Economic Analysis of Social Investment Fund Projects:

Case Studies and Minimum Requirements Proposal

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Currency And Equivalent Units

Bolivia:
US$1.00 = Bs5.60

Panama
US$1.00 = 1.00 Balboa (B/.)

Argentina

US$1.00 = A$1.00

Fiscal Year

January 1 – December 31

Glossary of Acronyms

EIA	Environmental Impact Assessment
ERR	Economic Rate of Return
FDC	Bolivia—Fondo de Desarrollo Campesino
FES	Panama—Fondo de Emergencia Social
FIS	Bolivia—Fondo de Inversión Social
FSE	Bolivia—Fondo Social de Emergencia
FOPAR	Argentina—Fondo Participativo de Inversión Social
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HD	Human Development
IRR	Internal Rate of Return
IDB	Inter-American Development Bank
ISO	International Standards Organization
Kg	Kilogram
Km	Kilometer
M	Meter
M^2	Square meter
M^3	Cubic meter

NGO	Non-Governmental Organization
NPV	Net Present Value
PAD	World Bank Project Appraisal Document
PTI	Program of Targeted Interventions
SIF	Social Investment Fund
SAR	World Bank Staff Appraisal Report

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I. Introduction

A. Background

The first phase of this study was carried out by one of the consultants (Cecilia Pérez de Castillo) during the first two weeks of April 1998. The main objective of the first phase was to advance the World Bank's thinking on the economic analysis carried out by Social Investment Funds (SIFs) as part of their ex-ante project assessment process by examining sector economic analysis methodologies, reviewing SIF methodologies, SIF ex-post project evaluations and economic analysis carried out by other Bank projects which use delivery mechanisms similar to SIF mechanisms. The first phase of the study recommended an in-depth review of economic analysis methodologies in selected SIFs.

B. Objectives and Scope of the Study

The main objective of this second phase is to propose minimum baseline requirements in terms of economic analysis of Social Investment Fund (SIF) subprojects that should be followed by SIFs financed by the Bank. For this purpose, four case studies were carried out in Bolivia (FIS and FDC), Argentina (FOPAR) and Panamá (FES). An analysis of different SIF methodologies and "best practice" economic analysis mechanisms will allow the World Bank to develop a simple methodology for the economic analysis of projects. The work was carried out in four steps:

(a) Revision of financial and economic analysis systems and methodologies utilized by SIFs. This step included a validation of the different processes, an assessment of the systems' strengths and weaknesses and problems encountered during the implementation of the processes;

(b) Analysis of results of processes. This step included an analysis of variation in costs through the project's different stages (appraisal, contracting, implementation and conclusion). The purpose of this analysis was to assess the efficiency of the financial appraisal system;

(c) Major Findings. After having concluded steps (a) and (b), a comparison of financial and economic analysis systems utilized by the SIFs was carried out; and

(d) Design of a Standard Economic Analysis Methodology for SIF projects. Based on major findings and on the consultants experience, final recommendations were made.

C. Missions

The two consultants, Cecilia Pérez de Castillo and Raúl Lema, spent a total of 8 days between June 1st and June and June 10, 1998 in La Paz, Bolivia studying economic evaluation methodologies at the Fondo de Inversión Social (FIS) and at the Fondo de Desarrollo Campesino (FDC). The Fondo de Emergencia Social (FES) in Panama was visited by the consultants between June 15 and June 19, 1998. Finally, the Fondo Participativo de Inversión Social (Argentina) was studied between September 7 and September 11, 1998.

II. Bolivia ¾ Fondo de Inversión Social

A. Description

The Bolivian FIS currently finances only social infrastructure (education, health and water & sanitation) and productive training projects.[1] According to FIS evaluators, cost benefit and cost effectiveness analysis is not part of FIS's comprehensive evaluation process because: (i) it is difficult to quantify benefits in social infrastructure and productive training projects; and (ii) no alternatives are considered to reach the project's expected output. On that account, project impact is based on a comprehensive analysis which includes unit costs, institutional, social and environmental evaluations and operation and maintenance cost calculation (which is currently in the process of being turned into a municipal commitment).

Beginning in 1995, only projects submitted to FIS by municipalities are eligible for financing. Projects are identified through the "participative planning process" set forth in the Popular Participation Law by which needs are identified and prioritized by communities and included in the municipality's annual operations plan and budget. Projects chosen by communities are expected to have a greater impact on poverty reduction and to be sustainable due to a larger sense of ownership bestowed on the community by the whole process. If the project agrees with FIS's intervention criteria (i.e. sector—education, health and water & sanitation—guidelines, targeting, resource allocation by geographical area, program and subprogram) and complies with the guidelines set forth in FIS's Project Presentation Manual, the project's evaluation process is initiated.

B. Ex-Ante Project Evaluation

First Phase

During the first phase of the evaluation process, financing requests, profiles and projects—selected after a negotiation process with municipalities—are assigned to FIS evaluators who are now stationed in FIS's nine decentralized offices. Suggestions for

[1] A small economic infrastructure pilot project is currently being implemented.

project design are made to institutions that only submitted requests and profiles. Projects are then screened to verify compliance with FIS's Project Presentation Manual. A field visit to the project site is compulsory and includes the following steps:

(a) Meeting with Municipal Officers. During this meeting, the following forms are filled out: (i) Financing Request Form; (ii) Cofinancing Form (in which the Municipality and the community assign counterpart resources to the project); (iii) Cofinancing Disbursement Schedule; and (iv) Land Title Certificate or a document that states that legal steps are being taken to obtain a land title, when no titling exists;

(b) Institutional Assessment of Stakeholders (municipality and organizations in charge of project design, execution, implementation and operation and maintenance). For this purpose, the Institutional Form—which looks at experience, stability and organizational level—is filled out. At this point, commitments related to operation and maintenance of the project, for example, are made;

(c) Technical and Technical-Methodological Form. A Technical or a Technical-Methodological Form (depending on the program) is filled out by the evaluator. For example, the form on formal education requires information on: (i) the project's geographical location as well as its location within the education system (district, nucleus, etc.); (ii) the school's enrollment during the past 5 years (number of students, grade levels, number of teachers, etc.); (iii) physical environment and existing infrastructure; (iv) availability of local construction materials; and (v) local labor. Finally, the project's size is verified based on sectoral norms (sq. meters per student, number of bathrooms, number of desks, etc.) included in FIS's Project Presentation Manual. Existing cut-off points were negotiated with line ministries. Hence, they are not based on FIS's experience;

(d) Environmental Impact Assessment. The Environmental Form is the same for all programs. It contains information on: (i) the degree of changes on the environment brought about by the project; (ii) production of effluents and contaminants; (iii) utilization of natural resources; (iv) change in habits and activities of target population brought about by project: and (v) operation and maintenance capacity of executing organization. If the project's environmental impact is high, a document is signed by which the municipality declares that it will implement mitigation measures recommended by FIS.

(e) Social Assessment. The main objective of the social assessment is to determine—through a series of meetings—whether community organizations (Water Committees, Health Committees, School Boards, etc.) have the capacity to execute and operate the project and to establish the degree of participation of these organizations in the development, execution and operation of the project. To this end, a Social Form is filled out. The form requires information on: (i) the community (number of families, target population, migration pattern, etc.); (ii) main activities, income, size of property, etc.; (iii) services (water, sewage, electricity, health, transport,

etc.); (iv) transportation costs; (v) description of situation "without project"; (vi) communal and other organizations; and (vii) proposed organization to sustain project. The meetings include conversations with the community on project cofinancing and sustainability.

(f) Technical Assistance to Beneficiary and Executing Institution. If necessary, FIS makes recommendations on changes to project and/or on the use of FIS's prototypes; and

(g) Approval or Rejection of Project.

Second Phase

The second phase takes place at the departmental office where the evaluator verifies whether field visit recommendations were carried out and decides on one of three outcomes;

(a) Project is ready to be processed;
(b) Project requires a second field visit; and
(c) Project can be amended without field visit.

Projects which fall into a) and c) are assessed by the environmental evaluator who fills out the "Environmental Assessment Statement" or the "Project Dispensation Certificate." Then the project is introduced into FIS's computerized evaluation system which contains an extensive list of modules, activities (i.e. foundations, beams, walls, etc.) and construction items corresponding to FIS's different programs. The evaluator analyzes the project's plans and chooses FIS prototypes, modules and activities corresponding to the project in question, adds activities when necessary and inputs prices which include transportation costs. Prices inputted are extracted from the unit cost data base. The project is also compared to sector norms and standards. The project's financing structure is established (FIS resources, municipal and community co-financing) by component.

Finally, a social tariff and a market tariff are calculated to see whether the project is sustainable. Total administrative, operating and maintenance costs are calculated and divided by the number of beneficiaries to estimate the market tariff. A unit cost figure is obtained. A 5-year time line is taken into consideration. Costs are expected to increase 15% per year. The social price is calculated by assigning a maximum of 7% of a family's income to cover operation and maintenance costs. If the social tariff is equal or greater than the market tariff, the project is sustainable. If the social tariff is lower than the market tariff, operation and maintenance costs are analyzed and alternative sources of financing are studied. To convert this theoretical exercise into a commitment, FIS is in the process of signing an agreement with municipalities which must budget operation and maintenance expenses in their annual operations plan for schools, health centers and water and sanitation projects. FIS is monitoring budget execution. The following table presents the methodology utilized by FIS to calculate annual operating and maintenance expenses:

Table 1: FIS—Operation and Maintenance Expenses

Project Type	Life Span	O & M Expenses (% of total investment)
Education and Health Infrastructure	35 years	2.86%
Water & Sanitation Infrastructure	20 years	5.00%
School Equipment	5 years	20.00%

Source: FIS—Operación y Mantenimiento 1998.

All projects are reviewed by the Technical Committee at the departmental level. Projects under $50,000 go through a "preliminary approval process" at that same level. All projects receive a final approval grade from FIS's Board of Directors. Projects under US$50,000 are approved without a detailed revision by the Board of Directors, while projects over $50,000 undergo a detailed revision by the Board of Directors.

C. Cost Database

General Considerations

The main objective of this section is to analyze FIS's cost database to determine how it is structured, operated, updated, maintained and applied in the ex-ante evaluation process of FIS. The cost database is used to determine the reference cost of the projects and, as such, is the main financial evaluation instrument of FIS projects and one of the most important project approval tools. This reference cost is utilized to program activities, set local counterpart financing and develop evaluation indicators. Thus, it has to be effective and reliable. The cost database is centralized and maintained by one person with costs for materials priced for the nine department capitals.

Structure

The cost database is composed of items and activities and is divided into three databases that are managed in an electronic worksheet. The three databases are: (i) items; (ii) activities; and (iii) material performance.

1. Items. An item is a basic material like cement, nails and water pipes. The items database contains the item code, description, unit and price.

Example: Item Code: I01CB01
Description: Portland Cement
Unit: Kilogram

Each item is priced at each of the nine department capitals. Prices are collected by FIS evaluation officers (permanent SIF Personnel) who are based in each department or by

temporary personnel hired specifically for this task. The items are also priced directly from manufacturers that have regional offices in all nine departments. All items are priced in Bolivianos and converted to US dollars at the current rate of exchange. This reduces the need to update prices constantly. Items are divided into two major groups: (i) infrastructure; and (ii) equipment and supplies.

Infrastructure Items. This group makes up the largest part of the cost database and has 2,500 items that are divided into three categories: (i) materials; (ii) labor; and (iii) machinery. **Materials** consist of basic construction materials. **Labor** has two groups or families: skilled labor and unskilled labor. Pricing of these items is based on the market price. **Machinery** contains 20 construction equipment items such as mixers, compacting equipment and concrete vibrators. The pricing of these items takes into consideration fixed costs (depreciation, and parts), variable costs (lubricants and gas) and operation costs. Since FIS works with small construction companies, equipment rental is also considered.

Item codes are divided into 5 fields: (i) category; (ii) family; (iii) group; (iv) sub-group; and (v) item. The codification allows for future growth in any of the five levels and has been implemented since 1996. The following table shows an example of an item code:

Table 2—FIS: Example of Item Code

Code: I02BA01 Concrete Block (10x20x40)				
Category	**Family**	**Group**	**Sub-Group**	**Item**
I	02	B	A	01
Materials	Bricks, Blocks and Adobes	Blocks and Adobes	Concrete Blocks	Concrete Blocks 10x20x40

Equipment and Supply Items. These items are used for health, education and productive training projects. They are divided into four categories that are structured under the Bolivian Expenditure Groups Norm or "Partidas de Gasto": (i) supplies; (ii) equipment; (iii) personal services; and (iv) non-personal services. The following table shows a breakdown of expenditure groups according to the type of cost:

Table 3—FIS: Breakdown of Expenditure Groups

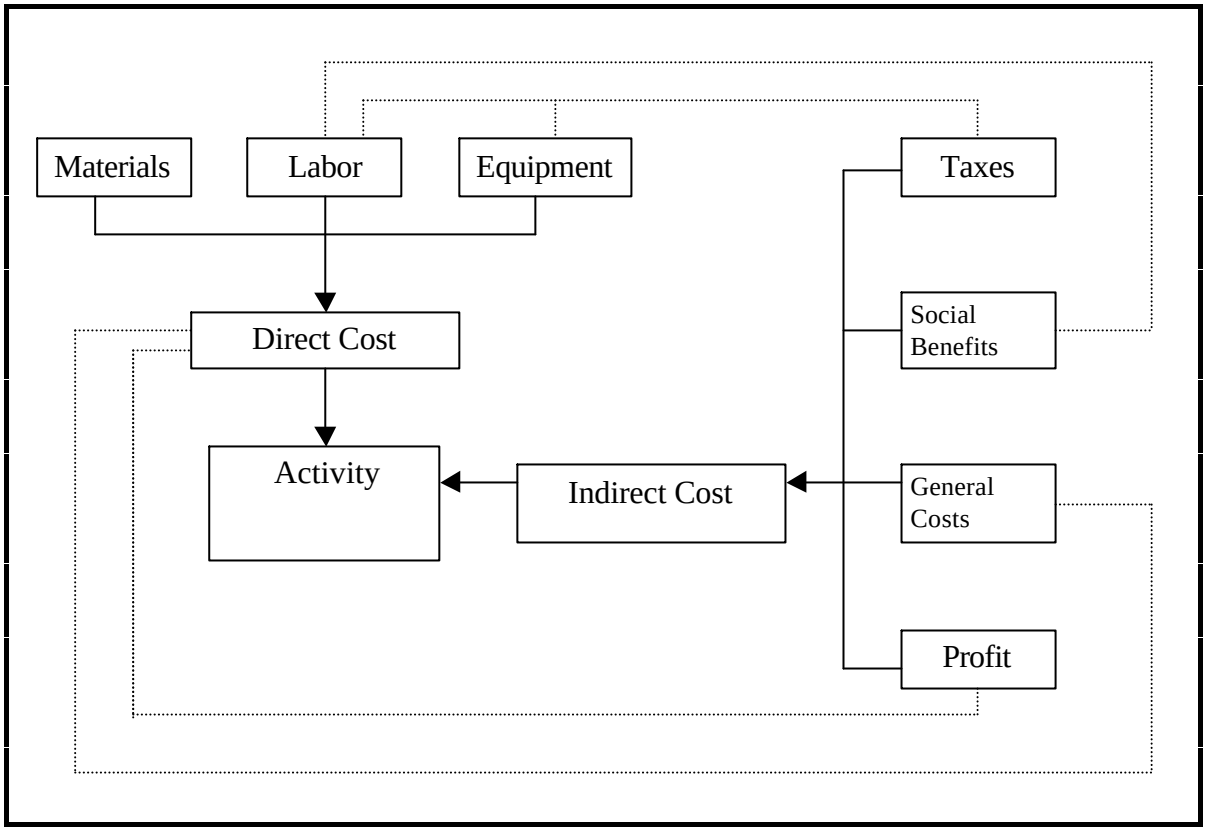
Fixed Costs	**Variable Costs**
Supplies: small medical equipment such as surgical and dental equipment	Personal Services: items relating to the hiring of permanent personnel
Equipment: metal and wood furniture and large medical equipment such as x-ray machines	Non-Personal Services: telephone bills, electric bills, etc.

2. Activities. The activities database contains the activity code, description and unit.

Example: Activity Code: 10AD010
Description: Hollow Brick Wall. 6 Holes. Thickness: 0.24m. (24x18x12).
Unit: M^2

Activities are made up of direct costs and indirect costs. Direct costs are composed of material costs, labor costs, and equipment costs. Indirect costs include general costs, taxes, social benefits and profit. These costs affect direct costs at different levels. The following drawing shows how activities are structured:

Drawing 1—FIS: Structure of Activities



Activities are classified into three major groups: (i) master activities, that represent 90% of the activities in the cost database; (ii) departmental activities, which represent the remaining 10%; and (iii) in addition to the above, a small number of activities may also be created in the project implementation stage through a change order. Master activities are used in all types of project at a national level and are only modified through an internal process. Modifications to master activities can be requested or suggested by operative levels based on implementation experience. The only person who is authorized to modify a master activity is the person responsible for the database at the FIS central office. Department and change order activities are created for specific projects at each

departmental office and can be turned into a master activity when justified. These activities are related to local construction techniques and their inclusion in the master activity list is not usually warranted.

Codification of activities differs according to group (master, departmental and resulting from a change order). Master activities are in category 01 to 91, departmental activities in category 93 and activities resulting from a change order in category 96. Departmental activities and activities resulting from change orders are revised every two months to verify that duplicate activities are not being created either by mistake or because the evaluation and supervision officers did not follow procedures.

Activity codification is divided in 4 fields: (i) the first one defines the category; (ii) the second one, the group; (iii) the third one, the sub-group; and (iv) the fourth one, the activity code. The following table shows an example of activity codification:

Table 4—FIS: Example of Activity Code

Code: 10AD010—Hollow Brick Wall. 6 Holes. Thickness: 0.24m. (24x18x12)			
Category	**Group**	**Sub-Group**	**Activity**
10	A	D	010
Walls	Walls	Hollow Brick Walls	Hollow Brick Wall. 6 Holes. Thickness: 0.24m (24x18x12).

3. Material Performances. Performances represent the amount of each material, number of hours of labor and hours of machinery that go into making a unit of activity. Material performances are applied to an activity in combination with the priced items in order to get the unit price of that activity. The material performances database contains the activity code, the codes of the items used in the activity and the performance of each item.

Example: Activity Code: 10AD010

Item Code: I01CA01
Item Performance: 16.00

Item Code: I01EA02
Item Performance: 0.06

Item Code: I02AC01
Item Performance: 42.00

Item Code: M00AA02
Item Performance: 2.60

Item Code: M00BA01
Item Performance: 2.60

The following table shows an example of material performances for a specific activity:

Table 5—FIS: Example of Material Performances

Activity: 10AD010. Hollow Brick Wall. 6 Holes. Thickness: 0.24m (24x18x12) m2					
Code	**Description**	**Unit**	**Unit Price**	**Performance**	**Total Price**
I01CA01	Cement	Kg	0.12	16.00	1.92
I01EA02	Sand	M^3	14.78	0.06	0.88
I02AC01	Brick	Piece	0.13	42.00	5.46
M00AA02	Brick Layer	Hour	1.36	2.60	3.53
M 00BA01	Helper	Hour	0.90	2.60	2.34
				Total direct cost	14.13

FIS has arrived at these material performances through years of experience that date back to the Social Emergency Fund that was established in 1986. All these performances are based on technical specifications for each specific activity.

Technical specifications are one of the most important inputs for reliable cost systems and are based on national and international norms. Most activities in the cost data system have a technical specification to back them up. Specifications are used not only to determine how an activity should be executed but also what materials, equipment and tools should be used, how the activity is measured and how it will be paid for. Therefore, technical specifications are used as part of the biding instructions to the contractor and become a quality control tool during the execution of the project. Specifications are also usually part of the contract.

FIS has two types of technical specifications: (i) general; and (ii) special. General specifications are used for all projects while special specifications are developed for specific projects. General specifications are divided into three sets of technical specifications: (a) wood and metal furniture for health and education projects; (b) dentistry, laboratory and surgical equipment; and (c) water, sewer and construction. Wood and metal furniture specifications are based on a set of standard designs approved by the line ministries. Each standard design document includes the graphic design of each piece, dimensions, building instructions, material to be used and expected finishes. The main objective of these instructions is to ensure product quality. Dentistry, laboratory and surgical equipment specifications are based on international ISO and DIN norms. The technical specifications document contains a reference image, a description and a norm for each piece of equipment. Finally, water, sewer and construction specifications are based on local building techniques, national and international building norms. The technical specifications document contains: (i) a definition of each activity; (ii) a list of materials, equipment and tools that should be used; (iii) dimensions, measurements, tolerances and execution procedures; and (iv) instructions on activity measurement and activity payment. All three types of technical specifications are documented and made available to the contractors. FIS is currently developing a CD-ROM for medical equipment.

Updating Procedures

Quality of information and accurateness of evaluation results is directly related to how often the cost database is updated. FIS has no set procedures for the updating or re-pricing of the items. The last time construction item costs were revised was in 1996. Equipment, on the other hand, was last revised in 1993. According to the cost database's administrator, since all the items are priced in U.S. dollars, there is no need for frequent updating. Nevertheless, FIS is currently pricing all existing items. There is a proposal for updating prices but it has not been approved nor is it part of a procedures manual. Price updating would be carried out according to the following criteria:

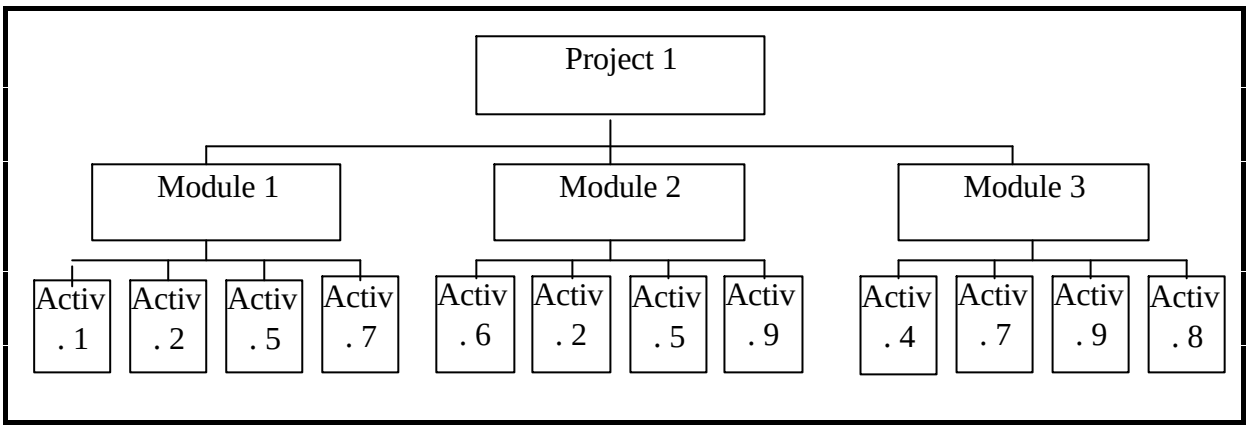
(a) Selected items would be updated every 5 years, 200 selected items every 6 months and 12 or 13 selected items every month;
(b) items to be updated would be chosen according to their importance, influence in activity and project cost and utilization; and
(c) updating would be done out of schedule only if something external factor affects the market, for example, an increase in gasoline costs or an increase in raw materials.

Application of the Database in the Evaluation Process

All the information from the three databases is merged into the management information system and the information is sent to the departmental offices for their application in the evaluation process. The departmental offices also have a set of documents containing the technical specifications, an items dictionary containing all the current prices, an activities dictionary with all of the performances and a manual for the use of the evaluation application in the system.

In the evaluation process, the project is divided into modules that contain the necessary activities for that module. There is no FIS norm that stipulates which modules must be used in the different project types, or what activities must be considered in each module. Therefore, there is no control over the modules that are used, or over which activities are considered in each module. Evaluation officers create them according to their needs and experience. The following drawing shows how projects are structured:

Drawing 2 ¾ FIS: Structure of Projects



The cost database system—which should be an integral part of the evaluation system—is applied only as a referral since the evaluation officers change most of the item prices to include local transportation costs. Material performances and indirect cost cannot be modified. This change in item cost is applied to the most significant items in terms of volume or to those items that have a large impact in the project cost (cement, water pipes, aggregates, bricks, etc.). The reference item prices in the evaluation system are only used in new projects. Since most of the projects used are typical projects or typical modules, a "copy-paste" system is applied. Whenever "copy-paste" is used, all reference prices correspond to those of the copied project and not to the updated database. Hence, all item prices have to be modified for the new project based on the printed price list. Transport costs are added to the printed list. This procedure saves time. Nevertheless, the automated price reference system is underutilized and errors can be made when copying prices from the printed price list.

Information Systems

Currently, FIS is migrating its different databases into a new integrated Informix platform management information system. This system is connected by Internet to all the departmental offices once a day for information migration.

III. Bolivia ¾ Fondo de Desarrollo Campesino (FDC)

A. Description [2]

FDC was established in 1989 by the same government that created the Social Emergency Fund in 1986. FDC's mission, according to its statutes, is to decrease rural poverty by assisting socio-economic development in rural areas. Its main objectives are to strengthen the productive capacity of rural communities and to transfer resources to capitalize rural areas through co-financing of productive and profitable investments. To fulfill these objectives, FDC: (i) obtains and administers financial resources from several multilateral and bilateral sources; (ii) co-finances, supervises and controls eligible programs and projects; and (iii) strengthens institutional, social and economic agents involved in rural productive development. FDS has two major programs: (a) Small Productive Infrastructure (irrigation and drainage projects, local roads, bridges, markets, collection centers, artisan workshops, etc.); and (b) Support to Productive Activities (technical assistance, training, agro-forestry, watershed management, etc.).

B. Ex-Ante Project Evaluation

FDC's evaluation methodologies were, until 1997, subjective, descriptive and mechanical. Information was collected in an unstructured and unsystematic manner. Technical (prototypes, technical specifications, activities, etc.), financial (unit reference costs and modules), socio-economic and environmental indicators were not developed to permit an objective, measurable and comprehensive project evaluation. Community institutions and organizations were not evaluated in terms of their strengths and weaknesses to participate in the project's different phases. The evaluation of the executing agency was carried out in a mechanical, simplistic manner utilizing legal and administrative criteria only. No firm, binding commitments were required from communities and other stakeholders in terms of project operation and maintenance. Evaluation forms consisted of an outline which was filled out in a descriptive manner.

Based on recommendations arising from evaluations carried out by bilateral and multilateral institutions which finance FDC's investments, FDC is reviewing its procedures, processes and methodologies. Thus, several manuals and forms are being developed, reviewed and implemented. According to FDC's new Operating Manual, [3] in order to include projects in its investment portfolio, FDC must follow procedures similar to those followed by FIS after the Popular Participation Law was enacted in 1994. Thus, only projects submitted to FDC by municipalities are eligible for financing. Projects are identified through the "participative planning process" set forth in the Popular Participation Law by which needs are identified and prioritized by communities and included in the

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[2] This section is based on: (i) conversations held with FDC officers; (ii) FDC documents; and (iii) Organización de las Naciones Unidas para la Agricultura y la Alimentación, Centro de Inversiones, Programa de Cooperación FAO/Banco Mundial. Bolivia. Proyecto de Desarrollo de Comunidades Rurales (PDCR). Evaluación Económica y Financiera de Proyectos de Inversión Rural del Fondo de Desarrollo Campesino. Informe No. 98/002 CP-BOL. 7 de enero de 1998.

[3] FDC. Gerencia Técnica. Programa de Inversiones de Desarrrollo Rural (PIDER). Reglamento Operativo. Mayo 1998.

municipality's annual operations plan and budget ("first phase of evaluation"). The project is designed according to FDC's Project Formulation and Presentation Manual[4] and an Executive Summary of the project is submitted to the pertinent FDC Departmental Office. The project then goes through the following steps which are part of the "second phase of evaluation" pertaining to eligibility criteria:[5] (i) maximum execution period; (ii) maximum project costs; (iii) characteristics of promoting agency; (iv) financial and non-financial counterpart; and (v) compliance with technical criteria of each component and subcomponent. If the project agrees with the above eligibility criteria, the "third phase" of the project's evaluation process is initiated. The third phase looks at sustainability criteria such as technical and economic feasibility, environmental impact evaluation, gender evaluation and project operation and maintenance. A Project Evaluation Form is filled out by the evaluator.[6] The project is then approved, rejected or postponed by the Departmental Committee in charge of project approval.

In 1995, FDC developed a financial and economic evaluation computer model with the cooperation of the German technical cooperation agency Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). The main objective of FDC's model is to evaluate a large number of small projects with similar characteristics in a cost efficient manner in terms of resources and time. For this purpose, the model makes generalizations with respect to: (i) productive aspects of small agricultural properties; and (ii) project benefits and costs which have an impact on the small farmer's socio-economic situation. A "Small Farm" prototype was developed for three geographical regions and "Project Prototypes" were developed for eleven types of projects financed by FDC. The "Small Farm" prototype shows the situation "without" and "with" project. The following three variables are taken into consideration to describe the farm's economic and productive capacity: (i) size and utilization of plot of land; (ii) productive structure (five principal crops); and (iii) traditional production methods in a situation without irrigation, machinery, inputs and technical assistance. For the different "Project Prototypes" two sources of benefits are identified: (i) improved conditions outside the farm brought about by the project (improved price margins, better access to markets, decreased transportation costs, decreased crop losses, etc. due to better roads and bridges, for example); and (ii) improved productive and economic conditions within the farm brought about by the project (agro-forestry, watershed projects, etc.). When the evaluator analyzes the project by means of the model, he introduces the following data, which are specific to the project: (i) name and location of project; (ii) dimension of infrastructure (for example, length of road, number of hectares to be irrigated, etc.); (iii) number of beneficiaries; (iv) monetary and other types of cofinancing resources; and (v) estimated duration of the project execution phase.

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4 FDC. Gerencia Técnica. Guía de Presentación y Formulación de Proyectos. Programa de Inversiones para el Desarrollo Rural (PIDER). Versión Preliminar. Mayo 1998.

5 FDC's projects must comply with 10 general eligibility criteria related to: (i) target group; (ii) gender impact; (iii) priority geographical areas; (iv) self-management; (v) technical feasibility; (vi) economic feasibility; (vii) sustainability and multiplication factors; (viii) environmental impact; (ix) executing agency; and (x) execution period.

6 A series of forms (16) corresponding to the second evaluation phase are filled out by the evaluator. These forms correspond to phases 110 to 199 of the project cycle. They range from project registration (Form 110-1) to project rejection (Form 160-1).

Even though the economic evaluation model is a step in the right direction, its generalizations in terms of: (i) production patterns in homogeneous agro-ecological and socio-economic areas; and (ii) benefits and costs of prototype projects, are not appropriate when evaluating individual projects. For the model to be reliable, it should permit the input of specific data on the project, such as size of the property, crop patterns, agricultural productivity "without" and "with" project, production costs, product prices, transport costs, etc. When simplified models, such as this one, are applied in a mechanical manner, the evaluator runs the risk of taking for granted underestimated risks and overestimated project outputs, for example.

C. Cost Database

General Considerations

The main objective of this section is to analyze FDC's cost database to determine how it is structured, operated, updated, maintained and applied in the ex-ante evaluation process. FDC has a temporary cost database which has been adapted for the Fund. This database has costs for materials priced in the capital city and has been distributed to the nine department offices. The cost database is used to determine the reference cost of the projects and, as such, is the main financial evaluation instrument of FDC projects and one of the most important project approval tools. Thus, it has to be effective and reliable. The cost database is centralized and maintained by one person only, who also has other functions and responsibilities. Currently FDC is developing a new management information system that will have a cost system integrated into it.

Structure

The cost database is composed of items and activities managed in a program purchased off-the-counter: PRESCOM. The structure of the items is based on the program adapted for the FDC. The projects are processed in the cost system as a whole, so there is no division by modules.

1. Items. An item is a basic material like cement, nails and water pipes. Each item was priced at the central office by the person responsible for the database and is updated at each of the nine department capitals by the evaluation officers (permanent FDC personnel). All items are priced in Bolivianos. The system maintains all prices in Bolivianos and generates reports in US$ dollars when the current rate of exchange is introduced. Since prices are in Bolivianos, item prices have to updated constantly in order to keep up with devaluation.

The cost database has around 1,000 items that are used for all basic infrastructure projects. Items are divided into three categories: (i) materials; (ii) labor; and (iii) equipment and machinery. **Materials** consist of basic construction materials. **Labor** has been divided into three geographic regions: highlands (altiplano), valleys, and lowlands. Each of these regions includes five different types of labor, ranging from skilled to unskilled. Pricing of these items is based on the market price. **Equipment and Machinery** contains one item for basic construction equipment and machinery items such

as mixers, compacting equipment and heavy equipment used for road construction. The price for basic equipment is based on the labor costs and represents 5% of these costs. In direct administration projects[7] this percentage is used to purchase some items like shovels. The pricing of machinery items takes into consideration fixed costs (depreciation, and parts), variable costs (lubricants and gas) and operation costs.

The purchased program sets the codification of items. This system is closed so codification cannot be broken down into sub-codes. All items are inputted into one of the three categories in order of appearance. The only information inputted corresponds to the description and price of each item.

2. Activities. Activities are structured basically in the same way as in FIS. Activities are made up of direct costs and indirect costs. Direct costs are composed of material costs, labor costs, and equipment costs. Indirect costs include general costs, taxes, social benefits and profit. These costs affect direct costs at different levels. FDC has three different modalities of intervention and the application of indirect costs varies according to the modality chosen for implementation:

(a) In projects executed by construction companies (local biding) all indirect costs are applied;
(b) For projects executed under "delegated administration" (usually through NGOs), profit is left out; and
(c) for projects executed under "direct administration" there is no profit or transaction taxes and general costs are increased from 12% to 15%.

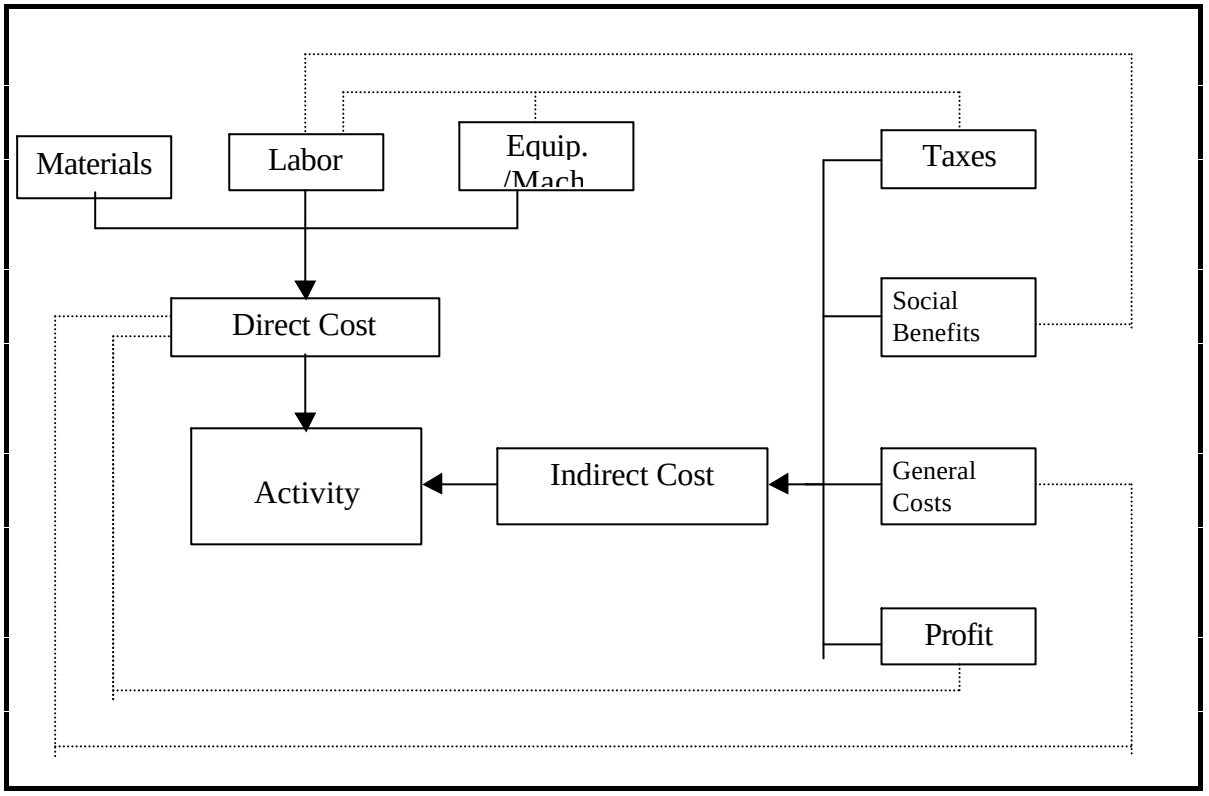
The information contained for each activity is the following:

Code/Description/Unit/Price

The following drawing shows how activities are structured:

[7] Projects are executed by the same organization which submitted the project.

Drawing 3—FDC: Structure of Activities



3. Material Performances. Performances correspond to the amount of each material, number of hours of labor and hours of machinery that go into making a unit of activity. Material performances are applied to an activity in combination with the priced items in order to get the unit price of that activity. FDC's performances are registered in the cost system but this system allows evaluation officers to modify them for every project. Material performances for constructions and irrigation where developed based on the evaluations officers' experience and existing reference books. For road projects, the data was obtained from the National Roads Service.

FDC doesn't have a set of technical specifications. The Fund requires the consultants that formulate the projects to present specifications as part of the project. Whenever there is a need for complementary specifications, these are obtained from similar projects previously submitted to FDC.

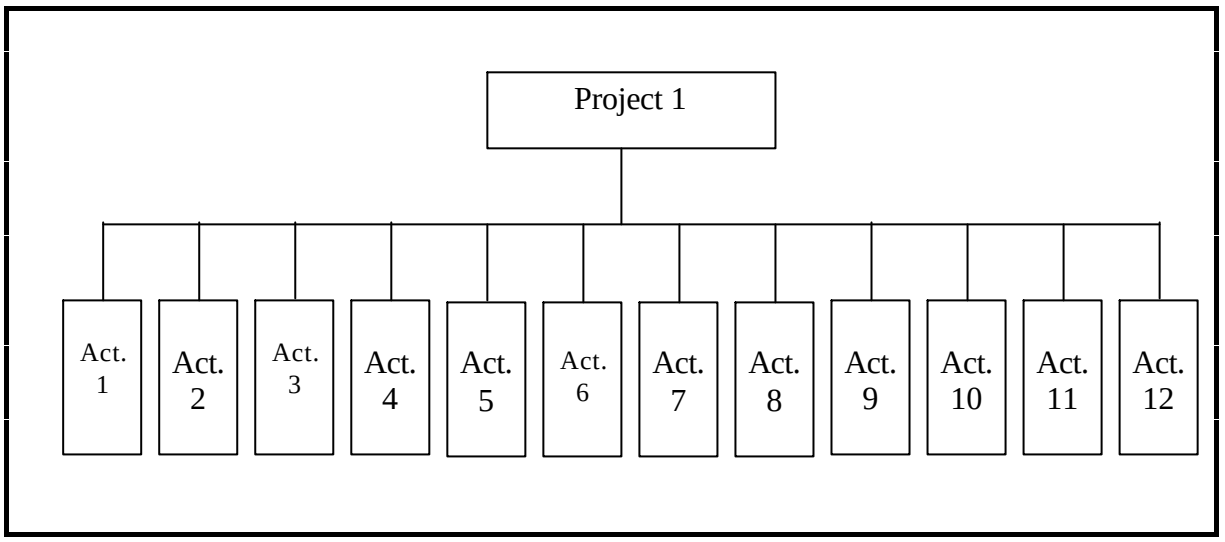
Updating procedures

There are no official policies for updating prices in the FDC. Since the cost database is managed in Bolivianos, prices have to be updated for every project. Therefore, the accuracy of current costing system depends on the evaluation officer's experience. Once the new system is implemented, there will be an update every 6 months.

Application of the Database in the Evaluation Process

The cost database is used as a project evaluation tool in the evaluation process. In order to insert the project into the system, all activities must be unified because the system does not permit a project to be divided into modules. This means, for example, that if the activity "concrete structure" is used in an irrigation channel of an irrigation project and is also used in a different part of the same project, both activities must be added before they can be processed by the system. The new system will allow a project to be modulated. Modulation results in a better control of the project in the implementation stage. The following drawing shows how projects are structured:

Drawing 4 ¾ FDC: Structure of Projects



The information resulting from the existing system is printed out in reports that are used for project approval. This information must be transferred manually to the next stage since there is no computerized link to the next stages.

Information Systems

Currently, FDC is using a cost database adapted to the Fund which does not respond to the needs of the fund. The cost system was originally developed for small private construction companies and is programmed in a Fox Base. The fund is developing a management information system that is expected to be completed in the next few months. This new system is expected to solve all the problems found in the purchased program.

IV. Panamá ¾ Fondo de Emergencia Social (FES)

A. Description

Panama's Fondo de Emergencia Social (FES) was created in 1990. It was financed by the United States Agency for International Development (USAID). Initially, it was an emergency operation aimed at employment generation. It received support from the European Union (EU) and the International Fund for Agricultural Development (IFAD) for rural development, indigenous and rural micro-credit programs. Later, government funding was provided for small infrastructure and community service projects. FES was reorganized, with support from the Inter-American Development Bank (IDB) in 1994/95 and a full portfolio of poverty targeted projects was established. Infrastructure programs which worked in parallel were integrated to attain a more efficient operation. The development of an integrated information system for its financial-accounting and operational (project cycle) data is currently being tested prior to its full implementation.

In accordance with FES's Operational Manual, cost-benefit analyses are carried out by FES's evaluation staff for water supply, sanitation and access road projects, which have quantifiable benefits. A cost-efficiency methodology is utilized to evaluate education and health projects. A cost-benefit analysis methodology for micro-enterprise activities is in the process of being developed by FES.

B. Ex-Ante Evaluation

Water

FES's Evaluation Department has developed an electronic worksheet cost-benefit analysis model (Form F6) which estimates the incremental benefits of the project by quantifying individual consumer surplus, which is the area beneath the demand curve. More precisely, the area under the demand curve corresponds to the value of water consumed by beneficiaries "with project" and the points along the demand curve correspond to willingness to pay at different levels of water consumption. Three different prices for water are used to calculate the area under the demand curve: (a) water must be carried from the source; (b) water is rationed; and (c) water is available without restrictions. The model assumes that project beneficiaries are homogeneous and thus, price elasticity of demand is constant. The model is applied to three types of water projects: (i) new project; (ii) improvement of existing infrastructure; and (iii) expansion of existing infrastructure. Monthly incremental benefits "with project" are calculated per family. Marginal costs are calculated and the resulting cash flow is discounted at a rate of 8%. NPV, IRR and the benefit-cost ratio are then estimated.

The model has two parts: (i) economic analysis; and (ii) technical analysis (project dimensions). The Economic analysis has the following sequence:

(a) Table I: Information on beneficiary population: location, population for 1980 and 1990 and monthly income per capita;

(b) Table IIa: Information on water consumption per family and unit costs of water. Once the type of project is chosen, water consumption per family and unit cost of water "without" project are inputted. There are three possibilities in terms of water consumption and each has a different price: (i) water must be carried from the source; (ii) water is rationed; and (iii) water is available without restrictions. Unit cost of water varies according to distance from water source and type of terrain, if water must be carried from the source. If water is rationed, price actually paid must be inputted. Water consumption "with" project corresponds to Ministry of Health norms that vary according to climate. Unit cost of water "with" project also corresponds to Ministry of Health norms and varies according to technical solution (pump, gravity or public faucet);

(c) Table IIb: Shows program calculations of the demand curve based on the information inputted in the above table and in the following table (III). The model presents two tables for the demand curve and their corresponding graphs. The first table and graph correspond to the case of a new project. The second table and two graphs correspond to renovations and/or expansions of the existing water system. Finally, there is a table which calculates price elasticity utilizing a routine;

(d) Table III: This table estimates beneficiary population for a 20-year period based on a 0.75% rate of growth per year. Data is available for beneficiaries without water problems, beneficiaries with restricted service and beneficiaries without service. The program redistributes beneficiaries with restricted service and turns them into beneficiaries with full service;

(e) Table IV: This table estimates demand and supply of water. Before estimating demand and supply, the evaluator must perform the technical analysis (see: Technical Analysis, below). The model estimates supply "without" project by using data corresponding to the component of the current water system which is restricting service (source of water, pump, storage tank, etc). Finally, for water supply "with" project, in the case of a new system or an improved system, the model utilizes the value which corresponds to the current system's component which restricts its full capacity. Incremental supply is the difference between supply "with" project and supply "without" project. The model calculates demand automatically by taking figures from other tables. Demand "without" project in the case of an existing water system is taken from Tables I and IIa and from the technical data (systems losses and maximum daily factor) in the table called "Global Analysis of the System's Dimension" (see below), which is part of the model. Incremental demand, in the case of an existing water system, is the difference between water consumption "without" project and water consumption "with" project. Maximum daily demand "with" project is taken from Tables I, IIa and III and from the technical data (systems losses and maximum daily factor) in the table called "Global Analysis of the System's Dimensions". Additionally, the model estimates the system's excess capacity and deficits to define how many years the system will benefit the population projected by the model;

(f) Table V: The project's marginal benefits and costs are presented in this table. The figures for marginal benefits are taken from Table IIb (Determination of Demand Curve). Total cost figures are introduced in the second part of the table. The model then calculates Net present Value, Internal Rate of Return and the Benefit-Cost Ratio. A discount rate of 8% is used. This is the "Social Discount Rate" recommended by the Ministry of Planning and Economic Policy; and

(g) Table VI: A sensitivity analysis is carried out by making the benefit-cost ratio equal to one and keeping all of the project's characteristics unchanged. The resulting figure is the maximum possible investment for the project.

In the technical analysis (Global Analysis of the System's Dimension), the system's dimensions are compared to Ministry of Health standards with the objective of achieving an optimum design in terms of volume per minute (gallons/minute). The model then presents a summary table "with" project and "without" project where three situations are compared: (i) current supply of water versus current demand; (ii) current supply versus future demand according to project design; and (iii) future supply versus future demand according to project design.

In order to make the model as realistic as possible, a fair amount of data is introduced into the worksheet. The following table summarizes the different types of information required for the duration of the project (20 years):

Table 6: Information Requirements

Description of Beneficiary Population	Demand Curve/Consumer Surplus/Cost-Benefit Analysis	Distribution of Beneficiary Population by Water System [e/]	Water System Dimensions (Technical Analysis)
• Geographical Location (Province, District, "Corregimiento" and Community) • 1980 and 1990 Census Data • Monthly Income per capita	• Type of project (see above) • Family Water Consumption "without project" [a/] • Unit Cost of Water "without project [b/] • Family Water Consumption "with project" [c/] • Unit Cost of Water "with project [d/]	• # of beneficiaries of water system without restrictions • # of beneficiaries of water system with rationing • # of beneficiaries who carry water	• Data included in Project Design for system components (source of water, pumping system, storage tank, etc.) • Health Ministry Standards

Assumptions:

a/ If water is carried from source, consumption per family per day is 27.5 gallons, if water is rationed and if consumption per family per day is 55 gallons

b/ Distance and type of terrain must be specified for water that is carried from source. A different factor is utilized for three possible types of terrain. The actual price of water is utilized in the case of rationed water.

c/ Ministry of Health consumption per capita standards vary according to regional climate: (i) 80 liters per day per capita in the humid climate region; (ii) 100 liters per day per capita in the semi-humid climate region; and (iii) 120 liters per capita in the dry climate region.

d/ Ministry of Health tariff standards vary according to type of system: (i) B/.2.50 for systems that use pumps; (ii) B/.2.00 for gravity systems; and (iii) B/.0.50 for public faucet type systems.

e/ A 0.75% per year rate of population growth is projected. In the case of rationed water systems, the model redistributes population when the current water system reaches full capacity. Current users of the rationed system are converted into beneficiaries of the "expanded water system". These beneficiaries receive the same benefits as beneficiaries of a new water system. The model also allows for partial coverage of demand for the three types of projects (new, expanded and improved systems).

The above information is collected by FES promoters in two forms (F4 and F5) which contain information on: (i) the type of project (new project, improvement of existing infrastructure, expansion of existing infrastructure, equipment); (ii) Ministry of Health project approval; (iii) description of existing water system and quality of service, as well as operation and maintenance arrangements and time and distance to water source, if applicable; (iv) description of proposed water system; and (iv) sustainability of project in terms of community commitment. [8] In addition to the information collected in forms F4 and F5, FES collects statistical and census information (F1) and information on the community's social condition (F2) and participatory skills (F3). An environmental impact assessment form (F7) is also filled out. These forms (F1 through F7) are the same for every project in FES's menu except for specialized information pertaining to each type of project.

Sewage

In 1995 and 1996, FES developed a worksheet model similar to the one developed for water projects to evaluate sewage projects. The model estimates the incremental benefits of

[8] (i) F4: Ficha de Viabilidad Específica del Proyecto (specific feasibility); and (ii) F5: Ficha de Levantamiento de Información de Campo (field data).

the project by quantifying individual consumer surplus, which is the area beneath the demand curve. The model was discussed with and approved by the National Water and Sewage Authority (IDAAN) and the Ministry of Health.

Information collected in promotion forms (F1, F2 and F5) are introduced into the economic evaluation worksheet (1990 population and projections for 1998, income per capita). There are three types of sewage projects: (i) sewage system in a community that has latrines; (ii) sewage system in a community that has septic tanks; and (iii) sewage system in a community that has latrines **and** septic tanks. In order to quality for a new sewage system, the community must have at least 1,500 inhabitants, 80% of which must be connected to a potable water system. Data on water consumption per family, price of water and cost of obtaining water in cases where water has to be carried across different types of terrain are introduced. IDAAN tariff recommendations for sewage services are introduced for cases in which: (i) only latrines exist; (ii) only septic tanks exist; and (iii) there is currently a sewage system.

In the case of projects with no sewage system (only latrines), three types of demand curves are calculated: (a) water consumption if water is carried across a distance and unit price of water; (b) water consumption if the community has latrines only and unit price of water; and (c) water consumption **with** sewage system and unit price the community is willing to pay. In the case of projects with latrines only, with septic tanks only or with latrines and septic tanks, four types of demand curves are calculated: (a) water consumption if water is carried across a distance and unit price of water; (b) water consumption if the community has latrines only and unit price of water; (c) water consumption if the community has septic tanks and unit price of water; and (d) water consumption **with** sewage system and unit price the community is willing to pay. Incremental benefits per family is the area under the demand curve "with project." In cases of demand curves where unit price of water increases "with project" (project with septic tanks and project with latrines and septic tanks), the area corresponding to increased consumption and increased price is deducted from the area which depicts consumer surplus. This is done to calculate net incremental benefits per family. The model assumes that project beneficiaries are homogeneous and thus, price elasticity of demand is constant.

The model then calculates the number of inhabitants that will benefit from the project during a 20-year period. Population is expected to increase at a rate of 1.8% per year. The project, when executed, will benefit the entire population of the community. Marginal benefits and costs are calculated for the 20-year project period. The resulting net cash flow is discounted at a rate of 8% and IRR, NPV and benefit-cost ratio are calculated. Finally, a sensitivity analysis is carried out.

In order to make the model as realistic as possible, two parameters were investigated in greater detail with the assistance of IDAAN: (i) incremental consumption "with project"; and (ii) operation and maintenance expenses. Twelve projects were examined to determine increase in water consumption "with project." The average increase in consumption of those projects was 26%. The objective of the second study was to determine a tariff of B/.3.00 per family per month. This tariff is subsidized by higher tariffs in areas with higher income per capita.

Access Roads

FES's economic evaluation methodology is based on the assumption that an improvement in access roads will result in significant savings in transportation costs, which will produce in turn an increase in the value of agricultural production in the area covered by the road and in the price of farms. FES utilizes an electronic worksheet model to estimate the project's benefit-cost ratio, IRR and NPV. A sensibility analysis is also carried out. The model makes the following assumptions:

(a) The existing road is the main limitation to community development. Therefore, the region must have an agricultural production potential in order for the project to be eligible;
(b) Beneficiaries will react positively to increases in the value of agricultural production and to improved transportation services. Thus, increases in production volumes are expected resulting from increased yields;
(c) Externalities from improvements in access roads include an increase in the value of farms and a decrease in input prices equal to the decrease in vehicle operation costs; and
(d) Increases in production volumes resulting from access road improvements in the project's geographical area are marginal compared to total production volume. Therefore, market prices for agricultural output will remain constant.

Eligibility Criteria. Access road projects are eligible for areas that have a minimum of 500 beneficiaries or 80 beneficiaries per km of access road improved. At least 5 vehicles per day must use the road. Income per capita of beneficiaries must be under B/.1,056/year. Beneficiary communities must have basic services such as water and health posts. The legal status of the land that the road crosses must be satisfactory. The Ministry of Public Works must approve the project and must guarantee project sustainability. Beneficiary communities must co-finance the project and commit itself to routine maintenance.

Economic Evaluation. The benefit-cost ratio must be equal or higher than 1.0 with an IRR of at least 8%. To reach these baseline figures, an access road with the following characteristics was considered:

(a) Length of access road: 10 km;
(b) Width of road: 5 m;
(c) Density of road: 0.15 m;
(d) Life span of road: 10 years;
(e) Total investment: B/.200 thousand.
(f) Increase per year in marginal benefits is 2% per year for years 1 through 5. No increases in marginal benefits are expected between years 6 and 10;
(g) Recurrent costs: routine maintenance, periodic maintenance, road reconstruction in year 7; and
(h) Cost of project per km must be between B/.17,000 and B/.23,000 (cut-off line).

The economic evaluation model produces the following tables:

(a) Page 1: Project Summary: name and number of project, population, cost, type of project (road construction, improvement or rehabilitation), type of terrain, etc.

(b) Page 2: Description of project tasks and costs. Social and economic information on beneficiary communities. Data for this table is collected by a FES promoter.

(c) Page 3: Characteristics of existing road infrastructure. Projection of types of vehicle traffic (cars, pick-ups and trucks). Data for this table is collected by a FES promoter.

(d) Page 4: Environmental Impact Assessment (EIA) "without" project and Environmental Impact Mitigation Measures. Calculations are carried out by FES's Environmental Unit.

(e) Page 5: Estimation of machinery requirements for routine and periodic maintenance according to number of community organizations committed to routine maintenance. Maintenance responsibility (Ministry of Public Works and community organizations).

(f) Page 6: Analysis of agricultural and livestock production "without" project and "with" project. Fifteen crops and five types of livestock are listed. FES's evaluator introduces the number of producers, hectares under production, number of animals, production volume and price. A 10% increment in production volumes "with" project is projected. Incremental benefits are calculated by comparing production values "without" project and "with" project. Data is provided by the Ministry of Agriculture (?).

(g) Page 7: Economic and social condition of beneficiaries: number of communities and income per capita, age structure, number of farmers and size of properties (subsistence, small, medium and large). Eligibility criteria are verified in terms of poverty level and community prioritization of access road.

(h) Page 8: Project investment budget including financing structure (FES and community). FES evaluator introduces data. At this point, a cost-efficiency analysis is carried out for two numbers taken from the project investment budget: total project cost and cost per km. In the case of total project cost, an annualized amortized cash flow ("payment" in financial terms) is obtained from: (a) the net present value of the project; (b) the number of years of project life; and (c) a discount rate of 8%. The same methodology is used for cost per km of road.

(i) Page 9: Estimation of project's marginal benefits and costs for a 10-year period. Estimation of NPV, IRR and benefit-cost ratio at a discount rate of 8%.

(j) Page 10: Project cut-off points: construction costs, total investment, annualized investment, annualized investment per capita. A sensibility analysis of the project is carried out using two variables: (a) number of beneficiaries; and (b) project cost.

Education

The data utilized to evaluate the project is collected in five forms (F1 through F5). This information is collected by FES's promoters through field visits and interviews with school teachers and directors and community members. Part of the information collected is available through the Ministry of Education. The project's size is calculated by the evaluator on the basis of this information. A school can either be rehabilitated or completely replaced. There are two possibilities with regards to rehabilitation: (i) the number of classrooms remains the same; and (ii) the number of classrooms is increased.

FES's evaluation process is thorough. Six types of analyses are carried out:

(a) Social Analysis: poverty targeting, compliance with the program's educational objectives and community participation.
(b) Technical Analysis: Technical specifications, prototypes, physical characteristics (Ministry of Education norms) of each subcomponent (classrooms, offices, teachers' quarters, etc.).
(c) Unit-Cost Analysis
(d) Environmental Impact Assessment
(e) Sustainability Analysis: personnel costs, materials and utilities must be covered by the Ministry of Education. Operation and maintenance costs are calculated "without" and "with" project and the source of financing is identified. If the current source does not cover 100% of costs, the project includes a training component to help the community maintain and operate the school.
(f) Cut-Off Points: Cut-off points were established on the basis of a sample of 20 projects. The size of the project is established (classrooms, director's office, kitchen-dining room, teachers' quarters, storage room for vegetable garden, fence, latrines, septic tank, water storage tank, flagpole, sports area, furniture, equipment and educational material)

FES's evaluation form (F6) is made up of 8 pages:

(a) Page 1 summarizes the project's main characteristics (geographical location, type of school, project budget by component and source of financing and description of different components);
(b) Page 2 gives data on population, on the school's condition "before" project and on the project's environmental impact;
(c) Page 3, 4 and 5 compare the school's situation "without" project with Ministry of Education standards and a decision is made on the number of classrooms that the school should have and whether the school will be rehabilitated or replaced (size of project). Number of classrooms, number of teachers, m^2 per classroom, students per teacher and m^2 per student are examined. When a decision has to be taken between rehabilitation and replacement, a budget is calculated for both options and the minimum cost option is selected. The same type of detailed analysis is carried out for each of the other elements that are part of the school, such as director's office,

kitchen-dining room, teacher's quarters, latrines, etc. Indicators based on the project's budget (m^2 for the whole project and for the project's different components) are compared with FES's cut-off points and the project is approved if its indicators are lower or equal to FES's cut-off points.

(d) Page 6 covers the project's sustainability analysis and a detailed project budget by component and source of financing.

(e) Page 7 covers costs per m^2 for the project's construction components. In the case of total construction costs and equipment costs (furniture, equipment, school supplies and training for operation and maintenance), an annualized amortized cash flow ("payment" in financial terms) is obtained from: (a) the net present value of the project; (b) the number of years of project life; and (c) a discount rate of 8%.

(f) Page 8 shows a comparison between FES's cut-off points and the project's unit cost indicators (construction cost per m^2, per potential student (plaza) and per classroom; total investment per inhabitant and per student; and total "annualized" investment per inhabitant, per potential student and per actual student). A sensitivity analysis is carried out involving changes in total investment when the number of students and construction costs are increased or decreased.

Health

The data utilized to evaluate the project is collected in five forms (F1 through F5). This information is collected by FES's promoters through field visits and interviews with health center personnel and community members. Part of the information collected is available through the Ministry of Health. The project's size is calculated by the evaluator on the basis of this information. A health post facility can either be rehabilitated/expanded or completely replaced. Equipment and furniture is included as part of the project. The choice between rehabilitation/expansion and replacement depends on the project's technical feasibility and on the project's cost. The number of offices is calculated according to the type of health facility (health post, health sub-center and health center). The number of offices depends on the number and type of services rendered per year. Personnel and services rendered depend on the type of health facility.

FES's evaluation process for health projects is very thorough. The evaluator revises the information collected by FES's promoters, determines the size of the project, evaluates the project in technical and economic terms and prepares an evaluation report. Economic analysis consists of choosing the least cost alternative by comparing unit cost indicators with FES cut-off points (cost per m2, cost per office, "annualized" cost per service, cost per inhabitant and "annualized" cost per inhabitant. FES cut-off points are based on a sample of projects. The project is approved if indicators do not exceed cut-off points according to a weight system devised by FES. Six types of analyses are carried out:

(a) Social Analysis: poverty targeting (income per capita and basic needs), compliance with the program's health objectives and community participation.

(b) Technical Analysis: Technical specifications, appropriate technology, prototypes, physical characteristics (Ministry of Health norms) of each subcomponent (medical office, etc.). Five types of plans are available from the Ministry of Health. A detailed description of each type of health facility plus furniture and equipment is included in FES's Eligibility Criteria Manual. Personnel, including services rendered per hour and total number of man/hours per year are also part of the project's technical analysis. Actual numbers are compared with Ministry of Health norms. Demand for services are expected to increase as a result of project execution.

(c) Unit-Cost Analysis

(d) Environmental Impact Assessment

(e) Sustainability Analysis: personnel costs and operation and maintenance costs materials and utilities must be covered by the Ministry of Health. Operation and maintenance costs are calculated "without" and "with" project and the source of financing is identified. If the current source does not cover 100% of costs, the project includes a training component to help the community maintain and operate the school.

(f) Cut-Off Points: Cut-off points were established on the basis of a sample of 20 projects.

FES's evaluation form (F6) is made up of 8 pages:

(a) Page 1 summarizes the project's main characteristics (geographical location, type of health facility, project budget by component and source of financing and description of different components);

(b) Page 2 gives data on population of the district covered by the health facility and evaluates the project's environmental impact;

(c) Page 3 shows the Ministry of Education standards in terms of: (a) number of offices and other auxiliary spaces according to type of health facility; (b) personnel (type and number) and services (per hour per type of personnel, hours per year and services per year). The second part of the forms shows current personnel and services rendered by type of personnel and type of office (situation "without" project).

(d) Page 4 and 5 depicts the project's situation "with" project in terms of physical space, personnel, services and equipment and furniture.

(e) Page 6 covers the project's sustainability analysis and includes a detailed project budget by component and source of financing. Maintenance and operation costs (personnel, medical supplies, utilities, etc.) are covered by the Ministry of Health. Costs are calculated by means of FES's cost system and introduced manually into this form.

(f) Page 7 covers unit costs for the project's construction, equipment and training components. Unit costs are compared to FES's cut-off points. A 10% difference with cut-off points is acceptable. In the case of total construction costs and equipment costs and training costs, an annualized amortized cash flow ("payment" in financial terms) is obtained from: (a) the net present value of the project; (b) the number of years of project life; and (c) a discount rate of 8%. A sensitivity analysis is carried out involving

changes in total investment when the number services rendered and construction costs are increased or decreased.

(g) Page 8 describes the beneficiary population's income level, age and gender structure, availability of basic services and medical profile.

C. Cost Database

General Considerations

This section analyzes FES's cost database to determine how it structured, operated, updated, maintained and applied in the ex-ante evaluation process of FES. It is the main financial evaluation instrument of projects. The FES cost database system was purchased from the El Salvador SIF in 1994 and has adapted to FES needs.

Structure

The FES cost database is composed of items, activities, and modules and is managed in a Fox Base environment. This database is used to cost the project components. It is controlled through three levels of access: (i) programmer; (ii) cost officer; and (iii) and evaluation officers. Currently the database allows only the cost officer and evaluation officers to access the cost database. The cost officer level allows the officer to change and introduce items, change and create activities and modify module costs.

1. Items. An item is a basic material like cement, nails, water pipes, etc. Each item is priced at each of the nine geographical regions. Pricing is done through price comparison. Prices are obtained from providers at the nine provinces by the cost officer. Since there is no rate of exchange, all items are priced in US$. Items are divided into three major groups: (i) materials; (ii) labor, and (iii) equipment and tools.

Materials. This group makes up the largest part of the cost database and has 2,600 items that are composed of construction materials like cement, nails, and bricks and medical and education instruments & supplies.

Labor. The labor group is divided into two categories: (i) skilled and (ii) unskilled labor. **Skilled Labor** has eight items, and **Unskilled Labor** has ten items. Pricing of these items is based on the information from the "Cámara Panameña de la Construcción"(CPC) or Panamanian Construction Chamber. CPC publishes these prices every 6 months.

Equipment and Tools. The database contains 59 construction equipment items such as shovels, mixers, compacting equipment and concrete vibrators. The pricing of construction equipment is based on the prices provided by the CPC. Tools are priced through price comparison.

Item codes are divided into 5 fields: (i) type; (ii) fabrication (local/imported); (iii) family; (iv) class; and (v) item. The codification was inherited from the El Salvador

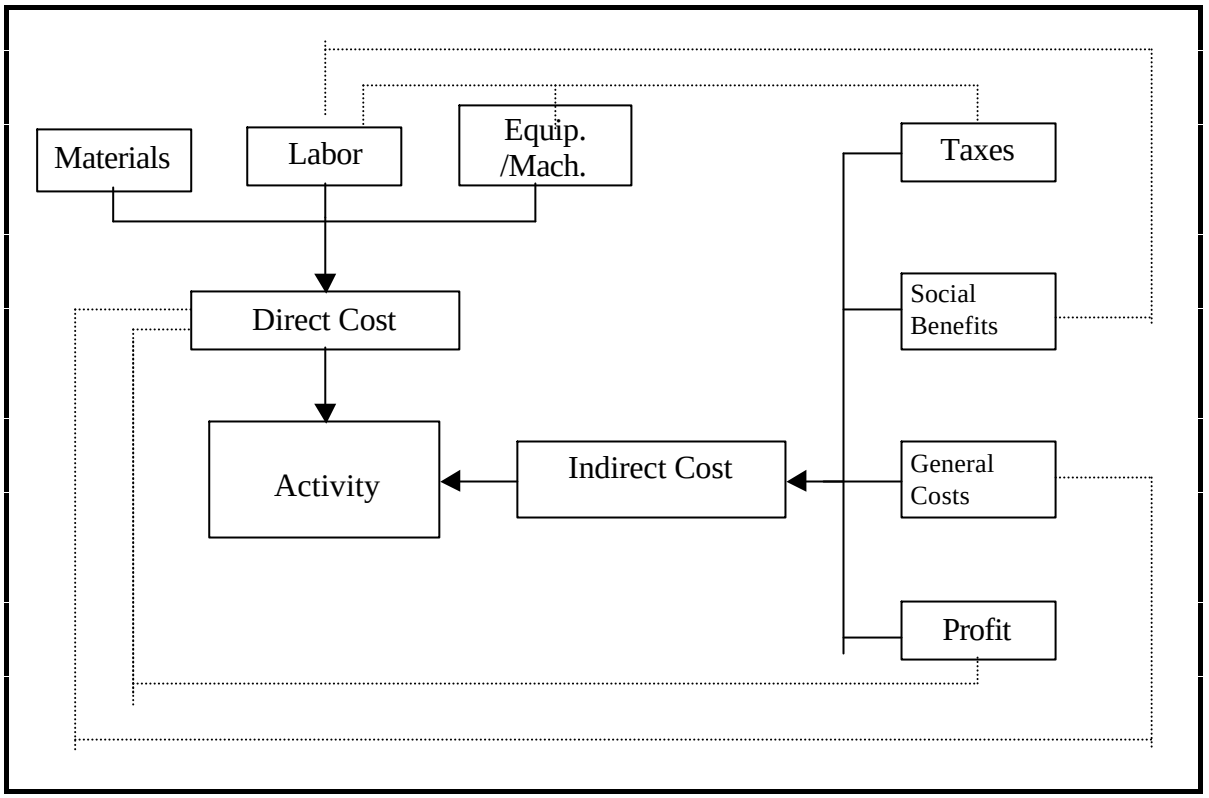
SIF when the system was purchased and cannot be modified by the FES personnel. The following table shows an example of an item code:

Table 7—FES: Example of Item Code

Code: 2" Round top Steel nails				
Type	**Fabricated**	**Family**	**Class**	**Item**
Materials	Imported	Metals	Nails	2" Round top Steel nails

2. Activities. The description of an activity is basically the same as in the Bolivian FIS and FDC. Activities are made up of direct costs and indirect costs. Direct costs are composed of material costs, labor costs, and equipment and tools costs. Indirect costs include general costs, taxes, social benefits and profit. These costs affect direct costs at different levels. The following drawing shows how activities are structured:

Drawing 5—FES: Structure of Activities



Activities are used in all types of projects at the national level and are only modified through an internal process. Modifications to activities can be requested or suggested by operative levels based on implementation experience. The only person who is authorized to modify an activity is the person responsible for the database at the FES central office.

Codification of activities is based on the original package. Activity codification is divided into three fields: (i) group; (ii) type; and (iii) activity. The following table shows an example of activity codification:

Table 8—FES: Example of Activity Code

Code: 0101001—Site Clearance		
Group	**Type**	**Activity**
01	01	001
Earth Work	Clearance	Site Clearance

3. Material Performances. Performances in FES were obtained from different sources. One of the main sources of information is the Panamanian Construction Chamber that gives performances for different types of labor, construction equipment and some materials. This information is updated every six months. Information for performances in road construction was obtained from the Public Works Department and performances for water and sewerage were obtained form the Water and Sewer Institute. All the other performances are based on FES technical specifications and experience.

Technical specifications are put together for each project. These specifications are based on national and international norms and are dictated by the line ministries and agencies. There are no general FES technical specifications because the Fund's experience with contractors shows that it is better to build a set of specifications for each project. Even though most of the specifications exist, the process of putting together individual specifications per project is time consuming. Specifications are revised when there are changes in norms implemented by the line ministries and agencies or if the operative levels find a problem.

Updating procedures

FES updates all the information every two years. The cost officers in nine locations or provinces do the updating. In the Panamanian case, where there is no rate of exchange, prices tend to be stable. 50 important prices as well as those that represent the highest cost in the project are revised constantly. There are no written procedures for price updating which is basically the responsibility of the cost officer. The last time prices were revised was in 1997 so a new revision is scheduled for 1999.

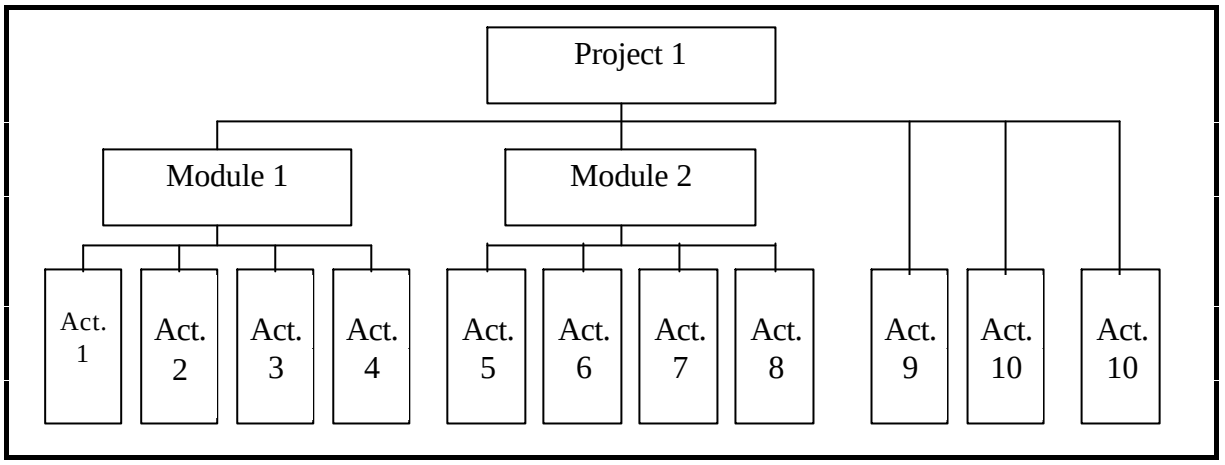
Application of the Database in the Evaluation Process

All the evaluation officers have access to the cost system and use it in the evaluation process. Since the system was not developed for the Fund or according to its needs, it has some limitations. FES uses modules to build up the different projects. The problem they have is that the system keeps all the information at the module level. What this means is that the modules cannot be modified because more than one project is using them as a reference, so special modules must be created all the time to account for the difference between projects. For example, when putting together a school project, one project may

use the three class rooms prototype model, including one administration building and one block of bathrooms. If the terrain is uneven, a module has to be created to take this factor into account because the prototype modules are designed for a flat surface. This means that the real cost of the bathroom block is not the one shown in the module, and in order to obtain the real cost one must add an additional module to which the volumes of work that belong to the bathrooms to the prototype module are added. When appraising a project, the evaluation officer must select the modules to be used, create the complementary module and assign a transportation cost. The system does not allow the officers to change any prices. The transportation cost is applied by the system to all the prices and this results in the final project cost.

The FES cost system also allows activities to be used directly in a project without them having to belong to a module, so a project could be built up by module and activities. There are no real advantages to having activities which don't belong to a module because this tends to disorganize the project structure.

Drawing 6¾ FES: Structure of Projects



Information Systems

FES has its cost system in a Fox Base that is not linked to the management information system. The MIS is been developed in a Unix platform. All the information generated in the cost system has to be reentered in the MIS. There are plans to develop a module for project costing in the MIS but this work has not begun. When this module is developed all the problems of the existing program will be corrected.

V. Argentina ¾ Fondo Participativo de Inversión Social (FOPAR)

A. Description

FOPAR is a SIF with a special emphasis on building capacity at the community level. Interventions are targeted to poor neighborhoods in provincial capitals and rural municipalities in six provinces in the north of Argentina.[9] Agreements signed between FOPAR and the targeted provinces sets the whole participatory process in motion. In the case of neighborhoods, the final selection for each province is made by FOPAR and the Provincial Participatory Council whose members include social sector provincial and municipal officers, NGOs, religious organizations, universities, etc. The final selection for rural municipalities is carried out jointly by FOPAR and the local Social Development Center. Projects are classified into three main categories: (i) Development and Strengthening of Communities (development of community leaders, strengthening of grassroots organizations, community development and communications); (ii) Social and Economic Infrastructure (health centers, community centers, child care centers, recreation areas, latrines, small water systems, waste management, small forestry projects, small irrigation projects and small electricity projects); and (iii) Economic and Productive Activities (strengthening of productive grassroots organizations, and technical assistance). All projects have a community strengthening component.

B. Ex-Ante Project Evaluation

First Phase

FOPAR's project cycle begins with the selection of neighborhoods and rural municipalities. This selection is carried out jointly by FOPAR and local authorities on the basis of poverty indicators. FOPAR's promoters explain the project menu to neighborhoods and municipalities. Projects are then formulated following FOPAR's project preparation guides and presented to FOPAR's provincial offices. If the project complies with eligibility criteria[10] and contains the information required, the formal evaluation process begins. The project is assigned to an evaluator who will carry the project through the whole evaluation process. The evaluator uses a manual developed by FOPAR for this purpose. There is a detailed manual for every type of project in the menu.

Economic analysis is similar for all projects in FOPAR's menu. A comprehensive evaluation, consisting of several dimensions, is carried out for each project. The first step is a field visit where information is collected to verify the following aspects:

(a) Level of community participation (relationship between needs of beneficiaries and the project, community participation and organization);

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[9] Three or four new provinces will be included during FOPAR's second phase.

[10] Eligibility criteria correspond to: (i) type of project; (ii) residence of beneficiaries; (iii) requesting institution; (iv) amount of project; (v) community cofinancing.

(b) poverty level (housing conditions and family income); and
(c) technical and economic aspects of project (components, materials, equipment, contractors, budget, etc.).

The economic evaluation is carried out to compare the project's costs with FOPAR's cut-off points and to verify whether community co-financing meets FOPAR's minimum requirements. There are two types of cut-off points, those related to the project's activities (for example, cost of technical assistance per hour) and those related to cost of component per beneficiaries. The cut-off points related to beneficiaries are called cost-efficiency indicators by FOPAR. If the project's cut-off points are higher than FOPAR's, the project's budget must be adjusted unless the evaluator can justify the difference. After having completed the field visit, the evaluator fills out a "Pre-Evaluation Form."

The second phase of the project's comprehensive evaluation is called "Ex-Ante Evaluation" by FOPAR's evaluation manuals. The evaluator verifies whether recommendations made during the field visits have been carried out. Aspects already evaluated during the field visit are examined more closely during this phase, which is divided into the following processes:

(a) Technical evaluation;
(b) institutional evaluation (contractors);
(c) economic evaluation; and
(d) environmental evaluation (for infrastructure projects only).

In the case of projects corresponding to Development and Strengthening of Communities and Economic and Productive Activities, the technical evaluation verifies whether the project design is coherent, that is, whether there is a logical relationship between activities, outputs and objectives and whether the training components follow efficiency and efficacy criteria. The project's technical-pedagogical design is studied by means of five indicators: objectives, contents, methodology, materials and equipment and beneficiaries. The project's proposal for the application of the capabilities acquired is also examined as well as source of funds to cover future operation and maintenance.

In the case of Social and Productive Infrastructure projects, the project's physical dimensions are analyzed, followed by an evaluation of terrain, plans and equipment. Alternatives such as building new infrastructure, enlarging existing infrastructure or repairing infrastructure are taken into consideration and minimum cost criteria are used to select the best alternative. The project's dimensions must be compared to FOPAR standards which take into consideration number of beneficiaries and activities to be carried out. Even though the evaluator is encouraged to compare the project's plans with sectoral norms, the utilization of standards and prototypes is not compulsory. Urban planning and building codes may be adapted to the areas physical characteristics. The equipment component is reviewed to verify if the equipment requested agrees with the project's needs and if price quotations are correct. The project's training component is also examined by using the same five indicators presented above for Development and Strengthening of Communities and Economic and Productive Activities projects.

The institutional evaluation of community strengthening and training components analyzes three aspects: (i) experience of the training institution in similar projects; (ii) experience of team coordinator with similar projects; and (iii) experience of team, when applicable, with similar projects. On the other hand, the institutional evaluation of infrastructure components analyzes several additional professionals and individuals (architect, technical representative of construction company and construction site supervisor). The sustainability of infrastructure projects is also evaluated by analyzing operation and maintenance costs and institutional commitments to sustain the project.

The economic evaluation for all project components consists of using cut-off points that compare costs to component activities and to beneficiaries. For training components, training fees per hour are compared with FOPAR's corresponding cut-off line. Indicators that are higher than cut-off points must be adjusted unless the evaluator can justify the difference by means of valid reasons. In order to approve or reject the project, the evaluator takes the following steps:

(a) indirect costs are examined to verify whether they have been calculated according to instructions given in the project presentation guides;
(b) an analysis is made to see whether the amount corresponding to the cost of the component corresponds to the amount financed by FOPAR;
(c) the number of direct beneficiaries is established;
(d) cost-effectiveness indicators are estimated per beneficiary and per "most representative" technical unit for the component; and
(e) indicators are compared to cut-off points.

Economic evaluation for infrastructure components follows the same steps as the evaluation carried out for training components. Nevertheless, greater attention is given to the following aspects:

(a) Indicators corresponding to a minimum of three activities which amount to at least 30% of the project's budget are compared to FOPAR's cut-off points. If the indicators are below the cut-off points, the project is approved. If the indicators are higher than the cut-off points, the project is rejected unless the evaluator can justify the differences. If some indicators are below cut-off points and some are higher than the cut-off points, the evaluator corrects the budget costs by calculating the "value sample" of the activities examined. The following formula is used to calculate the value of the project:

- $W1 \times X1 + W2 \times X2 + W3 \times X3 + ... + Wn \times Xn$

Where: W(i) = amount of activity (i) in project
X(i) = unit cost of activity (i) in project

The following formula is used to calculate the value corresponding to FOPAR's cut-off points:

- $W1 \times Y1 + W2 \times Y2 + W3 \times Y3 + \ldots\ldots + Wn \times Yn$

Where: W(i) = amount of activity (i) in project
Y(i) = average unit cost of activity (i) for FOPAR cut-off points

To obtain a correction factor, the value resulting from the first equation is divided by the value resulting from the second equation. If the result is less than 1, the component's cost is adjusted in the following manner:

Corrected cost = correction factor *x* total cost of the project component

(b) Global indicators are reviewed and compared to FOPAR's cut-off points.

(c) Project costs are inserted in a worksheet. Costs are broken up by component and by source of funds. One part of the worksheet shows costs submitted by the project designer and the other, costs defined by FOPAR's evaluator. Direct costs include: 1) component costs; 2) 5% of component costs for project administration; 3) up to 5% of infrastructure component for project administration (?); 4) transportation costs and per diem; and 5) 2% of component costs for beneficiary association expenses. Additionally, 10% of the amount financed by FOPAR is assigned to the beneficiary association (?).

(d) Disbursement schedule for the amount financed by FOPAR.

An environmental evaluation is performed only on infrastructure projects. Projects must be designed taking into consideration national and provincial environmental legal norms.

C. Calculation of Cut-Off Points

FOPAR bases its economic analysis of projects on cut-off points only. Until recently, cost-benefit analysis was utilized for Economic and Productive Activity projects. Difficulties encountered in quantifying incremental benefits as well as the time involved in calculating cash flows were the main reasons for having discontinued this type of analysis. For this type of project, in addition to using cut-off points, additional income from project is calculated per beneficiary. This additional income is compared to the salary that the beneficiary could obtain in the region. If additional income from project is higher than the local salary, the project is approved.

Cut-off points are used before the field visit and during the "Ex-Ante Evaluation." FOPAR calls this methodology cost-effectiveness analysis because project indicators are compared to maximum cut-off points calculated according to the methodology described below. Hence, one could assume that if cut-off points were calculated in a realistic manner, projects whose indicators are equal to or below these cut-off points are well designed in terms of number of beneficiaries and unit costs per components and activities. Different

alternatives to reach the same project objective are not compared except in infrastructure projects where renovations and extensions are compared.

There are two types of indicators: (i) global indicators for project components (cost per beneficiary, per hour of training, per hour of technical assistance, per square meter of infrastructure, per unit, per ton, and per hectare watered) and for projects as a whole per beneficiary; and (ii) indicators for activities (training fees per hour, technical fees per hour and cost per representative unit for infrastructure activities). Every project has a custom-designed training component. The main objective of the training component is to guarantee sustainability. Beneficiaries and project personnel receive training in areas related to project activities, community strengthening and construction, operation and maintenance of infrastructure.

For Development and Strengthening of Communities projects, indicators correspond to training and technical assistance components and to the project as a whole. For Social and Economic Infrastructure projects, indicators correspond to infrastructure and training and to the project as a whole. Infrastructure indicators include minimum quality standards. Finally, for Economic and Productive Activities, indicators correspond to training, technical assistance, infrastructure and to the project as a whole.

The following assumptions are made to calculate cut-off points:

(a) Total project cost includes direct and indirect costs (beneficiary group expenses and project supervision expenses);

(b) Component cost includes fees paid to contractor, executor or trainer. When the beneficiary group executes the project (infrastructure), beneficiary counterparts, project designer fees and site supervisor fees must be included in component cost; and

(c) Project beneficiaries are individuals that benefit directly from infrastructure services and receive training and technical assistance. FOPAR recently produced a set of definitions to define beneficiaries more closely.

FOPAR's first cut-off points were based on unit costs provided by similar public sector programs. When FOPAR had enough projects to study its own costs, two additional sets of cut-off points were calculated utilizing econometric functions (linear regression). For projects that have insufficient data (more than 6 and less than 30 projects), statistical analysis of the sample was used to determine inferior and superior limits on the basis of measures of central tendency (mean and median) and measures of dispersion (standard deviation). Finally, for new projects (small irrigation systems, solid residues, small forestry projects, training for productive activities and technical assistance for participatory management of community projects), FOPAR will once again utilize data from other programs until sufficient projects are available for statistical and econometric analysis. The current set of cut-off points calculated by means of econometric functions will be modified only in cases where prices change.

Forms

FOPAR has the following sets of forms and manuals:

(a) Project Preparation Guides for all 21 projects in FOPAR's menu; and
(b) Ex-Ante Evaluation Manuals for each type of project. The manuals have the following annexes:
- Field Visit Guide;
- Instructions to fill out the Pre-Evaluation Forms;
- Pre-Evaluation Forms;
- Forms requesting additional information from contractors, beneficiaries and other project participants;
- Instructions to fill out Ex-Ante Evaluation Forms;
- Ex–Ante Evaluations Forms;
- Instructions to fill out Final Technical Report;
- Instructions for Environmental Evaluation;
- Final Technical Report;
- Report to Promotion and Project Manager;
- Note to Beneficiaries.

C. Cost Database

General Considerations

The FOPAR cost database was analyzed in order to determine how it structured, operated, updated, maintained and applied in the ex-ante evaluation process. Unlike the other cases, the cost database is not used as the main ex-ante evaluation tool. The FOPAR cost database system (P Data) is a program purchased by the fund and applied as it was designed originally. No changes were made to adapt it to FOPAR's needs.

Structure

The FOPAR cost database is composed of items and activities. This database is used to cost activities but not to cost projects. The system is installed in one computer only at

the FOPAR central office and only the cost officer in charge of the system has access to it. This person can modify any item price or material performance but cannot access the program itself.

1. Items. An item is a basic material like cement, nails, water pipes, cement mixer, labor, etc. Each item is priced at each of the six provinces where FOPAR operates. Pricing is done through price comparison at each location. Since the peso is equivalent at all times to the US dollar, all items are priced in Argentine pesos. The database has costs for materials, labor and equipment. Even though the cost system purchased by FOPAR has a complete set of items in the three categories, only the ones which apply to the 76 activities which are used routinely are updated.

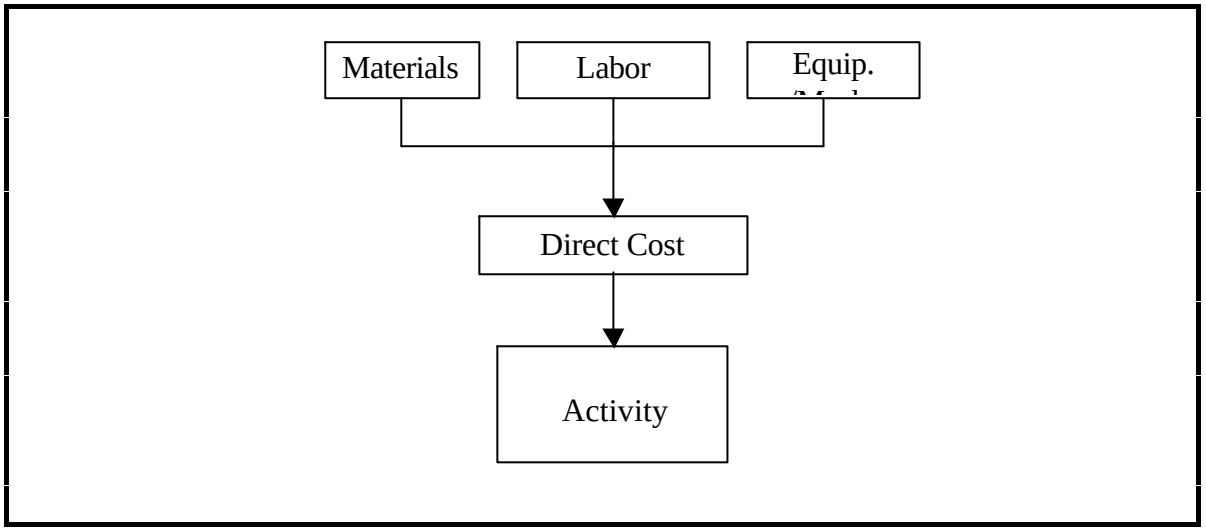
Item codes are based on the Argentinean standard of codification. The code is divided into 3 fields: (i) division; (ii) section; and (iii) item. The codification is based on an international codification system. The following table shows an example of an item code:

Table 9—FOPAR: Example of Item Code

Code: 0201000020: Medium Sand		
Division	**Section**	**Item**
02	010	00010
Sands, soils, and aggregates	Sands	Medium Sand

2. Activities. The FOPAR cost system has a complete set of activities but since the system is only used to set cut-off points at an activity level, only 76 activities are used. Since projects are implemented directly by the community, activities are composed only of direct costs and without taking into account indirect costs. Direct costs are material costs that include local taxes, labor costs, and equipment and tools costs. The following drawing shows how activities are structured:

Drawing 7—FOPAR: Structure of Activities



Only the cost officer modifies activities, has access to the system and generates reports with prices for the 76 activities in all six locations.

Codification of activities is based on the purchased system. Activity codification is divided into three fields: (i) group; (ii) type; and (iii) activity. The following table shows an example of activity codification:

Table 10—FOPAR: Example of Activity Code

Code: 0101001—Site Clearance		
Group	**Type**	**Activity**
01	01	001
Earth Work	Clearance	Site Clearance

3. Material Performances. Performances in FOPAR were obtained from other projects, from different government sources and from the purchased program. One of the main sources of information were line ministries. Since FOPAR's projects are implemented directly by the community, the main problem encountered with the gathering of information was that there where no other similar experiences in the country. A revision of performances was made based on the implementation of the first group of projects. The revision is meant to be an ongoing process until all the performances are adjusted.

4. Technical specifications. There are no specifications as such. There is only a set of minimum and maximum standards for 14 activities that have been developed as a guideline for quality control. Projects presented to FOPAR are required to have technical specifications.

Updating procedures

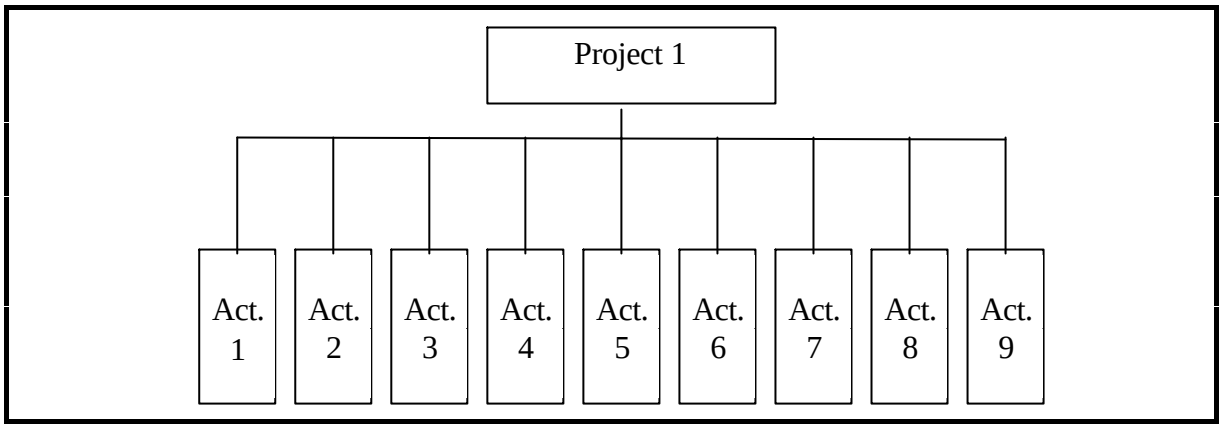
FOPAR updates all the information every year. The cost officer prices items in all six locations through price comparison. In Argentine peso is equal to the US dollar so prices are stable. There are no written procedures for price updating, which is basically the responsibility of the cost officer. The last time prices were revised was in 1997. A new revision is scheduled for 1998.

Application of the Database in the Evaluation Process

The FOPAR Project is different from the other SIFs studied. This project focuses more on community participation and organization of projects and leaves project pricing to project formulators who usually become project administrators during the implementation phase. The cost database is only used at the central office to generate cut-off points for 76 activities for the six provinces where FOPAR works. It is not used to price projects. These cut-off points are distributed to the evaluators to be used as a reference during project evaluation. Evaluation officers don't have access to the cost data base. The other major difference with the other SIFs is that the evaluation officers are not permanent personnel and are hired on a per project basis.

Evaluation officers check the activities that represent at least 30% of the project cost or at least 5 activities and compare them with the cut-off points. If the price is higher, a price revision is recommended. The price is either lowered or has to be technically justified to be approved. A revision of project folders showed that whenever the price was higher than the cut-off point it was usually changed to the FOPAR price. This process represents the first filter. Then the project total cost indicators are checked against another set of cutoff points.

Drawing 8 ¾ FOPAR: Structure of Projects



Information Systems

FOPAR has a windows based cost system named "P Data" that is not linked to the management information system. The MIS is developed in a SQL platform and has a visual basic interface. There is no cost module in the MIS, so the information generated in the cost system doesn't get migrated. There are no plans to develop a module for project

costing in the MIS but, according to the systems manager, it could be implemented if required.

VI. Conclusions and Recommendations

A. Bank Policies, Economic Analysis and SIFs

Bank Policies

Bank policies ("Ten Dimensions of Economic Analysis"[11]) recommend a sound and comprehensive economic project evaluation which includes other aspects in addition to cost benefit and cost-effectiveness analysis. Pure economic analysis is considered to be insufficient to guarantee project impact. These "Ten Dimensions" differ somewhat, depending on the documents consulted. The following table shows a list of the dimensions found in the different Bank documents:

[11] See Preker, Alexander S., Logan Brenzel and Annu Ratta. "Economic Analysis in the Health, Nutrition and Population (HNP) Sector: A Conceptual Framework and Portfolio Review. Working Draft. Human Development Department. Human Capital Development Vice-Presidency. September 26, 1996 and Project Appraisal Document (PAD).

Table 11¾ The Bank's "10 Dimensions of Economic Analysis"

<table>
<tr><th>Dimension</th><th>Dimension</th></tr>
<tr><td>1. Project coherency with respect to eligibility criteria</td><td>7. Quantitative analysis of alternatives</td></tr>
<tr><td>2. Poverty analysis—Targeting</td><td>8. Environmental impact analysis</td></tr>
<tr><td>3. Fiscal impact analysis, including cost recovery</td><td>9. Cost recovery and sustainability</td></tr>
<tr><td>4. Institutional capacity analysis</td><td>10. Quantitative sensitivity analysis linked to major risk factors</td></tr>
<tr><td>5. Social/Participative analysis</td><td rowspan="2">12. Comprehensiveness and clarity of performance criteria for project monitoring and evaluation</td></tr>
<tr><td>6. Cost-benefit, cost-effectiveness and/or cost-utility analysis</td></tr>
<tr><td colspan="2">Overall judgment of project justification based on a balanced assessment of the above dimensions</td></tr>
</table>

The survey found that SIFs utilize eligibility criteria to screen projects. Projects are targeted to poor communities by means of poverty maps. Most SIFs have reliable unit cost databases for infrastructure as well as for training projects. Since pure economic analysis does not apply to most SIF projects, these databases have become the cornerstone of the overall project evaluation system. Unit costs are closely related to other instruments routinely used by SIFs such as technical specifications, prototypes and modules and sector standards and norms. Cost recovery is examined more closely than in the past and mechanisms are being developed to guarantee project sustainability in the medium and long term. Institutional, social/participative and environmental impact analysis has become routine in most SIFs surveyed. Some SIFs have developed cost-benefit and cost-effectiveness analysis models and mechanisms tailored to their very special needs. In some cases, alternatives are examined for the same project. Sensitivity analysis is carried out for projects that undergo cost-benefit and cost-effectiveness analysis. Finally, all the above analyses are taken into account to justify project approval or rejection. Thus, it can be concluded that SIFs are increasingly utilizing the same type of comprehensive economic analysis that the Bank requires to approve its own projects.

Objectives of Economic Analysis

Economic analysis helps determine whether a project contributes to the welfare of a country's society. In the case of SIFs, which are poverty alleviation mechanisms, economic analysis measures the impact of the projects financed. Economic analysis is also a powerful resource allocation tool. The following table shows how SIF instruments identified by this survey help meet the two main objectives of economic analysis:

Table 12¾ Objectives of Economic Analysis and SIF Instruments

Objectives		SIF Instruments
1. Optimal Resource Allocation	Equitable	• Poverty Targeting • Social/Participative Evaluation
	Efficient	• Institutional Analysis • Cost Minimization (cut-off points) • Cost-Benefit Analysis • Cost-Effectiveness Analysis • Unit Cost Analysis/Cost Data Base • Sector Standards and Norms • Project Prototypes • Project Modules • Technical Specifications
	Sustainable	• Environmental Impact Analysis • Recurrent Cost Analysis
2. Project Impact Measurement		• Performance indicators for project monitoring and evaluation (input, output and impact indicators) • Forms & Manuals

B. Recommendations

Poverty Targeting

All SIFs should target their investments by means of poverty maps. Nevertheless, since poor and extremely poor municipalities and districts also have inhabitants that are above the poverty line, additional filters should be used to make sure that SIF investments are reaching the poor and very poor. Hence, poverty maps should be complemented with a thorough social/participative analysis and with consultations with local authorities. Poverty indicators such as physical condition of dwellings, number of dwellers per dwelling, family income, etc. should be verified on the field. This analysis should be carried out by experienced social evaluators who fill out forms designed to validate the beneficiary community's poverty level as defined by poverty maps. In order to validate the community's poverty level, at least 50% of the prospective beneficiaries should be interviewed.

Social/Participative Evaluation

Social/participative evaluations not only guarantee equitable investments but also make investments more sustainable because beneficiary communities are involved in the entire project cycle and are committed to the project's sustainability. The following information should be collected through extensive interviews with the community:

(a) relationship between the community's needs and project objectives;
(b) verification of community participation in the identification and formulation of project;
(c) level of community organization: formal or informal organization, type of organization, number of participants, main activities of organization, main problems encountered by organization when carrying out activities; and
(d) explanation of community participation in project execution.

In order for the evaluation to be objective, a form should be designed to cover all the above aspects and others which might apply to a particular SIF. Answers, which can be "yes", "no" or a number, should be given a weighted score that will allow the evaluator to make a fully justified final decision.

Institutional Analysis

To guarantee the project's impact and sustainability, the individuals and institutions involved in formulating, executing, supervising and maintaining and operating the project (community organizations, project designers, project executors, site managers, etc.) should be examined closely. A database of such institutions should be developed and updated regularly by every SIF. Aspects examined should include the following:

(a) In the case of individuals: reputation, educational level, net worth and experience in similar projects; and
(b) In the case of maintenance and operation of projects: documents to be signed by institutions or community organizations in charge of operation and maintenance should include a detailed analysis of operation and maintenance costs during the life of the project as well as sources of funding. Enforcement mechanisms should be developed to prevent the whole exercise from becoming theoretical.

As in the case of the social/participative evaluation, for the institutional evaluation to be objective, a form should be designed to cover all the above aspects and others which might apply to a particular SIF. Answers, which can be "yes", "no" or a number, should be given a weighted score that will allow the evaluator to make a fully justified final decision in terms of institutional capacity.

Cost Minimization (Cut-Off Points)

In cases where cost-benefit analysis is not feasible due to insufficient information on expected monetary benefits or when it is too costly or time consuming to calculate benefits, SIFs should calculate cut-off points for each type of project. Cut-off points relate

costs to benefits. Cut-off points show a monetary unit in the numerator and a non-monetary unit in the denominator, for example, "Total Cost of Project (in $)/No. of Beneficiaries." A well structured Cost Database is the starting point to calculate cut-off points (see Unit Cost Analysis/Cost Data Base, below). It is also necessary to have financed enough projects to constitute a suitable sample of unit costs. Such a sample is needed to establish maximum cut-off points which are realistic. Cut-off points should be developed for project activities and modules for every type of project financed by SIFs. Econometric and statistical analysis, similar to the type of analysis utilized by FOPAR, can be used to calculate the cut-off points. If cut-off points are based on a suitable sample of projects, only price changes justify changing cut-off points. Both FOPAR and FES consider cut-off points to be "cost-effectiveness" ratios because the project's ratios are compared to these fixed cut-off ratios to determine whether the project is comparable to standard "SIF costs."

Cost-Benefit Analysis

The survey confirms, in general terms, the perception that most SIF-type projects experience difficulties when subjected to cost-benefit analysis. FOPAR discontinued cost-benefit analysis for its productive training projects because of difficulties encountered in quantifying incremental benefits and because the process was time consuming. FDC's cost-benefit methodology goes into so many generalizations that the results are unreliable. Only FES's cost-benefit analysis models for water and sewerage projects seem to reflect a more realistic situation and are reasonably simple to implement. Furthermore, FES evaluators informed the consultants that the models frequently flag unusual or extreme situations.

Since costs are relatively straightforward and easy to determine for any SIF project, the main task of the FES models is the estimation of incremental benefits. Incremental benefits are estimated by quantifying individual consumer surplus, which is the area under the demand curve. Gains in consumer surplus occur when prices decrease and/or when supply increases in a situation where supply is rationed at a price below what consumers would be willing to pay. In order to quantify consumer surplus, a fair amount of primary and secondary information (Ministry of Health norms, Population Census data) is needed. FES promoters collect information on the following aspects in two well-designed forms. The following information is needed for water projects:[12]

(a) Geographical location
(b) 1980 and 1990 Census data for beneficiary community;
(c) Number of families;
(d) Annual rate of growth of population (0.75%);
(e) Beneficiary population for the life of the project broken down by type of water consumption (see (h), below)
(f) Income per capita;

12 Similar information is introduced in the worksheet for sewage projects.

(g) Type of project (new project, improvement of existing infrastructure or expansion of existing infrastructure);
(h) Actual water consumption per family (varies according to whether water has to be carried, service is restricted or water is available without restrictions);
(i) Actual unit cost of water (varies according to type of terrain and distance from source);
(j) Water consumption "with project" (Ministry of health norms);
(k) Unit cost of water "with project" varies according to technical solution (Ministry of health norms); and
(l) Technical description of proposed water system.

For cost-benefit models that rely on consumer surplus to justify the economic viability of the project, special attention should be given to the project's **financial** viability. If financial viability is not ensured, expenditures for maintenance and operation will suffer and the project's impact on poverty reduction diminishes.

Environmental Impact Analysis

A SIF project's poverty impact and sustainability are closely related to its environmental impact. Most SIF infrastructure projects have a very small negative impact on the environment and some projects, such as sewage and reforestation projects, also have the objective of improving the environment. SIFs should carry out an Environmental Impact Assessment (EIA) for each of its projects. Mitigation measures should be contemplated in cases where the project's environmental impact is negative. SIFs should follow national legal norms and procedures in this matter.

Recurrent Cost Analysis

Recurrent cost analysis should be compulsory for projects that undergo cost-benefit analysis as well as for projects whose benefits are difficult to establish. A detailed identification of: (i) project operation and maintenance costs throughout the life of the project; (ii) sources of financing for recurrent costs; and (iii) institutions and organizations responsible for maintenance and operation, is essential to the project's sustainability and impact. Enforcement mechanisms should be developed to guarantee that funding is available for maintenance and operation costs during the life of the project. Enforcement is easier in the case of projects submitted to SIFs by municipalities. For projects submitted by ONGs or community organizations, other, more innovative mechanisms can be developed.

Performance Indicators for Project Monitoring and Evaluation (input, output and impact indicators)

Of the four SIFs visited, only the Bolivian FIS has begun to develop performance indicators for infrastructure and social project monitoring and evaluation.[13] The main

[13] Sistema de Información de Seguimiento—Infraestructura (SISI). Marzo 1995 and Sistema de Información de Seguimiento—Social (SISS). Marzo 1995. Fondo de Inversión Social. Gerencia de

purpose of these indicators is to monitor FIS's processes and the results of its interventions. The indicators are the result of the systematization of FIS's monitoring experience throughout several years. Indicators are developed on the basis of variables related directly to each FIS subprogram. There are two types of variables, financial (project budget) and output. For example, in the case of financial variables, the variable "project execution period" is related to an indicator called "execution rate" (No. of actual days executed *x* 100/total execution period). In the case of output variables, the variable "participating communities" is related to an indicator called "participating communities rate" (No. of actual participating communities *x* 100/No. of participating communities forecasted). Even though variables have been identified and documented for every subprogram and the resulting indicators have been developed, FIS has not yet begun to monitor indicators throughout the whole project cycle. This is due to systematization problems. FIS has only recently integrated all its information systems. Consequently, some of the indicators are used only at the evaluation level. Supervisors use their own indicators. Nevertheless, this is an effort worth looking into since 55 indicators have been fully developed for social subprograms and 136 indicators for infrastructure projects.

Manuals & Forms

The survey showed that SIFs that have developed information collection forms adapted to the economic analysis instruments discussed above, are able to approve or reject a project on the basis of a balanced assessment of the whole set of instruments. The entire process is completed in a reasonable amount of time. Most of the SIFs surveyed have experienced project promoters and evaluators, many of whom have developed some of the forms and instruments themselves. Forms are accompanied by detailed promotion, evaluation and process manuals. The forms and manuals have undergone several modifications and adjustments as a consequence of feedback received from promoters, evaluators and supervisors.

Unit Cost Analysis/Cost Database

Based on the SIF surveys, it was determined that cost databases constitute one of the main of the financial/economic evaluation tools. This instrument is applied in different forms and for different purposes in SIFs. The Bolivian FIS, FDC and the Panama FES use it as an evaluation tool to set the sub–project reference prices or contracting prices. In the Argentina FOPAR, the cost data system is used to set cut-off points.

The existence of a cost database in SIFs or SIF-like like projects is necessary, especially for projects that have a strong infrastructure component. These cost databases should be implemented based on country and sector experience and should be developed specifically for each SIF. Based on the case studies, it was determined that SIFs should have cost systems developed specifically for each case and shouldn't purchase cost systems developed for private companies because these are usually designed for projects that are very different from those financed by SIFs. Another advantage of having a system

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specifically developed for each Fund is that the maintenance, future development, and linkage to the main system are easier.

Special consideration should be given to how the cost system is: (i) structured, (ii) updated and maintained; and (iii) applied in the evaluation process.

Structure

The structure of unit cost databases in all four SIFs surveyed is different. Nevertheless, the tendency is to go towards the same type of structure. The recommended structure for a unit cost system one divided into: (i) items; (ii) activities; and (iii) modules.

1. Items. An item is a basic material like wood, steel, sewer pipes, cement mixer, labor, etc. Each item should be priced at each location, department, or province where the SIF finances projects in order to have a more precise database. Items should be divided into four categories: (i) materials; (ii) labor; (iii) equipment; (iv) supplies.

(a) Materials: This category should include construction materials like cement, nails, and water pipes.

(b) Labor Costs: This category should include skilled and unskilled labor in different fields like carpentry and plumbing. For projects that include training, specialized labor costs should be included as well.

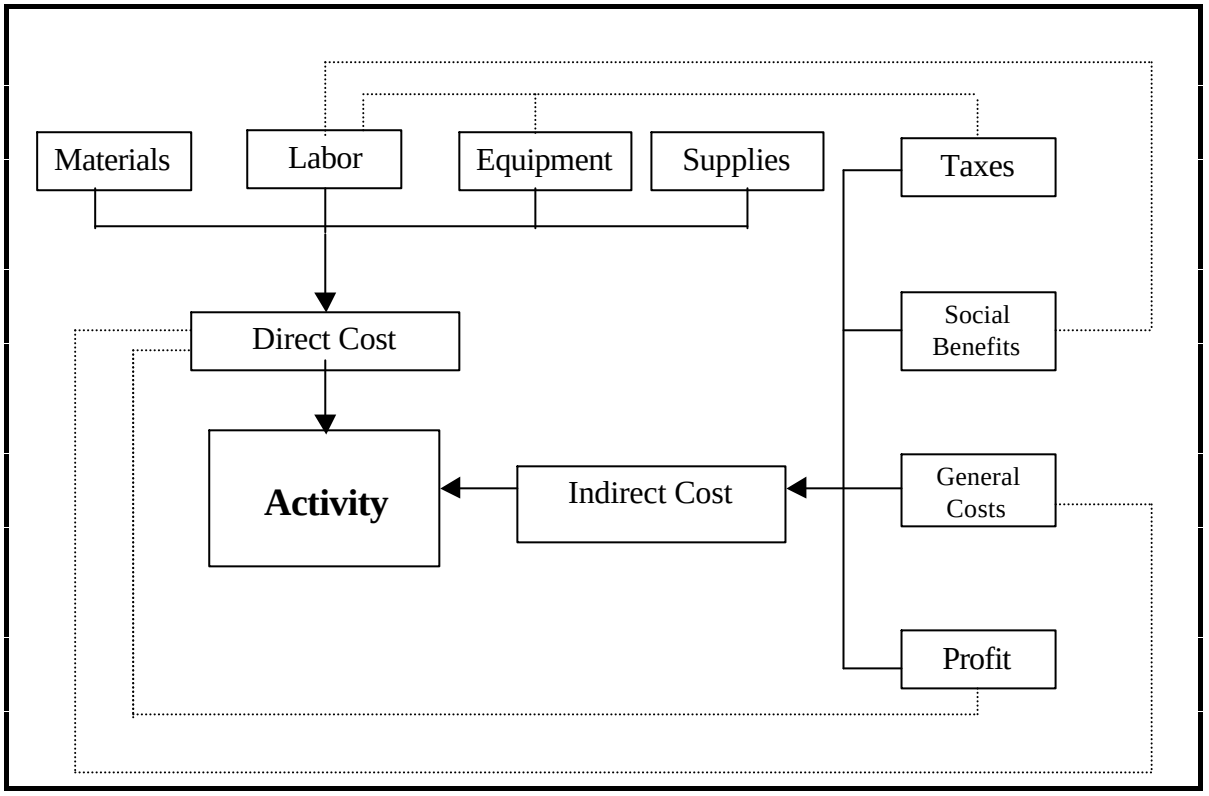
(c) Equipment: Equipment cost like cement mixers, vibrators, etc. should be taken into account.

(d) Supplies: This category depends on what the SIF includes in its project components. It can include items like books, pencils, food, seeds, etc.

Another important aspect is the codification of items. The codification should be one that allows for future growth, and that shows a clear differentiation between categories. In some cases, a differentiation should also be made between imported and local materials. This codification could be based on national or international standards if these standards meet the SIFs criteria.

2. Activities. An item or a number of items make up an activity. Examples of activities are concrete walls, excavation, brick wall, farming training, quilt making training, etc. An activity is composed of direct and indirect costs. Direct costs are: labor cost, equipment costs, material costs, and supply costs. Indirect costs are social benefits, taxes, profit, general costs and any external cost which may affect the activity. Direct and indirect cost may vary according to the type of activity and the location of the project

Drawing 9—Structure of Activities



The application of direct costs is based on the performance of each component or how much of each item goes into the activity.

Material performances are obtained from local, national, and international standards and should reflect the technical specification of each activity. Since most standards are based on skilled labor and SIF projects have lower material performances due to: (i) the geographical area in which they are implemented; and (ii) required community participation, material performances should be revised and adjusted constantly based on the implementation of the new projects.

As in the case of items, the codification of activities is very important. Activities should be divided into categories, groups, sub-groups and activities. This codification should allow for future insertion at any of the four levels. This codification could also be based on national or international standards. The codification should be properly documented and training on how to codify activities should be given to SIF staff, external consultants, NGOs and companies who work with the SIF.

3. Modules. The application of modules is recommended for SIF projects. Projects can be divided into modules in order to have more information and a better control of the components of a specific project. For example, a water supply project could be divided into:

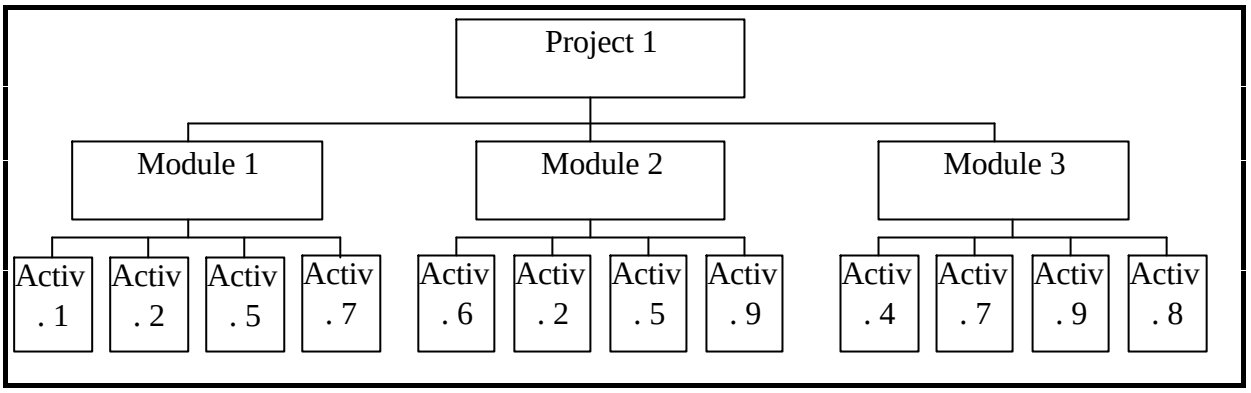
(a) Source Development Well
(b) Transmission Pipeline
(c) Treatment Plant-Slow Sand Filters
(d) Pumping
(e) Storage Tank
(f) Distribution Pipelines

Modulation also allows for specific indicators to be set at a module level. These indicators allow for a better analysis of the project at an evaluation stage and a better control of it during the implementation stage. Comparing projects at a module level allows for cut-off points to be set based on pre-established indicators.

In order to have the same base of comparison in the application of modules, the standardization of modules is recommended. Each SIF must define what modules will be used in each type of project it finances. When standardizing modules, the activities that are included in each module must be chosen and defined. The standardization must be properly documented and training in its application must be given to the evaluation officers.

In the implementation stage, projects that are divided into modules allow the supervisor to follow up on every part of the project. This is specially useful to monitor change orders and the actual financial and technical development of the project.

Drawing 10¾ Structure of Projects



Updating procedures

In order to have a reliable cost databases, the information must be updated. Updating varies from country to country, based on the stability of the local currency and market. In countries where the rate of inflation is high, prices must be registered in US dollars. In countries where the rate of exchange is stable, prices can be registered in the local currency (Panama and Argentina).

A complete revision of prices should be carried out once a year. Prices of the most significant items should be revised every 6 months. It is also recommendable to have a list of the suppliers where the pricing of items is carried out. Pricing should be done through price

comparison of at least 3 suppliers. To avoid problems, only the department responsible of the maintenance of the database must be able to modify the prices. Every SIF should have a person responsible for updating and maintaining the cost system.

Application in the Evaluation Process

The cost system should be used to compare the project's cost with the system. It should allow for adjustments to activity prices related to transportation and accessibility costs. When the project is to be implemented through a biding process, the cost of the project is used as a reference price and, when the project is implemented through direct contracting, the reference price becomes the contracting price. In either case, the project costing must be done through the system.

Information Systems

It is important that the cost system be a part of an integrated information system. This allows for cost information to be registered, compared and used by the following instances: (i) Contracting; (ii) Monitoring; (iii) Administration; (iv) Information; and (v) Ex–Post Evaluation.

Technical Specifications

Technical specifications (specs) are a very important part of the implementation of sub-projects. By using specs, a SIF is able to analyze and determine material performances. Specs also become the guideline for quality control during the implementation of projects. Every activity must have a technical specification to back it up. Technical specifications are developed based on local, national, and international standards. SIFs should have specs for every type of program they finance (Building, Water, Sewage, Furniture, etc.). Individual specs can be put together into a set of standard specs which include all the activities found in a specific program like water project specifications, or for a specific project based on an existing specification library.

Technical specifications should include the following:

(a) A definition of the activity;
(b) materials, tools, and equipment to be used;
(c) execution procedures of the activity;
(d) how the activity will be measured; and
(e) how the activity will be paid for.

Based on the implementation of projects, specs can be adjusted and modified.

Sector Standards and Norms

It is necessary to have sector standards and norms for all programs financed by SIFs. When these standards are not available or easy to understand, an effort must be made to come up with minimum standards in coordination with the sector. Based on these

standards, SIFs must develop a clear set of instructions for the preparation and presentation of projects. The existence of these standards and norms allow for the investment to be allocated under the right parameters and to comply with the country objectives for the sector. Sector standards and norms allow SIFs to develop project and module prototypes.

Project and Module Prototypes

Prototypes or typical projects and modules are used to standardize the intervention, to provide technical assistance in areas where there are no professionals, to formulate projects and to reduce the cost of project formulation. It is better to have typical modules which can be put together to create a project or that can be used for mixed projects which include refurbishing and new buildings. When SIFs finance projects which include only refurbishing, typical modules or projects cannot be used. Typical modules are useful for water and sewer projects where there are no typical projects. Since typical projects or modules are usually designed for flat sites, special care has to be taken to adapt them to site conditions.

Annex 1: Interviews

NAME	INSTITUTION	POSITION
José Luis Carvajal	Fondo de Inversión Social (Bolivia)	General Manager
Edwin Acuña	Fondo de Inversión Social (Bolivia)	Regional Evaluation Chief
Guillermo Roca	Fondo de Inversión Social (Bolivia)	Programming and Control Advisor
Ramiro Encinas	Fondo de Inversión Social (Bolivia)	Unit Cost Data Base Administrator
Alberto Requena	Fondo de Inversión Social (Bolivia)	Organization and Methods
Jorge Carrasco	Fondo de Inversión Social (Bolivia)	Regional Evaluation Chief
Joaquin Aramburu	Fondo de Inversión Social (Bolivia)	Operations Manager – Region 2
Patricia Caballero	Fondo de Inversión Social (Bolivia)	Systems Head
Eduardo García	Fondo de Desarrollo Campesino (Bolivia)	Technical Manager
Fernando Barja	Fondo de Desarrollo Campesino (Bolivia)	Evaluation
Valentín Escudero	Fondo de Desarrollo Campesino (Bolivia)	Evaluation Manager/Road Specialist
José Cuevas	Fondo de Emergencia Social (Panamá)	Water & Sewage Project Evaluator
Odoardo Torraza	Fondo de Emergencia Social (Panamá)	Cost Database Manager
Arelys Bouche	Fondo de Emergencia Social (Panamá)	Education Specialist
Eduardo Bosano	Fondo de Emergencia Social (Panamá)	Plans and Bids
Joanne Carrera	Fondo de Emergencia Social (Panamá)	Health Specialist
Roberto Sánchez	Fondo de Emergencia Social (Panamá)	Information Systems Manager
Ana Etchegaray	Fondo Participativo de Inversión Social (Argentina)	Program Coordinator
Gerardo Borches	Fondo Participativo de Inversión Social (Argentina)	Promotion and Project Manager

NAME	INSTITUTION	POSITION
Alejandra de Caruso	Fondo Participativo de Inversión Social (Argentina)	Evaluation Supervisor
Miriam Rangone	Fondo Participativo de Inversión Social (Argentina)	Social Evaluation