**. All critical activities, events or decisions should be highlighted.
VI. **Recommendations**. A summary of main recommendations should be included, including actions required, and key decisions to be made.
VII. **Annexes**.

a) **Communities**. A list of communities included in the project, classified according to implementation cycle: community request, project approved, contract signed for construction, contract signed for software, construction underway, provisional transfer, final transfer, software completed.

b) **Training**. A list of persons trained at community, municipal, regional, and central level. Training for operators/administrators should be particularly highlighted. Information should be presented indicating training description, timing, and duration.
c) **Financial information**. Should include--at least--an update of financial information provided in the SAR. It should also data on the structure and amount of SIF's administrative costs and the fee charged by SIF for the provision of its services.
d) **Contracts**. Should include a list of contracts awarded indicating the name of contractor/consultants, the value in *bolivianos* and dollars, the date of signature, and the status of implementation.
e) **Project accounts**. Should include summary reconciled-statements of all project accounts.
f) **Credit covenants**. Should include an updated evaluation of compliance with legal covenants.
g) **Institutional Agreements**. Should include an evaluation of usefulness and enforceability of key institutional agreements, and requirements for further adjustments.
h) **Workshops**. A summary of main conclusions for each workshop, including main recommendations and actions that have been agreed.
i) **Monitoring indicators**. Should include a summary evaluation of expanded monitoring indicators and independent audits performed under M&E component financed by the UNDP.
j) **Project Review**. Should include a tentative agenda and planning for the project review to be held before year-end between government officials and IDA according to paragraph of the SAR.

Annex 16
Supervision
Project Review

Objective	To discuss modifications of the project design if necessary, based on the performance on project implementation.
Timing	After presentation of project annual report (November 30 of each year) but before the end of the year.
Duration	One week
Location	Bolivia
Participants	All members of Project Committee, the head of UNASBAs and advisers, representatives from selected municipalities and communities, selected representatives from NGOs and consultants, IDA, and possibly other donors.
Content	• Review of Project Annual Report • Investment plan for the following year • Changes in project design criteria • Main issues affecting effective implementation of the project • Plan for institutional strengthening of project entities and stakeholders • Monitoring indicators • Detailed analysis of project costs • Progress in sector strengthening • Recommendations to the Government and to IDA

Annex 16
Supervision Plan

Missions approximate dates (month/year)	Activity	Expected Skill Requirements	Staff Input (staff-weeks)
3/96	Supervision Mission	Procurement Engineering	2
7/96	Supervision Mission: Project Launch Workshop	Procurement Disbursement Engineering Social Scientist	8
12/96	Supervision Mission:	Procurement Engineering	4
7/97	Supervision Mission	Engineering/Procurement Social Scientist Economist	8
12/97	Second Workshop on project implementation	Social Scientist Engineering	4
1998	Two Supervision Missions: Review overall progress	Social Scientist Engineer/Procurement	8
1999	Three Supervision Missions: Review overall progress	Social Scientist Engineer/Procurement	6
2000	Two Supervision Missions: Including one to prepare ICR (Implementation Completion Report)	Social Scientist Engineering/Procurement	10

Annex 17
Disbursement Schedule

Bank Fiscal Year and Quarter Ending	Quarterly Disbursements US$ million	Cumulative Disbursements	
		US$ million	% of Total
FY 1996*			
March 31,1996	2.00	2.00	10%
June 30,1996	1.00	3.00	15%
FY 1997			
September 30, 1996	1.40	4.40	22%
December 31, 1996	1.50	5.90	30%
March 31, 1997	1.50	7.40	37%
June 30, 1997	1.60	9.00	45%
FY 1998			
September 30, 1997	1.75	10.75	54%
December 31, 1997	2.00	12.75	64%
March 31, 1998	1.75	14.50	73%
June 30, 1998	1.50	16.00	80%
FY 1999			
September 30, 1998	0.75	16.75	84%
December 31, 1998	0.75	17.50	88%
March 31, 1999	0.50	18.00	90%
June 30, 1999	0.40	18.40	92%
FY 2000			
September 30, 1999	0.40	18.80	94%
December 31, 1999	0.40	19.20	96%
March 31, 2000	0.45	19.65	98%
June 30, 2000	0.35	20.00	100%

Annex 18
Description of Monitoring Indicators

No.	Indicators	YEAR						Total
		1995	1996	1997	1998	1999	2000	
	Physical							
1	Number of beneficiaries from water projects	5,256	88,442	121,667	117,321	60,036	32,850	425,573
2	Number of beneficiaries from sanitation projects	3,901	68,162	97,246	97,127	51,419	29,074	346,929
3	Number of water projects transferred to municipalities	15	253	348	335	172	94	1,216
4	Number of latrines constructed	751	13,148	18,783	18,783	9,955	5,635	67,054
	Institutional							
5	Number of contracts signed for community training (UNASBA/PROSABAR)	8	21	27	27	18	18	119
6	Number of communities benefiting from training and hygiene education	15	253	348	335	172	94	1,216
7	Number of strengthened municipal governments	10	30	30	30	-	-	100
8	Number of community operators certified	30	505	695	670	343	188	2,432
9	Number of water projects submitted to SIF for appraisal	16	265	365	352	180	99	1,277
10	Number of water projects approved by SIF	15	253	348	335	172	94	1,216
11	Number of monitoring and impact studies and reports prepared	-	3	5	5	2	1	16
12	Number of workshops held to review project strategy and policies	1	1	1	1	1	1	6
	Financial							
13	Total infrastructure investment (US$ '000)	400	7,000	10,000	10,000	5,300	3,000	35,700
14	IDA Credit excluding PPF (US$ '000)	200	2,200	2,300	1,700	1,100	800	8,300
15	SIF costs as percentage of investment	14	12	10	8	8	7	
16	Average per capita cost of water project	50.0	52.0	54.0	56.0	58.0	60.0	
17	Average cost of latrine	115.0	115.0	115.0	115.0	115.0	115.0	
18	Average per capita cost of sewage facility	75.0	78.0	81.0	84.0	87.0	90.0	
19	Per capita cost of community development	16	10	7	5	5	7	

Annex 18
Description of Monitoring Indicators

	Physical
1	**Number of beneficiaries** from water systems is equal, in year t, to the number of beneficiaries from water systems built in year t.
2	**Number of beneficiaries from sanitation facilities** is equal, in year t, to the number of beneficiaries from the sanitation systems built in year t.
3	**Number of water projects transferred to municipalities** is equal, in year t, to the number of water projects constructed and registered in the municipalities' cadaster in year t.
4	**Number of latrines constructed** is equal, in year t, to the number of latrines constructed in year t.
	Institutional
5	**Number of contracts signed for community training (UNASBA/PROSABAR)** is equal, in year t, to the number of training contracts signed in year t.
6	**Number of communities benefiting from training and hygiene education** is equal, in year t, to the number of communities that have signed contracts for community training and hygiene education in year t.
7	**Number of strengthened municipal governments** is equal, in year t, to the sum of water committees formed within each municipal government in year t.
8	**Number of community operators certified**) is equal, in year t, to the total number of operators certified (passed exam and received certificate) in year t
9	**Number of water projects submitted to SIF for appraisal** is equal, in year t, to the number of water projects to be appraised by SIF in year t.
10	**Number of water projects approved by SIF** is equal, in year t, to the number of water projects approved by SIF in year t.
11	**Number of monitoring and impact studies and reports prepared** is equal, in year t, to the number of impact studies undertaken in year t.
12	**Number of workshops held to review project strategy and policies** is equal, in year t, to the number of project workshops to be held in year t.
	Financial
13	**Total infrastructure investment** is equal, in year t, to the total contribution to water and sanitation iinvestments in US$ by the IDA, OPEC Fund, and SIF/IDB, municipalities and communities in year t.
14	**IDA investment** (US$ '000), is equal, in year t, to the total amount actually disbursed from IDA within year t.
15	**SIF costs as percentage of investment** is equal, in year t, to the percentage of operational cost of SIF to direct investment in year t.
16	**Average per capita cost of water project** (Average US$ per capita), in year t, is equal to the total infrastructure costs (total funds) of water projects in year t divided by total number of beneficiaries from water systems (1) in year t.
17	**Average cost of latrine** (Average US$ per capita), in year t, is equal to total infrastructure costs (total funds) of on-site sanitation projects in year t divided by total number of beneficiaries from sanitation systems (2) in year t.
18	**Average per capita cost of sewage facility** (Average US$ per capita), in year t, is equal to the total infrastructure costs (total funds) of sewerage projects in year t divided by total number of beneficiaries from sewerage systems (1) in year t.
19	**Per capita cost of community development** in year t, is equal to investments for community development and municipal strengthening in year t divided by total number of beneficiaries (1) + (2) in year t.

Note: Unless otherwise indicated, all calculations are made by December 31 of the corresponding year.

Annex 18
PROSABAR: Expanded Monitoring Indicators

Evaluation Component	Indicators	Source of Information			
		PROSABAR MIS	UNASBAs MIS	SIF MIS	In-depth Studies
A. Physical Results	Water projects constructed per technology option			X	X (service choice)
	Sanitation projects constructed per technology option			X	X (service choice)
	Water project beneficiaries (communities and individuals)			X	
	Sanitation project beneficiaries (communities and individuals)			X	
	Beneficiaries of community development and hygiene education	X	x		
	Trained community operators	X	x		
	Certified community operators	X	x		X (capacity)
	Strengthened municipal governments	X	x		X (capacity)
B. Financial Results	Investment subprojects, per type of project			X	X (unit costs)
	Community development, per community and beneficiary	X	x		X (unit costs)
	Training and workshops, per event	X	x		
	Consultancies and studies, per contract	X	x		
	Total IDA expenditures, per category	X		X	
	Total Deptal govt/UNASBA contribution	X	X		
	Total municipal (and community) contribution			X	X (fin. policy)
	Total municipal contribution above grant cap			X	X (fin. policy)
C. Institutional efficiency	Subprojects prepared (preinvestment)		X		
	Subproject submitted to SIF for appraisal (% accepted)			X	X (time lag)
	Subproject approved and bid by SIF (% approval)			X	X (time lag)
	Subprojects with provisional transfer to municipality			X	
	Subprojects with final transfer to municipality			X	X (time lag)
	Community development contracts bid	X	x		
	Community development contracts completed	X	x		
Costs	PROSABAR management and operating costs	X	x		X
	UNASBA TA and management costs	x	X		
	SIF administrative costs			X	X (unit costs)
	SIF fee charged on investment subprojects			X	X (unit costs)
Note: all of the above indicators will be included in the regular project reports (quarterly and annual progress reports)					

Annex 18
PROSABAR: Expanded Monitoring Indicators

	Indicators/information required	Baseline study	Process study	Impact study
D. Project policies and strategies	***Eligibility and prioritization criteria:***			
	* are communities with the highest demand being served?		X	
	* are criteria applied uniformly and equitably?		X	
	* is demand-responsive approach leading to greater sustainability?			X
	Financial policy:			
	* are community and municipal willingness to pay being captured fully?		X	
	* are some communities not able to participate because of affordability?		X	
	* what specific contributions are communities making to the project?		X	
	* is cost recovery policy for system replacement known to all?		X	
	Technical options and service levels:			
	* are these appropriate to respond to demand and management capacity?		X	X
	* which service level is most selected and why?		X	
	* what are the most efficient techniques for negotiating with communities?		X	X
	Management at the lowest appropriate level:			
	* is community participating in all steps of the project?		X	X
	* are beneficiaries aware of their long term responsibility for sustainability?			X
	* are institutional backstopping mechanisms being put in place to support community and municipal management?			X
	* is intermediation and community development process cost-effective?		X	X
E. Project impacts and benefits	***Investment sustainability: administration, operation and maintenance***			
	* percentage of tariff collected and/or WTP for repairs			X
	* financial solvency of water committee			X
	* availability and access to tools and spare parts			X
	* condition of infrastructure, frequency of preventive maintenance, repairs...			X
	* availability of trained personnel in community and local private sector			X
	* municipal follow-up and support to communities			X
	* cost recovery for facility replacement			X
	* environmental impacts			X
	Changes in hygiene practices, time savings and health benefits:			
	* sources and uses of water: amount consumed, time spent carrying	X		X
	* water quality before and after project	X		X
	* excreta disposal practices before and after project	X		X
	* personal, household and community hygiene	X		X
	* cases of diarrhea before and after project	X		X
	* cases of parasitosis before and after project	X		X
	* skin problems (scabies) before and after project	X		X

Annex 19
Documents in Project Files

1. PNUD/Banco Mundial
Proyecto de Saneamiento Basico "PROSABAR"
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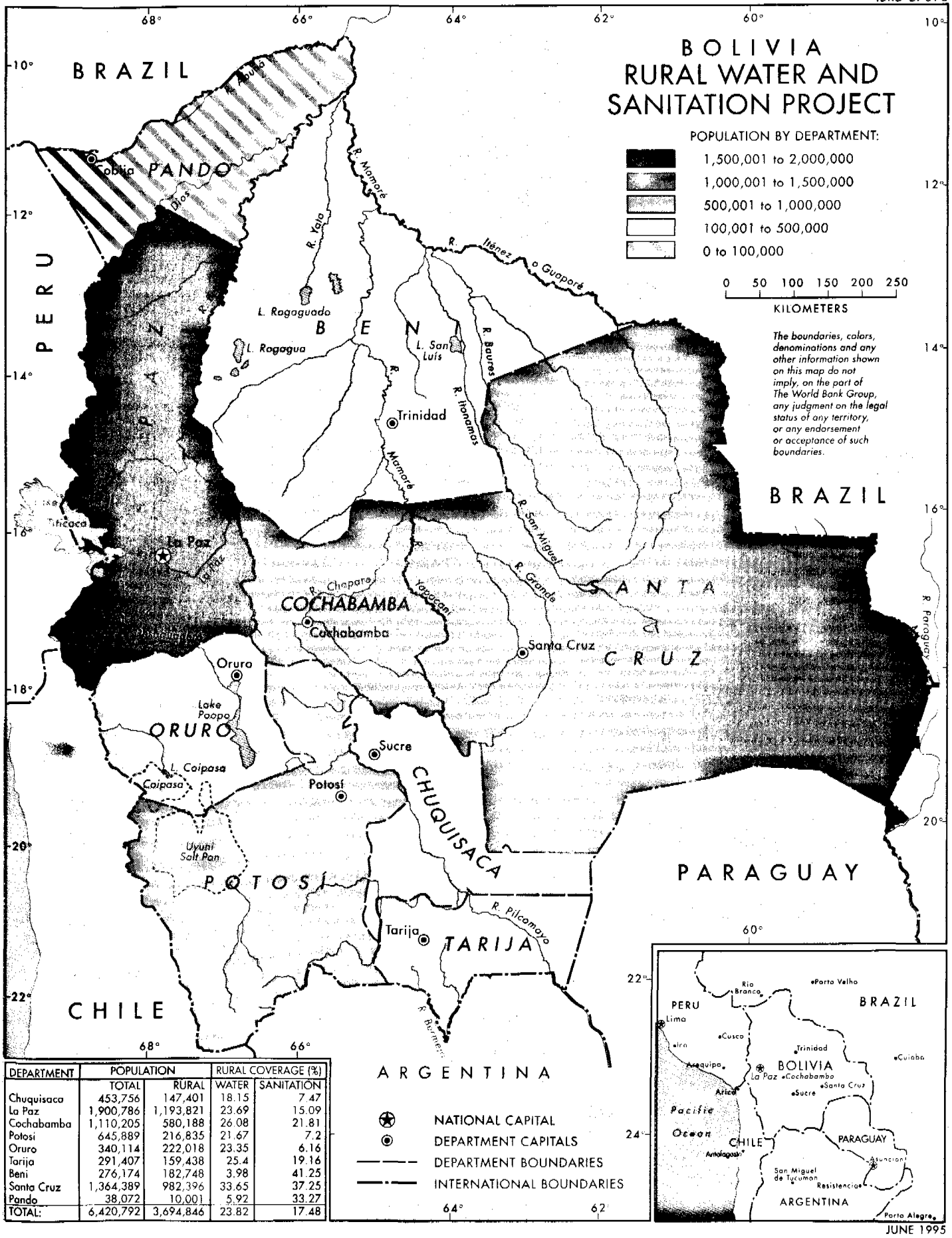

DEPARTMENT	POPULATION		RURAL COVERAGE (%)	
	TOTAL	RURAL	WATER	SANITATION
Chuquisaca	453,756	147,401	18.15	7.47
La Paz	1,900,786	1,193,821	23.69	15.09
Cochabamba	1,110,205	580,188	26.08	21.81
Potosi	645,889	216,835	21.67	7.2
Oruro	340,114	222,018	23.35	6.16
Tarija	291,407	159,438	25.4	19.16
Beni	276,174	182,748	3.98	41.25
Santa Cruz	1,364,389	982,396	33.65	37.25
Pando	38,072	10,001	5.92	33.27
TOTAL:	6,420,792	3,694,846	23.82	17.48

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