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The World Bank**

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**PROJECT PERFORMANCE ASSESSMENT REPORT**

**MOROCCO**

**SECOND LARGE SCALE IRRIGATION IMPROVEMENT PROJECT  
(LOAN 3587-MOR)**

**AND**

**IRRIGATED AREAS AGRICULTURAL SERVICES PROJECT  
(LOAN 3688-MOR)**

**June 20, 2005**

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

## CURRENCY EQUIVALENTS

*Currency Unit =Morocco Dhiram (DH)*

1993	US\$1.00	=	DH 9 .0 (appraisal)
2002	US\$1.00	=	DH 10.1 (completion)

## ABBREVIATIONS AND ACRONYMS

ASIL	Agricultural Sector Investment Loan
FLIIP	First Large-scale Irrigation Improvement Project
GDP	Gross Domestic Product
IAASP	Irrigated Area Agriculture Support Project
ICR	Implementation Completion Report
KfW	Kreditanstalt für Wiederaufbau
LSI	Large-scale irrigation
MoA	Ministry of Agriculture and Agricultural Development
OED	Operations Evaluation Department (of the World Bank)
OP	Farmers' organizations (Organisations Professionnelles)
ORMVA	Regional Authority for Agricultural Development (Office Regional de Mise en Valeur Agricole)
PPAR	Project Performance Assessment Report
SLIIP	Second Large-scale Irrigation Improvement Project
WUA	Water Users' Association
WUF	Water Users' Federation

## FISCAL YEAR

Government: July 1 - June 30

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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 and Key Staff Responsible

### SECOND LARGE SCALE IRRIGATION IMPROVEMENT PROJECT (LOAN 3587 - MOR)

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory
Sustainability	Likely	Non-evaluable	Likely
Institutional Development Impact	Modest	Modest	Modest
Bank Performance	Satisfactory	Satisfactory	Unsatisfactory
Borrower Performance	Satisfactory	Satisfactory	Unsatisfactory

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

<i>Project</i>	<i>Task Manager</i>	<i>Division Chief/ Sector Manager</i>	<i>Country Director</i>
Appraisal (1993)	Jean Pierre Villaret	Odin Knudsen	Mahmood Ayub
Completion (2001)	Hassan Lamrani	Salah Darghouth Doris Koehn	Christian Delvoie

### IRRIGATED AREAS AGRICULTURAL SERVICES PROJECT (LOAN 3688-MOR)

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

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

<i>Project</i>	<i>Task Manager</i>	<i>Division Chief/ Sector Manager</i>	<i>Country Director</i>
Appraisal (1993)	J. Cole	Odin Knudsen	Mahmood Ayub
Completion (2002)	Hassan Lamrani	Petros Aklilu	Christian Delvoie



## **Preface**

This is the Project Performance Assessment Report (PPAR) prepared by the Operations Evaluation Department (OED) for Morocco Second Large Scale Irrigation Improvement Project (SLIIP) and the Irrigated Areas Agricultural Services Project (IAAS). The SLIIP project was approved in March 1993 for a loan of US\$215 million. Kreditanstalt für Wiederaufbau provided independent parallel financing of US\$ 14.6 million as did the Caisse française de développement for US\$ 8.4 million. At closing on schedule in December 2000, total project costs were US\$199.8 million compared with the appraisal estimate of US\$367.3 million, and US\$107.2 million of the loan had been cancelled. The IAAS project was approved in November 1993 for a loan of US\$25 million. At completion one year behind schedule in June 2001, total costs were US\$21.7 million compared with the appraisal estimate of US\$34.7 million, and US\$9.9 million had been cancelled.

This report is based on the Implementation Completion Reports (ICRs) prepared by the Middle East and North Africa Region (Report No. 23264 dated December 2001 and Report No. 22454 dated June 2001), the Memorandum and Recommendation of the President, Staff Appraisal Reports, loan documents, project files, and discussions with Bank staff. An OED mission visited Morocco in June-July 2004 and met stakeholders to discuss the effectiveness of the Bank's assistance with development and financing partners, project implementing agencies, private sector agencies, and beneficiaries. The cooperation and assistance of central government and regional officials and staff, nongovernmental stakeholders, and other interested parties are gratefully acknowledged.

These projects were selected for performance assessment because of disagreements with the MENA region about ratings and also to support an OED evaluation of the Bank's investments in agricultural water management scheduled for June 2005. Findings will inform the 2005-06 Country Assistance Strategy under preparation.

Following standard OED procedures, the draft of this PPAR was sent to the borrower for comments before finalization, but none were received.



## Summary

The Morocco Second Large-scale Irrigation Improvement Project and the Irrigated Areas Agricultural Support Project were approved in 1993. Both projects aimed to develop the technical and institutional capacity of the nine Regional Authorities for Agricultural Development (ORMVAs: Offices Regionaux de Mise en Valeur Agricole) to contribute to increasing agricultural productivity in the large-scale irrigation subsector that accounts for 485,000 hectares – almost half – of Morocco's irrigation area.

The major objectives of the Improvement Project were to raise the efficiency of water distribution and use through rehabilitation of infrastructure, improved operation, and on-farm investment; to preserve public investments through appropriate replacement and maintenance; and to increase recovery of operation and maintenance (O&M) costs from beneficiaries through better management by the ORMVAs, thus reducing the need for the government's budgetary support. The Support Project's principal objectives were to raise agricultural production and farmers' income in the irrigated areas with special efforts to reach women, improve the organizational and operating efficiency of the ORMVAs' agricultural research activities and extension services, and promote farmer organizations to take an increasing share of development responsibilities.

The lack of progress on institutional reforms and the government's own budget problems resulted in steady contraction of the loans and budgets for both projects. This created significant managerial problems for the ORMVAs and undermined efficient long-term planning to achieve project objectives.

Because the projects' objectives were not reduced, none was fully achieved and shortcomings were numerous. Policy and managerial reforms were only partially implemented because of unresolved difficulties in the legal and regulatory environment of ORMVAs and other government stakeholders, and their lukewarm acceptance of the need for reform. One notable achievement was a marked improvement in the ORMVAs' management information systems, which now facilitate attribution of all costs. While the bulk of the Improvement Project's investment was used to enhance the efficiency of water distribution through rehabilitation and improved O&M, the absence of adequate monitoring and evaluation precludes assessment of impact. On-farm water-use efficiency improved only locally at a much smaller scale and with fewer innovations than planned. Overall maintenance expenditures per hectare declined by almost a third between 1995 and 2000 because falling revenue from water billings are used to cross-subsidize the ORMVA's agricultural extension activities. Farmers' willingness to pay declined because the quality of water service fell and ability to pay was undermined by low value irrigated crops encouraged by agricultural subsidies. Even though government has had to increase its budgetary support for large-scale irrigation – contrary to project objectives - the norms for O&M are not met.

Agricultural production and farmer incomes increased, but this is not clearly attributable to the Support Project. Outreach to women led to the formation of several cooperatives and producer organizations but was dropped for budgetary reasons on project closure. Agricultural services were partially reorganized and the volume of

services increased, but it is not clear to what extent farmers adopted new technologies due to lack of monitoring and evaluation. While the number of farmers' organization rose significantly, their effectiveness is unknown. Training and contracting agricultural research to universities were the only notably successful components.

OED rates the outcome of the Improvement Project as moderately unsatisfactory and the outcome of the Support Project as moderately satisfactory. Institutional development is rated as modest for both projects because there was minimal handover of agricultural and water services to farmers' organizations, cost recovery deteriorated, and the ORMVAs' dependence on government budget support increased. Overall Bank and borrower performance is rated as unsatisfactory. Project objectives were unrealistic because continued agricultural subsidies in parallel with the project provided no incentive for farmers to reduce agricultural water consumption and increase water use efficiency. During implementation attention to monitoring and evaluation was poor and negligible progress on managerial and institutional reform was condoned.

Experience with this project confirms a number of OED lessons:

- Water conservation has to be approached holistically and incentives to increase water use efficiency need to be harmonized at the macro- and micro-level. In Morocco, failure to remove agricultural subsidies and raise agricultural water charges encouraged farmers to take the low risk path of using high value (but low cost) water for low value crops. And low water prices and returns discouraged farmers' investment in on-farm water conservation improvements.
- Secure water rights and predictable water supplies provide incentives for farmers to invest in high-tech irrigation and bring about significant water savings. Profits from high value irrigated crops will enable payment of the higher water charges needed to efficiently operate and maintain the publicly-owned upstream water delivery system.
- Service providers should have full autonomy to set and retain water users' fees to guarantee water delivery through adequate operation and maintenance. Financial management and accounting of different services – in this case water and agricultural extension – should be clearly separated to avoid hidden cross-subsidies and allow clear demarcation of costs.
- Cost-recovery from users of irrigation and agricultural services will be difficult if beneficiaries are not involved in designing service packages and cost-recovery mechanisms, and project sponsors do not consider the incentive framework for farmers to participate. Equally important, water users will not pay if they receive no obvious and tangible benefits and do not have secure water rights.
- Adequate monitoring and evaluation and specialist inputs are essential to determining project achievements and the impact of the Bank's interventions.

Ajay Chhibber  
Acting Director-General  
Operations Evaluation

## 1. Background

1. Morocco is a lower middle-income country with a GDP per capita of US\$1,250 and a population of 30.5 million growing at 1.8 percent annually. Since 1991 the rate of growth of GDP fell by more than half, averaging only 1.9 percent during the 1990s, and per capita incomes stagnated causing the country to lag behind others in the MENA Region.

2. Agriculture contributes about 12-17 percent of GDP depending on rainfall, employs about half of the work force and 60 percent of the female labor force, and is a major component of the economy. Only about 14 percent (1.2 million hectares) of the 8.4 million hectares of arable land is irrigated which makes agricultural production highly vulnerable to drought. Even so, public investment in irrigation has been substantial, typically accounting for almost half of all agricultural sector expenditures or six to eight percent of national investment, until well into the 1990s. During this period irrigated land contributed 45 percent of agricultural value added and produced 75 percent of agricultural exports.

3. Significant agricultural growth, 0.8 percent per year, over the period 1986-91, faltered in the 1990s when growth declined to an average of -0.3 percent. Principal causes of poor sector performance were more frequent and recurrent drought, an incentive structure favoring import substitution of lower value cereals, and slow growth and diversification in export markets.<sup>1</sup> However, in the early 2000s more reliable rainfall allowed agriculture to recover and the 2003 harvest was one of the strongest on record, leading to government projections of a seven percent growth in the sector.

4. Morocco's irrigation sector is split among public sector capital-intensive large-scale irrigation (LSI) schemes covering 485,000 hectares that are operated by nine Regional Authorities for Agricultural Development (ORMVAs: Office Regional de Mise en Valeur Agricole), traditional small and medium-scale irrigation covering 400,000 hectares owned and operated by local communities, and about 100,000 hectares privately development. The projects under assessment are part of the LSI subsector. Most private sector and about 80 percent of the ORMVA-operated LSI areas support use of modern irrigation, while the remaining LSI area supports

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1. The Economist Intelligence Unit (2005) reports that "The doubling of the frequency of severe droughts to one year in two in the 1990s prompted a national debate over agriculture. Until recently the government continued to believe that its plans to increase the amount of water available for irrigation, introduce more efficient irrigation techniques and develop new farming methods would allow production of 6m tonnes of cereals each year, secure the rural economy and cut food imports. Yet low cereal yields are also related to other structural problems, such as the limited use of selected seeds (in the 2002/03 season usage actually fell by 20 percent to 488,000 tonnes), fertiliser and mechanical equipment, as well as the fragmentation of holdings—85 percent of farms are under 10 hectare and 49 percent under 3 ha. A measure of the inefficiency of cereal farming is that the government's guaranteed price for cereals is roughly twice the world price and that the authorities raised wheat import tariffs to 135 percent in order to protect cereal farmers. According to World Bank figures, the value-added per farmer in Morocco fell from some US\$1,700 in 1989 to US\$1,650 in 1999; over the same period the value-added per farmer in Tunisia has risen from US\$2,200 to US\$3,000."

improved traditional irrigation in the southern oasis. In the early 1990s about 36 percent of the LSI areas were planted with cereals, 20 percent with industrial crops (sugar beet, sugarcane, cotton, and oilseeds), 24 percent with vegetables and forage crops, 14 percent with citrus and olive trees, and 6 percent with food legumes. Typically, farms in LSI are small and privately owned and more than four-fifths of the farmers in LSI areas cultivate less than 5 hectares. Crop yields were below potential because of outdated farming techniques, climatic hazards, and unfavorable incentives to invest and produce, including issues of land tenure and sub-economic land holdings.

5. The Bank has lent Morocco over US\$6.1 billion for 105 loans and credits since 1965 and 30 of these, totaling US\$1.8 billion, have been to the agricultural sector. Until the mid-1980s the majority of agricultural investments were directed at building new irrigation infrastructure, supporting agricultural credit, improving rainfed agriculture and boosting crop productivity through better extension and marketing. In response to a worsening macro-economic situation, the government began a Medium-Term Agricultural Sector Adjustment Program (1986) that was supported by two agricultural adjustment loans (US\$325 million) and an agricultural sector investment loan (US\$50 million).

6. The primary objective of ASIL I (1992-94) was to finance part of the Moroccan government's total investment program in agriculture, estimated at US\$640 million, and to continue to advance key sector policy reforms, notably in the livestock and irrigation subsectors. Almost a third of the loan was earmarked for grants to farmers to promote improved farming techniques. OED's ex-post assessment of ASIL I rated its outcome as unsatisfactory because it had little impact on consolidating trade liberalization or improving the capacity and efficiency of the Ministry of Agriculture.<sup>2</sup> Even so, veterinary services were successfully privatized and independent veterinarians now contract with the state for provision of prophylactic services. A second ASIL (1994-97) was implemented in parallel with the projects being assessed.

7. The First Large-scale Irrigation Improvement Project (FLIIP), covering 150,000 hectares and approved in 1987, aimed at making the LSI sector more efficient, cost effective, and sustainable. Key issues it addressed in addition to rehabilitation and performance improvement were: withdrawal of the public sector and the ORMVAs from commercial activities,<sup>3</sup> introduction of water user associations (WUAs), improving cost recovery, fostering growth of professional associations and farmer cooperatives to stimulate crop production and marketing, and improving the ORMVA's capability for operation and maintenance (O&M).

8. The FLIIP demonstrated that the institutional weaknesses of the ORMVAs were deeper and more widespread than anticipated, farmers' participation was less

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2. OED. 1999. Performance Audit Report. Kingdom of Morocco: Agricultural Sector Adjustment Loan (Loan 3403-MOR). Report No. 19529. June 21, 1999.

3. Formerly, public sector agencies were involved in mechanized cultivation, input supply and veterinary services, and state-owned firms held processing monopolies for sugar and cotton.

than expected, and that project interventions had to be more carefully tailored to the individual and differing needs of each ORMVA. More importantly, FLIIP had had little impact on the use of heavy budget subsidies to compensate insufficient recovery of water charges and excessive involvement of ORMVAs in non-remunerative commercial activities. It became clear that irrigation and agricultural service costs needed to be clearly identified and separated, and that reforms to agricultural extension would be more effective if farmers' managerial capacity was also improved. To allow greater attention to these issues the follow-on second large-scale irrigation improvement project separated the agricultural services and capacity-building components into a free-standing project to be implemented in parallel. The Second Large-scale Irrigation Improvement Project was approved in March 1993 and the Irrigated Area Agricultural Services Project eight months later. The IAASP overlapped the Bank's Agricultural Research and Extension Project (1990-97) that focused on improving national research and extension institutions.

## **2. The Projects**

### **OBJECTIVES**

9. The goal of the SLIIP was to enhance the sustainability of large-scale irrigation through completion of irrigation system rehabilitation and restructuring of the ORMVAs begun under FLIIP. Its primary objective was to make large-scale irrigation more efficient, cost-effective, and sustainable in all nine ORMVAs covering an aggregate area of about 200,000 hectares.<sup>4</sup> Objectives are related to components and costs in Table 1. Agricultural development aspects were supported through the Irrigated Areas Agricultural Support Project (IAASP) that focused on raising agricultural production and farmers' income in the irrigated areas with special efforts to reach women, improving the organization and operating efficiency of the ORMVAs and farmers' organizations, and upgrading extension and research (Table 1). A second ASIL (1994-98 for US\$121 million) was implemented in parallel with the two assessed projects. In addition to trade liberalization and support for reform in the center, ASIL II complemented IAASP through provision of incentives to reform the livestock subsector, veterinary and extension services, and to expand WUAs in small-scale irrigation projects. Several of its policy reforms also supported achievement of SLIIP objectives, specifically on environment and agricultural infrastructure planning.

### **IMPLEMENTING ARRANGEMENTS**

10. Both projects were implemented by the Ministry of Agriculture (MoA) through the semi-autonomous ORMVAs and coordination was allocated to different departments within the ministry. The Directorate of Rural Equipment through its sub-department – the Service for LSI Improvement – was charged with project

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4. The ORMVAs were: Doukkala, Gharb, Haoz, Moulaya, Ouarzazate, Souss-Masa, Tadla, and Tafilalet

**Table 1: Project Objectives, Components, and Costs**

<i>Objectives</i>	<i>Components</i>	<i>Costs</i>	
<b><i>Second Large-Scale Irrigation Improvement Project</i></b>			
<ul style="list-style-type: none"> <li>❑ Preserve public investment through appropriate system maintenance</li> <li>❑ Enhance the efficiency of water distribution through rehabilitation of irrigation facilities and improved operation</li> </ul>	<p><b>Infrastructure Rehabilitation.</b> The ORMVAs to reconstruct 52,000 hectares in 6 irrigation distribution systems, rehabilitate diversion weirs and canals serving 21,000 hectares in 20 traditional flood irrigation schemes in the Sahel regions. Improve subsurface drainage in 19,000 ha. Replace equipment in 58 pumping stations and rehabilitate 1,060 km of feeder roads</p>	175.2	168.6
<ul style="list-style-type: none"> <li>❑ Reduce budgetary costs of O&amp;M activities by increasing cost recovery from beneficiaries and strengthen ORMVA management capabilities</li> <li>❑ Ensure better environmental protection by implementing monitoring plans for all large scale irrigation areas</li> </ul>	<p><b>Institution Building and Policy Reforms.</b> Provide equipment, vehicles, buildings, TA and training to improve management of irrigation schemes and enable the Directorate of Rural Equipment to coordinate project implementation and monitor ORMVA performance. Implement policy reforms to: restructure water tariffs, increase water charges, and define public-private water delivery contracts. Implement a long-term strategy and plan for systematic rehabilitation of irrigation infrastructure, and restructure of the institutional framework for large-scale irrigation.</p>	60.5	22.4
<ul style="list-style-type: none"> <li>❑ Enhance efficiency of water use by irrigators through improved techniques and appropriate on-farm investment</li> </ul>	<p><b>On-farm Water Use Efficiency Improvements.</b> Pilot demonstrations of improved irrigation techniques, upgrading of water metering systems and rehabilitation of on-farm irrigation systems on about 20,000 hectares on a 70:30 farmer/government cost sharing basis. Promote formation of 400 water user associations as a vehicle for on-farm demonstrations and investments, and to participate in O&amp;M of public infrastructure.</p>	44.3	8.7
	<b>Price and Physical contingencies</b>	<b>87.3</b>	<b>-</b>
	Total Project Cost	367.3	199.7
<b><i>Irrigated Areas Agricultural Services Project</i></b>			
<ul style="list-style-type: none"> <li>❑ Raise agricultural production and farmers' income with special efforts to reach women, who are mainly responsible for livestock management</li> </ul>	<p>Transfer of technology to and from farmers in the large-scale irrigation areas of the ORMVAs, including the strengthening of adaptive research, agricultural extension, women's programs</p>	26.1	19.0
<ul style="list-style-type: none"> <li>❑ Improve the organization and operating efficiency of agricultural services within the ORMVAs</li> </ul>	<p>Supporting services, including soils and plant analysis, pest and disease warning systems, and testing/demonstration of small equipment</p>		
<ul style="list-style-type: none"> <li>❑ Promote commodity and service-oriented farmer organizations to take an increasing share of development responsibilities</li> </ul>	<p>Promotion of farmer organizations, with provision for changes in the legal and regulatory framework, technical assistance, training and some initial investments</p>	4.1	1.4
<ul style="list-style-type: none"> <li>❑ Involve the university teaching and research staff in field extension and research.</li> </ul>	<p>Undertake studies of farm mechanization, farmer associations and product marketing</p>	4.5	1.3
	<b>Price and Physical contingencies</b>	<b>-</b>	<b>-</b>
	Total Project Cost	<b>34.7</b>	<b>21.7</b>

coordination of the SLIIP, monitoring of ORMVA performance and preparing policy reforms. The Education, Research and Development Department coordinated the six central departments that assisted in the implementation of IAASP. Interministerial coordination for both projects was carried out by the National Project Coordination Committee set up under FLIIP. This committee met once a year under the chairmanship of the secretary-general of the MoA. A special national-level Project Monitoring Committee was charged with systematic review of the ORMVAs' financial performance and making recommendations to the national coordination committee. National-level monitoring of the environmental impact of LSI was the responsibility of the interministerial Committee on Environmental Protection.

11. Each ORMVA was independently responsible for the planning and budgeting of project components implemented within their irrigation command areas (Table 1). For SLIIP this included infrastructure rehabilitation, improvement of ORMVA management and on-farm water use efficiency, and monitoring environmental impact. All activities of the IAASP would be implemented by specialist units within the ORMVA, linked as appropriate to technical advice from the relevant MoA departments.

12. To ensure reform of the ORMVAs' agricultural advisory services, the MoA piloted reorganization of four of them (Doukkala, Gharb, Loukkos, and Tadla) in which a new Director of Agriculture would manage a single department created from merging the crop production, livestock, and extension services. The regional development centers and livestock posts were consolidated into one agricultural development center and most technical staff were transferred from headquarters to sub-divisional level. It was expected that this reorganization of agricultural services would be mainstreamed in all ORMVAs by completion of the project.

## IMPLEMENTATION

13. Four years of severe drought affected Morocco over the period 1994–2001, seriously depleting water supplies and reducing agricultural productivity. Simultaneously, the difficult macroeconomic situation put serious constraints on the availability of counterpart financing. And in the irrigation subsector, the government found itself financially over-committed because of its substantial investment in the National Irrigation Program (to expand irrigated area by one million hectares), SLIIP, and IAASP. Institutionally, the reform agenda for the subsector experienced considerable problems due to weak ownership and reluctance to change the *status quo*. In the first three years of the SLIIP only a third of the expected progress on rehabilitation was achieved, while there was almost no progress on institution building, policy reform, training, and beneficiary participation. In part this reflected uncertainty during a period marked by major political change. Following the approval of a new constitution by popular vote in 1996 and elections to a bicameral parliament in September 1997, a new government (formerly the opposition) came to power in early 1998. Thereafter, there was greater realism about actions needed to restructure the projects.

14. As a result of the lack of progress on institutional reform and government's declining budget allocation to the ORMVAs, the scope of both projects and loans was reduced – but only after the Bank proposed suspending SLIIP disbursement in late 1997. For similar reasons IAASP was classified as a problem project over the period 1997-99. While the SLIIP was not formally revised, the project components were drastically downsized by 46 percent.<sup>5</sup> The greatest impact was on the budget for on-farm water use efficiency improvements that was cut by 64 percent. Although the budget for IAASP was cut by over a third through four reductions of the loan, project objectives were not changed even though the remaining budget was unevenly distributed. The women's program was cut by 62 percent, promotion of farmer organizations by 60 percent, adaptive research and supporting services by 31 percent and extension by 24 percent. The downsizing of the projects created significant managerial problems for the ORMVAs as the declining government budget allocation precluded efficient long-term planning to achieve project objectives.

### **3. Evaluation**

#### **EXPECTED BENEFITS**

15. The SLIIP was expected to directly raise incomes by at least 20 percent for 32,400 farm families, half of whom owned less than 2 hectares. Agricultural intensification was expected to generate 5,000 person years/year of on-farm employment and the same level of temporary off-farm employment during implementation. Being broader in scope, the IAASP was expected to directly benefit all farm families (125,000) within the ORMVAs plus an additional 75,000 families in adjacent rainfed areas. It was predicted also that adaptive research under IAASP would benefit farmers in other small-scale and traditional irrigation schemes covering some 800,000 hectares.

16. Rehabilitation of the irrigation infrastructure was expected to support increased agricultural productivity and lower costs over an aggregate area of 125,000 hectares. Specifically, it was expected that production of wheat would increase by 8 percent, sugar beet by 11 percent, and citrus by 20 percent. Increased forage production was expected to translate into an incremental 11 million liters of milk and 970 tons of beef. Replacement of pumps was expected to lower surface delivery irrigation costs by 12 percent and sprinkler irrigation costs by 11 percent. Improved roads would lead to savings of 25 to 46 percent.

17. Improved service delivery of water at higher efficiencies, allied with increased water charges and collection rates, was expected to increase irrigation cost-recovery

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5. US\$35 million of the SLIIP loan was cancelled in June 1996 and a further US\$17 million in May 1997. A further US\$19 million was canceled in July 1998, US\$16 million in February 2001 and US\$5.1 million was cancelled after closing. By completion, the Bank's loan had been reduced from US\$215 to US\$108 million. Similarly, parallel financing by KfW and AFD was reduced from UD\$54 million to US\$31 million.

by 40 percent. When offset against a projected 20 percent cost increase for O&M, this would allow the ORMVAs to increasingly contribute to financing asset depreciation – a major sector objective.

### COUNTERFACTUAL

18. Without the project it was projected that crop and livestock yields would not increase primarily due to water supply constraints and only moderately effective agricultural services constrained by insufficient funding. Continued poor maintenance of canals was projected to reduce water availability by about one million cubic meters a year leading to a loss of irrigated area. In turn this would accelerate farmer migration to congested urban areas, increase waterlogging and salinization of soils, and facilitate the spread of waterborne diseases.

### MONITORING AND EVALUATION

19. Failure to implement effective monitoring and evaluation (M&E), essential to determine if project objectives were met, was a major failing of both projects. General performance indicators were specified at appraisal and the IAASP even included a US\$1.5 million monitoring and evaluation component. Attention to M&E was late and both projects failed to operationalize O&M systems that moved beyond inputs. Consequently, apart from generic management, budget and financial indicators that have been collected by the ORMVAs as part of their routine management, there are no reliable data on project outputs or impacts. In consequence, impacts of the projects on water use efficiency, agricultural productivity and institutional development can only be inferred (in some cases) from more general statistical information. Because of the inadequate M&E systems and the presence of parallel investments affecting ORMVA water management and agricultural productivity, it is also difficult to firmly attribute observed improvements in key indicators solely to the intervention of these two Bank projects.

### OUTCOME

20. **The outcome of the Irrigated Area Agricultural Services Project is rated moderately satisfactory. The outcome of the Second Large-scale Irrigation Improvement Project is rated as moderately unsatisfactory.** These ratings are based on the relative importance of their objectives and taking into account their relevance, efficacy, and efficiency. The findings are summarized in Table 2 and elaborated below. The poorer outcome for the SLIIP is because quite good performance on physical objectives was nullified by inattention to institutional objectives and, at project closure, the level of budget support was higher and cost-recovery lower than at the start of the project.

21. **Overall relevance of both projects was high at appraisal and remains high.** The government's objectives for the irrigation subsector are to increase foodgrain security through efficient production of crops, to raise agricultural incomes and employment through increased on-farm productivity, and to improve marketing. More efficient water use is essential given that irrigated agriculture consumes 85

percent of the nation's water and water is the most constrained agricultural input. Morocco is defined as a "water-stressed" country and future industrial growth and economic development in general will generate much increased demand for other uses. The projects were highly relevant to the Bank's 1995 Water Sector Review (that was the basis for a seminar on water held in Morocco in late 1995), and the adoption of the 1996 Water Code. Both projects' promotion of beneficiary participation resonates with the government's 2020 Rural Development Strategy that calls for greater involvement of the people in planning and executing rural development programs.

**Table 2: Ratings for Achievement of Project Objectives**

<i>Objectives</i>	<i>Relative Importance</i>	<i>Relevance</i>	<i>Efficacy</i>	<i>Efficiency</i>	<i>OUTCOME</i>
<b><i>Second Large-scale Irrigation Improvement Project</i></b>					
1. Preserve public investment through appropriate system maintenance	1	High	Modest	Modest	Moderately Unsatisfactory
2. Enhance the efficiency of water distribution through rehabilitation of irrigation facilities and improved operation	2	High	Substantial	Modest	Satisfactory
3. Enhance efficiency of water use by irrigators through improved techniques and appropriate on-farm investment	3	High	Modest	Modest	Moderately Unsatisfactory
4. Reduce budgetary costs of O&M activities by increasing cost recovery from beneficiaries and strengthening ORMVA management capabilities	4	High	Negligible	Negligible	Unsatisfactory
5. Ensure better environmental protection by implementing monitoring plans for all large scale irrigation areas	5	Modest	Negligible	Negligible	Unsatisfactory
<b><i>Overall ratings</i></b>	<b>-</b>	<b><i>High</i></b>	<b><i>Modest</i></b>	<b><i>Modest</i></b>	<b><i>Moderately Unsatisfactory</i></b>
<b><i>Irrigated Areas Agricultural Services Project</i></b>					
1. Raise agricultural production and farmers' income with special efforts to reach women, who are mainly responsible for livestock management	1	High	Modest	Substantial	Moderately Satisfactory
2. Improve the organization and operating efficiency of agricultural services within the ORMVAs	2	High	Modest	Modest	Moderately Unsatisfactory
3. Promote commodity and service- oriented farmer organizations to take an increasing share of development responsibilities	3	High	Modest	Substantial	Moderately Satisfactory
4. Involve the university teaching and research staff in field extension and research	4	Substantial	Substantial	Substantial	Satisfactory
<b><i>Overall ratings</i></b>	<b>-</b>	<b><i>High</i></b>	<b><i>Modest</i></b>	<b><i>Substantial</i></b>	<b><i>Moderately Satisfactory</i></b>

22. The projects were relevant to the 1997 and 2001 CASs that, inter alia, emphasized reform of public enterprises, increased cost-recovery and rationalization of their finances through reduction of subsidized services — objectives endorsed by OED's 1998 Country Assistance Review and its 2001 Country Assistance Evaluation. The projects' emphasis on removing government from agricultural activities that could be carried out by the private sector, farmers' and professional organizations was and is highly relevant to reducing subsidies to agriculture. Building more efficient service-provider organizations and improving cost-recovery from farmers (for the ORMVAs' irrigation and animal husbandry services) were and are essential for the financial sustainability of the irrigation subsector.

## EFFICACY

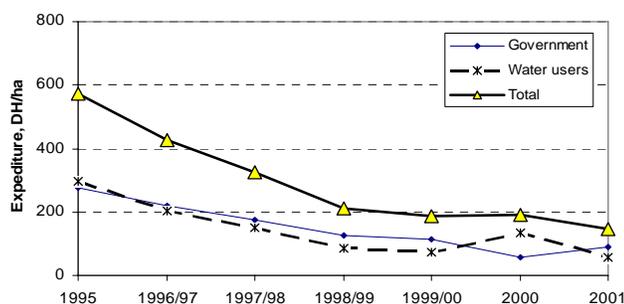
### Second Large-scale Irrigation Improvement Project

23. Overall efficacy is rated modest taking into account the relative importance of the objectives and their level of achievement.

***Objective 1: The preservation of public investment through appropriate system maintenance was only partially achieved – and the system continues to deteriorate***

24. Although the maintenance skills of all ORMVA staff were considerably enhanced by the project, full utilization of these skills was hindered by consistently declining budget allocations for O&M of large-scale irrigation facilities, Figure 1. At appraisal, it was estimated that the average annual O&M expenditures (excluding amortization) for all ORMVAs over the period 1994-99 should be 608 DH/ha. A re-estimate in 2004 was 602 DH/ha.<sup>6</sup> Thus, expenditures met about 90 percent of needs at the start of the project but less than a third after 2000. The situation is even worse if replacement investment is added to the O&M costs. Thus, maintenance cannot keep pace with needs and irrigation infrastructure continues to deteriorate.

**Figure 1: Expenditures on O&M for large-scale irrigation continue to decline**



25. The primary reason for the shortfall in O&M budgets is that water-user fees are generally too low, and the income from them goes into the general funding of all ORMVA activities. Recovery of billings is also low – a problem exacerbated by users' reaction to water shortages or irregular supplies resulting from deteriorating infrastructure and the series of droughts in the late 1990s. While overall O&M

6. World Bank. 2004. Kingdom of Morocco: Institutional Reform and the Large Scale Irrigation Sector – Findings and Recommendations of the Working Group. April 4, 2004.

expenditure is inadequate, there are marked variations in performance among the ORMVAs. In 1999/2000 Tadla expenditures exceeded the O&M norms and Moulouya achieved 90 percent. But Gharb, Doukkala, and Souss-Massa met less than half.

***Objective 2: Enhanced efficiency of water distribution through rehabilitation of irrigation facilities and improved operation was achieved in targeted areas.***

26. The ORMVAs preferentially invested in civil works, spending 96 percent of the initial budgeted amount and, because of the overall reduction in the budget for the project, this was at the expense of investments to improve water use efficiency and institution building. Water distribution systems and associated electro-mechanical equipment were reconstructed and rehabilitated over a net area of 37,000 hectares, or 70 percent of appraisal targets in four ORMVAs. Because system deterioration was greater than anticipated, unit costs were 37 percent higher than planned.<sup>7</sup> Even so, the impact of the project's full or partial rehabilitation on water conveyance efficiency cannot be accurately determined because water metering equipment was not included in the loan. Field inspection and discussion with project beneficiaries by OED within the rehabilitated zones, and the beneficiary surveys undertaken at project completion in 2001, indicated that there had been localized water distribution efficiency gains – but no systematic accounting of them is available.<sup>8</sup> The most discernable efficiency improvements were in the Dra'a valley in Ouarzazate where the dam was improved and six existing weirs rehabilitated – overall water use efficiency rose from 50 to about 65 percent. Elsewhere, much of the rehabilitation was within larger systems. While water use efficiency at Loukkos is good, radical redesign is needed to reduce operating costs.<sup>9</sup>

27. Indirect measures of overall operational efficiency for three large-scale irrigation systems (Gharb, Tadla and Doukkala) show that the level of water losses prior to sale increased modestly throughout the project (Figure 2.)

28. Rehabilitation only addressed the most serious rehabilitation needs on less than a third of the total area of the targeted ORMVAs. Meanwhile the effects of continued deterioration in the non-project areas outpaced improvements brought about by the project.<sup>10</sup> The marked reduction of water losses after closure of SLIIP in

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7. Most of the rehabilitation effort was directed at four ORMVAs: 5,013 ha (6%) of 85,000 hectares in Gharb; 9,098 hectares (15%) of 61,000 hectares in Doukkala, 15,218 hectares (23%) of 67,300 in Moulouya; and 7,400 hectares (8%) of 97,000 hectares in Tadla. Planned costs were US\$3,362/ha; actual costs were US\$4,593/ha.

8. ICR Annex 8.1 pp 41-51.

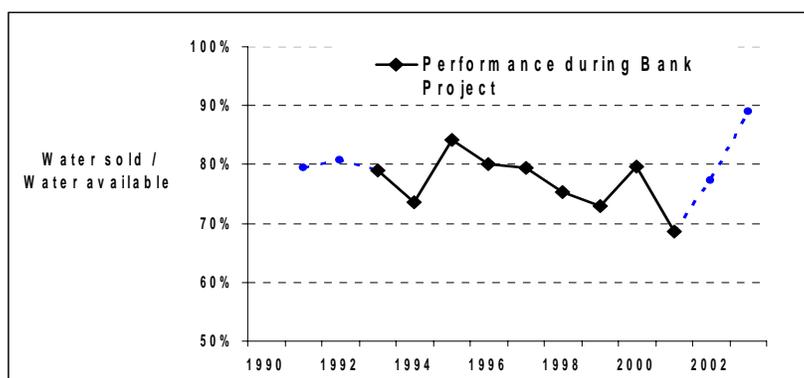
9. The 16,000 hectares irrigation system at Loukkos received US\$4,000/hectare budget transfers over the period 1980-99 to cover high energy costs.

10. Repairs to main canals and structures improved water conveyance to about 29 percent of the total irrigated area in these ORMVAs while rehabilitation below the main canals benefited 12 percent of the area of the ORMVAs.

2001 can be attributed to new investment that continued upgrading, rehabilitation, and sector reform (totaling about US\$500 million).<sup>11</sup>

29. **There were efficiency gains in energy use** through improvements to 74 pumping stations, and this generally exceeded appraisal expectations. The overall impact was positive as 76 percent of the project area (128,000 hectares) benefited. Table 3 shows the results from four ORMVAs that have comparable data. Results from Gharb (using different data) also show improvement. Overall, average pumping costs dropped from 0.33 DH/cubic meter to 0.19 DH/cubic meter over the period 1995-2000.

**Figure 2: Water distribution efficiency declined during the project**



Source: Data provided by the ORMVAs, 2004.

**Table 3: More efficient energy use was achieved.**

Year/Area	Pumping use efficiency by ORMVA (kwh/1000m <sup>3</sup> /total head)				
	Souss Amont	Souss Massa	Moulouya	Doukkala	Tadla
Area, ha	42,100		20,900	32,500	1,000
1993-94	6.9	4.6	5.2	2.0	4.1
2003	5.0	3.7	4.4	3.6	4.4
Gain in efficiency	+27%	+19%	+15%	-20%	-7%

Source: Data provided by the individual ORMVAs, 2004.

***Objective 3: Enhanced water use efficiency by irrigators through improved techniques and appropriate on-farm investment was partially achieved.***

30. The primary reason was that the budget for on-farm investment was only 16 percent of the amount planned. Because of this shortfall, pilot demonstrations of improved surface and drip irrigation pilot projects, their replication by farmers (fostered

11. These investments include an EU water sector loan 2001-04 of Euro 120 million; an EIB loan of US \$45 million and a grant of US\$40 million; and an African Development Bank loan of US\$250 million (2004-06).

by a 30 percent government subsidy) and assistance to water user associations to promote higher-technology irrigation were all cancelled. Additionally, because unit costs were underestimated, less than a third (2,962) of the planned number of 9,500 farm hydrants were installed.<sup>12</sup> Even so, this substantially improved pressurized water supplies for sprinkler systems over a larger area (37,000 hectares) than originally planned (35,000 hectares). Farmers are enthusiastic about the benefits of the new hydrants that maintain water pressure and continuity, reduce water losses, and enable accurate metering of usage. With an assured water supply farmers are able to practice demand-driven water rotations more effectively. However, when water supplies are limited, water allocations are determined administratively by the ORMVAs.

31. Although the Bank-financed drip irrigation was cancelled, other development agencies successfully supported pilot projects in parallel and the adoption rate in public irrigation systems is expanding – albeit slowly.<sup>13</sup> Since July 2002, the Ministry of Agriculture has promoted a five-year program to increase the area under drip irrigation in public irrigation schemes to 100,000 hectares – by December 2003 about 8,000 hectares had been equipped. While most leaders of water user associations interviewed see the advantages high technology irrigation brings, they identified the major constraints as (a) lack of farmers’ financial resources to match government subsidies due to small landholdings and access to credit, (b) difficulty of adoption because of the high levels of illiteracy among older farmers, (c) the fact that farmers’ sons want to move out of farming or to more profitable areas (cities or work in Italy or Spain), and (d) the mixture of land tenure arrangements that may preclude a collective approach.<sup>14</sup>

***Objective 4: Monitoring plans for all large-scale irrigation areas to ensure better environmental protection were only partially implemented with major shortcomings.***

32. ORMVA staff are aware of the importance of better environmental protection and each ORMVA established Environmental Monitoring Action Plans. Reduced conveyance losses and higher water use efficiency should have markedly reduced the environmental impact of large-scale irrigation. However, because continued system deterioration marginally outpaced project rehabilitation (paras 24, 25) and on-farm water use efficiency improvements were drastically cut (para 29), the project’s physical improvements probably had only modestly positive impacts on the environment. Even though monitoring of environmental parameters is now routine, there is negligible evaluation of the findings. Thus impacts are not known. Part of the

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12. At appraisal, individual farm hydrants were estimated to cost DH 6,000; actual costs were DH 20,000.

13. In parallel with SLIIP, USAID independently increased the area under drip irrigation at Tadla from about 600 hectares in 1995 to almost 3,000 hectares by 2001. And in the Sous-Massa area, the area under micro-irrigation rose from 14,000 hectares in 1995/96 to almost 36,000 hectares by 2002/03 primarily as a result of private investment responding to improved agribusiness export opportunities.

14. Interviews with water user associations and federations June 21-29, 2004: Gharb WUA Lechmalcha; Tadla WUA Nassr; Haoz WUAs Sultania, Skhait and Said El Hamd; and Souss Massa/Amont: WUF Mezguita and WUA Massirat El Ouahda.

problem may be inadequate coordination with the Environmental Monitoring Units created by 1999 in the Ministry of Agriculture under the terms of ASIL II. As the ICR of that operation noted: “An environmental screening unit was established by Ministerial Note but no resources were given to it for screening of projects, so the impact of the measures is minimal.”<sup>15</sup>

***Objective 5: The budgetary cost of O&M activities was not reduced***

33. A key project objective was to reduce the treasury’s contribution to operation and maintenance costs of large-scale irrigation. The need for a central subsidy arose because only two of the nine ORMVAs (Doukkala and Tadla) were able to fully cover O&M costs, the difference being made up by transfers from the central budget of the Ministry of Agriculture. SLIIP proposed to fill the gap in four ways: increasing cost-recovery from beneficiaries, reducing the ORMVAs management costs, further increases in the basic water charges, and facilitating government’s restructuring of the water pricing system to reflect the scarcity of water brought about by inter-sectoral competition. None of these interventions was wholly successful (as discussed below) and, as a result, the net subsidies to O&M for all large-scale irrigation has steadily increased since 1996 in total and per unit area irrigated, Table 4.<sup>16</sup>

**Table 4: Subsidies for large-scale irrigation have increased**

	SAR Base	Project being Implemented					Post-project	
		1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
<b>ORMVA Cashflows</b>	<b>1991</b>							
Total O&M costs (excluding depreciation)	363	548	605	683	609	685	544	629
Income from tariffs and fees	369	550	589	655	603	480	408	461
Receipts/costs	98%	100%	97%	96%	99%	71%	75%	73%
Total Government Subsidy	-6	-2.1	15.5	27.7	6.1	205.3	136.1	158.0
Total Area LSI Irrigated, ha	408,300			500,000				672,000
Subsidy DH/ha	-13			+55				+235

**Source:** Ministry of Agriculture, Rural Development, Water and Forestry, 2005

34. In 2003 only one ORMVA, Tadla, produced revenues in excess of expenditures on O&M – even then the balance was declining rapidly due to the effects of drought (Annex B). Gharb’s surplus became negative after 2001 and while Moulouya (through good management) had managed to achieve a modest surplus in

15. ICR. Kingdom of Morocco. Second Agricultural Sector Investment Loan (Loan 3765-MOR). June 15, 1999. Reference: paragraph 40.

16. The mainly traditional irrigation systems east of the Atlas (Ouarzazate and Tafilatet) are fully subsidized by government and any water charges are set, managed and internally utilized by tribally-based water user associations according to ancient and traditional water rights.

2002, it needed a subsidy in 2003. Conversely, Doukkala slipped from surplus to a deficit from 2001. Haouz is borderline successful, small surpluses over the period 1997-99 becoming marginal deficits in 2000-03.

**35. Income from water fees increased during the project despite a fall in collections.** Overall income from water fees rose by a quarter between 1996-97 and 1999-2000 and achieved 63 percent of the SAR target of DH 565 million. Although the amount billed in the final year was only slightly (4 percent) under expectations, the main problem was declining collection rates (Table 5). After the project both the collection rate and income further declined, only recovering slightly by 2003. While the average collection rate is low, there is a marked difference among the ORMVAS. As before, Moulouya, Tadla and Haouz were the best performers, achieving averages of 70 percent or better over the period 1996-2002, the others being around 50 percent. And when recovery of arrears is included in current receipts, overall cost recovery in 2003 compared with that year's billings was greater than 90 percent. Whatever the level of recovery, however, anything in excess of expenditures goes straight to the central fund of the ORMVA to cross-subsidize other activities – particularly extension services – and cannot be used to address deferred maintenance.

**Table 5: Cost recovery is a chronic problem**

	1994	1996-97	1998-99	2001	2003
Revenue DH (millions)	348	287	358	233	368
Recovery rate of current billings	84%	73%	70%	67%	69%

**Source:** Data submitted by each ORMVA, 2004

**36.** Recovery of billings is adversely affected by a number of factors and perverse incentives. Farmers are unwilling to pay for reduced water supplies caused by drought or interruptions to service due to defective conveyance. In many cases ORMVAs allow some farmers free water to compensate for water losses.<sup>17</sup> ORMVA staff are also not empowered to penalize delinquent accounts and quickly collect outstanding debt (farmers typically take about 8 years to pay off outstanding water bills.) And from the ORMVAs' perspective, the most substantial disincentive is that water fee income in excess of current expenditure is used to offset guaranteed government subsidies to the whole ORMVA. Why should the ORMVA push too hard with the onerous and expensive task of chasing and extracting payment from each individual farmer when the government will subsidize any shortfall?

**37. ORMVA management capabilities were substantially improved through the project** by relevant training and equipment. The most tangible improvement was the introduction of a common management information system that has allowed the ORMVAs to undertake detailed cost-accounting. In consequence, the costs of

<sup>17</sup> Many farmers interviewed stated that ORMVA staff typically allow them an extra 20% over the water billed to compensate for conveyance water losses.

operation and maintenance are well-defined and areas for efficiency improvements are known – essential actions, however, are often curtailed by inadequate ORMVA budgets. Management also improved following the formation of water user associations: the collective view of farmers' groups is now generally taken into account when planning operation and maintenance tasks.

### Irrigated Areas Agricultural Services Project

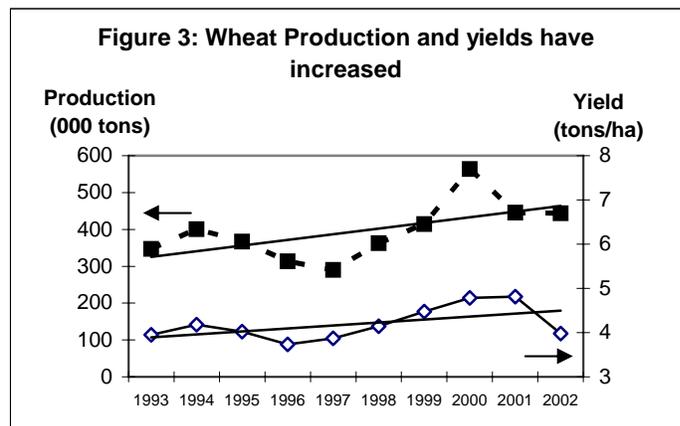
38. The overall efficacy of IAASP is rated as substantial.

#### ***Objective 1: Agricultural production and farmers' incomes increased but special efforts to reach women withered through lack of support***

39. At appraisal there were no quantifiable projections of the impact of the project on agricultural production and incomes because project inputs supported adaptive research, extension, and promotion of farmers' organizations. Therefore, there are no targets against which to measure achievements. Project justification was based upon the analysis of the benefits of agricultural research and extension elsewhere that gave ex-post economic rates of return ranging from 14 to more than 500 percent. It was thus expected that the project would cover incremental costs because project activities would increase overall value added by agriculture in the ORMVAs by more than 0.1 percent.<sup>18</sup> A variety of data covering the period 1990-2003 was collated for OED by individual ORMVAs and provides strong evidence that agricultural production increased during the life of the project, notwithstanding the droughts which occurred during project implementation and the difficulty of attribution.<sup>19</sup> For example, continuous time series data provided by four ORMVA (Doukkala, Gharb, Moulouya, and Tadla) clearly demonstrate that yield and production of wheat increased during the project period (Figure 3).

40. It is unclear, however, how much of the observed increase is attributable to the project. Government subsidies allied with low water charges seriously distort cereals production, induce irrigation of low value crops and reduce farmers' risks.

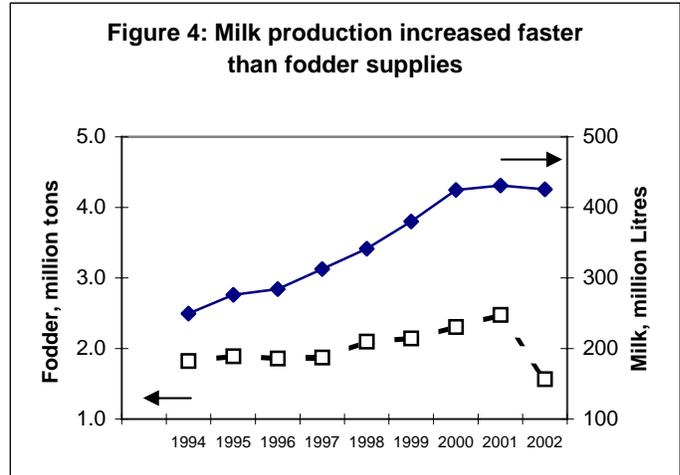
41. Both SLIIP and IAASP activities synergized agricultural production chains (Figure 4). In Gharb, for example, the yield of irrigated maize grown for forage increased from 29 to 39 tons/hectare over the period 1994-2002 and production



18. World Bank. 1988. The Economic Impact of Agricultural Extension: A Review. Birkenhauser, D., R.E Evellson and G. Feder.

19. These data have been added to the Bank's archival files on these two operations.

increased 98 percent to 138,700 tons. There remains significant untapped yield potential as the higher forage yields (50-70 tons/hectare) in Doukkala and Tadla indicate. The failure to significantly increase yields at Gharb is wasteful of scarce water that has a high opportunity cost. Even so, the total area under irrigated forage in all three ORMVAs increased by almost 40 percent to over 44,000 hectares by 2001. As a result of this and better animal husbandry, breeding, and improved dairy practice and marketing through cooperatives and other farmers' organizations, total milk production increased.



42. Special efforts to promote women's development were successful but became less important after project closure. Of the two sub-objectives, only that dealing with extension support was implemented but on a lesser scale than planned because additional qualified staff were not recruited.<sup>20</sup> The proposal to study and evaluate women's role in agriculture was dropped when the project was downsized.

43. Tafilalet, where 80 percent of women are engaged in agricultural work, provides a good example of the component's effectiveness. Extension activities reached an estimated 5,500 women a year and eventually 28 women's groups were successfully formed under the umbrella of the D'Man cooperative to undertake sheep breeding, wool, milk, and meat production. In 2002 this provided an income of about 350 DH/month for each of the 972 women members. About 1,000 home vegetable gardens were set up that yield both cash benefits and improvements to the family diet and health. During this program initial steps were taken to redress low levels of female literacy (5 percent) – which have been mainstreamed under a national literacy program – and about 3,000 young girls are being trained in handicrafts. By 2004 the D'Man women's cooperative has expanded to include 36 groups and 1,553 beneficiaries. Ouarzazate had 18 female assistants working on women's extension in 2001 and 411 women joined to create 11 professional organizations including sheep rearing, apiculture, and vegetable gardening. And 2,300 women a year enrolled in literacy programs.

44. Ownership of the WID program is weak at the center. Since the project closed all 13 women assistants' positions in Ouarzazate have been deleted from the budget (on instructions from the Ministry of Finance to reduce payroll costs) and the five remaining assistants are employed as day laborers. In Haouz, of the six WID staff, three left and were not replaced for the same reason. In Souss-Massa there are only

20. Recruitment of 3 graduates and 30 technicians to complement the existing staff of 23. Another 40 assistants were to be recruited locally.

two WID staff for the whole region and lack of transport curtails their mobility. In Tadla the eleven former WID workers now work for NGOs.

***Objective 2: The organizational and operational efficiency of agricultural services within the ORMVAs was improved in line with the reduced budget.***

45. Because diagnostic studies to identify priority tasks tailored to the widely variable agro-climatic regime of each ORMVA were not available, the ORMVAs' extension activities were not significantly expanded until 1998.<sup>21</sup> Until then, and while building capacity via extensive training, ORMVA staff only gradually replaced routine activities with IAASP tasks. However, once initiated, staff enthusiastically implemented a rejuvenated extension effort. The ICR's assessment of this objective as being marginally satisfactory and its observations on quality are fully endorsed by OED's field observations and interviews.

46. Substantial volumes of agricultural and extension information were provided by most ORMVAs to OED and this gave a very clear picture of gross inputs and agricultural outputs by year – some of which have been used in the graphs of this report. All these data were aggregated to the ORMVA level and there was no differentiation by either IAASP or SLIIP inputs, or of agricultural outputs by irrigation type or rainfed areas within the ORMVAs. Similarly, there is no reporting on the effectiveness of extension efforts, uptake by farmers and lessons learned. Given that extension consumes the major part of the ORMVAs' budget – averaging 53 percent – much more attention is needed to justify these expenditures.

47. Despite the shortcomings in M&E, it is possible to infer substantial benefits from improved extension services. Many staff and farmers met by OED stated that the project brought about a shift in the culture of the ORMVAs from a centralist top-down organization to one that has become aware of farmers' service needs. A number of farmers' leaders participated in overseas visits and became aware that they could catalyze change.<sup>22</sup> In some respects the 60 percent cut in the vehicle budget proved a blessing in disguise because it made extension personnel more dependent on farmers for mobility and field coordination. Transferring the results of adaptive research to farmers was notably successful in some areas – in Tadla for example, cereals were fine-tuned to local conditions, reducing inputs and increasing yields – but not in others (Gharb.)

***Objective 3: Commodity and service-oriented farmer organizations were promoted but they have yet to take an increasing share of development responsibilities***

48. The number of professional organizations, including water user associations, created to represent farmers' specialist activities, grew appreciably over the life of the

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21. The exception is Souss-Massa which had undertaken a participatory evaluation in 1995. The delay was incurred by government's unwillingness to use foreign consultants recruited via FAO.

22. For example, the President of the Haouz's Sultania WUA went with other WUA presidents on study tours to Tunisia and France to learn about modern irrigation techniques.

project, a notable achievement (Table 6). Water user associations now cover 71 percent of Morocco's irrigated area, up from 20 percent before the project. Not all these organizations, however, are active. Although Moulouya has 77 WUAs, only 16 are operational. Similarly, in Doukkala only 24 of 39 WUAs are active and only 219 of 295 cooperatives.

49. Discussion with farmers indicated that farmers' organizations are active and thriving in the traditionally managed areas of the ORMVAs; indeed, many such organizations are the latest incarnation of tribally-based agricultural and water resource sharing and management systems that go back several thousand years. The vigor of local organizations is highly correlated with the level of autonomy given to farmers and is most apparent in the three traditional schemes (Haouz, Ouarzazate, and Tafilalet) where old water rights still apply and public investment costs are not recovered. Thus, for example, cooperatives are still growing in Tafilalet which was the one ORMVA with the most enthusiastic women's agricultural producer organizations. Ownership is also high in the traditional areas of other ORMVAs, particularly Souss-Massa and Haouz.

**Table 6: Growth of Farmers' Organizations Was Impressive**

Cooperatives and other Professional Organizations		Water User Associations (WUAs)			
1994	2004	1994		2004	
Number	Number	Number	Area, ha	Number	Area, ha
92*	1,534**	157	98,429	486	347,838

**Source:** OED interviews and data from ORMVAs

\* Data from Tafilalet only, numbers probably in excess of 500

\*\* Data from 7 of the ORMVAs, Loukkos and Moulouya missing

50. Outside the traditional areas, the independence of farmers' organizations depends very much on their financial resources. Non-profit making organizations, particularly the WUAs, remain strongly dependent on the ORMVAs for technical support and advice because they depend on state infrastructure investments. Conversely milk cooperatives are almost wholly independent, particularly in the Tadla, where there are 110 engaged in husbandry and breeding to increase production, currently about half million liters/day. Similarly, citrus, vegetables, olive, honey, and henna cooperatives – where the means of production are all privately owned – are highly successful.

51. Since 1995 most WUAs were formed via the extension effort, although some were voluntary – and all farmers have to join to obtain water service. In Gharb for example, rice growers formed 22 of the 54 WUAs because they saw opportunities for water saving and reducing water costs. In most non-traditional areas water allocation by the ORMVAs had been sometimes contentious and billing for water has been difficult particularly for the large number of smaller farms – these are major tasks for all WUAs and, in most cases, the underlying rationale for their creation. Generally, involuntary formation overcame the major problem of retrofitting the WUAs to

existing system configurations while trying to ensure some ethnic, hydraulic, and crop homogeneity to ease the management burdens.<sup>23</sup> Where these problems were not solved, WUAs tend to be ineffective. In many areas, land is collectively owned and this makes billing for water much more difficult until land leveling and consolidation take place. Although WUAs can be quite large, their responsibilities, except in traditional systems, are quite limited (Box 1).

52. WUAs typically cover areas of 300-1,500 hectares (average 716 hectares) and have 300-600 members. In traditional systems the ORMVAs tend to manage only the headworks and major diversion structures down to the secondary-level below which WUAs undertake and fund all the O&M tasks seeking advice as needed from the ORMVAs. In these areas, WUAs have formed federations to give them greater political leverage and a higher-level dispute resolution mechanism.

53. Within the existing large-scale irrigation systems, the ORMVAs continue to own, operate, maintain, and pay for all infrastructure down to the tertiary-level turnouts. Distribution within farm units, generally via earthen canals, is the farmer's responsibility. The ORMVAs see the WUAs as their interface with the farmers. WUAs elect their committee and chairman, and the ORMVA delegates one of its staff to sit on the WUA management board. As many of the WUA's committee members in most systems also serve on input, output and marketing cooperatives, they facilitate an integrated approach to agricultural improvement.

54. There are mixed views about the role of the ORMVAs in the management of the WUAs and other water-related farmers' associations. In Tadla, the members of the Drip Irrigation Association are enthusiastic primarily because the ORMVA is the conduit that provides a 40 percent government subsidy for the high technology drip irrigation system and gives them *de facto* water rights (Box 2). In the same area, the President of the Nasr WUA lauded the ORMVA's help in rescheduling their agricultural credit following six-seven years of drought. But the same farmer felt that the new concrete canalettes were far less robust than the ones that had been replaced, that there were no improvements attributable to the project, and that more attention should have been given to extension and outreach services.

55. In Gharb the Erraha WUA wanted to do more O&M but only if there were adequate financial incentives – to date their better water management had led to 20 percent water savings but their water costs stayed the same. They were willing to undertake billing of their own members but did not do so because the ORMVA would not cede to them the authority or give them a discount for doing so. In Haouz Amont's Skrhait WUA, the president said that the controversy surrounding water allocation and regulation was so great that they relied upon the ORMVA's impartial decision-making. And the universal view of most ORMVA irrigation professionals

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23. In Tadla, for example, where feasible it was found better to form separate WUAs for Berbers and Arabs to avoid conflict. And in Haouz, Ouazazte and Tafilalet almost all the secondary or tertiary distributaries of traditional systems are tribally-managed. Similar crop types are an issue because water billings are on an area basis within the WUAs and are subject to negotiation – volumetric sales throughout the system would ease this constraint.

was that the farmers were unable to cope with the complexity of water demand forecasts and thus water allocation issues above the tertiary level distributaries.

### **Box 1: WUA's Responsibilities Differ in Modern and Traditional Irrigation Systems**

***Garb (Modern): Erraha WUA.*** Formed May 1999. Has 722 hectares and represents 240 members. Grows rice, forage and cereals.

What does the WUA do?

President of the WUA acts as the interlocutor with ORMVA staff and signs for the water consumption of the whole group.

Water allocation is decided by the ORMVA after taking account of the cropping patterns within its command area provided by the WUAs. The ORMVA therefore acts as the honest broker to ensure equitable distribution for the WUAs.

The ORMVA records the volume, time and discharge of water to the WUA area, and this is distributed by ORMVA staff pro rata by area irrespective of crops, providing water to cereals first.

The ORMVA maintains a register of each farmer's consumption for billing purposes, giving a copy to the WUA. After the WUA committee agrees the record, the bill is countersigned by both and sent to ORMVA headquarters.

The Ministry of Finance agent within the ORMVA bills the farmer and the revenue department then collects the account from the farmer. The water fees collected go into the general ORMVA account and are not earmarked for operation and maintenance.

The ORMVA undertakes and finances all operation and maintenance to the tertiary level; farmers maintain their own irrigation channels below the tertiary level and within their own farms. They are willing to undertake maintenance above the tertiary level, but the MoF is not agreeable to paying them via a 20% discount on water charges.

**Dispute resolution.** Normally by the WUA committee with the Chairman having the casting vote. If not solved there, referred to the ORMVA. If a farmer is unable to pay he can make an arrangement with the ORMVA to pay it off in installments. In the meantime he continues to receive water.

**Source:** OED interview June 21, 2004

***Ouazazate (Traditional): Mezquita WUF.*** Has 21 WUAs formed 1994-2001. Covers 2,785 hectares and represents 1,179 farmers.

What does the WUF do?

Participate in the preparation of irrigation and allocation.

Review and discuss with the ORMVA its proposed operations and maintenance and agree priorities.

WUAs participate and provide labor for all O&M below the primary channel (in some areas the secondary). If they don't have enough labor they raise money from the membership pro rata according to water rights and hire labor from the market.

Water allocation. The union of water users' association meets with the ORMVA to agree on the overall allocation of water within the area, and water is shared within the area according to traditional water rights. The WUAs do not pay the ORMVA for water or contribute to any capital investment.

Water management is by the owners according to their water rights. The ORMVA supplies the water to the primary or secondary canals and thereafter the local WUAs manage, distribute, bill and charge the members on a pro rata basis. The WUAs retain and use the income to undertake operation, management and maintenance of the irrigation system below the primary level.

**Dispute resolution.** In the first instance, this is done within the WUAs by the Chairman, and where there is no solution, the WUF forms a jury from the WUAs to judge the issue. If they cannot agree, it goes to the ORMVA or governor. Extreme cases may even go to the Ministry of Agriculture.

**Source:** OED interview June 28, 2004.

**Box 2: Tadla Drip Irrigation Associations (DIP) – a successful farmer-led initiative**

USAID piloted drip irrigation in this area and subsequently the initiative was expanded under the SLIIP. The President of the DIP farms 300 hectares and planted 120 hectares to citrus orchards in 1999. After seeing the efficacy of drip irrigation on a visit to Spain, he had converted the whole area to drip irrigation at US\$2,000/hectare, induced by a 40 percent government subsidy. The whole 120 hectares is served by a one hectare reservoir that (including pumping station and filtration system) cost \$280,000. Current citrus yields are 40 tons/hectare and he expects to increase this to 60 using fertigation by 2007. The DIP has 30 members farming 5,000 hectares. Anyone can join if they willing to do all the work themselves – but the DIP will provide advice. The advantages of membership are substantial. Apart from the subsidy, the ORMVA will guarantee them water if they invest; members are not confined to the normal rotation and can get water on demand; and water use efficiency gains reduce water usage by about 40 percent (from 12,000 m<sup>3</sup>/hectare to 7,000 m<sup>3</sup>/hectare.)

**Source:** OED Interview with Mr. Sfiani. June 23, 2004.

***Objective 4: University teaching and research staff contributed much to research and imparting results to field extension***

56. Independent evaluation of the components contributing to this objective found that the research topics were relevant, the work quality high and dissemination of results to ORMVAs and farmers was satisfactory. Contracted-out research benefited both the ORMVAs and universities: the ORMVAs learned to translate regionally variable agricultural development problems into well-formulated research proposals while the universities became involved in the practical application of research at the field level.<sup>24</sup>

**EFFICIENCY**

57. **The overall efficiency of the two projects together is rated as substantial on economic efficiency criteria.** At appraisal the economic rate of return of SLIIP was estimated to be 23 percent. The re-estimation at completion was 28 percent, the slight increase being attributed to the significantly higher (almost 2.5 times greater) net returns attributable to partial rehabilitation. The ERR was not estimated for IAASP either at appraisal or closure. Even so, the agricultural benefit stream of SLIIP was enhanced by improvements made by IAASP to improving irrigation and drainage through WUAs, improved management of extension services and other inputs, and better marketing. Thus, true costs of the SLIIP benefits stream should include IAASP's costs. Adding IAASP's costs to those of SLIIP increases SLIIP costs by a

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24. Agbani, M., A. Harzeni and A. Laamamri. 2000. Evaluation de la Recherche Adaptative dans les ORMVAs. FAO Project UTF/014/MOR.

modest 11 percent and reduces the overall ERR by about two percentage points to 26 percent.<sup>25</sup>

## INSTITUTIONAL DEVELOPMENT IMPACT

### *Overall institutional development impact of SLIIP is rated as modest.*

58. Although farmers have been organized into a large number of associations and cooperatives, some of the most vital, the WUAs, are operating far below their potential contribution to O&M. This is most clearly demonstrated by the wide-ranging responsibilities effectively discharged by the WUAs and WUFs in the traditionally irrigated areas. WUAs in traditional areas not only manage their own systems, they have ancient water rights and allocation procedures that enables them also to charge much higher water service fees than the ORMVAs.<sup>26</sup> Conversely, in the modern systems the majority of WUAs remain almost wholly reliant on the ORMVAs for most aspects of O&M, including allocation of water, billing and collection of water charges.

59. Contracts for water deliveries to WUAs were supposed to be applied to all ORMVAs but were piloted in only three (Haouz, Moulouya, and Loukkos) with indeterminate results partly because of the droughts. The major issue is that government is unwilling to grant water rights, and is ambivalent about scope of beneficiary participation. It accepts WUAs as institutional interlocutors but will not make binding agreements with them or transfer any irrigation management functions to them.

60. Thus WUAs are not in a position to demand better water service because none is offered. And this acts as a strong disincentive for farmers to invest in equipment to improve on-farm water management, disincentive enhanced by an agricultural policy that favors heavy subsidies which encourage irrigation of low value and low profit crops. And low profitability effectively precludes raising water service fees thus continuing the cycle of insufficient maintenance and lower service delivery standards. Not only does this low level equilibrium trap stop modernization of on-farm water management, it also causes scarce water to be used unproductively considering its opportunity cost.

61. The wide-scale adoption of management information systems was a notable success of the project. It has enabled a very clear understanding of what contributes to

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25. The SARs and ICRS only contain summary analyses of ERRs and the detailed analysis is not available in the project files. Accordingly OED's evaluation is based on the summarized sensitivity tests included in the SLIIP's SAR.

26. In Sous Massa and Sous Amont both modern and traditional irrigation paid 0.22 DH/m<sup>3</sup> in 2002 (prior to pumping costs) because O&M was undertaken by the ORMVA. Conversely, in the traditional Issen perimeter the water charges for gravity supplies were 0.58 to 0.62 DH/m<sup>3</sup>. In Doukkala gravity supplies are 0.18 to 0.25 DH/m<sup>3</sup> and in pumped systems 0.34 to 0.41 DH/m<sup>3</sup>. The value added by irrigation in Doukkala was 3.5 to 5 DH/m<sup>3</sup> for vegetables, 2.6 for cereals, 2.4 for sugar beet and 1.5 for fodder crops. Water costs are therefore about 10% of value added given that most vegetables would have pumped supplies, the other crops being gravity.

the cost of running the ORMVAs and has effectively introduced quasi-commercial cost accounting. Several ORMVAs now subcontract maintenance to other state-owned, mixed, or private companies. At the government and the ORMVA levels, however, there is unwillingness to move away from business-as-usual and move toward actual commercialization, unbundling, and privatization of many of the service delivery functions. There are several reasons for this. Current laws would need substantial revision. The public sector, fearing job losses, is resistant. The Ministry of Finance fears that it would have no control over private sector management and cost-recovery on public assets. And there is political pressure not to charge realistic prices for irrigation water. Even lesser reforms have not been pursued. Management Improvement Programs were agreed with Tadla and Doukkos in 1993 but this has not been replicated in the other ORMVAs.

### ***Irrigated Areas Agricultural Services Project***

62. **Institutional development is rated as modest.** Organizational change to improve service delivery and lower costs was only partially achieved in four of the seven ORMVAs. Crop production, livestock, and extension were brought under one director (instead of three) and several formerly independent field activities were merged in district development centers. The most serious failing was the failure to introduce performance monitoring and evaluation to discern what works and why and determine the cost-benefit ratio for various input packages at the farm level.

### **SUSTAINABILITY**

63. **Sustainability of both projects is likely in the medium-term.** This will be true as long as the government continues to subsidize the recurrent costs, and external development partners provide the bulk of the rehabilitation and investment costs. Sustainability would be improved if the irrigation operations of the ORMVAs are made financially autonomous and water tariffs are increased to cover full O&M costs.

### **BANK PERFORMANCE**

64. **Overall Bank performance on both projects is rated as unsatisfactory.** The design of SLIIP was very much a case of “business as usual” with too much emphasis on civil works and not enough on institutional reform that was identified as a major issue for the sector (para 7). A standard approach applied to all ORMVAs did not consider that each had very different management approaches, and that social, geographic and agroclimatic challenges were not the same. At the yellow cover stage several reviewers argued for more focused objectives to avoid too much dilution of effort, and a smaller project directed at one or two ORMVAs. These views were ignored. Concerns that the high level of tariff protection for agriculture would provide perverse incentives for conserving water were not seen as relevant to these projects. The size of the projects was also at variance with the macroeconomic realities, leading to problems later.

65. Although there was much rhetoric about the transforming power of farmers’ participation to make irrigation and extension service delivery more accountable,

these stakeholders were not included at appraisal. The substantial body of work on water tariffs required to make the ORMVAs irrigation operations financially viable and the need for improved extension was not matched by the same level of attention to institutional analysis to determine how beneficiary ownership could be built. The use of water rights to create farmers' demand for better service delivery was overlooked, as was redressing the incentive structure of participating government and ORMVA institutions or looking at alternative ways to achieve objectives. Similarly the attention given to enabling M&E was woefully inadequate. Separating the agricultural and irrigation components put the two projects in competition for the same financial resources within the ORMVAs, and led to a significant loss of potential synergy between O&M needs and revenue generation from beneficiaries.

66. Supervision of both projects was complicated by significant budget cuts, delays in procuring specialist consultants, and disbursement difficulties, all of which jeopardized achievement of most institutional objectives. While it would have made sense for Bank management to have redefined the projects' objectives and/or downsize or eliminate components, this was not done. As a result of these problems, supervision teams had an uphill task delivering on objectives, a task not helped by several changes of task manager on IAASP and separate supervision missions until 1998. On the positive side, proactive supervision ensured good quality civil works and greater realism of the agricultural research and extension programs. The World Bank Institute facilitated introduction of participatory irrigation management (PIM) through a national workshop and PIM gathered some momentum as the project came to closure.

## **BORROWER PERFORMANCE**

67. **Borrower performance is rated unsatisfactory.** Despite the importance of the sector and the need for reform, government ownership of the institutional reform aspects of the projects was weak. Government was unwilling to see that large agricultural subsidies provided few incentives to conserve water thus creating conflicting objectives in the sector. Counterpart funding was problematic throughout the project, a situation exacerbated by the failure to include the Ministry of Finance in project appraisal and subsequent revisions of the projects' financing.

68. While the projects appear to have contributed substantially to increases in agricultural production and knowledge about the costs of ORMVA operations, the efficiency improvements to the ORMVAs' service delivery functions cannot be determined because of poor monitoring and evaluation. Consequently, attention to cost recovery languished. ORMVAs are only modestly more accountable to service users. There was little progress on water conservation and environmental management. Budget support for the ORMVAs' irrigation activities increased rather than decreased. The large number of farmers' agricultural organizations created function far below their potential (except in traditional systems) because of the government's unwillingness to allow co-management or privatization, particularly for the O&M of irrigation systems. In short, the situation at the end of SLIIP was only marginally improved – but at considerable cost – compared with that at the end of FLIIP (para 8).

## 4. Findings and Lessons

### FINDINGS

69. The deterioration of Morocco's large-scale irrigation infrastructure was slowed by the SLIIP and the relevance of agricultural extension services and research was enhanced by the IAASP. The impact of the SLIIP was significantly diluted because the funding was spread too thinly over all nine ORMVAs. Of even more concern, attention to institutional reform was sidelined by the demands of the technical aspects of the projects most of which were under-funded. If the project had focused on only one or two ORMVAs, bringing them to much higher standards of operational efficiency, and had given detailed attention to the institutional and social aspects of beneficiary participation/management and cost recovery linked to improvements in extension, then a replicable model for the sustainable management of the remaining ORMVAs may have emerged. Apart from the engineering, little more is known after the projects about how to share costs or how to motivate beneficiaries to pay their dues. And apart from a few select areas, water use efficiency was not improved.

70. Although a large number of farmers' organizations was formed, in general they have neither relieved the ORMVAs of their service delivery role nor led to increased payment for these services. In particular, the marked contrast between WUAs in the traditionally managed areas and those within the modern irrigation perimeters clearly indicates that farmers' leaders are willing to take responsibility for water distribution, management and cost recovery – if given water rights and empowered to do so through enabling laws and regulations. Currently, neither the government nor the ORMVAs (in modern perimeters) appear willing to cede any real authority to the WUAs.

71. The projects' separation of the agricultural and irrigation activities was counter-productive because both were in competition for the limited financial resources within each ORMVA. This was particularly important since both agricultural benefits and improved irrigation service delivery will be the factors to encourage farmers to willingly pay more for water. Indeed, the neglect of on-farm water management improvements nullified the positive effect of more reliable water supplies. Most farmers, except in the pressurized systems, saw no improvements in on-farm water use efficiency and no direct financial benefits. This in turn highlights the importance of beneficiary participation in the design and balance of future projects to determine what packages of inputs farmers would be willing to pay for. But while integrated planning and management of inputs packages is essential, the costs of the different service activities and associated benefits need to be clearly separated, monitored and evaluated.

72. The government's desire to reduce subsidies to large-scale irrigation by forcing irrigation cost-recovery to cross-subsidize general ORMVA activities is counter-productive. It denies the universally acknowledged link between farmers' willingness to pay for improved water services that are dependent on adequate

maintenance that in turn are jeopardized by continued inadequate funding. Similarly, spending on agricultural extension services within the ORMVAs is potentially wasted if water delivery or improved on-farm irrigation systems cannot be guaranteed. Unwillingness to make the irrigation operation and maintenance and cost recovery functions financially autonomous clearly displays the government's ambivalence to systemic reform of the sector.

73. It is imperative that the government should pursue new policies that phase out costly irrigation water for crops in which Morocco does not have a comparative advantage. This would permit water to flow to other higher-valued uses including export crops and urban water supplies. Crop production remains distorted because price structures provide incentives for irrigated crops that are either water intensive such as rice and sugarbeet, and even for cereals to which water adds only a small value. If more attention were given to diversification by relaxing food grain and sugar subsidies, then the value generated by irrigation would be significantly higher, thus enabling higher water tariffs – providing the government was willing to levy them. In turn, higher-value production would accelerate investment in high efficiency irrigation systems: the very slow growth of the area under intensive high-tech irrigation is surprisingly small for a country that is critically water-short. And more profitable irrigation would enable the higher water user fees needed to improve operation and maintenance of the LSIs.

74. The government clearly recognizes that things have to change. To this end a Bank-government institutional reform-working group was set up within the Ministry of Agriculture in late 2001. This group has highlighted the issues underlying the lack of maintenance, declining irrigation service delivery and users' unwillingness to pay for poor service. It recommends that ORMVAs' activities be unbundled to separate irrigation and agricultural extension functions to make them ready for commercialized management and eventual privatization. The necessary cost information is already available and so is the knowledge about the level of water tariffs that are needed to make the O&M financially viable. These proposals remain under consideration by the government. In the absence of decisions to reform, the government has embarked on a new round of foreign loans to finance deferred maintenance and continues with plans to expand the irrigated area.

## **Lessons**

75. Experience with this project confirms a number of OED lessons:
- Water conservation has to be approached holistically and incentives to increase water use efficiency need to be harmonized at the macro- and micro-level. In Morocco, failure to remove agricultural subsidies and raise agricultural water charges encouraged farmers to take the low risk path of using high value (but low cost) water for low value crops. And low water prices and returns discouraged farmers' investment in on-farm water conservation improvements.
  - Secure water rights and predictable water supplies provide incentives for farmers to invest in high-tech irrigation and bring about significant water

savings. Profits from high value irrigated crops will enable payment of the higher water charges needed to efficiently operate and maintain the publicly-owned upstream water delivery system.

- Service providers should have full autonomy to set and retain water users' fees to guarantee water delivery through adequate operation and maintenance. Financial management and accounting of different services – in this case water and agricultural extension – should be clearly separated to avoid hidden cross-subsidies and allow clear demarcation of costs.
- Cost-recovery from users of irrigation and agricultural services will be difficult if beneficiaries are not involved in designing service packages and cost-recovery mechanisms, and project sponsors do not consider the incentive framework for farmers to participate. Equally important, water users will not pay if they receive no obvious and tangible benefits and do not have secure water rights.
- Adequate monitoring and evaluation and specialist inputs are essential to determining project achievements and the impact of the Bank's interventions.
- The phasing of irrigation and agricultural improvement projects requires very careful attention to maximize their effectiveness particularly when they involve institutional reform. The experience of these and other OED project evaluations is that line agencies responsible for operation of infrastructure and extension services will put their own interests before institutional reform - thus expecting that reform will follow infrastructure investment is risky. Conversely, conditioning investment on high level borrower buy-in and reform does work, a good example being the Amman water supply project.
- Project effectiveness is enhanced when the scope of rural development projects is restricted so that measurable results can be achieved. First, care has to be taken, in geographically and socially diverse countries, that resources are not spread too thinly to achieve project objectives. Second, focus objectives and subprojects so that the investment brings about substantive and replicable improvements. Third, fine-tune project interventions so that local circumstances and needs are fully taken into account.



## Annex A: Basic Data Sheet

### MOROCCO SECOND LARGE SCALE IRRIGATION IMPROVEMENT PROJECT (LOAN 3587-MO)

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

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
Total project costs	367.3	199.8	54
Loan amount	215.0	108.0	50
Cofinancing	23.0	23.0	100
Cancellation	--	107.2	--

#### Cumulative Estimated and Actual Disbursements

	<i>FY93</i>	<i>FY94</i>	<i>FY95</i>	<i>FY96</i>	<i>FY97</i>	<i>FY98</i>	<i>FY99</i>	<i>FY00</i>	<i>FY01</i>	<i>FY02-04</i>
Appraisal estimate (US\$M)	0	0	11.0	37.0	67.0	101.0	139.0	179.0	205.0	215.0
Actual (US\$M)	0	5.0	7.6	30.9	47.2	80.2	94.8	106.5	113.2	113.2
Actual as % of appraisal	-	-	69	83	70	79	68	59	55	52
Date of final disbursement:	6/10/1998									

#### Project Dates

	<i>Original</i>	<i>Actual</i>
PXS	-	05/24/1989
Appraisal	-	12/10/1992
Board approval	-	03/30/1993
Effectiveness	09/22/1993	09/22/1993
Closing date	12/31/2000	12/31/2009

#### Staff Inputs (staff weeks)

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	172.4	280.7
Appraisal/Negotiation	112	259.9
Supervision	246.6	811.3
ICR	22.5	85.5
Total	553.5	1437.4

## Mission Data

<i>Month/Year</i>	<i>No. of Persons</i>	<i>Specializations represented</i>	<i>Implementation Progress</i>	<i>Development Objective</i>
Identification/Preparation				
05/1989	2	Irrigation Engineers	S	S
04/1991	2	Economists	S	S
	1	Agriculturalist	S	S
	1	Sociologist	S	S
	1	Environment Specialist	S	S
	2	Financial Analysts	S	S
	1	Institution Specialist	S	S
Appraisal/Negotiation				
10/1992	2	Irrigation Engineer	S	S
	1	Economist	S	S
	1	Financial Analysts	S	S
	1	Sociologist	S	S
	1	Environment Specialist	S	S
Supervision				
08/1993	1	Irrigation Engineer	S	S
12/1993	1	Civil Engineer	S	S
02/1994	1	Institution Specialist	HS	HS
06/1994	1	Economist	S	S
10/1994	1	WUA Specialist	S	S
05/1995	1	Trade Specialist	S	S
02/1996				
06/1996				
08/1996				
01/1997				
06/1997				
12/1997				
05/1998				
01/1999				
04/1999				
12/1999				
06/2000				
ICR				
06/2001	2	Irrigation Engineer	S	S
	1	Economist	S	S
	1	WUA specialist	S	S
	1	Agronomist	S	S

## Other Project Data

Borrower/Executing Agency:

<i>FOLLOW-ON OPERATIONS</i>			
<i>Operation</i>	<i>Credit no.</i>	<i>Amount (US\$ million)</i>	<i>Board date</i>
None.			

## MOROCCO IRRIGATED AREAS AGRICULTURAL SERVICES PROJECT (LOAN 3688 -MO)

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

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
Total project costs	34.7	21.7	63
Loan amount	25.0	25.0	100
Cofinancing	--	--	--
Cancellation	--	9.9	--

### Cumulative Estimated and Actual Disbursements

	<i>FY94</i>	<i>FY95</i>	<i>FY96</i>	<i>FY97</i>	<i>FY98</i>	<i>FY99</i>	<i>FY00</i>	<i>FY01</i>	<i>FY02-04</i>
Appraisal estimate (US\$M)	1.5	3.3	7.9	13.9	19.7	22.9	24.4	25	25
Actual (US\$M)	0	0	1.8	3.5	4.1	6.8	8.0	11.9	12.8
Actual as % of appraisal	-	-	23	25	21	30	33	48	51
Date of final disbursement:	11/16/2001								

### Project Dates

	<i>Original</i>	<i>Actual</i>
PCD	-	06/20/1991
Appraisal	-	01/22/1993
Board approval	-	12/21/1993
Effectiveness	-	05/04/1995
MTR	12/31/1996	11/27/1997
Closing date	06/30/2000	06/30/2001

### Staff Inputs (staff weeks)

	<i>Actual/Latest Estimate</i>	
	<i>No. Staff weeks</i>	<i>US\$ ('000)</i>
Identification/Preparation	na	305.5
Appraisal/Negotiation	na	included in the amount above
Supervision	na	502.1
ICR	na	20.0
Total	na	827.6

## Mission Data

<i>Month/Year</i>	<i>No. of Person</i>	<i>Specializations</i>	<i>Implementation Progress</i>	<i>Development Objective</i>
<b>Identification/Preparation</b>				
September 1991	1	Agronomist		
September 1992	5	Agronomist, Agricultural Economist, Horticulturalist, Extension Specialist, Sociologist		
<b>Appraisal/Negotiation</b>				
February 1993	5	Agronomist, Agricultural Economist, Horticulturalist, Extension Specialist, Financial Analyst		
November 1993	3	Agronomist, Lawyer, Disbursement Officer		
<b>Supervision</b>				
May 1994	3	TTL, Economist, Extension Specialist	S	HS
April 1995	2	TTL, Economist	HS	HS
December 1995	2	TTL, Financial Analyst	U	U
May 1996	1	TTL	U	U
June 1996	1	TTL	S	S
December 1996	1	TTL	U	U
July 1997	1	TTL	S	S
December 1997	4	TTL, Cooperative Specialist, Research & Extension Specialist Financial Analyst	S	U
May 1998	2	TTL, Financial Analyst	S	U
December 1998	3	TTL, Operations Officer, Financial Analyst	U	U
June 1999	1	TTL	S	S
December 1999	2	TTL, Economist	S	S
June 2000	4	TTL, Operations officer, Economist, Financial Analyst	S	S
January 2001	3	TTL, Research and Extension Specialist, Financial Analyst	S	S
June 2001	3	TTL, Agricultural Services Specialist, Financial Analyst	S	S
<b>ICR</b>				

**Other Project Data**

Borrower/Executing Agency:

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***FOLLOW-ON OPERATIONS***

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<b><i>Operation</i></b>	<b><i>Credit no.</i></b>	<b><i>Amount (US\$ million)</i></b>	<b><i>Board date</i></b>
None.			

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Maps

IBRD 23744

IBRD 24899



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