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PROJECT PERFORMANCE ASSESSMENT REPORT

MEXICO

**IRRIGATION AND DRAINAGE SECTOR PROJECT
(LOAN NO. 3419)**

**ON-FARM AND MINOR IRRIGATION NETWORKS IMPROVEMENT
PROJECT (LOAN NO. 3704)**

**AGRICULTURAL PRODUCTIVITY IMPROVEMENT PROJECT
(LOAN NO. 4428)**

July 22, 2005

*Sector, Thematic and Global Evaluation Group
Operations Evaluation Department*

Currency Equivalents (annual averages)

Currency Unit = Mexican Peso (Mex\$)

1994	US\$1.00	\$3.38i
1995	US\$1.00	\$6.28i
1996	US\$1.00	\$7.60
1997	US\$1.00	\$7.93
1998	US\$1.00	\$9.52
1999	US\$1.00	\$9.56
2000	US\$1.00	\$9.47
2001	US\$1.00	\$9.35
2002	US\$1.00	\$9.69
2003	US\$1.00	\$10.81
2004	US\$1.00	\$11.31

Abbreviations and Acronyms

ALCAMPO	Alianza para el Campo (Agricultural Productivity Improvement Project)
CNA	Comision Nacional del Agua
FAO	Food and Agricultural Organization of the United Nations
FIRCO	Trust Fund for Sharing Farming Risks
GDP	Gross Domestic Product
ICR	Implementation Completion Report
OED	Operations Evaluation Department
PPAR	Project Performance Assessment Report
PRODEP	Programa de Desarrollo Parcelario (On-Farm and Minor Irrigation Networks Improvement Project)
PSRD	Programa Sectorial de Riego y Drenaje (Irrigation and Drainage Sector Project)
SAGARPA	Ministry of Agriculture
WUA	Water User Association

Fiscal Year

Government: January 1 – December 31

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OED Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Operations Evaluation Department assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, OED annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by OED. To prepare PPARs, OED staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader OED studies.

Each PPAR is subject to a peer review process and OED management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the OED Rating System

The time-tested evaluation methods used by OED are suited to the broad range of the World Bank's work. The methods offer both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. OED evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (more information is available on the OED website: <http://worldbank.org/oed/eta-mainpage.html>).

Relevance of Objectives: The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). *Possible ratings:* High, Substantial, Modest, Negligible.

Efficacy: The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. *Possible ratings:* High, Substantial, Modest, Negligible.

Efficiency: The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. *Possible ratings:* High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

Sustainability: The resilience to risk of net benefits flows over time. *Possible ratings:* Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

Institutional Development Impact: The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. *Possible ratings:* High, Substantial, Modest, Negligible.

Outcome: The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. *Possible ratings:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

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Principal Ratings

IRRIGATION AND DRAINAGE SECTOR PROJECT (LOAN NO. 3419)

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Highly Satisfactory	Highly Satisfactory	Satisfactory
Sustainability	Highly Likely	Likely	Likely
Institutional Development Impact	Substantial	Substantial	Substantial
Bank Performance	Highly Satisfactory	Highly Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

ON-FARM AND MINOR IRRIGATION NETWORKS IMPROVEMENT PROJECT (LOAN NO. 3704)

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Satisfactory	Satisfactory	Satisfactory
Sustainability	Likely	Likely	Likely
Institutional Development Impact	Substantial	Substantial	Substantial
Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

AGRICULTURAL PRODUCTIVITY IMPROVEMENT PROJECT (LOAN 4428)

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Satisfactory	Satisfactory	Unsatisfactory
Sustainability	Highly Likely	Likely	Unlikely
Institutional Development Impact	Modest	Modest	Negligible
Bank Performance	Satisfactory	Satisfactory	Unsatisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate Operations Evaluation Department (OED) product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

IRRIGATION AND DRAINAGE SECTOR PROJECT (LOAN NO. 3419)

<i>Project</i>	<i>Task Manager/Leader</i>	<i>Division Chief/ Sector Director</i>	<i>Country Director</i>
Appraisal	Vahram Nercissiantz	Hans Binswanger	Rainer Steckhan
Completion	Jose Simas	John Redwood	Olivier Lafourcade

ON-FARM AND MINOR IRRIGATION NETWORKS IMPROVEMENT PROJECT (LOAN NO. 3704)

<i>Project</i>	<i>Task Manager/Leader</i>	<i>Division Chief/ Sector Director</i>	<i>Country Director</i>
Appraisal	Jose Simas	Michael Baxter	Ediberto Segura
Completion	Michael Carroll	John Redwood	Olivier Lafourcade

AGRICULTURAL PRODUCTIVITY IMPROVEMENT PROJECT (LOAN 4428)

<i>Project</i>	<i>Task Manager/Leader</i>	<i>Division Chief/ Sector Director</i>	<i>Country Director</i>
Appraisal	Michael Carroll	Maritta Koch-Weser	Olivier Lafourcade
Completion	Michael Carroll	Mark Cackler	Isabel Guerrero

Preface

This is a Project Performance Assessment Report for three Mexico projects.

The Irrigation and Drainage Sector Project was supported by Loan No. 3419 in the amount of US\$400 million equivalent which was approved on December 3, 1991. The loan closed on June 30, 2000, almost five years later than expected. A balance of US\$50 million equivalent was canceled.

The On-Farm and Minor Irrigation Networks Improvement Project was supported by Loan No. 3704 in the amount of US\$200 million equivalent which was approved on February 17, 1994. During a 1997 restructuring the loan amount was reduced by US\$30 million. The loan closed on March 31, 2002, almost two years later than expected. The restructured loan amount was fully disbursed.

The Agricultural Productivity Improvement Project was supported by Loan No. 4428 in the amount of US\$444.5 million equivalent which was approved on December 22, 1998. The loan closed according to schedule on June 30, 2003 and was fully disbursed.

This report presents the findings of Operations Evaluation Department missions to Mexico in December 2004 and January 2005. The missions were conducted by Mr. John R. Heath, assisted by Dr. Fernando Barceinas (consultant). In February 2005, in support of this assessment, Dr. Barceinas conducted a survey of 239 water users in irrigated areas of the states of Guanajuato and Sonora.

In addition to the results of the February 2005 survey, this report draws on a series of datasets listed in the main report, as well as interviews with officials of the Government of Mexico, with water user associations, and with Bank staff. A special note of thanks is reserved for: the Comisión Nacional del Agua for facilitating the survey of water users; Dr. Iván Cossío and the FAO/SAGARPA evaluation team, and Dr. Enrique Palacios of the Colegio de Posgraduados for providing invaluable orientation. The Operation Evaluations Department also gratefully acknowledges the assistance received from the World Bank/Netherlands Water Partnership, without which the survey could not have been funded.

Following standard OED procedures, copies of the draft PPAR were sent to government officials and agencies for their review and comments. Comments were received from the Comisión Nacional de Agua. Where deemed appropriate by OED the text of the PPAR was revised to reflect these comments, which are reproduced as Annex 8.

Summary

This report assesses three projects whose ultimate goal is related to the challenge of boosting Mexico's lagging agricultural productivity—whether by exploiting land more intensively, increasing physical yields, or adopting a more profitable mix of crop and livestock activities.

Two of the projects aimed to improve the administration of irrigated areas. The **Irrigation and Drainage Sector Project (PSRD)** was a time-slice operation, with the Bank financing US\$400 million of the government's US\$1.2 billion program. It was conceived as the first phase of a broader program for the sustainable development of water and soil productivity in the public Irrigation Districts. PSRD supported the transfer of management responsibility from a state agency, the Comision Nacional del Agua, to water user associations in the Districts. The investment package targeted major off-farm networks. The **On-Farm and Minor Irrigation Networks Improvement Project (PRODEP)** provided follow-up support to government's program, focusing on upgrading minor networks and making on-farm improvements.

The third project sought to boost private investment in agriculture. The **Agricultural Productivity Improvement Project (ALCAMPO)** supported the Alianza para el Campo program, which aimed to leverage private investment in agriculture by providing partial reimbursement to producers for investment costs they had incurred. It entailed co-financing by federal government, state governments and producers of subprojects in small-scale irrigation, pasture establishment, improved dairying and infrastructure for poor farmers.

The outcome of the irrigation projects (PSRD and PRODEP) is rated satisfactory. The project objectives were highly relevant to current Bank and Borrower strategy, the projects met or exceeded most of their targets and OED re-estimates the economic rate of return of each project at 15 percent. Although ALCAMPO achieved a rate of return of 16 percent, its outcome is rated unsatisfactory because its objectives were only modestly relevant and it did not fully achieve them—technical assistance to smaller farmers was not substantially strengthened and there was no increase in the state governments' capacity to administer the Alianza program.

With respect to institutional development impact, the two irrigation projects are rated substantial, based on their success in empowering the water user associations. ALCAMPO's rating for institutional development impact is negligible because the project made no lasting contribution to ensuring more efficient resource use in the Alianza program: this program is not well targeted to poorer producers with potential for productivity growth, and its approach to selecting and appraising subprojects is insufficiently rigorous.

Sustainability is rated likely for all three projects, partly because the economic analysis indicates a positive net benefit flow that is likely to extend into the next decade. Bank and Borrower Performance are both rated satisfactory for the irrigation projects. For ALCAMPO, Borrower Performance is rated satisfactory, but Bank Performance is

rated unsatisfactory, based on poor quality at entry and an overestimation of the leverage that this project could exert over the poorly-targeted program to which it was contributing.

This assessment confirms the following OED lessons of broader relevance:

Projects need to dovetail with programs; but well-designed projects can rarely turn around a poorly-designed program. This is a particularly important lesson for the Bank's work in Mexico where leverage is limited. Mexico has ample access to alternative sources of funding, private as well as public. In line with the Bank's poverty reduction mandate, its resources should be tightly targeted, rather than added to programs where there is a high potential for subsidies to be captured by better-off groups.

The Bank's leverage may be substantially diluted when project funds flow into a multi-state program in which state governments have considerable influence over the use to which resources are put. The number of interlocutors can be so large that it may make it difficult for the Bank to influence the overall direction—of project as much as program. For example, it is often difficult to secure support of state governments for a monitoring and evaluation framework, particularly one that is of uniform design applying the same approach in all states. Also, ALCAMPO demonstrates how difficult it can be to persuade state governments to follow Bank procedures for procurement and justification of expenses.

Programs as large as Alianza are candidates for formal impact evaluation. The main limitation of the FAO/SAGARPA evaluation of Alianza is the absence of a control group of non-beneficiaries, a striking oversight given the level of funding committed. The evaluation should have sampled those who did not apply to the program; and those who applied but were rejected. (It is not clear that a list of the rejected is maintained.) Without this control it is impossible to assess claims about the program's leverage: much of the investment (and the income growth attributed to it) might have occurred without a subsidy. Subsidies may have leaked to better-off groups who don't need them.

Vinod Thomas
Director-General
Operations Evaluation

1. Background

1.1 This report assesses three projects whose ultimate goal is related to the challenge of boosting Mexico's lagging agricultural productivity—whether by exploiting land more intensively, increasing physical yields or adopting a more profitable mix of crop and livestock activities. Two of the projects aimed to enhance the performance of irrigated agriculture. The third sought to subsidize private investment in agriculture by providing partial reimbursement to farmers for the cost of inputs and equipment they had purchased. All three projects embodied elements of decentralization. The two irrigation projects were intended, respectively, to expedite and to consolidate the process of transferring responsibility for operating and maintaining the public irrigation districts from a central government agency to associations of water users. The investment subsidy project required state governments to co-finance with federal government the grant element provided to help fund subprojects in small-scale irrigation, pasture establishment, improved dairying and infrastructure for poor farmers.

1.2 Around 1990, when the first of the three projects was designed, Mexico's program for agriculture and rural development was geared to an opening of the trade regime, signaled by accession to the World Trade Organization (or GATT as it then was) in 1987 and to the North American Free Trade Area in 1993. This was accompanied by the phasing out of producer price support for key crops and its replacement by a program of direct income support decoupled from production (Procampo)—intended to run until 2008, by which time, supposedly, farmers would have adjusted the scale and mix of their activities in line with comparative advantage. There were parallel initiatives to promote rural land markets (legalizing the rent or sale of land reform holdings) and to reduce government's role as a provider of agricultural services (e.g. extension, credit). In addition, there was considerable support for irrigation and from—1996 onwards—a special program for subsidizing investments in agriculture (Alianza para el Campo).¹ In 2002, the cost of Procampo, Alianza and support to irrigation added up to three-quarters of public spending for agriculture.

1.3 The various initiatives for agriculture and rural development add up to a plausible and broadly coherent whole; but so far results have been limited. Agricultural exports rose by 69 percent between 1990 and 2002 but, overall, sector productivity growth has been sluggish. In 1990-2002, the average annual growth rate of agriculture was 1.6 percent (up from 0.8 percent in 1980-1990). The economy as a whole grew by 3.0 percent between 1990 and 2002. Based on triennial averages, between 1979-81 and 2000-02, value added per agricultural worker grew by 22 percent in Mexico, compared to 59 percent for Latin America as a whole.² Many of the rural work force are not market-oriented farmers but semi-subsistence producers, combining the income from production for own consumption with casual wage earnings, remittances from migrant relatives and government transfers (of which Procampo is the most important).

1. With the change of administration in 2001 this was renamed Alianza Contigo.

2. Data in this paragraph are taken from World Bank, World Development Indicators, 2004.

2. Data Sources

2.1 Several datasets were used for the assessment. These datasets refer to the irrigation and Alianza programs as a whole and it is not possible to isolate data referring to the Bank-supported projects. This problem is addressed in two ways. First, program outcomes are matched against the development objectives of the three projects to see whether results are consistent with what the projects were intended to achieve. Second, the difference the projects made to program outcomes is assessed, based on interviews with Bank staff and a review of Bank documents.

2.2 The program-wide datasets are:

- A 2005 OED survey of water users: in three Irrigation Districts (Alto Rio Lerma [N=70] in the state of Guanajuato, and Rio Mayo [N=71] and Costa de Hermosillo [N=48], both in the state of Sonora) and two Irrigation Units (Las Golondrinas [N=16] and El Cubo [N=34], both located close to the Alto Rio Lerma District). Respondents were sampled randomly from the register of water users provided by user associations at each location. This survey does not pretend to be representative of the diverse Districts in Mexico (N=85), or of the population of water users in those Districts (around 400,000). Alto Rio Lerma and Rio Mayo were chosen for study because they were the subject of previous surveys, making it possible to examine change over a period of ten years or so. Costa de Hermosillo was selected precisely because it is a high-productivity outlier.
- A 1986 to 2003 series on crop production and water use for each of the 85 Irrigation Districts of Mexico (supplied by the Comisión Nacional del Agua to OED);
- A 1980 to 2002 series of data on the land and water productivity of all Irrigation Units and Districts (supplied by Dr. Enrique Palacios, Colegio de Posgraduados, Texcoco, Mexico);
- A 1999 survey of the performance of water user associations in Irrigation Districts, covering 229 Modules (administrative sub-units of Districts) and the District Costa de Hermosillo (Comisión Nacional del Agua/ Colegio de Posgraduados);
- A set of four consecutive FAO evaluations of the entirety of the Alianza program (2000, 2001, 2002 and 2003), involving a nationwide sample of around 20,000 beneficiaries;
- Staffing and program budget data from the Comisión Nacional del Agua and the Statistical Annex of the government's 2004 "State of the Nation" report.

3. The Irrigation Projects

OBJECTIVES

3.1 The two projects were designed in sequence and their development objectives were mutually reinforcing. The development objective statements of each project are very detailed and are quoted in full in Table 1.

Table 1. Objectives of the Irrigation Projects

Irrigation and Drainage Sector Project (PSRD)	On-Farm and Minor Irrigation Networks Improvement Project (PRODEP)
<p>“The project would help government to (a) sustain the irrigation and drainage sector through adequate levels of investments selected on the basis of rigorous economic and technical criteria, procured competitively and implemented efficiently; (b) decentralize irrigation funding and management through institutional reforms that would gradually move funding of irrigation and drainage investments from a centrally-managed system of government grants towards a system based on regional and local public utilities which would help to recover costs through user charges and collection instruments, and thus help sustain the investments by the beneficiaries; (c) fully utilize existing irrigation schemes by finishing uncompleted works, upgrading deteriorated infrastructure, and rehabilitating irrigated land affected by water logging, salinity problems and lack of maintenance; (d) improve water use efficiency by introducing: better water management techniques, the conjunctive use of surface and ground water, volumetric measurement of water, providing more adaptive research results, and training of technicians and farmers in better operation and maintenance of the irrigation infrastructures; (e) strengthen the institutional capacity of the Comisión Nacional del Agua and user organizations to implement policy programs, investments and maintenance; (f) monitor and help prevent environmental and natural resource degradation; and (g) optimizing the use of land and water resources in the Irrigation Districts and Units”</p> <p>(Staff Appraisal Report, p.22, emphasis added).</p>	<p>“The project’s main objective is to assist irrigation farmers in transferred Irrigation Districts complete the transfer process, consolidate existing irrigation investments through direct user participation in decision-making and investment, move to diversified agricultural production, and increase their efficiency in the use of land and water resources. Specific objectives consistent with the sector policy improvements are to: (a) reduce the loss and waste of irrigation water; (b) promote decentralization and private investment in irrigation; (c) increase cropping intensities and yields; and (d) increase crop diversification into higher value crops”</p> <p>(Staff Appraisal Report, p. 10, emphasis added).</p>

3.2 These objective statements call for some explication. First, although it is not obvious from the wording of the statements, both projects are directed at Irrigation Districts and Irrigation Units.³ In the Districts *part* of the infrastructure (typically the head works) remains the responsibility of the Comisión Nacional del Agua, which receives a part of the irrigation service tariff levied on water users. In the Units *all* the infrastructure is the responsibility of the respective water user associations; and none of the tariff goes to the Comisión. Of the 6 million ha of crops under irrigation, 3.2 million ha are located in the Districts and 2.8 million ha in the Units.

3. The second project (PRODEP) did not originally cover the Units but there was a mid-term amendment in order to include them.

3.3 Second, the objective statements refer to a process of decentralization, entailing **District transfer**. Transfer occurred in two stages. First, the secondary and tertiary canals and associated drains and roads were handed over by the Comisión Nacional del Agua to user associations set up as part of the transfer process, associations whose function is to provide irrigation services to their members. Typically, Districts were divided into several administrative modules, each one represented by a users association. In a second stage responsibility for the primary infrastructure of each District (including main canal) was transferred from the Comisión to an apex organization (Sociedad de Responsabilidad Limitada). Overall administration of the District is the responsibility of a Water Committee (Comité Hidráulico) which is headed by the Chief Engineer (a Comisión staff member) and contains representatives of each of water user associations plus the apex organization. Irrigation service tariffs are fixed by each association and are intended to fully cover the cost of operation and maintenance; hence the reference to cost recovery in Table 1.

3.4 Third, one of the aims of both projects was to make the investments necessary to exploit the existing irrigation works more effectively—the focus was on maintaining and rehabilitating what had already been built rather than constructing new works. Fourth, there was a parallel process of institutional strengthening aimed at both the Comisión Nacional del Agua and the water user associations.

3.5 Finally, the objective statements made several references to productivity enhancement: “improve water-use efficiency”; “optimize the use of land and water”; “reduce the waste of irrigation water”; “prevent natural resource degradation”; “increase cropping intensities and yields”; and “increase crop diversification into higher value crops”. There was an expectation that the combined effect of the investments in infrastructure and institutional strengthening would be to boost returns per unit of land and water.

3.6 Based on this explication and, in order to simplify the discussion, this report will henceforth refer to the following objectives, which are taken to apply equally to both projects:

- (i) Upgrade irrigation works;
- (ii) Strengthen decentralization by consolidating District transfer; and
- (iii) Increase land and water productivity.

DESIGN AND IMPLEMENTATION

3.7 Both projects were designed to support large government programs: first and foremost the irrigation program, executed by the Comisión Nacional del Agua; and, to a lesser degree the Alianza program of capital investment subsidies—Alianza provided a vehicle for financing individual irrigation investments in the Districts and Units, particularly under the second project. The two projects will be distinguished from each other by their Spanish acronyms, PSRD and PRODEP.

Irrigation and Drainage Sector Project (PSRD)

3.8 PSRD was a time-slice operation, with the Bank financing US\$400 million of the government's US\$1.2 billion irrigation and drainage program. Unlike a standard investment project the time-slice was designed to support, in addition to a set of investments, a sector-wide dialogue between Bank and Borrower on policy issues, including investment selection criteria, environmental safeguards, procurement and auditing and monitoring and evaluation.

3.9 The project involved the following primary activities: a set of investments intended to improve irrigation works in Districts and Units; transfer of Irrigation Districts, including formation of water user associations and preparation of the necessary regulations; supply of the operation and maintenance equipment needed by water user associations; training of the staff of user associations and the Comision Nacional del Agua; and the development of new operating procedures. The expected outputs of the project and their respective costs are listed in Annex 1.

3.10 When Districts were transferred they were first divided into a series of sub-areas, or Modules, the number and size of each depending on the configuration of the irrigation works and the number of users. The Module is the core administrative unit and there is one water user association per Module. A Hydraulic Committee represents all the Modules (Associations) in a District and is the key interlocutor between the District and the Comision Nacional del Agua.

3.11 The operation spanned twelve years. Gestation was slow. The operation was identified in December 1988 and approved in December 1991. Implementation was protracted and the loan closed almost five years later than expected (in June 2000). The main reason for this was government delay in releasing budgets. Slow disbursements led to three extensions of loan closing.

On-Farm and Minor Irrigation Networks Improvement Project (PRODEP)

3.12 PRODEP was intended to build on the achievements of PSRD. While PSRD focused on upgrading the major off-farm networks, PRODEP financed complementary on-farm and minor network improvements. Once again, the emphasis was on improving existing schemes rather than further expansion of the irrigated area. The project was intended to support the lining of irrigation ditches, land leveling, the installation of drip and micro-sprinkler irrigation, electrification of pumps, and the building of underground drains. The project's outputs and costs are detailed in Annex 2.

3.13 This operation was also lengthy: it was identified in 1992 and the loan closed in 2002, almost two years later than expected owing to disbursement lags. The project was initially limited to certain Irrigation Districts but the loan agreement was amended during implementation to include the Irrigation Units.⁴ At the same time, the loan amount was reduced from US\$200 million to US\$170 million. The reduction was applied evenly to all components leaving their relative size unchanged.

4. This amendment was dated June 6, 1997 (Implementation Completion Report, No. 24603, 2002, p. 40).

OUTCOME

3.14 Because each of the assessed projects fed into a broader program it is a challenge to sort out the project specific effects. Both projects served Units as well as Districts but data from the Units is patchy (none are cited in the completion reports), partly it seems because there is inadequate government oversight of the Units—which lie outside the remit of the Comisión Nacional del Agua. There is ample information on the Districts but, even if this assessment were to limit itself to Districts financed by the project (PSRD and PRODEP covered, respectively, 72 and 14 Districts), within each District it is impossible to separate what was financed by the project from what was financed by the broader program. The report addresses this problem by: matching program-wide data against project objectives; identifying discrete technical inputs made by the projects; presenting survey findings on Districts that were covered by both projects (Alto Rio Lerma and Rio Mayo); and basing the economic analysis on the same subset of project Districts that was covered in the completion reports.

Relevance

3.15 Both projects are rated “high” on relevance because their objectives remain consistent with Bank and Borrower strategy today. The 2004 partnership strategy between the government of Mexico and the Bank refers to the need to manage water resources in a sustainable manner.⁵ The strategy contains no mention of the water user associations but implicitly it is the water users who must assume responsibility for addressing the problem of water scarcity. The two irrigation projects assessed here took a step in that direction by empowering water users through the transfer of the Districts, even if they did not centrally address the issue of over exploitation of water.

Efficacy

Objective (i). Upgrade Irrigation Works

3.16 This objective was achieved. According to the completion reports, PSRD and PRODEP exceeded the area targets set at appraisal: investments in irrigation works benefited 2.0 million ha under PSRD and 226,000 ha under PRODEP, an area respectively 5 percent and 27 percent larger than envisaged (Annexes 1 and 2). The machinery for operation and maintenance was satisfactorily transferred from the Comisión Nacional del Agua to water user associations. Under PRODEP, targets for the installation of pressurized (drip and sprinkler) irrigation and for underground drainage were substantially exceeded (Annex 2).

3.17 The bulk of the investment in works (93 percent in the case of PSRD) was devoted to deferred maintenance and rehabilitation—getting the best out of the existing system rather than expanding it. The projects’ emphasis on rehabilitation was consistent with the overall direction of Mexico’s irrigation program: while rehabilitation averaged only 22 percent of the investment in irrigation works between 1977 and 1984, the average

5. Country Partnership Strategy, March 2004, pp. 20-21 and Annex A1. With respect to agriculture and rural development, the list of Bank instruments proposed for the strategy period (FY05-08) is limited to water and natural resource management, support for rural savings and credit institutions, and land titling measures.

for 1997-2002 was 60 percent.⁶ When District transfer was initially proposed, user associations agreed to take over infrastructure in its existing state, on the understanding that the Comisión would retrospectively rehabilitate it, assuming the full cost. But government funding of rehabilitation did not match the scale of District transfer, actually falling in 1995. From 1997, after new negotiations with the water user associations, the rules were changed. In exchange for an increase in the Comisión's budget for rehabilitating and modernizing transferred Districts, the associations agreed that water users assume 50 percent of the cost of future investments in rehabilitation and modernization.

3.18 In terms of technical upgrade, a clear difference was made by both irrigation projects. The projects spurred the introduction of subsurface drainage (which, before 1990, many Mexican engineers had dismissed as inappropriate for Mexico) and promoted the use of light-weight equipment for canal dredging. Both innovations helped to reduce investment and maintenance costs. Cost containment was also favored by allowing the water user associations to take the lead in the tendering of works contracts: this had initially been resisted by the Comisión (which preferred to do the tendering itself) but the Bank strongly advocated the decentralized approach and eventually the Comisión came round. In the view of one expert observer, "the machinery operators hired by the water user associations are much more productive than the government staff that operated the machinery before farmers undertook the management of these systems".⁷ A major achievement was the expansion of the irrigated area under drip and micro-spray irrigation—it grew by 93,228 ha, more than four times what was expected at appraisal.⁸ Finally, the project introduced new technology for land leveling that lowered costs from US\$700/ha to US\$200/ha.

3.19 In all these respects the projects boosted the effectiveness of the overall irrigation program. Under PSRD, as a result of the technical upgrade, operation and maintenance costs fell by 30-40 percent in the period immediately after transfer. Under PRODEP, the efficiency of water conveyance and water application reached 87 percent and 69 percent respectively, in line with appraisal targets.

3.20 However, OED found in 2005 that, in the areas that it surveyed in Guanajuato and Sonora, technical upgrade was limited. (Obviously, this survey captured only a small part of the diverse reality of Mexico's irrigated areas.) Only a minority of the water users that were interviewed reported receiving a subsidy explicitly for irrigation investment and an even smaller proportion had upgraded to pressurized irrigation (Table 2). However, most of the upgrade took place after the startup of the two projects assessed, suggesting they may have contributed. Access to groundwater sources favors the introduction of pressurized irrigation, helping to explain why District Costa de Hermosillo—which is

6. 1977-84: Government of Mexico/World Bank, *Public Sector Investment Review* (report No. 63712), Washington, DC, 1986; 1997-2002: *Anexo del Cuarto Informe del Gobierno* (table on "Infraestructura Hidroagícola"), Mexico, DF, September 1, 2004.

7. E.V. Palacios, "Benefits and Second-Generation Problems of Irrigation management Transfer in Mexico" in D. Groenfeldt & M. Svendsen (eds.) *Case Studies in Participatory Irrigation Management*, WBI Learning Resource Series, Report No. 20247, 1997, p. 16.

8. PRODEP, *Implementation Completion Report* (No. 24603), December 2002, p. 11.

entirely geared to groundwater—showed the highest incidence of investment. From the first moment after transfer investment in Costa Hermosillo focused on farm-level improvements, giving it a head start in relation to other Districts where rehabilitation of head works and the primary canal network had to be accomplished before the need for on-farm improvements could be attended to.

Table 2. Investment in Irrigation

% of users who reported...	...receiving a public Irrigation subsidy	...installing pressurized irrigation	...installing pressurized irrigation since 1990
Districts			
Rio Lerma, Salvatierra (N=39)	12.8	10.3	75.0
Rio Lerma, Cortazar (N=31)	35.5	19.4	50.0
Rio Mayo, Module 04 (N=39)	10.3	-	-
Rio Mayo, Module 13 (N=32)	15.6	3.1	-
Costa de Hermosillo (N=48)	56.2	43.8	90.5
Units			
Las Golondrinas (N=16)	37.5	-	-
El Cubo (N=34)	17.6	-	-
All (N=239)	26.5	10.9	71.8

Source: OED Survey, 2005.

Objective (ii). Strengthen Decentralization by Consolidating District Transfer

3.21 This objective was achieved. A central aspect of decentralization was transfer of the public Irrigation Districts. A number of complementary measures were also important. First, the staffing of the Comisión Nacional del Agua needed adjusting. Second, the water user associations needed strengthening. Third, the burden of operation and maintenance costs needed to be shifted from government to the users.

3.22 The first project (PSRD) amply exceeded the transfer target. The original intention was to transfer 21 out of a total of 82 Districts; by project end 72 Districts had been transferred. The momentum continued after the project. Today there are 85 Districts and all but 4 have been handed over to users. Most of this transfer was accomplished under PSRD auspices, between 1991 and 1994, with involvement of 431 user associations.

3.23 As part of the push for decentralization the number of staff working on irrigation for the Comisión Nacional del Agua was reduced. From 1990 to mid-1994, 42 percent of the Comisión personnel involved in irrigation operation and maintenance were retired or released. The PSRD completion report notes that “the elimination of unionized staff controlling operation and maintenance activities has removed one of the farmers’ major complaints”.⁹ Since 1990 the number of staff working in the Districts has fallen from 8,000 to around 3,000. According to Johnson, the staffing target for the Districts—based on projections in the early 1990s about the number of staff needed following transfer (around 2,000)—had been achieved by 1998. But the number of staff today is about 3,000, 1000 of whom are effectively (but not formally) redundant.¹⁰

9. Report No. 22165, April 2001, p. 8, footnote 5.

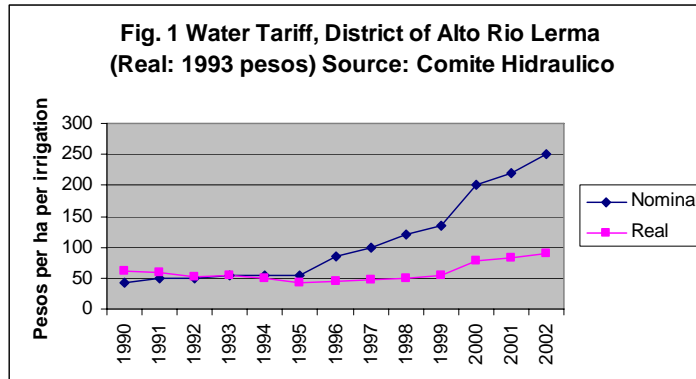
10. For the 2,000 target, see Table 6 in S.H. Johnson, Irrigation Management Transfer in Mexico, Research Report No. 16, International Irrigation Management Institute, 1997. In responding to an earlier draft of this report, the Comisión informed OED that in June 2004 there were 3,271 employees working on the Districts. But 1,014 of these were without

3.24 Towards the end of PSRD implementation the user associations were, for the most part, operating soundly. The 1999 survey (paragraph 2.2) found that most associations rated highly on organization and accounting, and on the operation and maintenance tasks for which they were responsible. Of the five areas of performance rated—Organization, Operation, Maintenance, Accounting, and Technical Efficiency and Modernization, only the last showed significant shortfalls (Annex 5, Table A5.3). A particular problem was the lack of attempt to measure the quantity of water applied to fields and to set targets for more efficient water use. Also, there was some weakness in forward planning reflected in absence of measures to replace worn out equipment and to build up a contingency fund.

3.25 The absence of a contingency or savings fund severely weakens the water user associations. In the 1999 survey only 6 percent of associations kept such a fund. This would be less critical if the volume of water authorized was the same from one year to the next. But in periods of drought (the case for the north-west in much of the past five years) the volume authorized for release from reservoirs is reduced and because associations have less water to sell their funds shrink, leading maintenance to be deferred. Water user associations could tackle this by levying a special quota in years of good water availability, creating a fund that could be used to keep maintenance up in years when water is scarce. But the Comisión advocates an alternative approach which would entail reducing the size of the Districts to bring them more in line with available water supply, reducing the sharp fluctuations between years in the area irrigated.

3.26 Decentralization was also predicated on increased recovery of costs from users. Water tariffs roughly quadrupled at the time of transfer, users increasing their share of operation and maintenance costs from 20 percent to an average of 90 percent. This was a slight shortfall in terms of project targets: for Districts covered by PSRD the target was 100 percent recovery. Since transfer, although most associations have continued to raise their tariffs in nominal terms, the increase has not keep up with inflation leading, in most cases, to a deferment of maintenance. Delays in performing maintenance works, in turn, make water users reluctant to agree to tariff increases. But there are exceptions: in the District of Rio Alto Lerma OED found that tariffs had increased slightly in real terms over the past decade (Figure 1).

a job to do given that their functions had been taken over by the water user associations. On the other hand, the number of mid-level staff (263 in June 2004) was short by 39, reflecting the high response to the government's voluntary retirement program. The Comisión concedes that a more effective staffing strategy should have been put in place at the moment of the transfer (Communication No. BOO.06.04.420, July 12, 2005).



3.27 One issue is whether tariffs are high enough to cover the costs of administration plus operation and maintenance; the other is whether they are actually collected. Unlike in many countries, tariff collection in Mexico is assured because the user has to pay for the water before it is delivered. The 1999 survey found that in 87 percent of the associations, users complied with their statutory obligations (which include payment of tariffs), in 73 percent, the water tariff was revised each year and, in 63 percent, the association was taking steps toward financial self-sufficiency (Annex 5, Table A5.3).

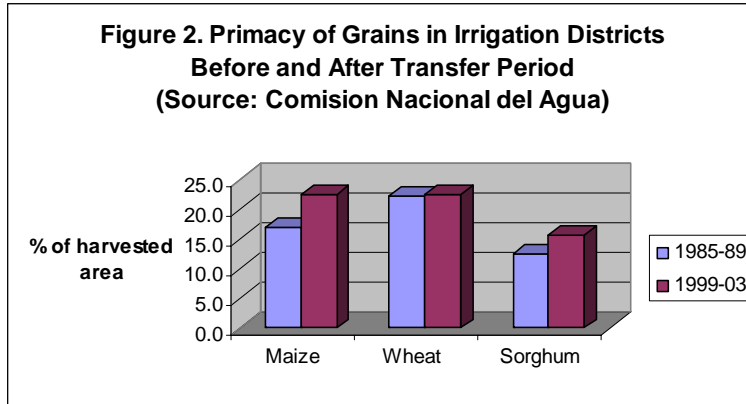
Objective (iii): Increase Productivity

3.28 This objective was partially achieved: there was an increase in physical yields but, in real terms, revenues per unit of land and water did not increase. Between 1985-89 and 1999-03—that is, comparing the periods before and after transfer—the mean harvested area in the Districts fell by 18 percent. In real terms, gross output value declined by exactly half that amount, reflecting an improvement in physical yields rather than an improvement in prices. Between the two periods mean tons of produce per hectare rose by 50 percent (from 9.7t/ha to 14.5t/ha). In constant pesos, gross revenue per hectare rose by 10 percent (from \$5,356/ha to \$5,901/ha).¹¹

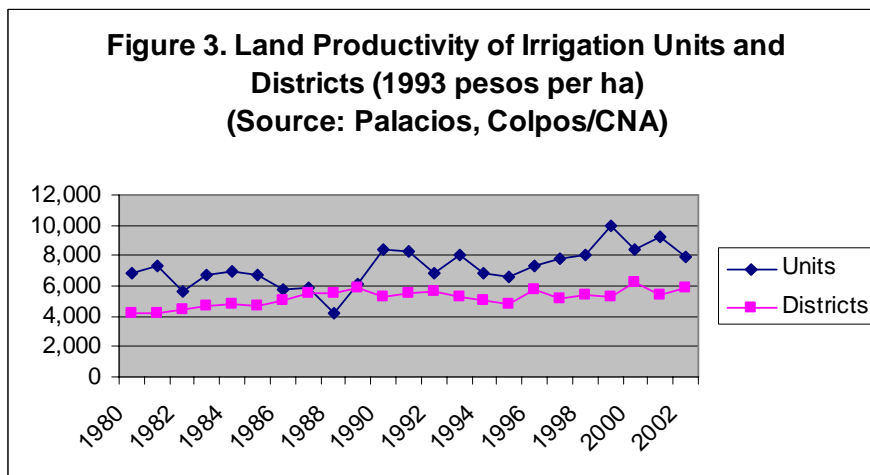
3.29 Underlying the sluggish growth in farm revenues is a combination of falling real prices for the major grains and a rise in the share of the Districts devoted to these crops. Between 1990 and 2003, in constant pesos, the average rural price of maize and wheat plummeted respectively by 40 percent and 39 percent; the price of sorghum, the third-ranked grain by area, held roughly steady. Between them these three grains accounted on average for 51 percent of the harvested area in 1985-89 and 61 percent in 1999-03 (Figure 2). In the case of maize, although price supports have been reduced substantial protection is still conferred through marketing subsidies. When the irrigation projects assessed here were being designed one of the stated objectives (Table 1) was to promote crop diversification. So far this has not happened to any significant degree. This is a function not only of distortions in the incentive regime; it reflects the high risks associated with diversification, the limited development of contract farming and export niches and the relative inflexibility of the water supply in the Districts: most of the water is from surface sources and does not lend itself to the on-demand irrigation required by many fruit and vegetable crops. According to the Comisión, the main constraint on

11. Data supplied to OED by the Comisión Nacional del Agua.

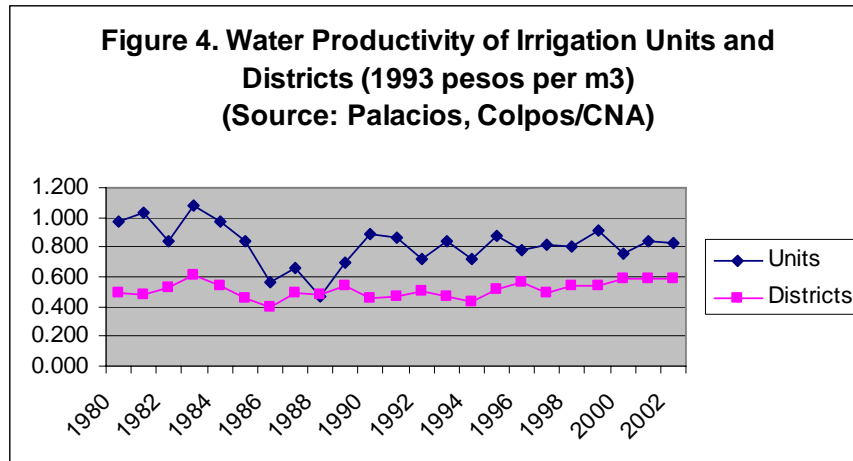
diversification of the Districts is the difficulty that farmers face in obtaining working capital credit and the complications and risks involved in marketing perishable produce. Providing farmers with the right irrigation infrastructure is a necessary but not a sufficient condition for diversification.



3.30 There is a notable discrepancy in revenue per hectare between the Districts and the Units (Figure 3; Annex 4). Both before and after the transfer period, the Units reaped higher gross revenues per hectare. This reflects the greater use that Units make of groundwater compared to the Districts: the greater reliability and flexibility of this source facilitates crop diversification and irrigation upgrade, pushing up productivity. To a smaller extent the discrepancy between Units and Districts may also reflect differences in entrepreneurial skills. Because they have a long tradition of operating independently of the government, on aggregate, water users in the Units may be better organized and more resourceful than those in the Districts. If this skills gap has narrowed somewhat since transfer it has yet to show up in a substantial narrowing of the productivity gap between Districts and Units. But the Comisión points out that data on the Units are less systematic and less reliable than those on the Districts, making it hard to be sure that there is a large productivity gap. (By the same token the gap might be larger than the existing data suggest.)



3.31 The data on productivity per unit of water reveal a similar gap between Units and Districts. Here the measure of productivity is gross revenue per cubic meter of water, comparing the volume of water allocated with the value of crops grown. From the pre-transfer to the post transfer period the gap remained more or less the same (Figure 4; Annex 4).



3.32 Data on farm incomes from OED's 2005 survey are consistent with the lack of productivity growth referred to above. Unsurprisingly, for two-thirds or more of users irrigated farming is the single most important source of income. Overall, only one-quarter of respondents report that this income source has grown in relative importance since 1995 (although for Rio Mayo, Module 04, the proportion is over 40 percent). Finally, in only one-fifth of cases do users report that the total household income (in terms of purchasing power) has grown over the past 10 years.

(c) Efficiency

3.33 For both projects efficiency is rated "substantial", despite some suggestion that the completion report overestimated the economic rate of return. With respect to the ten key Districts common to both PSRD and PRODEP—accounting for about one-half the total irrigated area in all Districts—gross crop revenue fell by 21 percent compared to an increase of 27 percent in the other districts (Table 3).¹² This was largely a consequence of differences in water availability. Six out of the ten project Districts are located in the Pacific Northwest, an area that was hard hit by drought in the late 1990s. The share of water derived from pumping groundwater was the same for the ten-district subset and the other districts: 15 percent in both cases. It is regional differences in the incidence of drought rather than differences in access to groundwater (which fluctuates less than water in reservoirs) that explains the output gap.

12. Rio Yaqui, Delicias, Alto Rio Lerma, Rio Colorado, Bajo Rio San Juan, Rio Mayo, Carrizo, Rio Fuerte, Culiacán, and Guasave. One district was unique to PSRD: Colonias Yaquis. Four districts were unique to PRODEP: La Laguna, Pabellón, Lazaro Cardenas and Bajo Rio Bravo.

Table 3. Trend: Project Subset of Irrigation Districts Compared to Other Districts

	1993	2003	% Change
Harvested Area			
('000 ha)			
Project subset	1,627	1,246	-23.4
Other Districts	1,368	1,352	-1.2
Gross Crop Revenue (Millions of 1993 pesos)			
Project subset	9,242	7,292	-21.1
Other Districts	6,173	7,859	27.3
Gross Water Availability			
(Million m3)			
Project subset	19,435	10,759	-44.6
Other Districts	12,186	13,569	11.3

Note. Subset refers to 10 Districts common to PSRD and PRODEP. Rio Yaqui, Delicias, Alto Rio Lerma, Rio Colorado, Bajo Rio San Juan, Rio Mayo, Carrizo, Rio Fuerte, Culiacán, and Guasave.

3.34 In the completion report, the economic rate of return was re-estimated as 32 percent for PSRD. The economic analysis was extremely thorough. The assumptions about yields and prices were conservative and consistent with recent trends. The eleven districts chosen accounted for 46 percent of the investment cost and 46 percent of the area transferred.¹³ But the analysis fails to allow for the 20 percent shrinkage of the harvested area that has affected these districts—a consequence of the declining availability of surface water. It is also overoptimistic about the level of diversification into high-margin crops, assuming that by Year 10 of the project, 42 percent of crop returns would be derived from chili peppers and tomatoes; in practice, these crops accounted jointly for 11 percent of gross revenue in 2003. If the economic analysis is adjusted to allow for these factors the rate of return falls to 15 percent (Annex 6). Although this is a significant reduction the rate of return is still acceptable, leading OED to rate efficiency of PSRD as substantial.

3.35 In the case of PRODEP, the completion report based the analysis on 14 districts, 10 of which were the same as for PSRD, and used the same farm models. Making the same adjustments for PRODEP that were made for PRSD may be expected also to yield a revised rate of return of around 15 percent, compared to the 35 percent estimated at completion.

3.36 These estimates are based only on the Districts but the two projects also covered Irrigation Units: PSRD from the outset and PRODEP following a mid-term amendment to the project agreement. But it is not clear from the completion reports how many Units were covered and what area they represented. In general, information on the Units is less systematic than that for the Districts making it hard to monitor any difference the projects might have made here.

13. The 11 were: Valle del Yaqui, Delicias, Alto Rio Lerma, Rio Colorado, Colonias Yaquis, Bajo Rio San Juan, Valle del Rio Mayo, Carrizo, Rio Fuerte, Culiacan, Humaya and Guasave.

3.37 In summary, the outcome of both PSRD and PRODEP is rated satisfactory, based on the aggregation shown in Table 4.

Table 4. Derivation of the Outcome Rating

	Irrigation and Drainage Sector Project (PSRD)	On-Farm and Minor Irrigation Networks Improvement Project (PRODEP)
CRITERIA/1		
Relevance	High	High
Efficacy	Substantial	Substantial
Efficiency	Substantial	Substantial
Outcome	Satisfactory	Satisfactory

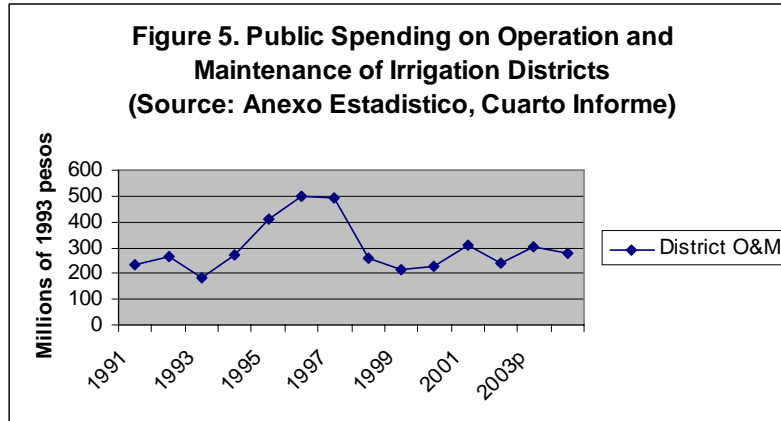
/1 The criteria are defined in the frontispiece of this report.

INSTITUTIONAL DEVELOPMENT IMPACT

3.38 Both projects are rated “substantial” on institutional development impact. The irrigation projects substantially empowered water user groups to assume control over the management of the Districts. Also, under the auspices of PSRD, a National Water Law was passed in 1994, permitting the sale of water rights, this enabling more efficient farmers to expand their operations and giving non-farm users the right to bid for water. The legal framework governing the cost recovery obligations of the user associations was adequately worked out, although there is still a gap with respect to measures for limiting the overexploitation of water. A further weakness concerns the absence of an integrated planning framework for the Units and Districts—the Units are not negligible accounting for 47 percent of the irrigated area.

3.39 Both projects were founded on an assumption that the federal government’s fiscal burden would be reduced by the process of District transfer, because water users would recover a larger share of total costs. This is not the case. Because water tariffs have not yet reached self-sufficiency level the associations continue to depend partly on government for the funding of operation and maintenance tasks that are formally the associations’ responsibility. Federal spending on these items has not fallen in real terms since 1991 (see paragraph 3.23), despite the reduction in Comision staff working on operation and maintenance (Figure 5). The 1993-97 bulge reflects deferred maintenance which the Comision carried out as a parting gesture before or shortly after the Districts were transferred. It also shows the extent of government response to a drought in northern Mexico in 1995-96. User associations had no water to deliver to farmers, the collection of fees dropping to nearly zero. The government stepped in with a 100 percent subsidy for most associations, staving off their collapse.¹⁴

14. PRODEP Implementation Completion Report, (No. 24603), December 2002, p. 21.



3.40 Also, the rate of improvement in the quality of irrigation service seems to have leveled off since District transfer. The performance of the water user associations was assessed, using two sets of evidence. First, the 1999 rating instrument was reapplied by OED in early 2005, the ratings being based on interviews with key informants (Annex 5, Table A5.1). The ranking was the same in 2005 as it was in 1999, with the Rio Mayo modules scoring highest and Costa de Hermosillo showing the weakest performance. All of the areas performed slightly less well in 2005 than in 1999 but this may not be significant because it was not possible to re-interview the same people.

3.41 Application of the rating instrument was combined with an open ended discussion with officials in the CNA District office and in the modules. In both states informants described how water was being overexploited (too many withdrawals from dams in Sonora; mining of aquifers in Sonora and Guanajuato). In the case of groundwater, decentralization has not been accompanied by adequate measures to enforce those provisions of the National Water Law that aim to control the rate of extraction. In some cases (e.g. Costa de Hermosillo) there are conflicting accounts of how much is removed each year from the aquifer, coupled with uncertainty about the stock of water available. CNA has little control over the rate at which private wells are sunk (most drilling taking places in Units) and imprecise data about the level of withdrawals from these sources. The lack of an integrated planning framework for Units and Districts aggravates this problem.

3.42 A second source of information is OED's 2005 survey of water users. To the extent possible the 2005 instrument incorporated items applied in the same modules in Rio Mayo in a 1994 survey. Asked if irrigation services had improved since transfer, in 1994 and 2005, a majority of respondents in Rio Mayo Module 13 said "yes" and, also in both years, were more positive than those in Module 04 (which has currently been taken back under CNA management following a leadership dispute). But over the period there was some decline in the share of users in Module 13 who reported that service had improved (Annex 5, Table A5.2).

3.43 The OED survey gives a mixed reading of improvements in the quality of irrigation service. On various measures of "fairness" (Table 5), a minority of users interviewed in 2005 reported that circumstances have improved since the start of the transfer period. The Units present a more positive picture than the Districts.

Table 5. Fairness: Change Between Circumstances Before 1990 (“Pre-Transfer”) and Now

% of users who reported an <i>improvement</i> in...	...terms of less corruption (less bribing of ditch tenders to supply more than the agreed amount of water)	...the way in which water is distributed between users	...terms of reduced conflict between users over access to water	...the way in which the water tariff is determined
Irrigation Districts				
Rio Lerma, Salvatierra (N=39)	46.2	51.3	46.2	43.6
Rio Lerma,. Cortazar (N=31)	45.2	41.9	38.7	35.5
Rio Mayo, Module 04 (N=39)	20.5	38.5	12.8	23.1
Rio Mayo, Module 13 (N=32)	34.4	53.1	43.8	28.1
Costa de Hermosillo (N=48)	Na	8.3	14.6	8.3
Irrigation Units				
Las Golondrinas (N=16)	43.8	62.5	50.0	50.0
El Cubo (N=34)	52.9	70.6	61.8	67.6
All (N=239)	39.8	43.1	35.6	33.9

Source: OED Survey, 2005 (Na=not applicable: ditches are not significant in Costa de Hermosillo).

3.44 What of change over the last decade? A majority of users in 2005 report that the water user association defends its members interests and makes a good use of funds. But less than 50 percent feel that in these areas there has been an improvement over the past 10 years (Table 6). Once again, a more positive picture emerges from the Units than the Districts.

Table 6. User Assessment of the Water User Association

% of users who reported...	...that the WUA defends the interests of users	...that WUA defense of user interests has improved over the last 10 years	...that the WUA makes good use of funds raised from water tariffs	...that WUA use of funds from water tariffs has improved over the last 10 years
Irrigation Districts				
Rio Lerma, Salvatierra (N=39)	69.2	38.5	61.5	15.4
Rio Lerma,. Cortazar (N=31)	35.5	32.3	38.7	25.8
Rio Mayo, Module 04 (N=39)	53.8	38.5	48.7	35.9
Rio Mayo, Module 13 (N=32)	78.1	62.5	71.9	50.0
Costa de Hermosillo (N=48)	54.2	33.3	54.2	20.8
Irrigation Units				
Las Golondrinas (N=16)	93.8	50.0	81.3	50.0
El Cubo (N=34)	64.7	67.6	61.8	52.9
All (N=239)	61.5	44.8	57.7	33.5

Source: OED Survey, 2005

SUSTAINABILITY

3.45 The sustainability of PSRD and PRODEP is rated “likely”. The District transfer process is unlikely to be reversed and, even if the potential for more efficient water use has not yet been realized, transfer was a step in the right direction. Nevertheless, there is an undeniable need to use water more sparingly. The District of Costa de Hermosillo is illustrative. It generates high returns per unit of water used but according to various independent estimates withdrawals from the aquifer exceed the annual rate of recharge. OED encountered a similar problem with respect to groundwater supplies in the District of Alto Rio Lerma and neighboring Units.

BANK AND BORROWER PERFORMANCE

3.46 For both irrigation projects, performance of Bank and Borrower was satisfactory. The Bank’s technical input was generally of high quality. The projects’ successful contribution to the upgrade of irrigation works partly reflected the quality, continuity and accessibility of expertise fielded by the Bank. One of the task managers was an experienced irrigation engineer who worked on the projects for eight years, three of these based in the Mexico resident mission. The projects’ design was flexible enough to accommodate mid-course adjustments that favored technical upgrade. The Bank has also been effective in showcasing the Mexican experience, by inviting irrigation professionals from other countries on study tours designed to promote participatory irrigation management.

3.47 Once it had overcome initial resistance to “letting go”, the implementing agency, Comision Nacional de Agua, made a highly satisfactory job of expediting the transfer process. The performance of government overall (leaving aside the Comision) is rated moderately satisfactory given the significant disbursement delays. Adding up, this yields an aggregate Borrower performance rating of satisfactory.

4. The Agricultural Productivity Improvement Project

OBJECTIVES

4.1 Based on the statement of development objectives (Table 7), this assessment derives three primary objectives:

- (i) Raise poor farmers' access to investment subsidies;
- (ii) Enhance agricultural services for small farmers; and
- (iii) Strengthen decentralization.

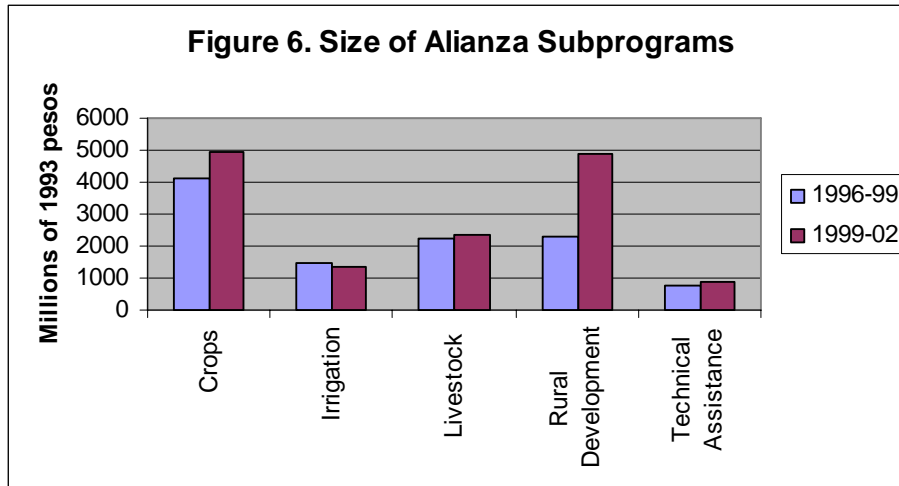
Table 7. Objectives of the Agricultural Productivity Improvement Project

"[The project development objective is...] To **increase capitalization of small farmers** and improve their productivity and income by promoting the adoption of sustainable agricultural production systems, by providing technical and financial assistance to eligible beneficiaries under a matching grant scheme. This would be done within the framework of selected programs currently being executed under the ongoing Agricultural Development Program *Alianza para el Campo*. This objective would be achieved through: (i) the **improvement of access of small and poor farmers** to the activities currently supported by the three programs of the currently 90 percent disbursed Bank-financed Rainfed Areas Development Project, as well as the Rural Development Program, that are being exercised under Alianza; (ii) **promotion of a better integration of the various activities of Alianza** aimed at development of irrigated and rainfed agriculture; (iii) generation, validation and **transfer of technologies suited to small farmer production conditions**; (iv) strengthening **production support services** for small farmers; and (v) support of the Government promoted **decentralization** process by strengthening the planning and implementation capacity of the State institutions and producers' organizations" (Project Appraisal Document, p. 2, emphasis added).

DESIGN AND IMPLEMENTATION

4.2 *The program.* The project (ALCAMPO) supported the government's Alianza para el Campo program, which was launched in 1996 and continues to operate to this day.¹⁵ Alianza aims to boost productivity by providing matching grants for a variety of farm and off-farm investments and by delivering research, extension, information and training services. It is a complex program offering a broad menu of federal, state and regional subprograms. In 2000, it comprised 40 federal programs administered by the Ministry of Agriculture, plus additional programs administered by the Comision Nacional del Agua (Figure 6). In order to reduce Alianza's administrative overhead, the program was executed by existing federal and state agencies, rather than by a specialized unit.

15. The program was renamed Alianza Contigo with the change of administration in 2001.



4.3 Alianza is not intended to be a targeted program. The question is not so much whether subsidies favor better off groups (they clearly do) but whether they represent an effective use of public resources. A key principle of Alianza is leverage. On average, for every peso invested by the federal government, producers put in 2.82 pesos, of which only 1.67 pesos were obligatory matching funds—the balance being an additional contribution by the beneficiary.¹⁶ But some of this producer funding may be forthcoming even if the program did not exist. The FAO-Ministry of Agriculture evaluation classifies beneficiaries into five socioeconomic types. Types IV to V (the better off) account for 19 percent of beneficiaries and capture 24 percent of the subsidy.¹⁷ It is possible that many in this group would have made the investment even without a subsidy. For lack of a control group of non-beneficiaries (matched by income level) the program's leverage is impossible to assess.

4.4 The income effect of Alianza seems to have been greatest for those who are already fairly comfortable. Better-off producers were more likely to report an increase in income following participation in the Alianza program: 34 percent of beneficiaries in the bottom income stratum reported an increase in income, compared to 47 percent of the middle stratum and 52 percent of the top stratum.¹⁸ Among illiterate beneficiaries, 23 percent said their income increased compared to 53 percent of those with post-secondary education. The type of land tenure also influenced the increase in income: 46 percent of private owners benefiting from the program reported an income increase compared to 35 percent of beneficiaries in the land reform and communal sector.¹⁹

4.5 *The project.* ALCAMPO worked within the framework of the broader Alianza program but applied a tighter set of eligibility criteria to ensure that funds were channeled to a subset of beneficiaries that would be poorer than the program average. At appraisal it was characterized as a targeted intervention. The project financed demand-driven

16. FAO/SAGARPA Evaluation, Informe General, 2000, p. 76 & p. 120.

17. FAO/SAGARPA Evaluation, Informe General, 2003, p.9.

18. FAO/SAGARPA Evaluation, Informe General, 2000, p. 83.

19. FAO/SAGARPA Evaluation, Informe General, 2000, p. 108.

investment subprojects using matching grants with the beneficiary contribution made up front in cash or kind. The matching grants were financed jointly by central and state government and the terms varied between each of the four subprograms supported by the project. For *irrigation development* there was a grant equal to 35 percent of the cost of the subproject with eligibility limited to farms no larger than 30 hectares. For the two subprograms *dairy technology improvement* and *improved pasture establishment* there was a grant of 50 percent limited to producers with no more than 70 cows. Finally, under the *rural development* subprogram, up to US\$2,220 per beneficiary would be provided to households farming on less than 20 hectares of rainfed land or 5 hectares of irrigated land.

4.6 In addition to the targeting implicit in these eligibility criteria, the project aimed to target particular groups and regions:

“The project activities, although nationwide in scope, would be targeted to groups of eligible beneficiaries including indigenous people, women and rural youth located mostly in the Center and Southern States of the country, i.e., the areas with the largest concentration of small and poor farmers. Eligibility of households would be screened applying simple and easily verifiable criteria based on size of holding and/or livestock assets.” (Project Appraisal Document, p. 6)

The project used the framework of the broader program for pragmatic reasons: the Bank hoped that using existing arrangements and procedures would help to smooth disbursement, avoiding the problems encountered by other Bank-supported projects that did not have such an established home. Thus, a targeted project was inserted within an untargeted program. A considerable monitoring effort was needed to ensure that the government agencies applied eligibility criteria for the (minority of) subprojects financed by the project that were tighter than the criteria applied by those same agencies to the (majority) of subprojects financed within Alianza but outside the project. Only the first five subprojects financed by ALCAMPO were subject to prior review by the Bank. The appraisal document notes that this limited review “would be largely compensated by a significant effort to monitor procurement procedures as part of project supervision”, including “field review of a sample of subprojects” (p. 53).

OUTCOME

(a) Relevance

4.7 The relevance of ALCAMPO to current strategy is rated “modest”. The 2004 Mexico/Bank strategy contains no reference to Alianza and expresses no support for the principle of capital investment subsidies. Nevertheless, Alianza has continued to grow in both absolute and relative terms. Clearly it is still considered relevant by the government, if not by the Bank. However, in the context of Mexico’s overall development needs, it probably does not represent a sound use of public resources given weak targeting and the evidence (examined below) that the process for identifying and appraising subprojects lacks rigor.

(b) Efficacy**Objective (i): Raise Poor Farmers' Access to Investment Subsidies**

4.8 It is not possible to assess if this objective was achieved because project monitoring and evaluation was, in the words of the completion report, “unsatisfactory”. Therefore, it is not possible to verify if the project-specific targeting rules were observed by the multiple agencies involved in project implementation; nor is it clear what share of project proceeds went to the poorer states or benefited the groups (including indigenous people and women) identified as a priority at appraisal. The challenge of building a monitoring system capable of spanning the 32 state governments and the regional offices of the Ministry of Agriculture proved insurmountable. As an alternative, the completion report could have drawn on data from the sample of subprojects selected for field review during supervision. But this data is missing from the completion report and was not available to OED. Instead the completion report relies on the series of annual evaluations conducted by FAO and the Ministry of Agriculture. These evaluations provide information on the overall Alianza program. This dataset does not separate out subprojects financed by ALCAMPO. The quality and reliability of the information varies widely between the states, because the evaluation employed different consultant teams in each state.

4.9 Program and project may, to some extent, have worked against poor farmer access to investment subsidies. ALCAMPO (like Alianza) required that would-be beneficiaries make an upfront contribution to the subproject investment cost. There were no credit facilities to help the would-be beneficiaries cover their share of the subproject cost. (In commenting on an earlier draft of this report, the Bank task manager argued that applicants could have used funds from Procampo, a transfer program, to cover this cost; but it is not clear that Procampo supplied the necessary surplus over subsistence needs.) Also, the matching grant was retroactive and at the moment they were required to make the investment applicants could not be sure that they would qualify for it.

4.10 Taking the program as a whole, access to the investment subsidies appears to have had a positive impact on incomes. The FAO evaluation of Alianza found that participation in Rural Development (which absorbed one-half of ALCAMPO's subproject funding) was associated with the following increases in beneficiary income: 26 percent for crop production; 37 percent for livestock production; and 59 percent for rural non-farm activities. However, because the evaluation did not include a control group of non-beneficiaries it is impossible to estimate how much of this increase was attributable to the program. Also, because the FAO evaluation was program-wide in scope it is not clear what share of benefits may be attributed to the Bank-supported project.

Objective (ii): Enhance Agricultural Services for Small Farmers

4.11 This objective was partly achieved. There were some positive signs. The completion report states that, in the farming systems targeted by the project, productivity increased by 20 percent, compared to the 25 percent forecast at appraisal. The number of

beneficiaries served by project-supported extension services was 540,000, 54 percent more than projected.

4.12 Other evidence is less positive. ALCAMPO had a sizeable research and extension component (accounting for one-third of project costs) and the completion report states that it was reflected in an upturn in federal funding of these services. But the same source notes that state governments have not supported these activities and the available programs are not sufficiently demand driven: it is the suppliers of these services and not farmers who set the priorities. In general, technical assistance did not adequately complement the investments in infrastructure: for example, under ALCAMPO, it was provided to only seven percent of the producers who received subsidies for pasture improvement.²⁰

4.13 Taking Alianza as a whole, technical assistance was short changed. Successive FAO evaluations have shown that the income impact of Alianza support is greater the higher the level of technical assistance provided.²¹ The absence of supporting technical assistance for Alianza investments has been noted by several evaluations.²² Only one-third of Alianza beneficiaries received technical assistance as a complement to the subproject investment; two-thirds expressed a need for such assistance.²³

4.14 Of the beneficiaries in the Crop Promotion subprogram in 2001, 26 percent experienced an increase in the level of technology that was attributable to Alianza support.²⁴ For the program as a whole there was less impact: only 10 percent of beneficiaries reported technical upgrade.²⁵ Most of the investments subsidized by Alianza were used to replace or rehabilitate existing equipment or systems, rather than to promote the shift to a higher technical plane. This is mainly because only better-off producers could put up the matching funds, and most of these producers tended already to be operating at a relatively high technical level before they received the subsidy.

4.15 Producers in lower income strata reported more technical change as a consequence of the program than those in higher strata. Figure 7 is based on the equipment and inputs used in crop farming, assigning each item to a scale.²⁶ It suggests that farmers in the lowest socioeconomic strata were more likely than better-off farmers to move to a higher technological plane as a result of receiving the Alianza subsidy. For a program whose ultimate aim was to boost productivity, this lack of targeting to poorer producers seems to indicate a missed opportunity, given that it is the less-rich farmers that show the highest response potential.

20. Report No. 29439, June 2004, pp. 7-8.

21. FAO/SAGARPA Evaluation, Informe GeneralG, 2003, p. 41.

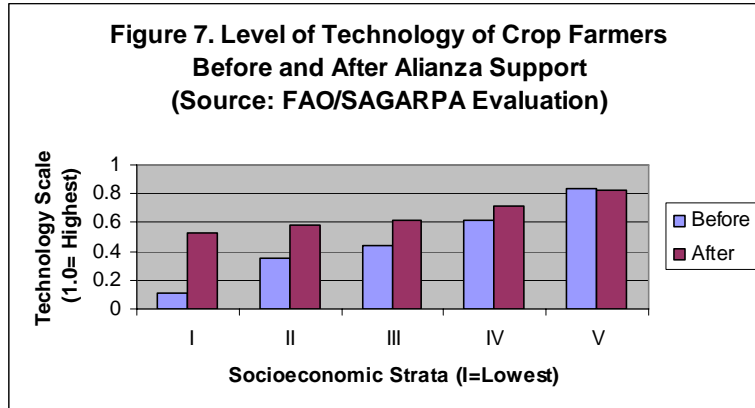
22. FAO/SAGARPA Evaluation, Informe General, 2000, p. 50.

23. FAO/SAGARPA Evaluation, Informe General, 2000, p. 46.

24. FAO/SAGARPA Evaluation, Fomento Agrícola, 2003, p. 69.

25. FAO/SAGARPA Evaluation, Conclusiones, 2002, p. 26.

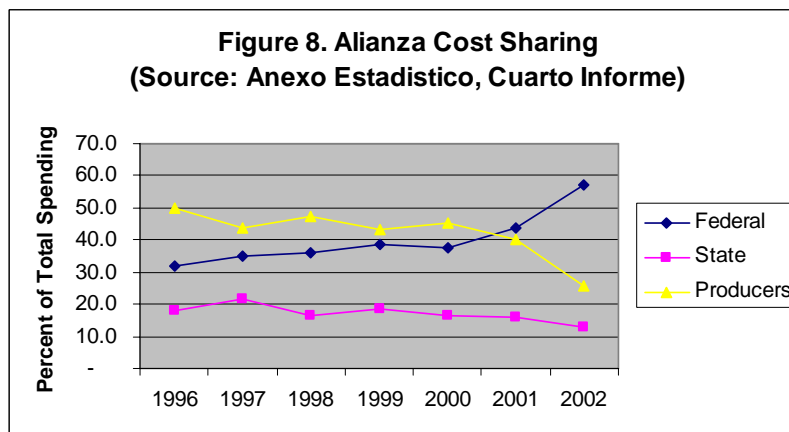
26. FAO/SAGARPA Evaluation, Informe General, 2003, p.37.



Objective (iii): Strengthen Decentralization

4.16 This objective was not achieved. Bank funds earmarked for strengthening decentralization were not disbursed, the loan proceeds being reallocated to the financing of investment subprojects. ALCAMPO did not improve the capacity of state governments to administer the Alianza program. Contrary to expectations it did not help to improve subproject preparation and selection mechanisms, either by state governments or by central government.

4.17 At the program level, the project had little leverage over the share of the subsidy borne by state governments—a share that has declined slightly over time (Figure 8). The steep rise in the federal government's share partly reflects the growth in importance of the Rural Development subprogram which involves lower producer co-financing. It is the central rather than the state governments that has picked up the slack.



4.18 The state governments' share of program costs has declined partly because state governments still find the operating rules inflexible, preferring to put most of their rural development funds into state-specific initiatives where they can set their own priorities.²⁷ The incentive mechanism governing state contributions to Alianza is flawed. In principle,

27. FAO/SAGARPA Evaluation, Informe General, 2003, p. 20.

the volume of federal transfers to any given state is related to the amount subscribed by that state the previous year. But, in practice, the level of federal transfers is only weakly correlated with state contributions.²⁸ Also, the level of federal oversight of the program has weakened. Since 2001 state governments have been given full control over resource allocation (of federal funds as well as the state counterpart) for each of the main subprograms.

(c) Efficiency

4.19 Efficiency is rated modest. The economic analysis in the completion report shows acceptable rates of return to a number of farm models (16 percent, on average). But the data informing this analysis were not based on a survey of poor farmers that had received ALCAMPO funding. Second the analysis covered three of the four subprograms financed by ALCAMPO, leaving out Rural Development—which accounted for 80 percent of project beneficiaries. Was funding from this subprogram well used? Subsidies may have been too thinly spread to have a big impact on productivity. Beneficiary households received, on average US\$250 per household, compared to the US\$2,200 that was expected at appraisal. The equipment subsidized was very modest (e.g. knapsack sprayers).

(d) Adding Up: Overall Outcome

4.20 In summary, the outcome of ALCAMPO is rated unsatisfactory (Table 8). Owing to the project's monitoring deficiencies it is unclear how many, or by how much, the project's target group of poorer producers actually benefited.

Table 8. Derivation of the Outcome Rating

	Agricultural Productivity Improvement Project (ALCAMPO)
CRITERIA/1	
Relevance	Modest
Efficacy	Modest
Efficiency	Modest
Outcome	Unsatisfactory

/1 The criteria are defined in the frontispiece of this report.

Institutional Development Impact

4.21 ALCAMPO's institutional development impact is rated "negligible". Given that the follow-on project mooted in the 2002 Country Assistance Strategy was dropped, in the long run, what counted was the mark left by this single project on the continuing program. Although project spending amounted to almost one-half billion dollars, the implementation period was relatively short (four years), reducing the opportunity for project leverage over the efficiency of program resource allocation.

4.22 Does the Alianza process ensure that the best proposals get selected? The operating rules state that subproject proposals will be subject to technical and financial appraisal in order to ensure that only projects with the highest potential for boosting

28. FAO/SAGARPA Evaluation, Informe General, 2003, p. 20.

productivity are selected. Since 2001 there has been less oversight of the appraisal process by central government. The initiative has passed from FIRCO (a federal agency experienced in project appraisal) to state governments. State governments have not taken steps to train their staff in project appraisal and the loss of rigor in the appraisal process is acknowledged.²⁹ According to the FAO evaluation, “in some cases, state governments review each proposal up to six times, but none of these reviews amounts to a serious appraisal and often there is no detailed check that the proposals meet the eligibility requirements for Alianza support”.³⁰ The system of incentives rewards the speed of disbursement more than the rigor with which appraisal is undertaken.³¹ The order in which proposals are presented has more bearing on which get accepted than the appraisal process. Persons interviewed by OED confirmed that the prevailing principle is “first come, first served”. This makes it more likely that the better-connected will capture a disproportionately large share of the benefits.

4.23 Equipment and input retailers play a big role in helping would-be beneficiaries prepare investment proposals; this expedites the application process but brings a cost. Many applicants lack the skills to prepare proposals. Retailers quickly learn what proposals are most likely to be accepted and the outcome is quicker and surer if applicants deal directly with retailers rather than the Alianza office. Retailers will typically discount the equipment they sell by an amount equivalent to the subsidy, so sure are they that they will subsequently be able to recoup the money from the program. Informants noted that in some towns (e.g. Celaya) the number of retailers has risen sharply since the start of Alianza. Retailers have an incentive to exaggerate the sophistication and the cost of the equipment that is required; and, in a system where 90 percent of proposals get accepted, there is little external check on this inflationary bias. Also, there is no explicit screening of the credentials and record of companies that sign up to provide equipment and install systems for Alianza beneficiaries; and no formal blacklisting of suppliers that do a bad job.

4.24 Flaws in the monitoring system reduce the program’s capacity to leverage productivity growth. The lack of up-to-date information on producer characteristics makes it harder to channel resources to those with most potential for increased productivity. None of the state governments have funded the baseline surveys that were expected of them. A further concern is that the Alianza’s weak arrangements for tracking beneficiaries enable the same producer to benefit simultaneously from different subprograms or in consecutive cycles of the same subprogram. In 2004, for the first time, there was an attempt to redress this failing. During the first two months of the application season, only persons who had not previously been funded by Alianza could apply.

29. FAO/SAGARPA Evaluation, Informe General, 2003, p. 30.

30. FAO/SAGARPA Evaluation, Informe General, p. 29.

31. FAO/SAGARPA Evaluation, Fomento Agrícola, 2003, p. 7.

SUSTAINABILITY

4.25 Sustainability is rated “unlikely” because the project did not lead to the opening of a permanent window in the broader program for addressing the needs of poorer producers. Also, because of the monitoring failures it is impossible to evaluate the soundness of the poor farmer investment subprojects that were actually financed by ALCAMPO.

BANK AND BORROWER PERFORMANCE

4.26 Bank performance is rated unsatisfactory. The Bank was initially leery of Alianza, because the proposed targeting seemed weak; but at a later stage it relented. Having refused to get involved with Alianza at the design phase, when the Bank climbed aboard two years later it could not expect to fundamentally change the nature of the program. It settled for tinkering at the margins, introducing tighter eligibility criteria for project resources (compared to the program at large) and relying on sound supervision to make a difference. There are two ways of judging the wisdom of this move. The first is pragmatic. The Bank wanted to revitalize its agriculture portfolio in Mexico and it was quicker to build on an existing program than construct a new vehicle (which might have been difficult given the Bank’s weak leverage in Mexico). Also, by backing Alianza the Bank was buying a seat at the table, which it might use to promote reform above and beyond this one program.

4.27 On the other hand, there was a reputational risk from associating with such a poorly-targeted program. OED’s 2001 Country Assistance Evaluation judged that the Bank was wrong to get involved. The latest Country Assistance Strategy makes no reference to the program and the follow-on project mooted in the 2002 Country Assistance Strategy has now been dropped. By the time the Bank became involved the die was cast and even with the best possible design and supervision the project would not have been able to move the program in a progressive direction. This assessment has assumed that the project’s targeting criteria (which were stricter than those for the overall program) were duly enforced. However, owing to the weakness of project monitoring, it is not possible to prove this—indeed, the completion report made no attempt to do so. Also, this assessment finds that the focus of ALCAMPO was wrong. A key productivity constraint in Mexico is the weakness of the framework for generating and transferring agricultural technology. ALCAMPO dealt with this only tangentially: a more frontal assault on the problem was needed.

4.28 Borrower performance for ALCAMPO is rated satisfactory: the government and the implementing agency discharged their obligations to the project adequately.

5. Findings and Lessons

5.1 Agricultural productivity growth has lagged in Mexico compared to other countries in comparable circumstances. Since 1980 cereal yields have risen by one-third

in Mexico; in Brazil they doubled. In Mexico, agricultural value added per worker increased by 22 percent over the past two decades; in Brazil it rose by 139 percent.

5.2 The three projects assessed here need to be viewed in the light of Mexico's weak agricultural productivity growth. The three projects could not by themselves have overcome this weakness; but they did not go as far as they could to improve productivity.

5.3 The design of the two irrigation projects assessed here was consistent with a push for higher productivity; but the expected results have not yet been delivered. The shortfall has little to do with the performance of the implementing agency (Comision Nacional del Agua), and is primarily a reflection of weaknesses in the incentive environment and the absence of institutions needed to generate and disseminate improved farm technologies. The Alianza program is explicitly intended to boost productivity but has not targeted its resources at farmers (generally smaller, poorer producers) who have the biggest potential for technical upgrade; a substantial share of the programs resources finance the replacement of existing technology rather than achieving upgrade to a higher technical plane. The Bank-supported input to Alianza (the ALCAMPO project) did not have the leverage needed to address this design weakness.

5.4 In addition to this general finding, this assessment makes the following specific observations:

- Investments in irrigation in Mexico continue to depend substantially on public sector support and there is no indication of fiscal savings following the peak period of District hand over (see paragraph 3.39 above).
- Although there was an immediate improvement following transfer, the quality of irrigation services has not continued to improve since then (paragraph 3.44).
- User associations have taken only limited steps toward financial self-sufficiency (paragraph 3.25).
- Producers in the Districts have not substantially diversified into higher-margin crops (paragraph 3.29).
- Weak control over the rate at which water is extracted from dams and aquifers, and the non-measurement of water use is the biggest problem facing Districts and Units (paragraphs 3.41, 3.45).
- The absence of an integrated planning framework for Districts and Units makes it harder to address the growing problem of water scarcity (paragraph 3.14).
- The absence of adequate technical support to farmers is a continuing problem—one that ALCAMPO did not adequately address (paragraph 4.10).

5.5 This assessment confirms the following OED lessons of broader relevance:

Projects need to dovetail with programs; but well-designed projects can rarely turn around a poorly-designed program. This is a particularly important lesson for the Bank's work in Mexico where leverage is limited. Mexico has ample access to alternative sources of funding, private as well as public. In line with the Bank's poverty reduction mandate, its resources should be tightly targeted, rather than added to programs where there is a high potential for subsidies to be captured by better-off groups.

The Bank's leverage may be substantially diluted when project funds flow into a multi-state program in which state governments have considerable influence over the use to which resources are put. The number of interlocutors is so large that it may make it difficult for the Bank to influence the overall direction—of project as much as program. For example, it is often difficult to secure support of state governments for a monitoring and evaluation framework, particularly one that is of uniform design applying the same approach in all states. Also, ALCAMPO demonstrates how difficult it can be to persuade state governments to follow Bank procedures for procurement and justification of expenses.

Programs as large as Alianza are candidates for formal impact evaluation. The main limitation of the FAO/SAGARPA evaluation of Alianza is the absence of a control group of non-beneficiaries, a striking oversight given the level of funding committed. The evaluation should have sampled those who did not apply to the program; and those who applied but were rejected. (It is not clear that a list of the rejected is maintained.) Without this control it is impossible to assess claims about the program's leverage: much of the investment (and the income growth attributed to it) might have occurred without a subsidy. Subsidies may have leaked to better-off groups who don't need them.

Annex 1. Results Matrix—Irrigation and Drainage Sector Project (L3419)

Objectives	Outputs		Outcomes	
	Expected	Actual	Expected	Actual
(a) Make sound new irrigation and drainage investments in Districts and the smaller Units	Total irrigated area covered, 1.9 m. ha of which	Total irrigated area covered, 2.0 m. ha of which	Benefit about 425,000 farmers, of which 50% have an income lower than the minimum wage	No data in ICR on N of beneficiaries or poverty impact
(b) Exploit existing irrigation and drainage schemes more effectively in Districts and the smaller Units	132,000 ha new 66,000 ha improved 753,000 ha deferred maintenance 967,000 ha rehabilitated	149,000 ha new 49,000 ha improved 360,000 ha deferred maintenance 1,403,000 ha rehabilitated		
	Cost US\$1.1 billion (*)	Cost US\$1.3 billion (*)		Slow diversification: Only 10% of cultivated area in high-value crops
(c) Decentralize funding and management	Transfer 21 of 82 Districts under ComNaAgua control to Water User Organizations (2.0 m. ha)	Transfer 72 of 82 Districts under ComNaAgua control to Water User Organizations (3.3 m. ha); transfer covers 96% of the 3.4 m. ha of publicly irrigated land	All projects have at least 12% ERR with the mean over 14%	Ten out of 11 Districts have ERR above 12% with the mean at 31%
(d) Make water and energy use more efficient			Efficient use of water and energy on 380,000 ha	Efficient use of water and energy on 702,000 ha
(e) Strengthen institutions, inc. ComNaAgua and water user organizations		431 Water User Organizations have taken over O&M and have hire/fire authority without recourse to CNA	Full O&M cost recovery in 21 Districts	Substantial O&M cost recovery in 72 Districts
(f) Optimize land and water use by ensuring that only viable projects are financed	Cost US\$112.0 m.(**)		Cost US\$208.7 m. (**)	
				O&M costs reduced by 30-40% under Water User Organization management
				Water User Organizations finance most of the main canal O&M and land-leveling carried out by ComNaAgua
				50/50 cost sharing scheme introduced for rehab/modernization
				Volumetric measurement started but not all problems resolved
				(New law passed allowing sale of water use rights)
(g) Prevent environmental degradation	Reuse sewage waters over 3,000 ha	Reuse sewage waters over 3,900 ha		Routine control of water quality, pesticide levels, drainage and soil salinity performed in many Districts
	Cost US\$44.0 m. (***)	Cost US\$9.4 m (***)		Siltling of reservoirs and canals and over-pumping of groundwater still a problem

(*) Covers components (a) construction of irrigation districts, (b) construction of small irrigation units, (c) rehabilitation of irrigation districts, (d) rehabilitation of small irrigation units, (e) deferred maintenance and (f) O&M equipment

(**) Covers components (a) institutional development, (b) small river training works, (c) dam safety and (d) rain-fed areas

(***) Covers components (a) environmental actions and (b) reuse of sewage waters

Annex 2. Results Matrix—On-Farm and Minor Irrigation Networks Project (L3704)

Objectives	Outputs		Outcomes	
	Expected	Actual	Expected	Actual
(a) Reduce the loss and waste of irrigation water	Components,	Components,	Water conveyance efficiency, 84%	Water conveyance efficiency, 87%
	(a) Technical support, communications and training, US\$37.4 m.	(a) Technical support, communications and training, US\$21.2 m. Physical targets mainly exceeded	Water application efficiency, 69% Increased availability of water for irrigation, 667 m. cubic metres	Water application efficiency, 69% Increased availability of water for irrigation, 425 m. cubic metres
(b) Increase cropping intensities and yields	(b) Minor network improvements, US\$225.3 m.	(b) Minor network improvements, US\$177.2 m. Several physical targets not met	Cropping intensity, 19% Yields, t/ha Maize, 5.0 Wheat, 5.1 Tomato, 21.0 Chile, 18.1 Melon, 24.0	Cropping intensity, 21% Yields, t/ha Maize, 8.9 Wheat, 6.5 Tomato, 52.3 Chile, 29.7 Melon, 25.1
	(c) On-farm improvements, US\$238.9 m. Benefit 178,000 ha	(c) On-farm improvements, US\$198.3 m. Benefited 225,691 ha and 27,121 producers	Revenues, (US\$'000) Maize, 120 Wheat, 132 Tomato, 132 Chile, 42 Melon, 29	Revenues, (US\$'000) Maize, 124 Wheat, 69 Tomato, 22 Chile, 69 Melon, 1
(c) Increase diversification into higher value crops	Lining of irrigation ditches, 6,000 km Land grading, 120,000 ha Drip irrigation, 15,750 ha Micro-sprinkler, 5,500 ha Pump electrification, 250 Underground drainage, 200 ha	Lining of irrigation ditches, 0 km Land grading, 42,373 ha Drip irrigation, 72,496 ha Micro-sprinkler, 20,732 ha Pump electrification, 0 Underground drainage, 12, 840 ha	User's annual income, US\$22,700 ERR, 19%	User's annual income, US\$20,560 ERR (partial), 11% to 19%
(d) Promote decentralization (Consolidate transfer of Irrigation Districts and Irrigation Units to Water User Associations)	Total cost, US\$568.8 m.	Total cost, US\$396.7 m.		Water User Associations strengthened, e.g. machinery procurement decentralized, greater transparency in accounting
(e) Promote private investment				Investment said to be up but no data in ICR

Annex 3. Results Matrix—Agricultural Productivity Improvement Project (L4428)

Objectives	Outputs		Outcomes	
	Expected	Actual	Expected	Actual
(a) Improve access of small farmers to programs being executed under the Alianza para el Campo	Productive Investment Cost, US\$343.3 m. Subprojects, financed on a matching grant basis*, for	Productive Investment Cost, US\$377.5 m.	Average beneficiary household income increases by 25% by project completion	Average beneficiary household income increases by 60%
(b) Improve integration of various Alianza activities aimed at developing irrigated and rainfed agriculture	Small irrigation development 33,000 beneficiaries >300,000 ha Pasture establishment 110,000 beneficiaries > 2 m. ha Improved dairying 51,000 beneficiaries > 10,000 production units Small-scale on-farm infrastructure and equipment 750,000 poor rural households (PADER program) US\$2,200/household	Small irrigation development 28,815 beneficiaries, 198,000 ha US\$86.9 m. Pasture establishment 106,417 beneficiaries, 4.1 m. ha US\$61.2 m. Improved dairying 60,467 beneficiaries, 50,000 production units US\$45.6 m. Small-scale on-farm infrastructure and equipment 763,000 beneficiaries US\$ 183.8 m. <US\$250/household	Economic rate of return, 18.5% (Mean of 28 farm models)	Economic rate of return, 15.5%
(c) Generate, test and transfer technologies appropriate for small farmers	Production Support Services Cost, US\$172.9 m. Applied research >50% research projects address beneficiary needs	Production Support Services Cost, US\$172.5 m.	Productivity increases of 25% in target farming systems	Productivity increase of 20%
(d) Strengthen production support services for small farmers	Extension 350,000 beneficiaries, (SINDER) Training for small farmers 1.2 m. beneficiaries, (PEAT)	Not measured 540,000 beneficiaries (SINDER) 197,000 beneficiaries (PEAT)		
(e) Promote decentralization by strengthening institutions in the states and producers' organizations	Institutional Strengthening Cost, US\$34.9 m. Includes Training and technical assistance for staff in Ministry of Agricultural and at state level Establishment of a monitoring and evaluation system	Institutional Strengthening Cost, US\$0 No funds disbursed from Bank loan	Evaluation of outcomes and impact as well as physical and financial indicators	FAO monitoring effort covers Alianza as a whole; hard to assess impact on project target group; data from states of variable quality Regional offices of Ministry of Agriculture not equipped for M&E

SINDER National Extension System PEAT Technical Assistance Program

* Beneficiary contribution was at least 50% (in cash or kind) for irrigation, pasture and dairy programs and 30% for rural development (PADER)

Annex 4. Productivity of Land and Water in Irrigation Units and Districts, 1980-2002

Year	Area Units 000 ha	Area Districts 000 ha	Water volume units 000 m3	Water volume Districts 000 m3	Output value Units 000 Pesos (Current)	Output value Districts 000 Pesos (Current)	Output value Units 000 Pesos (\$1993)	Output value Districts 000 Pesos (\$1993)	\$/ha Units	\$/ha Districts	\$/m3 Units	\$/m3 Districts
1980	1,657	3,241	12,073,223	29,509,285	56,331	68,891	11,735,623	14,352,294	6,798	4,252	0.972	0.486
1981	1,676	3,457	11,829,614	30,503,348	77,061	92,443	12,231,944	14,673,453	7,298	4,244	1.034	0.481
1982	1,731	3,438	13,355,652	33,154,120	98,573	153,521	11,201,472	17,445,604	5,607	4,397	0.839	0.526
1983	1,524	3,321	10,753,159	29,304,348	195,351	298,361	11,628,058	17,759,582	6,758	4,734	1.081	0.606
1984	1,370	3,512	10,019,341	32,113,723	288,482	510,234	9,779,044	17,296,065	6,962	4,802	0.976	0.539
1985	1,725	3,593	13,975,259	36,389,336	560,390	798,352	11,797,683	16,807,420	6,766	4,627	0.844	0.462
1986	1,942	3,234	19,482,230	40,563,698	918,788	1,324,541	11,096,468	15,996,870	5,819	5,036	0.570	0.394
1987	2,202	3,252	20,594,354	38,018,767	2,570,627	3,535,991	13,565,314	18,659,581	5,912	5,506	0.659	0.491
1988	2,075	2,937	18,506,817	32,740,134	3,452,324	6,375,885	8,598,566	15,880,161	4,203	5,485	0.465	0.485
1989	2,019	3,213	16,637,730	33,096,521	6,152,439	9,467,867	11,521,421	17,730,088	6,071	5,871	0.692	0.536
1990	1,908	3,035	16,604,059	33,020,522	10,249,402	10,330,423	14,815,557	14,932,672	8,350	5,290	0.892	0.452
1991	2,137	2,995	19,156,886	33,568,670	14,122,671	13,173,385	16,634,477	15,516,354	8,322	5,538	0.868	0.462
1992	2,250	2,759	20,308,637	29,822,849	13,918,388	14,195,687	14,600,218	14,891,102	6,781	5,642	0.719	0.499
1993	2,025	3,004	19,225,788	33,772,972	16,217,200	15,757,300	16,220,444	15,760,452	8,008	5,245	0.844	0.467
1994	2,340	3,066	22,740,202	35,893,814	17,372,949	16,638,069	16,312,628	15,622,600	6,845	5,003	0.717	0.435
1995	2,163	2,798	19,183,352	29,844,280	21,442,864	19,905,313	16,758,784	15,557,103	6,629	4,757	0.874	0.521
1996	2,191	2,778	21,698,156	29,461,809	31,529,589	31,343,515	16,802,339	16,703,179	7,361	5,772	0.774	0.567
1997	2,202	2,963	22,537,201	33,385,057	39,244,404	35,312,977	18,359,955	16,520,691	7,764	5,192	0.815	0.495
1998	2,118	2,774	22,915,183	29,929,472	44,363,173	39,166,796	18,329,617	16,182,620	8,018	5,405	0.800	0.541
1999	2,101	2,631	22,963,930	25,794,390	52,755,232	35,401,692	20,867,542	14,003,280	9,932	5,322	0.909	0.543
2000	2,076	2,604	22,836,000	27,466,293	44,909,545	41,922,643	17,318,196	16,166,375	8,342	6,208	0.758	0.589
2001	2,050	2,698	22,345,000	24,807,031	50,638,639	39,566,529	18,844,776	14,724,377	9,193	5,458	0.843	0.594
2002	2,241	2,602	21,393,100	26,160,855	50,023,633	43,058,188	17,833,255	15,350,097	7,958	5,899	0.834	0.587

Source: Enrique Palacios, Colegio de Posgraduados (based on data from SAGARPA and CNA).

Annex 5. Additional Tables

Table A5.1 Rating of Survey Modules, 1999 and 2005

% (based on N of positive responses to 10 questions in each category)	Organization	Operation	Maintenance	Technical Efficiency	Accounting & Finances	MEAN
ALTO RIO LERMA						
Module Salvatierra						
1999	70	70	90	55	80	73
2005	53	75	80	60	78	69
Module Cortazar						
1999	95	70	80	30	90	73
2005	50	94	84	59	65	70
RIO MAYO						
Module 04						
1999	100	85	80	70	70	81
2005	51	89	74	67	67	70
Module 13						
1999	100	80	85	90	80	87
2005	67	78	84	69	85	77
COSTA DE HERMOSILLO						
1999	80	50	50	70	80	66
2005	60	14	50	50	75	50

Source: 1999 data: Palacios; 2005 data: OED Survey.

Table A5.2 Rio Mayo: Has Irrigation Service Improved Since Transfer?

	Module 04		Module 13	
	1993	2005	1993	2005
N of users interviewed	16	39	18	32
N replying "Yes"	0	20	15	21
% "Yes"	0%	51%	83%	66%

Table A5.3. Performance Rating of Irrigation Districts (by Module), 1999

N=230 (229 Modules plus DR051 Costa de Hermosillo) Response categories were binary in each case ("Yes" and "No") unless otherwise specified	% of responses that signify a positive outcome
ORGANIZATION	
(1) Are the directors of the Users' Committee familiar with the Water Law?	93%
(2) Is the Water Law complied with?	92%
(3) Have there been problems in electing directors to the Users' Committee? (<i>Positive response="No"</i>)	79%
(4) Do private owners and land reform farmers alternately head the Committee?	73%
(5) Are water rights transmitted according to the regulations?	67%
(6) Is the Module registered in the Public Registry of Water Rights?	69%
(7) Is the water tariff set according to the regulations?	92%
(8) Do users fail to carry out their statutory obligations? (<i>Positive response="No"</i>)	87%
(9) Are supplementary tariffs authorized by a General Assembly vote?	91%
(10) Are there training programs for the directors of the Users' Committee?	62%
OPERATION	
(11) Is the Register of Water Users up-to-date?	80%
(12) Is implementation of the irrigation plan properly monitored?	95%
(13) Does irrigation programming follow CNA guidelines?	96%
(14) Do ditch tenders verify the area irrigated by users?	98%
(15) Does the Module receive water at the established control points?	89%
(16) How timely is the delivery of water to parcels? (<i>Positive response="Good"</i>)	56%
(17) How adequate is the amount of water delivered? (<i>Positive response="Good"</i>)	54%
(18) How sound a consideration is given to water resource sustainability? (<i>Positive response="Good"</i>)	58%
(19) Does the Module operate water use planning targets?	11%
(20) Does the Users' Association report the area sown and harvested to the CNA?	66%
TECHNICAL EFFICIENCY & MODERNIZATION	
(21) Does the Module deliver planning information to the Irrigation District?	47%
(22) Is this information delivered systematically every month?	36%
(23) Has the Module benefited from government development programs?	79%
(24) Has land leveling been carried out?	43%
(25) Have water meters and other measurement devices been installed?	33%
(26) Has the efficiency of water application been studied?	21%
(27) Has the cropping pattern change since the Module was handed over?	71%
(28) Is the level of the water table regularly measured?	30%
(29) Is soil quality analysis carried out?	47%
(30) Have programs to improve soil quality been carried out?	19%
MAINTENANCE	
(31) Is the list of scheduled maintenance works updated every crop cycle?	88%
(32) Is the machinery and equipment inventory checked every year?	63%
(33) Is the canal layout in line with CNA guidelines?	88%
(34) Are maintenance needs assessed before each crop cycle?	93%
(35) Does the annual maintenance program follow CNA guidelines?	93%
(36) Is the maintenance program reviewed and approved by CNA?	97%
(37) The Water User Association participates in the district-wide planning of maintenance?	77%
(38) Have there been projects to rehabilitate or modernize plant and equipment?	19%
(39) In carrying out maintenance does the Association follow the approved program?	54%
(40) In what state is the infrastructure of the Module? (<i>Positive response="Good"</i>)	81%
ACCOUNTING & FINANCE	
(41) Are incomes and expenditure budgets prepared?	93%
(42) Is budget reporting up-to-date?	76%
(43) Are the budgets approved by the General Assembly?	87%
(44) Is training in accounting principles provided?	53%
(45) Are supplementary charges levied (in addition to the water tariff)?	69%
(46) Is the water tariff revised each year?	73%
(47) Is there a special fund for meeting unforeseen contingencies?	6%
(48) Has the Association taken steps toward financial self-sufficiency?	63%
(49) Is the Association up-to-date with its income tax returns?	80%
(50) Is the Association up-to-date with employee social security contributions?	81%

Note: Items for which the positive response rate was under 50% are shown in bold italic font.

Source: Palacios (Colpos)

Annex 6. Revised Economic Rate of Return (PSRD)

	ORIGINAL			REVISED INFLOW				REVISED OUTFLOW			REVISED CASHFLOW		
	W/o	W	Difference	W/o	W	Difference	Less 25%	W/o	W	Difference	W	Difference	
Y1	10,677	9,034	-1,643	22,046	22,046	-	-	11,369	13,012	1,643	-1,643		
Y2	9,349	8,111	-1,238	20,594	20,952	358	269	11,245	12,841	1,596	-1,328		
Y3	8020	7187	-833	19142	19857	715	536	11122	12670	1,548	-1,012		
Y4	6949	7263	314	17917	19950	2,033	1525	10969	12687	1,718	-193		
Y5	5877	7339	1,462	16692	20044	3,352	2514	10816	12705	1,889	625		
Y6	5431	7182	1,751	16692	20044	3,352	2514	10816	12705	1,889	625		
Y7	4987	7026	2,039	16692	20044	3,352	2514	10816	12705	1,889	625		
Y8	4544	6869	2,325	14343	20571	6,228	4671	10688	14015	3,327	1,344		
Y9	4099	6713	2,614	14343	20571	6,228	4671	10688	14015	3,327	1,344		
Y10	3656	6556	2,900	14343	20571	6,228	4671	10688	14015	3,327	1,344		
Y11	3651	6588	2,937	14343	20571	6,228	4671	10688	14015	3,327	1,344		
Y12	3646	6621	2,975	14343	20571	6,228	4671	10688	14015	3,327	1,344		
Y13	3642	6653	3,011	14533	21282	6,749	5062	10898	14547	3,649	1,413		
Y14	3638	6686	3,048	14533	21282	6,749	5062	10898	14547	3,649	1,413		
Y15	3634	6718	3,084	14533	21282	6,749	5062	10898	14547	3,649	1,413		
	ICR	IRR	31%						OED IRR	15%			

Note—The analysis covers 11 Irrigation Districts that were included in PSRD, representing those that absorbed the largest part of project investment (46 percent); these Districts also accounted for 46 percent of the area transferred under PSRD. The analysis in the completion report is based on five representative farm models. OED checked the price and yield assumptions and found them to be reasonable. The revised cash flows retain all the original assumptions, adjusting only for the area actually harvested and the crop mix

Annex 7. Basic Data Sheet

IRRIGATION AND DRAINAGE SECTOR PROJECT (LOAN 2700)

Key Project Data (amounts in US\$ million)

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
IDA Loan	400.0	350.0	88.0
Cofinancing	200.0	200.0	100.0
Government	645.0	932.7	145.0
Total project cost	1245.0	1482.7	119.0

Cumulative Estimated and Actual Disbursements (US\$ million)

	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Appraisal estimate	52.5	122.5	122.5	77.5	25.0	-	-	-	-
Actual	39.9	96.3	33.9	40.4	21.4	13.2	13.1	54.0	37.8
Actual as % of estimate	76	79	27	52	86	-	-	-	-
Date of final disbursement									

Project Dates

	<i>Original</i>	<i>Actual</i>
Appraisal		February 19, 1991
Board approval		December 3, 1991
Effectiveness	November, 1991	June 18, 1992
Mid Term Review	-	May 16, 1997
Closing date	December 31, 1995	June 30, 2000

Staff Inputs (staff weeks)

	<i>Actual Weeks</i>	<i>US\$US\$('000)</i>
Identification/Preparation	149.9	201.1
Appraisal/Negotiation	57.6	101.4
Supervision	187.0	637.2
ICR	10.0	25.0
Total	404.5	964.7

Mission Data

	Date (month/year)	No. of persons	Specializations represented	Performance rating*	
				Implementati on status	Development objectives
Identification/ Preparation	February 1988	1	Agronomist		
	May 1988	1	Engineer		
	July 1988	1	Engineer		
	November 1988	2	Engineer, Economist		
	June 1989	1	Agricultural Economist		
	July 1989	1	Irrigation Engineer		
	September 1989	6	Mission Leader, Agricultural Economist, 2 Irrigation and Drainage Engineers, Agronomist, Institutional		
	October 1989	1	Environmental		
	February 1990	5	Mission Leader, Agricultural Economist, Irrigation & Drainage Engineer, Agronomist, Project Analyst		
Pre-appraisal	April 1990	11	Mission Leader, Economists (3), Environmental Officer, Institutional Specialist, Lawyer, Agronomist Consultant, Engineers (2), Project Analyst		
	December 1990	2	Mission Leader, Engineer		
Appraisal/ Negotiation	February 1991	11	Mission Leader, Economists (3), Environmental, Institutional Specialist, Lawyer, Accountant, Engineers (3)		
	May 1991	3	Engineer, Economists (2)		
	June 1991	1	Environmental		
Supervision 1	January 1992	4	Mission Leader, Economist, Legal, Sr. Irrigation Engineer		
Supervision 2	April 1992	1	Mission Leader		
Supervision 3	October 1992	2	Mission Leader, Economist	2	1
Supervision 4	December 1992	1	Mission Leader	2	1
Supervision 5	April 1993	1	Mission Leader	2	1
Supervision 6	February 1994	3	Sr. Irrigation Engineer, Drainage Engineer, Procurement Assistant	2	1
Supervision 7	August 1994	2	Irrigation Engineer, Financial Expert	S	HS
Supervision 8	November 1994	2	Irrigation Engineer, Financial Expert	S	HS
Supervision 9	June 1995	2	Irrigation Engineer, Financial Expert	S	HS
Supervision 10	April 1996	3	Irrigation Engineer, Financial Expert, Operations Officer	S	HS
Supervision 11	September 1996	3	Irrigation Engineer, Financial Expert, Operations Officer	S	HS
Supervision 12	May 1997	3	Irrigation Engineer, Financial Expert, Agricultural Economist	S	S
Supervision 13	January 1998	3	Irrigation Engineers (2), Financial Expert	S	S
Supervision 14	October 1998	2	Irrigation Engineer, Financial Expert	S	S
Supervision 15	June 1999	2	Irrigation Engineer, Financial Expert	S	S
Supervision 16	November 1999	2	Irrigation Engineer, Financial Expert	S	S
Supervision 17	June 2000	2	Irrigation Engineer, Financial Expert	S	S
Supervision 18					
ICR	November 2000	1	Agricultural Economist	S	HS

* Performance Rating: 1: Improving; 2: Stationary; S: Satisfactory; HS: Highly Satisfactory

ON-FARM AND MINOR IRRIGATION NETWORKS IMPROVEMENT PROJECT (LOAN NO. 3704)

Key Project Data *(amounts in US\$ million)*

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
IDA Loan	200.0	170.2	85.0
Government	137.2	23.9	17.0
Banking	146.2	-	-
Farmers	85.4	202.8	237.0
Total Project Cost	568.8	396.9	70.0

Project Dates

	<i>Original</i>	<i>Actual</i>
Appraisal		July 10, 1993
Board approval		July 17, 1994
Effectiveness		September 20, 1994
Mid-Term Review		June 11, 1997
Closing date	June 30, 2000	March 31, 2002

Staff Inputs *(staff weeks)*

	<i>Actual Weeks</i>	<i>US\$US\$('000)</i>
Identification/Preparation	15.3	124.0
Appraisal/Negotiation	49.8	100.2
Supervision	146.93	558.9
ICR	10.0	29.7
Total	222.0	812.8

Mission Data

	Date (month/year)	No. of persons	Specializations represented	Performance rating*	
				Implementation status	Development objectives
Identification/ Preparation	December 1991	1	Irrigation Engineer		
	February 1992	1	Irrigation Engineer		
	March 1992	2	Irrigation Engineer, Institutional Specialist		
	April 1992	1	Irrigation Engineer		
	July 1992	5	Irrigation Engineer (2), Credit Expert, Ground Water Hydrologist, Water Legal Specialist		
	October 1992	1	Irrigation Engineer		
	December 1992	1	Irrigation Engineer		
	March 1993	8	Irrigation Engineer (2), Procurement Specialist, Credit Expert, Agroeconomist, Legal, Geo-Hydrologist, Hyko Laeyedeckekr (EC1AG?)		
	May 1993	6	Irrigation Engineer (2), Agronomist, Agricultural Economist, Procurement Specialist, Credit Expert		
	Appraisal/ Negotiation	July 1993	2	Sr. Irrigation Engineer, Consultant	
May 1994		3	Sr. Irrigation Engineer, Irrigation Engineer, Credit Specialist		
July 1994		1	Sr. Irrigation Engineer		
September 1994		1	Credit Specialist		
October 1994		2	Principal Operations Officer, Procurement Specialist		
Supervision 1	May 1995	2	Sr. Financial Expert, Sr. Water Engineer	HS	S
Supervision 2	November 1995	2	Sr. Financial Expert, Sr. Water Res. Engineer	HS	S
Supervision 3	September 1996	3	Sr. Operations Officer, Sr. Financial Expert, Sr. Water Res. Engineer	S	U
Supervision 4	April 1997	2	Task Manager, Financial Analyst	S	S
Supervision 5	October 1997	2	Task Manager, Financial Analyst	S	S
Supervision 6	July 1998	2	Task Manager, Financial Analyst	S	S
Supervision 7	March 1999	4	Sr. Agriculturalist, Economist, Water Res. Engineer, Ag. Economist	S	S
Supervision 8	December 1999	4	Sr. Agriculturalist, Ag. Economist, Sr. Economist, Water Res. Engineer	S	S
Supervision 9	April 2000	2	Task Team Leader, Irrigation Specialist	S	S
Supervision 10	November 2000	2	Task Team Leader, Irrigation Engineer	S	S
Supervision 11	April 2001	2	Sr. Agric./TTL, Ag. Economist	S	S
Supervision 12	November 2001	2	Sr. Agric./TTL, Irrigation Engineer	S	S
ICR	April 2002	2	Irrigation Engineer, Operations Analyst		
	June 2002	2	Agronomist, Irrigation Engineer		

* Performance Rating: S: Satisfactory; HS: Highly Satisfactory

AGRICULTURAL PRODUCTIVITY IMPROVEMENT PROJECT (LOAN NO. 4428)

Key Project Data *(amounts in US\$ million)*

	Appraisal estimate	Actual or current estimate	Actual as % of appraisal estimate
IDA Loan	444.50	444.50	100.0
Cofinancing	555.60	555.60	100.0
Government	111.20	111.30	100.0
Total project cost	1111.30	1111.40	100.0

Project Dates

	Original	Actual
Appraisal		September 11, 1998
Board approval		December 22, 1998
Effectiveness	March 31, 1999	June 23, 1999
Mid-Term Review	March 31, 2001	-
Closing date	June 30, 2003	June 30, 2003

Staff Inputs *(staff weeks)*

	Actual Weeks	US\$US\$('000)
Identification/Preparation	37.0	343,233.00
Appraisal/Negotiation	14.0	60,808.00
Supervision	30.8	163,418.00
ICR	7.0	29,773.00
Total	88.0	597,232.00

Mission Data

	<i>Date (month/year)</i>	<i>No. of persons</i>	<i>Specializations represented</i>	<i>Performance rating*</i>	
				Implementation status	Development objectives
Identification/ Preparation	October 1997				
Appraisal/ Negotiation	September 1998	5	Institutional Specialist, Ag. Economist, Social Scientist, Ag. Extensionist, Consultant		
Supervision 1	March 1999	5	Sr. Agriculturalist, Social Scientist, Ag. Economist (2), Financial Specialist	S	S
Supervision 2	March 1999	3	Sr. Agriculturalist, M&E Specialist, Sr. Ag. Economist	S	S
Supervision 3	May 2001	3	Sr. Agriculturalist, Ag. Economist, Operations Analyst	S	S
Supervision 4	November 2001	2	Sr. Agriculturalist, Consultant	S	S
Supervision 5	November 2001	3	Ag. Economist, Sr. Agriculturalist, Operations Analyst	S	S
Supervision 6	November 2001	3	Sr. Agriculturalist, Operations Analyst, Consultant/Rural Development Specialist	S	S
Supervision 7	March 2003	2	Sr. Agriculturalist, Operations Analyst	S	S
ICR	May 2004	2	Sr. Agricultural Economist, Economist		

* Performance Rating: S: Satisfactory

Annex 8. Borrower Comments

Unofficial Translation

[logo]

**Subdirectorato de General Programming
Financial Management Unit**

Official Corr. No. BOO.06.04.- 420

Subject: Comments on the Preliminary
Assessment of Irrigation Projects

Mexico City, July 12, 2005

Mrs. Ethel Sennhauser
Sector Manager
Rural Development and the Environment
International Bank for Reconstruction and Development
Av. Insurgentes Sur 1605, Piso 24
Col. San Jose Insurgentes
03900 Mexico City

I am writing in reference to the evaluation of the Sectoral Irrigation and Drainage and On-farm and Minor Irrigation Networks Improvement Programs, which were partially financed by the International Bank for Reconstruction and Development (IBRD) through Loans 3419-ME and 3704-ME and, more specifically, to your letter of June 4, 2005, requesting our comments on the preliminary version of the report.

Further to the report and to the request from the IBRD, I am attaching the comments on the document in question for transmission through you to Mr. Alain Barbu. They were prepared by the staff of the Offices of the General Subdirectorates for Hydroagriculture and Programming.

I would be very grateful if you would send us a copy of your final report on the evaluation of the aforementioned programs.

I look forward to hearing from you.

Regards

REAL SUFFRAGE, NO RE-ELECTION
THE MANAGER

/s/

RAUL DESCHAMPS DIAZ, ENGINEER

Cc: Grayeb Bayata – Director of International Financial Organizations - SHCP, Palacio Nacional, National Palace, Segundo Patio Co. Centro
Escobedo de la Peña – International Subdirector – Nacional Financiera, Av. Insurgentes Sur 1971, Plaza Inn Torre IV
...dalupe Inn.
r. O. Ramos Valdés.- General SubDirector of Hydroagriculture.- CNA, Insurgentes, -Insurgentes Sur 2416, Col.
Herrera Toledo.- General SubDirector of Programming.- CNA, Insurgentes Sur 2416, Col. Copilco El Bajo
--andón Pimental.-Irrigation Districts and Units.- CNA, Insurgentes Sur 2416, Col Coplico El Bajo.
...a Media Laguna – SubManager for Financial Management.-CNA, Insurgentes Sur 2416, Col. Coplico El Bajo.

**National Water Commission
Subdirectorate of General Programming
Financial Control**

With reference to the evaluation of the Sectoral Irrigation and Drainage and On-farm and Minor Irrigation Networks Improvement Programs, which were partially financed by the International Bank for Reconstruction and Development (IBRD) through Loans 3419-ME and 3704-ME and, more specifically, to your letter of June 4, 2005, requesting our comments on the preliminary version of the report,

our comments are as follows:

Reference	Text	Observation
1.1	Two of the projects aimed to improve the administration of irrigated areas.	What is meant by improve the administration of irrigated areas?
1.1	The irrigation projects were intended to consolidate the process of transferring responsibility for operating and maintaining the public irrigation districts from a central government agency to associations of water users.	We suggest you mention the initial number of Irrigation Districts that were going to be transferred and how many Irrigation Districts were actually transferred by the time the PSRD was closed.
Table 1	By water logging	Registro del agua [translator's note: the suggested Spanish translation is incorrect. They seem to be misconstruing the meaning of "logging", taking it to mean the act of "registering", as in "entering in a record or log."]
3.2	que generalmente <i>cobren</i> ...	Que generalmente <i>cobren</i> ... [Correct form of Spanish verb]
3.2	The government continues to heavily subsidize the electricity used for pumping. This pushes up net incomes in the Units relative to the Districts; and it also encourages the over exploitation of aquifers.	We suggest the text mention the requirements that users must meet, from registration of the well to the tariff payable.
3.3	headworks	Should be translated in the Spanish as "obras de cabeza"
3.9	transfer of Irrigation Districts, including preparation of the necessary regulations; supply of the operation and maintenance equipment needed by water user associations	[translator's note: Borrowers comments unclear-please verify]
3.9	users associations	water users associations
3.11	Given that the agency's budget is not dependent on the loan there is little incentive for the agency to comply with Bank procurement and auditing procedures—and long delays between the presentation of expense statements to the Bank for reimbursement. Slow disbursement led to three extensions of loan closing.	We suggest this text be deleted.
3.11	Also, project implementation was partially impeded by Mexico's financial	We suggest the text be modified, with mention made of the problem of the banking

	crisis of 1994-95 and several years of severe drought which reduced the availability of water to users, particularly in north-west Mexico.	crisis of 1994-1995 and the drought that occurred in seven states of the Mexican Republic.
3.12	Once again, the emphasis was on improving existing schemes rather than further expansion of the irrigated area.	Once again, the emphasis was on improving existing schemes rather than expansion of the irrigated area. [Translator's note: the suggested change in the Spanish could suggest that they wish to have the mention of "further" removed.]
3.13	At the same time, the loan amount was reduced by US\$30 million to accommodate fiscal tightening by the government	We suggest modifying the text to say how much the original loan amount was and how much it was reduced to. We suggest deleting "to accommodate fiscal tightening by the government", unless you have the grounds on which to base your assertion.
3.18	The projects spurred the introduction of subsurface drainage (which, before 1990, many Mexican engineers had dismissed as inappropriate for Mexico) and promoted the use of light-weight equipment for canal dredging. Both innovations helped to reduce investment and maintenance costs.	We suggest giving the names of the engineers that opposed subsurface drainage, and of the person who proposed using light-weight equipment for maintaining the secondary network. Do you have the figures to back your assertion about lower costs?
3.18	Cost containment was also favored by allowing the water user associations to take the lead in the tendering of works contracts: this had initially been resisted by the Commission (which preferred to do the tendering itself) but the Bank strongly advocated the decentralized approach and eventually the Commission came round.	We suggest you mention the origin of the idea of federalization with respect to the Alianza para el Campo Program. The idea of the federal government contributing \$1 for every \$1 contributed by the users.
3.18	In the view of one expert observer, "the machinery operators hired by the water user associations are much more productive than the government staff that operated the machinery before farmers undertook the management of these systems".	We suggest you name the expert, as well as the reference.
3.27	One issue is whether tariffs are high enough to cover costs; the other is whether they are actually collected.	We suggest this be recast as follows: whether the tariff collected from users is sufficient to cover the operating, maintenance, and administrative costs of the Module and the Irrigation District."
3.38	a law was passed permitting the sale of water rights	We suggest specifying the name of the law and the corresponding articles, if not, delete.
Annex 1 Results Matrix	New law passed allowing sale of water use rights	We suggest you delete this paragraph

**NATIONAL WATER COMMISSION
GENERAL IRRIGATION INFRASTRUCTURE SUBDIVISION
IRRIGATION DISTRICT AND UNIT MANAGEMENT AUTHORITY**

**ASSESSMENT REPORT ON THE RESULTS OF THREE PROJECTS IN MEXICO:
IRRIGATION AND SEWAGE PROJECT (LOAN 2700);
ON-FARM AND MINOR IRRIGATION NETWORKS IMPROVEMENT PROJECT (LOAN
3704);
AGRICULTURAL PRODUCTIVITY IMPROVEMENT PROJECT (LOAN 4428)**

COMMENTS

One's attention is drawn to the fact that the Operations and Evaluation Department (OED) communiqué refers to the Irrigation and Sewage Project (Loan 2700) and proceeds instead to assess the Immigration and Sector Drainage Project (Loan 3419). Likewise, the name of the On-Farm Improvement Project was changed in the same communiqué, (Loan 3704).

The correct name for PRODEP, which is Programa de Desarrollo Parcelario (On-Farm and Minor Irrigation Networks Improvement Project), should be included among the abbreviations and acronyms.

Paragraph 1.1 reads: The irrigation projects were intended to consolidate the process of transferring...

This is not accurate, in that, there was support for the transfer under the PRSD and there was support for its consolidation under PRODEP, which is borne out in Table 1, in the Assessment Report.

There are several inaccuracies in paragraph 3.2. For example, it refers to the Units as smaller private schemes, which is not accurate, as the two irrigation units evaluated, El Cubo and La Golondrina, are public. Concessions for their operation were awarded to organized users for them to provide irrigation services to their members.

Again in paragraph 3.2, an attempt is made to explain the difference between districts and units in terms of size, saying that the districts are larger than the units, which is false. The irrigation unit evaluated, El Cubo (2029 ha) have (sic) a larger surface area than irrigation districts 028, in Tulancingo (753 ha), and 068, in Tepecuacuilco (1991 ha).

There are two differences between irrigation districts and units:

- For strategic and security reasons, the National Water Commission is responsible for part of the infrastructure of irrigation districts while the users organizations are in charge of the entire infrastructure in the irrigation units.

- In the irrigation districts, the National Water Commission (CNA) collects the charge for block water supply to users associations, that is to say, of the charge paid by the users for the irrigation service, a portion goes to the users association, and another to the CNA. This, in accordance with Article 105 of the Regulations under the National Water Law. In the irrigation units, the CNA does not collect a charge, since the users association is responsible for the entire infrastructure.

Further in paragraph 3.2 it reads: “The Units take a larger share of their water from aquifers”, but there is no basis for this. It then goes on to say that: “Aquifers provide water on demand which is a prerequisite for producing high-margin fruit and vegetable crops.” This means that, because of gravity, no fruit and vegetable cultivation was pursued in the irrigation districts, an assertion refuted by the statistics published by the Irrigation Districts and Units Management Unit, which show that in the 2002-2003 agricultural year, 14,106 ha and 35,533 ha of fruit and vegetable crops were harvested in irrigation districts 010, in Culiacán-Humaya and 075, in Río Fuerte, Sinaloa, respectively.

Paragraph 3.3 is not accurate either in saying: “This means that responsibility for operating and maintaining the secondary and tertiary canal network (but not the main canal and headworks) is transferred from a federal government agency (Comision Nacional del Agua) to a number of user groups in the Districts.”

The Irrigation Districts and Units Management Unit notes with surprise that the report says that user organizations were not the ones responsible for operating and maintaining the main canals, whereas the report says that the OED visited irrigation districts 011, in Alto Río Lerma, Gto., and 038, in Rio Mayo, Son., where the main canals are under the responsibility of Sociedades de Responsabilidad Limitada (SRLs)—Limited Liability Companies.

We would like to make it clear to the OED in this connection that the transfer of the irrigation districts took place in two phases. In the first, concessions were awarded for the minor infrastructure (secondary and tertiary canal, road, and drainage networks) to users organized into civic associations for them to deliver the water to their members.

In the second phase, the civic users organizations formed SRLs. The CNA awarded concessions to the SRLs for the major infrastructure, (canals, drains, and main roads) so they could deliver the water to their partners, which are the civic users associations.

In paragraph 3.10 we read: “A Hydraulic Committee is also created which represents all the Modules (Associations) in a District and is the key interlocutor between the District and the Comision Nacional del Agua.” The Management Unit proposes that the paragraph align itself with the provisions of Article 66 of the National Water Law:

A hydraulic committee shall be established in each irrigation district. The terms of its organization and operation shall be stipulated in the relevant regulations drafted by each district, and it shall function as a deliberative body building consensus for proper water and infrastructure management.

Provision is made in the irrigation district regulations for the Hydraulic Committee to be chaired by the Chief Engineer, who is a CNA staff member, and a representative of each civic users association and SRL.

Paragraph 3.11 says: “Given that the agency’s budget is not dependent on the loan there is little incentive for the agency to comply with Bank procurement and auditing procedures—and long delays between the presentation of expense statements to the Bank for reimbursement. Slow disbursement led to three extensions of loan closing. Also, project implementation was partially impeded by Mexico’s financial crisis of 1994-95 and several years of severe drought which reduced the availability of water to users, particularly in north-west Mexico.”

These two paragraphs are not correct at all. The Irrigation District and Unit Management Unit would like to point out the following:

It is true that the budget of the National Water Commission is not dependent on the loan, since the Federal Public Administration Budgetary Rules Manual published by the Ministry of Finance and Public Credit (SHCP), stipulates in Article 98 that: “The units shall be responsible for allocating sufficient budgetary resources for implementing externally financed programs and projects, in accordance with the implementation program agreed upon with the source of financing. The amount of the external loan shall be part of the budget ceiling approved for such programs and projects, as a result of which all the expenditure to be undertaken shall include the part financed with the foreign loan as the national counterpart.”

Regardless of whether there are incentives at CNA to work with externally financed resources, the General Irrigation Infrastructure Subdivision has always complied in a timely manner with the procurement and auditing procedures of the Bank. By the same token, CNA submitted the expense statements promptly to the Bank for reimbursement.

In summary, the point can be made that the delay in the disbursement of the loan was due to the fact that in the budget ceiling authorized by the SHCP to the CNA, it was not possible to allocate sufficient resources for the PSRD to effect the disbursements, in accordance with the established program.

The Irrigation District and Unit Management Unit queries whether the drought had any influence on disbursements because every year the users had a larger counterpart than the resources allocated by the CNA because of a lack of budget availability.

In paragraph 3.12, the Spanish used is not appropriate. We propose the following changes:

El proyecto tenía como propósito apoyar el revestimiento y entubamiento de los canales, la nivelación de tierra, la sustitución del riego por gravedad por el riego en alta y baja presión, la electrificación de equipos de bombeo y la instalación de drenaje parcelario.*

Paragraph 3.13 says that operation of PRODEP was also lengthy for the reasons mentioned in paragraph 3.11. The Management Unit reiterates the arguments in 3.11 regarding the causes for the disbursement of resources from external loans.

Paragraph 3.14 reads: "...data from the Units is patchy (none are cited in the completion reports), partly it seems because there is not a clear division of labor between the National Water Commission and the Agriculture Ministry when it comes to monitoring, and planning for the Units." This is an incorrect assessment since the planning, implementation, and evaluation of the rehabilitation and modernization works in the irrigation units is a challenge for the federal government because the units are scattered. The dearth of information in the irrigation units is due to the fact that the Mexican Government does not have a body with the human, material, and economic resources to service them, and not due to a lack of coordination between CNA and SAGARPA. The Management Unit also has its doubts as to whether the sample is sufficiently representative (irrigation districts 011, Alto Rio Lerma, Gto., and 038, Rio Mayo, Son.) for inferences concerning the 86 irrigation districts to be drawn.

The Irrigation District and Unit Management Unit is concerned over the contents of paragraph 3.17 where it says "The Comision Nacional del Agua introduced a matching grant scheme for rehabilitation and modernization works with users bearing 50 percent of the investment cost", because they are inaccurate. When the CNA proposed awarding concessions for the rehabilitated infrastructure of the irrigation districts to the users organizations to provide irrigation services to their users, the users made two requests: that the CNA give them the concession for the rehabilitated infrastructure and that the irrigation service charge be increased gradually until it is self-sustaining. In the negotiations, the users organizations agreed with CNA that they would take the infrastructure in the state it was in and that CNA would be responsible for 100 percent of the investment in the rehabilitation and modernization of the infrastructure under concession.

In the initial stages of the transfer of the irrigation districts, the entire CNA budget was earmarked for rehabilitation and modernization of the infrastructure under concession. The transfer program advanced apace, as a result of which approximately 2.75 million hectares were transferred in the first five years, but not only did the CNA budget earmarked for the rehabilitation and modernization of the infrastructure under concession not grow, but it contracted in 1995, such that there was a drastic reduction in the budget earmarked for rehabilitation and modernization per hectare under concession. This contraction gave rise to fresh negotiations with users organizations, in 1996 under the umbrella of the National Association of Irrigation Users, who proposed that investments in rehabilitation and modernization of the transferred infrastructure be done on a peso-for-peso basis, in exchange for an increase in the CNA budget for this heading. The proposal was accepted [and implemented] as of 1997.

It should be made clear in paragraph 3.18, that the use of the light equipment is for the maintenance of canals and drains and not "for canal dredging".

* Translator's note. The changes made in the Spanish here are not reflected in the updated English version of the Report.

The Spanish used in paragraph 3.19 is, again, inappropriate. Perhaps the OED meant to say “la eficiencia de *conducción y aplicación* del agua” [translator’s note: the Borrower is proposing the words in italics to render the English more accurately].

Paragraph 3.20 deserves a closer look because it says that the “...OED found in 2005 that, in the (few) areas that it surveyed in Guanajuato and Sonora, technical upgrade was not as great as the completion reports indicated. Only a minority of the water users that were interviewed reported receiving a subsidy explicitly for irrigation investment and an even smaller proportion had upgraded to pressurized irrigation (Table 2). However, most of the upgrade took place after the startup of the two projects assessed, suggesting they may have contributed. Access to groundwater sources favors the introduction of pressurized irrigation, helping to explain why Costa de Hermosillo—which is entirely geared to groundwater—showed the highest incidence of investment.”

There is an apparent discrepancy between the implementation reports and the OED—a difference due perhaps to the representativeness of the sample taken by the OED, as we have already remarked in reference to paragraph 3.14.

The statement that only a minority of the water users interviewed reported receiving a subsidy explicitly for irrigation investment, except irrigation district 051, in Costa de Hermosillo, is explained by the fact that in the initial stages of the transfer all the investment went to the primary and secondary networks. Subsequently, with the start-up of PRODEP, an investment was made in interfarm and on-farm irrigation, while in all the pump-irrigation districts, such as 051, in Costa de Hermosillo, investment was made from the outset in on-farm irrigation, since there are no networks of shared canals. Besides, all the wells are privately owned.

The last part of paragraph 3.23 reads: “The staffing target for the Districts—based on projections in the early 1990s about the number of staff needed following transfer (around 2,000)—had been achieved by 1998.³² But between then and now numbers have risen by 37 percent, suggesting that the Comision initially overestimated the scope for reducing staff following District transfer.”

The Irrigation District and Unit Management Unit finds this statement rash and disconcerting because in June 2004 there were 3008 workers on the general payroll and 263 middle managers. In all there were 3271 workers, which means that if it is true that in 1998 there were 2000 workers, then there was a 64 percent increase in the staff payroll. Regardless of whether the OED can verify with Personnel Management the roster of workers in the 86 irrigation districts on different dates, what the report does not say is that in June 2004 there was a surplus of 1014 workers on the roster who were not assigned any work because the work was being performed by the irrigation users organizations, while 39 middle managers were needed because of the federal government’s voluntary retirement program.

One of the lessons learned from the transfer, by the Irrigation District and Unit Management Unit, is that an early retirement program should have put in place for the staff that was made redundant.

10. See Table 6 in S.H. Johnson, *Irrigation Management Transfer in Mexico*, Research Report No. 16, International Irrigation Management Institute, 1997.

The Irrigation District and Unit Management Unit is concerned by the proposal of the OED in paragraph 3.25 to establish a contingency fund to receive the surplus funds collected during years of abundant water availability. This, because according to the statistics on water inflows to storage dams, there are more years with inflows below the arithmetic mean than years when inflows are equal or heavier and this proposal from the OED implies that in years of abundant water availability, more water is extracted than not only the mathematical models for optimization of dam operation, but also common sense, would dictate. There is a proposal from the Irrigation District and Unit Management Unit to readjust the size of the irrigation districts based on the sustainable extraction of water from the dams, cropping patterns, climate, and the overall efficiency of water use, in order to achieve more stability in irrigation coverage every year.

Paragraph 3.26 refers to the irrigation service charge, saying that the charges quadrupled as a result of the transfer, making it possible to cover 90 percent of the operating and maintenance costs, which is accurate.

The same paragraph ends with the following statement, however: “Since transfer, although most associations have continued to raise their tariffs in nominal terms, the increase has not keep up with inflation leading, in most cases, to a deferment of maintenance.” This is accurate, but the Irrigation District and Unit Management Unit does wish to make the following remark:

As said in reference to paragraph 3.2, the civic users associations are the ones responsible for collecting the charges for irrigation services, which should be enough to cover the cost of managing, operating, and maintaining the irrigation districts. A portion of the charge is paid over to CNA by the civic users association as payment for the management, operation, and maintenance of the infrastructure under its responsibility. Now, it is common knowledge that most of the collection takes place in the months of October, November, and December, and therefore, for lack of time, it is not possible to invest the money in maintenance because the fiscal year ends on December 31. Furthermore, for budgetary reasons, the money budgeted is always less than the money collected. As a result of these two factors the resources implemented are less than what is collected, which is a disincentive to increasing the charge for block water supply, which means the maintenance of the facilities for which the CNA is responsible is not always the best.

The second part of paragraph 3.29 reads: “When the irrigation projects assessed here were being designed one of the stated objectives (Table 1) was to promote crop diversification. So far this has not happened to any significant degree. This is a function not only of distortions in the incentive regime; it reflects the high risks associated with diversification, the limited development of contract farming and export niches and the relative inflexibility of the water supply in the Districts: most of the water is from surface sources and does not lend itself to the on-demand irrigation required by many fruit and vegetable crops.”

The OED persists in saying in this paragraph, as it does in 3.2, that it is not possible to increase the area under high-margin fruit and vegetable cultivation in the irrigation districts because the water comes from surface sources. This statement is not accurate, as in its comments on paragraph 3.2, the Management Unit mentioned that in Irrigation District 075, Río Fuerte, Sinaloa, 35,553 ha of fruits and vegetables were harvested in the 2002-2003 agricultural year.

In the same district, in the same agricultural year, they harvested 91,138 ha of corn, with an average yield of 9.9 tons/ha. Converting part of this area under corn cultivation to high-value crops, such as potatoes, pumpkin, chilies, tomatoes, and fruits, will not be possible unless the issue of farm credit and marketing is resolved. This, because it costs 10 ten times more to produce fruit and vegetable crops because the price is very sensitive to supply and the fruit and vegetable farmers have very well defined marketing channels.

Another of the lessons learned by the Irrigation District and Unit Management Unit from the implementation of the PRSD and PRODEP, is that investment in modernizing irrigation infrastructure and technology, as well as improving the operation and maintenance of the irrigation districts are necessary but, alone, are not enough to restructure production.

There is renewed emphasis in paragraph 3.30 on the fact that the districts are public and the units, private, which echoed a previous assertion in 3.2. This paragraph says that output, measured in pesos per hectare, is higher in the irrigation units than in the districts. The Irrigation District and Unit Management Unit questions the sources of information on the irrigation units, since, as mentioned in paragraphs 3.14 and 3.36 on the Units, the data is patchy and, generally speaking, the information is less systematic than the information on the Districts.

We read in paragraph 3.41 that: “In the case of groundwater, [translator’s note: insertion of (sic) in Spanish indicates Borrower’s dissatisfaction with *agua de suelo* as a translation of groundwater] decentralization has not been accompanied by the development of a regulatory framework for controlling the rate of extraction.” This is inaccurate, because the regulatory framework does exist in the National Water Law.

Following are some of the articles of the National Water Law dealing with the regulatory framework for controlling the extraction of groundwater (or water from the subsoil).

Article 29.- The concession holders shall have the following obligations, in addition to those set forth in this Title:

XI. To not exploit, use, take advantage of, or discharge volumes greater than those authorized in the concession titles;

Article 29 Bis 4. The concession, allocation, or permit to discharge, as well as the applicable provisional permit, may be revoked in the following cases:

I. If the beneficiary uses more than a fifth of the volume of water authorized and is subject to a prior suspension of this right for the same reason;

Article 119. “The Water Authority” shall apply penalties in accordance with the provisions of this Law for the following breaches:

- III. Exploiting, using, or taking advantage of national waters over and above the volume authorized in the respective titles or in the records entered in the Public Registry of Water Rights;

It is the view of the Irrigation District and Unit Management Unit that above and beyond a mere regulatory framework, what is required is the enforcement of the National Water Law, although the problem will persist in the aquifers exploited by too many concession holders.