Real incomes of Mali's rice and vegetable farmers have risen dramatically since 1989, when reform of Mali's irrigation scheme ensured maintenance of the irrigation infrastructure, gave farmers rights to land, and allowed them to process and market their products. **Making a Large Irrigation Scheme Work** analyzes how, over a 14-year period, Mali's government made a commitment to share maintenance fees and authority for irrigation operation with users. The authors describe how Malian and expatriate irrigation experts shaped technical and institutional change that led to increased yields and income and reduced opposition to the payment of full water-delivery costs. They also describe how democratization and liberalization have led to mechanisms for farmer representatives, agency managers, and departmental ministers to negotiate responses to reform and emerging challenges.

**Making a Large Irrigation Scheme Work** will be of interest to irrigation professionals involved in the transfer of irrigation management authority from a government to users. They will learn how government commitment to this transfer can be generated and how components of the process and resulting scheme in Mali may be relevant for their own countries.

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Making a Large Irrigation Scheme Work
Making a Large Irrigation Scheme Work
A Case Study from Mali

Djibril Aw and Geert Diemer
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Foreword

When Mali’s Office du Niger (ON) irrigation scheme embarked on a reform voyage in the 1980s, all agreed on the need for reforms, but no one was certain what the results might be. Now, two decades later, the results are extraordinary. Between 1982 and 2002, rice yields have quadrupled, total production has increased sixfold, incomes have increased dramatically while supporting a four-times-larger population, agriculture has diversified, cropping intensities have increased, and food security has improved. Maintenance of the irrigation infrastructure is fully paid for by farmers, who have organized themselves to be fully involved in the management of the scheme. A buoyant private sector has emerged, making a sustainable living out of milling, trading, and transporting rice; providing farmers with credit; manufacturing farm equipment; and selling farm inputs. The ON has become an attractive investment opportunity for investors who want to expand irrigation to enhance and accelerate the important contribution irrigated agriculture is making to the national economy.

The case of the ON offers a tremendous example of hope for poverty reduction, food security, and economic development that reaches well beyond Mali’s borders. It offers global inspiration for farmers and policymakers alike. The experience of the ON shows that the Green Revolution can happen in Africa if conditions are right. By creating the right conditions, Mali’s comprehensive macroeconomic, policy, and institutional reforms have turned irrigated agriculture in the agency into a profitable undertaking, providing sustainable livelihoods for farmers and the entire regional economy.

The success of the ON illustrates the important contribution that irrigation reforms can make to poverty reduction, food security, and economic growth. This report describes in detail the consensus-building process that enabled the reform process, in the hope that others can draw
on this experience to advance the reform agenda in their own countries. As a partner for development, the World Bank has a lengthy and continuing involvement in providing assistance for reforms in Africa and elsewhere.

*James P. Bond*

Sector Director
AFTSD
January 2004
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The authors are grateful to the many individuals who reviewed a draft of this paper and provided valuable inputs and comments. From Mali they are N’Fagnanama Koné and Issoufou Kéïta, respectively minister of rural development during the pioneering phase of the reforms of the Office du Niger and its current director general, together with all participants at the January 2003 meetings in Segu and Bamako at which a draft was discussed. From the Sudan they are Mohamed Abdelgadir Adam, of the Economic and Social Research Institute in Khartoum, and Jamal Dafalla Taha, a member of the executive board of the Gezira Farmers’ Union. From the Netherlands they are Willem Genet, Jan Vlaar, and Rienk Wiersma, who were all associated with the early Dutch projects, and Peter Mollinga, professor at Wageningen University. From the International Water Management Institute they are Douglas Merrey and Douglas Vermillion. From Washington they are Raymond Peter, architect of the irrigation reforms in Andhra Pradesh and executive director of the International Network on Participatory Irrigation Management; Chantal Dejou, Ariel Dinar, IJsbrand de Jong, Dominique Lallement, and Philippe Marin, staff members of the World Bank and International Finance Corporation; François Gadelle and Hervé Plusquellec, World Bank retirees; and Kathleen A. Lynch, editorial consultant.

Notwithstanding such valuable contributions, the responsibility for the views in this paper, and for any errors, is entirely the authors’.

Djibril Aw and Geert Diemer
Djibril Aw, a native of Mali, was trained as an agronomist in France. He started his professional career in 1962 at the Office du Niger, where he served as director of the production department and deputy director general. Later he headed the Malian Agricultural Research Services and the Development Department of the West Africa Rice Development Association. He joined the World Bank in 1979 and in 1993 took a two-year leave of absence to head the Office du Niger reform unit. Since his retirement in 1997, he has consulted on food security and irrigation management. His work has allowed him to study irrigation schemes of all sizes in a dozen countries in western and eastern Africa. He can be reached by email at djibrilaw@yahoo.com.

Geert Diemer is a native of The Netherlands, where he was trained as a political scientist and anthropologist and earned his PhD. He joined the Food and Agriculture Organization in 1975 and in 1980 began working on irrigation institutions as a researcher with Leiden University’s African Studies Center, for which he did field research on the social and institutional dimensions of farmer-managed irrigation projects along the Senegal River. In 1985 he joined Wageningen University’s department for irrigation engineering and soil and water conservation and later co-managed a West Africa Rice Development Association project on engineering issues as the department concluded its involvement in Office du Niger reforms. In 1998 he joined the World Bank as an institutional specialist, and in 2001 he established himself as an independent consultant. He can be reached at geertdiemer@aol.com.
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AFMA</td>
<td>Agriculture and Fisheries Modernization Act</td>
</tr>
<tr>
<td>ARPON</td>
<td>Amélioration de la riziculture paysanne à l’Office du Niger (Improvement of peasant rice cultivation at the Office du Niger)</td>
</tr>
<tr>
<td>AVIO</td>
<td>Name for a downstream water-level regulator (from aval, the French word for downstream, the “I” of irrigation, and the “O” of orifice)</td>
</tr>
<tr>
<td>BOT</td>
<td>Build-operate-transfer</td>
</tr>
<tr>
<td>CAFON</td>
<td>Coopérative des artisans forgerons de l’Office du Niger (blacksmiths’ cooperative at the Office du Niger)</td>
</tr>
<tr>
<td>CFAF</td>
<td>Communauté financière africaine franc, the currency used by the CFA group of countries in western and central Africa</td>
</tr>
<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
</tr>
<tr>
<td>CILSS</td>
<td>Comité permanent inter-états pour la lutte contre la sécheresse au Sahel (Permanent Inter-State Committee for Drought Control in the Sahel)</td>
</tr>
<tr>
<td>CMDT</td>
<td>Compagnie malienne de développement des textiles (Malian company for textile development)</td>
</tr>
<tr>
<td>EDF</td>
<td>European Development Fund</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>GIE</td>
<td>Groupement d’intérêt économique (business partnership)</td>
</tr>
<tr>
<td>IMT</td>
<td>Irrigation management transfer</td>
</tr>
<tr>
<td>INPIM</td>
<td>International Network on Participatory Irrigation Management</td>
</tr>
<tr>
<td>IOV</td>
<td>Inspectie Ontwikkelingssamenwerking te Velde (Evaluation Department of the Dutch Ministry for Development Cooperation)</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>IRR</td>
<td>Internal rate of return</td>
</tr>
<tr>
<td>IRRI</td>
<td>International Rice Research Institute</td>
</tr>
<tr>
<td>KfW</td>
<td>Kreditanstalt fur Wiederaufbau (Germany’s development bank)</td>
</tr>
<tr>
<td>MLF</td>
<td>Malian franc</td>
</tr>
<tr>
<td>MP</td>
<td>Member of parliament</td>
</tr>
<tr>
<td>NCIA</td>
<td>National Confederation of Irrigation Associations</td>
</tr>
<tr>
<td>NGO</td>
<td>Nongovernmental organization</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and maintenance</td>
</tr>
<tr>
<td>ON</td>
<td>Office du Niger (Niger Authority)</td>
</tr>
<tr>
<td>PRMC</td>
<td>Projet de réforme des marchés céréaliers (cereals market reform project)</td>
</tr>
<tr>
<td>RETAIL</td>
<td>Primary canal on which France sponsored land rehabilitation, crop intensification, and institutional reform projects</td>
</tr>
<tr>
<td>TCI</td>
<td>Taxe conjoncturelle d’importation (variable import tax)</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>WARDA</td>
<td>West Africa Rice Development Association</td>
</tr>
</tbody>
</table>
Executive Summary

How did the government of Mali become committed to reform of the Office du Niger (ON), an irrigated rice scheme and economic heavyweight? In this report, the government’s decision is explained as the outcome of a series of small power shifts triggered by pro-reform players. Reform advocates devised them whenever opportunities arose and used whatever maneuvering room there was to tilt the power balance between agency and farmers to further the goals of sustainability and partnership. The shifts were thought out for their strategic value, but most came without a timeline or plan for the next moves.

The first, seemingly insignificant, steps jump-started the reform, because in a single season they raised yields and farmer incomes. With later steps, the evolving coalitions grew into unique partnership institutions that became coherent and effective enough for government to consolidate them in a legal and financial framework. The authors use this history to show how the World Bank and other donors can help governments turn public irrigation systems into financially sustainable operations despite the preference of most agency personnel and users for the unsustainable status quo.

Chapter 1 presents the ON scheme and its history. Chapters 2 through 5 analyze the reform process. Chapter 6 and appendix B discuss the parts that might be applied in other countries. Appendix A gives operational details on rightsizing the agency and the legal framework. Appendix C analyzes the political dimensions of irrigation reforms in other countries.

Chapter 1. In central Mali, the topography along the Niger River is suitable for gravity irrigation on a million hectares. The ON was created in 1932 to tap this resource. Its initial infrastructure was built by forced labor. Land was cultivated by involuntary settlers. These settlers became heavily indebted because they were forced to grow cotton, a crop that was selected to supply the French textile industry but that failed through no fault of the growers. Rice cultivation was allowed only to feed the settlers and alleviate food insecurity in the region.
At independence in 1960, 45,000 hectares had been developed. Mali added 8,000 hectares between 1960 and 1965. Its new government maintained a top-down management structure and monopolies in crop processing, marketing, and operation and in maintenance of the intake and canals.

Politically, in that period the government and the ON were locked in a solid coalition in which farmers had no voice. The government needed a reliable rice supply to satisfy its urban constituents, who were switching from sorghum and millet to rice. Agency personnel demanded that the government guarantee their salaries and absorb the agency’s losses. In 1969, rising demand caused Mali to import rice for the first time. A year later, the government abandoned cotton and made rice the only scheme crop. Partly in response to a succession of droughts, production and yields were climbing when the government approached the World Bank with a request to expand the scheme.

Chapter 2. The World Bank and bilateral donors first made a diagnosis. They concluded that expansion would be economically unjustified until the scheme became financially sustainable. Institutionally, they saw a need to make the settlers partners in scheme management and grant them land-tenure security. Donors also noted that farmers lacked incentives to raise yields and therefore said that rice marketing should be reformed. In addition, they indicated that the agency’s monopolies should be abolished, management costs should be cut by rightsizing, and water delivery should be made more efficient through field and canal improvements.

The government shared only the conclusions concerning water delivery and opposed those regarding reform. It held on to its goal of expansion, because its maneuvering room was bounded by the stakeholder coalition that kept it in power, but the government also expressed interest in infrastructure rehabilitation.

A stalemate threatened early in 1982 because all donors required the government to commit to full reform before releasing funding. A deadlock was avoided by the initiative one donor took in negotiating a deal to test a combination of physical and institutional improvements on a single secondary canal.

Chapter 3. Using all the political space available, the deal forced an opening by trading small reform steps for physical improvements. The steps included short- and medium-term credit for all farmers, even those who had defaulted. Village associations administered the credit arrangement and became partners in canal operation and maintenance. The test more than doubled yields and shifted some power from agency staff to farmers when the government asked the donor to extend the rehabilitated area.
Impelled by the alliance between the same donor and the country’s sole political party, more power shifts followed in 1984 and 1986 as farmers started to use small threshers and small hulling machines. From then on, the farmers no longer had to have their rice threshed and milled by the agency. Agency personnel lost more control over farmers when another bilateral donor negotiated farmer-friendly land-tenure rules that eliminated the agency’s prerogative to force farmers to move to other villages or deny settlers access to land. The same donor also won a battle to create transparent and user-accountable institutions. The agency was to share with elected farmers its authority to spend water service fees. Full liberalization of paddy processing and marketing raised producer prices, further strengthening the farmers’ position.

Devising and spreading technologies that would help shape new institutions went hand in hand with forging a stakeholder coalition in which organized farmers replaced the agency staff as the most powerful group of stakeholders. Through innovations and pressure, the highly committed, mixed field staff in the donor projects obtained the government’s verbal commitment. By 1989, when the Bank signed its ON consolidation loan, the government had opened up to the need to reform the agency.

**Chapter 4.** A window of opportunity to complete and seal the reforms opened in 1991, when the one-party regime was toppled. Like its predecessor, the new government initially hesitated, but it quickly committed to reforms. It trusted the market and was convinced that it could take on the agency, since it would have the political support of a new stakeholder: organized farmers. Also, the agency’s staff was weakened and had lost political leverage and social standing. In 1992, in a telltale sign of political change, farmers showed they had become a national political force by threatening to march on the capital if the government did not stop the illegal rice imports that were depressing rice prices. The government’s decision to consolidate the irrigation reforms squared with its policy to further liberalize the economy with the help of donors.

**Chapter 5.** The new political landscape explains the serenity of the consolidation phase. A reform unit under the prime minister’s office paced the reform by setting the timetable and brokering lasting compromises. Consultation with the ON employees union, farmers, ministries, and donors allowed the unit to downsize the agency staff and fine-tune the new institutions. This paved the way for the quick passage of a law enshrining land-tenure security for farmers as well as full-cost recovery and joint management by elected farmers’ representatives and agency staff.

The unit institutionalized the new balance of power among the three stakeholders through an innovation: three-party performance contracts that were valid for three years. These contracts allow government, the
agency, and organized farmers to negotiate, monitor, and assess one another’s contributions and performance.

All in all, a two-part institutional framework for partnership was created. One part combined farmer monitoring of the use of the water service fees with agency administration of the sizable fee income and government authority to enforce compliance. The other part, composed of the recurring contract negotiations, created a policy arena in which stakeholders could adjust current rules to emerging realities, such as the need to expand the scheme to make room for the younger generation.

The reforms led to sharp increases in yields, cropping intensity, and incomes. These gains in production and income further solidified the new institutional framework. The reforms reduced poverty by increasing the incomes of established farmers and accommodating many newcomers. They created openings for women to farm and trade and for households to shift from subsistence cultivation to cash crops and commercial services.

Chapter 6. Parts of this reform process are applicable to other countries. The political economy of Mali’s process is typical of irrigation reform processes elsewhere. Few nonirrigation actors take an interest in the performance of the public irrigation sector, even when it drains finances from services such as health, education, and road building. This lack of interest denies governments the political space to draft and implement a reform policy and makes irrigation reform politically infeasible as long as the two parties that make up the sector fiercely oppose change.

The ON case demonstrates a way out of this stalemate. It shows that governments can trigger a change process by granting farmers small gains in control that are politically feasible and in line with a diagnosis and with the goal of sustainability. In the ON, the initial shifts concerned water (leveling of the fields, proportional structures on the secondary canal), credit, and dialogue concerning the operation of the canal.

This case also shows that important gains were made when a powerful nonirrigation stakeholder, Mali’s single political party, entered the arena, and reform advocates shaped a new intervention (movable threshers and hulling machines run by village associations) that would meet both their own goal and that of the nonirrigation stakeholder.

Another lesson points to the need for the long-term presence of field staff who are committed to farmer welfare and have good access to decisionmakers.
1
Introduction

In the early 1980s, farmers in the Office du Niger (ON) irrigation scheme in Mali lived on rations that the agency doled out to them from their own harvests. The rations were barely enough to allow their families to survive. The agency’s “economic police” force (the official name) ransacked farmers’ homes to find any paddy they might have hidden. Those present at a meeting with the president in 1984 recall that a farmers’ representative told him: “Our country has been free since 1960, but we farmers in the Office du Niger are still the agency’s slaves.” They reaped a sorry 1.5 tons paddy per hectare from the most potentially productive site in West Africa, where heavy clay soils lie next to abundant freshwater low in salt. Mali imported between 50,000 and 300,000 tons of rice, depending on the rainfall in the rest of the country.

In contrast, by the late 1990s, most farmers fed their families to satisfaction all year long. They also sold tons of rice and vegetables to send children to school and buy clothes, medicines, motorcycles, radios, and other items that make for a good life. The economic police had been disbanded. Here is how one farmer summed up the change: “Before [the reforms] it was a disgrace to be farmer on the . . . scheme. Now we are kings” (Edmond Dembelé in Touré, Zanen, and Koné 1997:60). They harvested an average of 5 to 6.5 tons paddy per hectare because water reached every part of their fields. In an average year, Mali produced enough rice to feed its people and export tens of thousands of tons of rice and onions.

How did things turn around? The short answer is that the government reformed the scheme’s governance. It redefined and redistributed responsibilities, accountability, incentives, and controls that governed the behavior of managers, users, officials, and others in the irrigation sector. Providing the longer and more informative answer is the objective of the remainder of this report. The report describes how, at the start, donors and government made different analyses of the problems, and how they gradually edged closer as they developed new institutions until they united to consolidate the reforms in a new legal and financial framework.

Our analysis is set against the backdrop of the political democratization now under way in the developing world. Increasing citizen participation is limiting decision-makers’ leverage and freedom of maneuver (Brinkerhoff 1996:9). An alert, informed electorate makes changing the governance of public irrigation systems an ever tougher challenge. We therefore look
closely to see exactly what the advocates of ON reform did to make reform politically feasible.

Tables 1.1 and 1.2 summarize the outcomes of the irrigation reform in terms of farmer involvement and business processes.

**Table 1.1 Changes in farmer involvement in the Office du Niger irrigation scheme, 1978–82 and 1996–2003**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Stakeholder coalition underpinning institutions</td>
<td>Government of Mali, agency staff, and urban consumers</td>
<td>Organized farmers, government of Mali, donors, private operators of threshers and hullers</td>
</tr>
<tr>
<td>Breadth of control</td>
<td>ON held monopoly over a large array of activities, stifling farmers’ and private sector’s initiatives</td>
<td>ON control limited to O&amp;M, extension and feasibility studies</td>
</tr>
<tr>
<td>Land tenure</td>
<td>Farmers were tenants without land-tenure security</td>
<td>Farmers may hold farming licenses granting indeterminate and transmissible usufruct rights</td>
</tr>
<tr>
<td>Farmer access to markets</td>
<td>Farmers must use ON threshers, mills; sell to ON at price fixed by government of Mali</td>
<td>Farmers free to select threshers, mills, and buyers</td>
</tr>
<tr>
<td>Farmers’ participation in O&amp;M management</td>
<td>Farmers had only token representation on ON board</td>
<td>ON accountable to farmers on water use fee; joint staff-farmer committees prioritize, outsource maintenance</td>
</tr>
<tr>
<td>Farmer involvement in policy issues</td>
<td>Farmers had no effective say in policy matters</td>
<td>Farmer representatives negotiate performance contract with government, ON</td>
</tr>
<tr>
<td>Government control</td>
<td>Government subsidized O&amp;M and other ON activities but had no handle on budget and operations</td>
<td>Government no longer funds O&amp;M, yet has handle on budget and maintenance through performance contracts</td>
</tr>
<tr>
<td>Donor contributions</td>
<td>Donors unwilling to fund expansion of unreformed agency</td>
<td>Donors fund rehabilitation and expansion of scheme, consolidation of reforms</td>
</tr>
</tbody>
</table>

O&M: operation and maintenance
ON: Office du Niger

Source: Authors.
Table 1.2 Changes in business processes in the Office du Niger irrigation scheme, 1978–82 and 1996–2003

<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>ON staffing</td>
<td>Around 3,000</td>
<td>Around 400 in 2000</td>
</tr>
<tr>
<td>Water service fee as share of gross value of output</td>
<td>20 percent</td>
<td>Between 8 and 9 percent</td>
</tr>
<tr>
<td>Average net income per household</td>
<td>Averaged about CFAF 150,000</td>
<td>Increased by 600 percent in real terms between 1989 and 1998</td>
</tr>
<tr>
<td>Water management</td>
<td>By extension staff</td>
<td>By professional water management staff but few operational changes</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Controls on volume, quality only hierarchical; implementation through force account, diversion of fee to salary</td>
<td>Budget negotiated in performance contracts; implementation monitored by fee-paying farmers; outsourced to contractors</td>
</tr>
<tr>
<td>Fee collection rate</td>
<td>Below 80 percent</td>
<td>Around 97 percent</td>
</tr>
<tr>
<td>Credit</td>
<td>Handled by ON; low reimbursement rates; frequent debt forgiveness by the government of Mali</td>
<td>Handled by private savings and loans associations; reimbursement greater than 98 percent</td>
</tr>
<tr>
<td>Expansion</td>
<td>None</td>
<td>Greater than 20 percent since 1996, through farmers’ participation and donor and private investment</td>
</tr>
<tr>
<td>Average paddy yields</td>
<td>Between 1.5 and 2.5 tons per hectare</td>
<td>Between 5 and 6 tons per hectare</td>
</tr>
<tr>
<td>Crops, cropping intensity (CI)</td>
<td>Monocropping of rice; CI around 75 percent; horticulture nearly nonexistent</td>
<td>Diversification around rice; CI climbed to 120 percent; horticulture contributed more than 50 percent of gross value of rice output</td>
</tr>
</tbody>
</table>

CFAF: Communauté Financière Africaine (franc)
ON: Office du Niger
Source: Authors.
Main features of Mali

Mali lies in West Africa; its capital, Bamako, is 1,200 kilometers from main seaports. Half of its 1.24 million square kilometers of land is arid, with average annual rainfall of less than 200 millimeters. Its population, estimated at 11 million in 2002, is growing by 2.4 percent a year. With a gross domestic product (GDP) of US$240 per head, Mali is one of the world’s poorest countries. On the UN Development Programme Human Development Index of 162 countries, Mali ranked 153, with 64 percent of the population living below the poverty line. Life expectancy at birth is 43 years in Mali, and 57 percent of its people are illiterate.

Colonized by France from the 1880s, Mali regained sovereignty in 1960. It started off with a one-party political system and was ruled by the military from 1968 to 1991, when a popular uprising led to a multiparty democracy and restored civilian control.

Economically, Mali is vulnerable. It earns more than 90 percent of its foreign exchange from only three commodities: cotton, gold, and livestock. Mali derives 43 percent of its GDP from agriculture. Harvests depend on rainfall because less than 100,000 hectares can be irrigated despite a physical potential of 1 million hectares. Rainfall is highly variable, and droughts are frequent.

Since the early 1990s, Mali has reduced its macroeconomic imbalances and liberalized its economy. A 50 percent devaluation of the Communauté Financière Africaine (CFA) franc in 1994 gave the economy a boost: between 1995 and 2000 GDP grew at 5.7 percent a year.\(^1\) During this period Mali became Africa’s second largest cotton producer and third largest gold producer. Its governance and economic policies make it a donor favorite: it is one of the world’s top 10 recipients of foreign aid per capita.

Main features of the Office du Niger

The Office du Niger (Niger Authority) refers to both the 60,000-hectare scheme and the organization that manages it. The project is located in the middle of Mali on land fed by the Niger River, which rises in the Futa Jalon mountains in Guinea Conakry and flows across all of Sahelian West Africa to its estuary in southeastern Nigeria. The agency’s headquarters were built in Segu, 225 kilometers east of Bamako. The biggest city in the command area is Niono. Tarmac roads connect Segu to Bamako (construction: 1960s), Niono (construction: 1980s), and Masina (construction: 1990s).

French colonial authorities established the ON in 1932 at the initiative of civil engineer Emile Bélimé, following his discovery in 1925 of a vast fossilized inland delta between Segu and Tombouctou composed of alluvial soils well suited for gravity irrigation (box 1.1).
The delta’s total physical irrigation potential is estimated at 1 million hectares. Colonial authorities directed the ON to produce 100,000 tons of cotton fiber, to reduce by one-third the French textile industry’s dependence on imports. A secondary objective was to grow rice to enhance the food security of the inhabitants of the Sahelian and Saharan regions of French West Africa and Algeria.

For the design of ON’s hydraulic scheme and institutions, the founders borrowed heavily from the Sudan’s Gezira scheme. The two schemes achieved different track records, in part because of less obvious but vital physical differences in rainfall and microtopography. Box 1.2 summarizes ON history from 1932 to the first donor meeting in 1978.

**Box 1.1 Origin, features, and development of the inner delta of the Niger River**

Millions of years ago earthquakes created a 3-million-hectare basin between the present cities of Segu and Timbuktu. More than 60 meters deep on its northern side, the basin served as a delta to a river known as Joliba, corresponding to the upper reaches of the present-day Niger River. The inner delta served the Joliba in the same way that Lake Chad serves as a delta to the Logone River. Just thousands of years ago, sediment filled this basin, resulting in the capture of the Joliba River by the Isa Ber, another river that had risen in the Sahara mountains during a wet climate cycle and ran eastward along the present course of the Niger River to Timbuktu downstream. The capture led to the present course of the Niger River and dried out the inner delta.

Emile Bélime discovered this delta in 1925. His finding was confirmed the same year when an exceptional flood of the Niger rewatered distributaries in the inner delta. Bélime had been working on a land development project to reduce the dependence of the French textile industry on cotton from the United States and Egypt. He expected that irrigation of this vast expanse of alluvial soils by gravity would create a huge potential for cotton production.

As in all estuaries, the river in the inner delta lies above the level of adjacent lands. Diking the fossilized distributaries would allow their rewatering and turn them into irrigation canals. Using these principles, Bélime drafted a project to develop 960,000 hectares. The Office du Niger was created in 1932 to implement this project. Since the completion of the Markala Dam in 1947, gravity irrigation of about 1 million hectares has theoretically been possible. The inner delta of the Niger River is probably one of the largest reserves of alluvial land that could be irrigated by gravity because only 70,000 hectares have been developed.

*Source:* Adapted from Aw and Dejou 1995.
Box 1.2 History of the Office du Niger from founding to first donor meeting

1932   ON is founded.
1934–47 The Markala Dam is built with forced labor.
1935   Land development for rice cultivation begins in the Masina Zone.
1937   Land development for cotton cultivation begins in the Niono Zone.
1945–48 More than 40 percent of the settlers leave ON when coercion is abolished.
1945–49 Pause in land development to find ways of raising yields on areas already developed.
1949   A mechanized state farm begins operations at Molodo.
1952   Land development for long-staple cotton begins in the Kuruma Zone.
1958   Intensive cotton cultivation on leveled land is introduced.
1960   Mali achieves independence; area developed measures 45,000 hectares.
1960–65 Development of 8,000 hectares for rice and cotton.
1961   France transfers ownership of ON to Mali. Short transition period in the handover causes loss of knowledge and know-how.
1962   All ON management staff are Malian.
1965–75 Development of 6,000 hectares for sugar cane.
1966   Sugar cane plantation starts cultivation.
1968   The Second Republic is declared under a military regime.
1969   For the first time, Mali officially imports rice (20,000 tons).
1970   Cotton cultivation is discontinued.
1970–76 Land on state farms is redistributed to settlers.
1972–74 Severe drought strikes the entire Sahelian zone.
1978   Donors meet for the first time on ON rehabilitation.

Source: Authors.

Physical resources

The longitudinal slope of the inland delta runs southwest to northeast, starting at the Markala Dam. The slope of the land is fairly smooth at 5 to 10 centimeters per kilometer, but the microtopography is uneven. Differences in elevation of more than 50 centimeters are recorded in unleveled 12-hectare areas. Soils are alluvial except for occasional sandy pockets where the villages and vegetable gardens are located.

The rainy season runs from May to October, with more than 90 percent of the rainfall concentrated in June and September. Average annual rainfall in Niono is 550 millimeters and ranges from 300 to 850 millimeters. Evapotranspiration is 3 meters a year, most of it during the dry season. Temperatures are suitable for rice, but from December to February the
minimum daily temperature frequently drops below 15 degrees Celsius. These low temperatures, the scarcity of water, and the differences in crop values make vegetables attractive as dry season crops.

The Niger River carries less than 50 grams of silt per cubic meter (compared to the Nile’s 1,650 grams above the Aswan Dam), sparing farmers much silt-removal expense. The water is also low in salt, less than 100 parts per million, and the soil has a low sodium absorption ratio. Risks of salinization and sodification are therefore minimal. The Niger’s natural flow at Markala averages 4,000 cubic meters per second in September and October and 50 cubic meters per second in April and May.3 Abundant water volumes are therefore available for the wet season crop. Dry season cropping became possible after 1982, when the Sélingué reservoir was built on an upstream tributary. Its capacity of 2 billion cubic meters can provide an additional flow of 80 to 100 cubic meters per second during the dry season.

Infrastructure and water management

Water is taken in at the Markala Dam, which is a weir rather than a reservoir dam (capacity 10 million cubic meters). Completed in 1947, it was designed to serve 1 million hectares and raise the upstream water level by 5.5 meters to take in water during the low flow season when crops need protection from water stress. Its gates are wide open during the rainy season when river levels are high enough for water to enter the feeder canal. This canal is 9 kilometers long and has a conveyance capacity of 200 cubic meters per second. It feeds three main canals:

- The Sahel Canal, running north, can transport 100 cubic meters per second and after 24 kilometers reaches a fossilized river branch, the Molodo Fala.4 Water then flows into the fala, whose banks were stabilized and raised along 100 kilometers to serve as an irrigation canal. Because the gradient is slight, water takes a week to travel through the Molodo Fala, but the fala allows flexibility in water management by storing more than 100 million cubic meters.
- The Masina Canal, running east, can transport 50 cubic meters per second and after 20 kilometers reaches a fossilized river branch, the Boky Wéré Fala, which serves the Masina Zone.
- The Costes-Ongoîba Canal, located between the Sahel and Masina Canals, can transport 48 cubic meters per second along its 19 kilometers and serves the sugar cane plantation and the new rice zone of M’Bewani.

The ON distribution system is divided into five 12,000-hectare zones: Masina in the east; Niono, Molodo, and NDebugu in the center; and Kuruma in the north (see map following appendixes). The three main canals feed primary canals, each of which serves 3,000 to 9,000 hectares.
Each primary canal feeds secondary canals that each serve between 150 and 1,000 hectares. The primary canal system is 153 kilometers long; the secondary canal system, nearly 500 kilometers. Tertiary canals each serve an average of 12 hectares; the tertiary canal system is 2,100 kilometers long. All the canals are unlined. Along most secondary canals, the inhabitants of a single village farm the land. Figure 1.1 shows the hydraulic units in the canal system.

For each primary, secondary, and tertiary irrigation canal, a corresponding drainage canal was planned. However, the main drains, which were to empty into large swamps or return the water to the river, were never completed. Drainage has therefore always been deficient, a situation aggravated by the unauthorized irrigation of 10,000 hectares of rice using drainage water. To irrigate these unauthorized fields, users admit excess discharge into the drain, causing it to overflow. The unauthorized fields also discourage maintenance of the drain, because its water level rises when weeds grow in it. In addition, farmers with fields along a drain dam it off to convey the drainage water to their fields, causing additional waterlogging upstream.

Land development, based on topographic surveys with insufficient detail and precision, was intended to provide limited water control for land-extensive cultivation of cotton and rice in large fields. Until the start of infrastructure and land rehabilitation in the mid-1980s, field water management was deemed unimportant, because water was abundant.

This design is still evident in the Molodo Zone, where little rehabilitation has taken place. Free intakes discharge from the fala into primary canals, while sliding gates admit water from primary into secondary canals and from secondary into tertiary canals. Experienced operators, using a mix of hydraulic calculus and on-the-job knowledge, decide when to open the sliding gates. Primary and secondary canals contain check structures that are also operated with sliding gates. Gated double culverts deliver water from tertiary canals into farmer-built quaternaries that were not part of the official design. Originally the canals were managed by means of upstream control. In the early 1980s, water use at the secondary canal level was estimated at 30,000 cubic meters per hectare of wet season rice.

Until the late 1980s, the ON employed no specialized O&M personnel. Gatekeepers operating the intakes of main canals reported to the chief of the agronomic service. The extension staff operated the lower hydraulic units. The ON holds no water rights, because no water-tenure legislation is in force.

Until crop intensification began to increase dramatically in the late 1980s, land allocations were generous. In the early 1960s, a farming household was given 1 hectare per family member of land for rice growing and 1 hectare per male adult of land for cotton growing, resulting in an average holding size of more than 12 hectares. The reforms drastically reduced both farm size and water deliveries. Current water consumption
at the secondary canal level is estimated at 15,000 cubic meters per hectare, and the average holding is 2.5 hectares.

O&M from river intake to tertiary intakes was, and still is, an ON responsibility. Farmers are charged a fee, which until the reforms, was 400 kilograms of paddy per hectare. The fee was expressed in kind as a hedge against inflation, thus offering protection to both ON and the farmers. The in-kind fee was convenient to administer, since it needed no revision to match changing prices and farmers had to deliver their paddy production to the ON anyway.

Yields on the 22,000 hectares developed before 1945 were disappointing, so France sent a fact-finding mission, but to little effect. Plots remained large—between 12 hectares and 24 hectares—and unleveled, allowing no adequate irrigation or drainage. Land development resumed in 1949 (table 1.3).

**Governance and management of people and resources**

Originally, the ON director general had great power over the inhabitants and resources of the command area. The ON had a monopoly that in-
cluded land survey and development, civil works, land administration, recruitment and installation of settlers, motorized farm mechanization, agricultural extension, establishment and oversight of farmers’ organizations, input supply, credit, marketing and processing of crops, sale and export of rice and cotton, transportation of agricultural inputs and produce by roads and canals, and management of guesthouses, seed farms, and a training center. So overwhelming was ON control over everyone and everything that ON was called “a state within the State” (Reste 1946:31). To the ON, such power was worth fighting for, and the agency did everything it could to keep it during the 1980s.

With this monopoly came administrative, financial, and managerial autonomy to fulfill the ON mission to develop the designated 1 million hectares. Until 1947, the board consisted of representatives of French ministerial departments, civil construction, and textile companies. From 1947 on, a representative of the farmers—appointed by the director general—and one delegate each from the European and the African employees’ unions were admitted to the board. During the colonial period, the director general reported to the French minister for the colonies. After independence, he reported to various ministries, ranging from Rural Development and the Special Ministry for state-owned companies to the presidency.

When the ON was established, vacant lands within its perimeter were declared state property. Because the delta was sparsely populated, the authorities had to find settlers. Until 1945, the state, with the complicity of local chieftains, forced families to leave their homesteads as far as 500

<table>
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<th>Period</th>
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<th>Cumulative total</th>
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<tr>
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<tr>
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<td>23,642</td>
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<td>2,463</td>
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<td>1955–60</td>
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<td>1960–65</td>
<td>1,694</td>
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<td>56,573</td>
</tr>
<tr>
<td>2000–02</td>
<td>3,864</td>
<td>64,301a</td>
</tr>
</tbody>
</table>

a. In addition, 5,806 hectares were developed for a sugar cane plantation that is now independent of ON.

Source: ON records.
kilometers away (in Upper Volta, today’s Burkina Faso) and settle in the ON area. These families became farm laborers, but without the security of a wage. The ON could evict them from their plots for nonpayment of the water fee and other services, for nonreimbursement of seasonal credit, or for failure to follow crop husbandry instructions or maintain the tertiary canal. The ON frequently changed the farmers’ field assignments and increased or decreased the size of their farms at will.

After World War II, the average ON farmer continued to lead a strenuous life. When coercion was abolished, 4 out of 10 settlers left the scheme. Between 1960 and 1968, during the socialist regime, the population decreased by 14 percent, when natural growth should have increased it by at least 20 percent. By contrast, in the 1970s, after year upon year of drought and the abandonment of cotton cultivation, the ON began to attract voluntary settlers and the population grew from 30,000 to 53,000. But even during the 1970s, resident settlers continued to desert the ON. During two years in the mid-1970s, 301 out of 4,500 holders separated voluntarily from the ON. Deserters often left stealthily in the night to avoid prosecution. The biggest bone of contention was the ON monopoly on paddy marketing, which meant that, particularly during drought years, farmers had to sell at a below-market price set by the government of Mali. In tacit protest, farmers defaulted on credit and service payments. Their total debt increased from Malian franc (MLF) 721 million to MLF 1,364 million (US$1.2 million to US$2.27 million) between 1972 and 1977.5

As a result, the country began to run rice deficits, and the ON and the government set up the economic police force composed of ON field staff and members of the army. The police were told to prevent farmers from storing more than their subsistence allowance of between 250 kilograms and 300 kilograms per household member and 100 kilograms of seed per hectare.6

Throughout this period, the ON had the status of a state company and was empowered to contract loans with development and commercial banks. Its largest sources of revenue were its four rice mills and two sugar plants. Despite its monopolies, autonomy, and full control over labor, however, the ON did not pay its own way and frequently needed subsidies. After independence, investment grants from the Ministry of Planning went directly into the ON operating budget and were sometimes used for salaries and other recurring expenses. The ON’s financial standing is hard to assess, but the fact that it was not profitable may be deduced from its frequent requests for tax exemptions and subsidies.

The opacity of ON’s accounting, and the causes of that opacity, resembled those of many unreformed public irrigation agencies. First, accounting capacity was deficient. No real balance sheets were produced, and no cost accounting was practiced. The only bookkeeping documents were profit
and loss accounts. In the words of a 1977 report in the World Bank’s archives: “[Management was] not given to reflections on questions of economic and financial feasibility” (Report on the Reconnaissance Mission: May 25–27, 1977). Second, the political economy of irrigation encouraged maintenance of a leaky wall between the ON and the national treasury. Between 1961 and 1966, less than 1 percent of Mali’s people lived within the scheme, but the ON received one-third of the investment budget of the Ministry of Rural Development (Labaste 1996:17). The government of Mali kept the ON afloat to serve rice consumers in the cities and the agency staff. Both belonged to the better educated, cash-earning groups that might reduce their support if rice became expensive or if salaries went unpaid.

Production before the reforms

The ON was set up to produce 100,000 tons of cotton fiber a year, but it never produced more than 3,500 tons a year. Independent Mali maintained cotton as a priority crop, but it became obvious that high yields could be achieved only in dry years unless large investments were made in drainage. Such outlays were beyond the government’s reach. This insight, combined with an increase in domestic demand for rice and a rise in cotton production in the rain-fed areas (from 2,700 tons of seed-cotton in 1960 to 42,000 tons in 1970), made the government decide to discontinue cotton production on the ON scheme.

During the colonial era, despite the priority given to cotton by the authorities, rice paddies had already come to occupy 80 percent of the farmed area. From 1969 on, the government of Mali encouraged rice production, and the ON converted its cotton fields to rice. The inefficient state farms that took up more than 40 percent of the ON area when the socialist regime was at its zenith were shut down and the land was distributed to settlers. Discontinuation of cotton also freed labor to prepare paddy fields. Agency and government interest in rice production grew further when a drought caused famine in the entire Sahel in 1972–73. Between 1969 and 1978, farmers expanded paddy production from 46,000 to 101,000 tons, and yields climbed from 1,550 to 2,660 kilograms per hectare. By 1978, Mali was again self-sufficient in rice; its urban population was switching from sorghum and millet to rice, and the ON supplied 80 percent of that.

Summary

Mali’s inland delta offers vast potential: 1 million hectares of alluvial soils close to a main river in a sunny climate. Development of this potential started off on a colonial footing, with a scheme that was built and cultivated by forced labor and managed by the French from the top down. The
scheme emphasized cash crop production, particularly of cotton, but paid little attention to the business side of farming. Rice was a secondary crop, grown to feed the settlers and alleviate food insecurity in the region.

After independence, all managers were Malian. They expanded the scheme and, beginning in 1970, made rice the only crop, but they did not change the management institutions. The government and the agency were locked in a solid coalition: the government needed a steady rice supply to satisfy its urban constituents, and agency personnel were glad to oblige as long as the government guaranteed salaries and covered operating losses. The top-down management style accorded with the views on development that were prevalent in Mali and many other African countries at that time.

Production and yields were growing when the government of Mali called the first donor meeting in 1978 to request funding to expand this vital production resource. Unwittingly, it had embarked on a reform path.

Notes

1. Throughout this report, two exchange rates are used to account for the devaluation of the CFA franc in January 1994. Before that date, US$1 = CFAF 300. After that date, US$1 = CFAF 600. The rates represent approximate averages over these two periods and provide only rough estimates in U.S. dollars.

2. In the Gezira scheme, about 480,000 hectares were developed between 1925 and 1937 and another 400,000 between 1958 and 1964.

3. Figures do not take into consideration the effect of the Sélingué Reservoir Dam.

4. Fala is a Bambara word for “swamp.” The choice of this expression indicates that local inhabitants were unaware that it was a fossilized branch of the Niger River.

5. The Malian franc (MLF) was created in 1962 on parity with the CFA franc. It was devalued by 50 percent in 1967. In 1984 Mali joined the CFA zone.

6. The ration varied with grain scarcity and dropped to 200 kilograms in 1983.

7. The ratio of fiber to seed-cotton was about 35 percent.
This chapter portrays the reactions of donors to the request by the government of Mali for aid to expand rice production. Where the government saw primarily untapped physical potential, donors saw both irrigation potential and shortfalls in finance and construction as they became familiar with the scheme. They wondered how sustainable the scheme was. Did the shortfalls point to management issues that could be solved through equipment and training? Would restructuring agency departments and redrawing internal lines of authority resolve the issues? Or did the problems result from the top-down governance system inherited from colonial times, and was there a need to redefine and redistribute the responsibilities of government, agency, and farmers? If the governance institutions were faulty, solving the problems would require reforming the scheme and perhaps also the rice sector.

Mali’s funding request to the World Bank

On March 25, 1977, Mali’s president, Colonel Moussa Traoré, sent a letter to World Bank President Robert S. McNamara requesting financial and technical aid for a project advocated by the ON director general, Captain Ongoiba. The proposed project was the construction of the Costes Canal. This was at odds with the conclusions of the Bank’s Agricultural Division and the results of exploratory talks with the civilian minister of rural development, who had agreed to consolidate the ON before expanding it.

Colonel Traoré was both head of state and secretary general of the only political party. Although the government was mostly civilian, military men headed key organizations such as the ON. The military were aware that their legitimacy was not the soundest and that they had every incentive to keep the rice in good supply. They therefore sought to raise production.

Horizontal expansion of cultivable land seemed a logical strategy, because only 6 percent of the physical potential had been developed. It was attractive because it carried little political cost yet brought immediate benefits and substantial loans. By contrast, raising production through reforms risked alienating support groups, postponing benefits from the short to the long term, and reducing sizable loans to small ones.
Bank President McNamara committed only to sending a fact-finding mission in May 1977. The Bank sent another mission in November 1977 to identify the technical assistance needed to draft a medium- and long-term rehabilitation and development program. The mission was assigned tasks that foreshadowed later issues:

- Assessing the state of canal maintenance and the scope for improving operations without major investments
- Assessing the need for infrastructure rehabilitation
- Defining the requirements for intensifying rice cultivation
- Defining organizational requirements such as resizing holdings for intensive rice cultivation and improving farmer participation in operations
- Analyzing the ON financial position and accounting practices.

Mission outcomes were submitted to a multidonor conference in Segu in November 1978. The conference was called by the government of Mali and the Permanent Inter-State Committee for Drought Control in the Sahel, known by its French-language acronym CILSS.

**The Segu multidonor meeting**

The meeting of donor representatives, the government of Mali, and CILSS was informed by several factors:

- Sharp increases in domestic demand for rice in Mali that made import substitution steadily more attractive
- Heightened awareness of the importance of national food security and the ON potential for food production in the wake of the 1972–74 drought and famine
- Doubling of paddy production during the 1970s, without outside assistance and without donor funding
- Analyses by CILSS and its donor counterpart, Club du Sahel, showing that of all irrigation schemes in the Sahel, the ON was in the best position to raise food production quickly
- The master plan for rice intensification at the ON drafted by the West Africa Rice Development Association (WARDA)\(^1\)
- Paddy yields of 5 to 6 tons per hectare and double cropping achieved in green revolution pilots in Burkina Faso, Niger, and Gambia.

Despite these strong points, the Bank, the Netherlands, and Germany made cautious commitments that contained exit options. Having never before worked with the ON, the three wished to explore the terrain. The terms of reference for the Bank’s first fact-finding mission stated that “...a first project should mainly serve as a door-opener to gain access to a complex and
little known structure which we will know imperfectly even after an ex-
tensive identification mission” (Report on the Reconnaissance Mission: 

The donors grew more cautious after learning about the economic po-
lice, the farmers’ declining subsistence rations, the rice-processing and 
rice-marketing monopoly, the price-setting that accommodated urban 
consumers rather than producers, and the accounting procedures that 
yielded little clarity about the ON’s financial position.

The Bank pledged US$4.5 million for technical assistance to finance in-
frastucture repairs, accounting assistance, a 1,500-hectare land-leveling 
pilot, and a feasibility study for rehabilitation of 35,000 hectares. New lend-
ing would depend on the outcomes of the pilot and the feasibility study.

The Netherlands stressed that crop production had to be intensified 
and pledged to reinforce direct support to farmers by training ON per-
sonnel, providing farmers with equipment, running functional literacy 
programs, improving extension services, and reinforcing social infra-
structure. It also committed to conducting studies of crop water re-
quirements and water management. From all these activities, the Netherlands 
could retreat without much ado if outcomes were unsatisfactory.

Germany made its commitments conditional on the outcomes of the 
Bank’s feasibility study. It was favorably disposed to a request to expand 
capacity for paddy storage. France, the only donor familiar with the 
scheme, insisted that rehabilitation be given priority over expansion—but 
committed to build the Costes Canal with French companies.

France, the Netherlands, and the World Bank, each with its own special 
requirements, became the major financers of ON reforms. Some peculiar-
ities were apparent at the Segu meeting. France’s ongoing commitment to 
the types of investments it had made while it was the colonizing power 
demonstrated its goal of tying Mali’s economy to France’s. The Nether-
lands’ pledge to test rehabilitation and water management drew on its 
own system of polders and its irrigation schemes in Indonesia, its main 
former colony. Its “software” package reflected its agricultural support 
system and its view of itself as an exemplar of social and political equal-
ity. The Bank’s proposals, true to the Bank’s charter, were intended to find 
out whether the ON offered a sound investment opportunity and, if not, 
what conditions would make it one.

**Deterioration of ON finances: The cost of Costes**

From 1978 to 1982, the ON financial situation deteriorated. ON manage-
ment proceeded in 1978 to build the Costes Canal without any financing 
from Mali’s budget and without waiting for approval of the French loan. 
The decision implied reallocation of resources earmarked for O&M and
depleted working capital. This neglect adversely affected production: from 1978 to 1983, paddy production fell from 101,000 tons to 56,500 tons, and sugar production from 19,000 tons to 6,500 tons. The conclusion had to be that the horizontal expansion strategy had failed.

Donors entertained the prospect that the ON would collapse of its own weight and that its bankruptcy would offer an opportunity to rebuild the agency. Between 1978 and 1983, paddy allocations to farmers dwindled from 840 to 200 kilograms per person. Widespread food shortages among farming families exacerbated already tense relations between the ON and settlers and threatened to stifle the donor-government dialogue.

The outcomes of donor explorations

While the ON built its Costes Canal, the Bank ran its technical assistance project. Its land-leveling tests at four locations did not show significant yield increases. Its socioeconomic survey of the settler population, attempting to identify conditions that would make rehabilitation successful, uncovered major production disincentives. Individually and in combination, the monopoly on threshing, milling, and marketing, abuses by the economic police, fines on cultivators who did not comply with instructions from extension staff, and insecure land tenure all encouraged farmers to underutilize or abandon irrigated lands, allocate their labor to rain-fed crops, and build unauthorized paddy fields. The Bank concluded that a rehabilitation investment would yield trivial results if farmers were not given production incentives. In the end, the technical assistance project failed to reach its objective of delivering a comprehensive feasibility study of ON rehabilitation.

The Netherlands also went to work. Early in 1979, its Wageningen University started to study crop water requirements. In 1980, it also set up a training center in Niono that afforded close contacts with both farmers and ON personnel. Proximity to farmers gave project staff intimate knowledge of farmer constraints and a fertile environment for devising solutions. The producer-level study projects were pragmatic and easily translated into actions that pioneered the ON reform.

Restructuring the rice market

The Bank’s survey showed that achieving irrigation reforms would require restructuring the grain market to give producers stronger incentives. Such a restructuring became possible beginning in 1978. When the government requested Bank assistance to expand the scheme, it also turned to donors to revise its failing food policy. Mali’s national food security policy relied heavily on irrigated rice cultivation because harvests of millet, sorghum,
and maize rose and fell with rainfall, and the wide dispersion of production of these crops made the delivery of inputs expensive and marketing unattractive. In contrast, irrigated rice cultivation was less vulnerable to variation in rainfall, allowed cost-effective delivery of all inputs because producers were in one spot, and made marketing rewarding due to the massive volume of the harvests.

Control over ON rice was therefore at the heart of the government’s grain policy. Settlers were legally bound to sell their rice to the ON, under threat of eviction, at prices set by the government to match the frozen incomes of government officials living in the cities and the high ON costs for collecting, transporting, storing, processing, and distributing the rice. The government subsidized the ON so that retailers could sell rice at prices its constituency could afford. This policy saddled the government with growing budget deficits.

In 1981, the government and donors jointly put in place a forum called Projet de réforme des marchés céréalières (PRMC), which outlined a strategy to restructure the grain market. It defined three goals: raise producer prices to improve producer purchasing power and, in the long term, boost production; liberalize the market to stabilize the supply of grains; and redefine the government’s role in order to achieve savings with which to upgrade civil servant pay and purchasing power.

In 1982, the government abolished its monopoly on marketing millet, sorghum, and maize, but it did nothing to liberalize the rice market until 1986. In the meantime, government administration of the rice market resulted in low producer prices, and ON control over processing deprived producers of incentives to produce and make enough money to pay ON for maintenance and water service. Agency, farmers, and the government were trapped in a vortex: low farmer rewards led to small harvests, low farmer incomes, and limited ON income. Fear of rice shortages prompted the government and the agency to expand the scheme, although construction made new demands on the government’s budget and staffing and lowered yields. The rapidly increasing demand for rice gave the government a political motive to depress producer prices and reduce food rations further to avoid having to subsidize imports. Lower prices and smaller food rations then further depressed production.

The cycle kept staff jobs and prestige secure. Some agency personnel nevertheless deplored the repression and the gap between potential and actual yields. Farmers were nearly powerless to lobby for change. They faced an omnipresent agency and its economic police force but were not united in a professional organization.
Donors and government narrowly escape stalemate

By the end of 1981, donors had reached consensus on the root causes of the ON’s problems. To them, the key issues were lack of production incentives for farmers, the inefficiency and expense of the bureaucracy, and the insufficiency of water control. The PRMC concurred. Training or reorganizing staff could hardly solve this set of problems. Reforms were called for. Responsibilities in rice marketing and scheme management had to be redefined and redistributed.

However, the government saw neither the lack of incentives for farmers nor the ON bureaucracy as major problems. It concurred that water control was insufficient and rehabilitation was needed. Its views were in line with the stakeholder coalition that kept it in power.

In 1982, the ON reaped its lowest paddy yields since 1970, but no one initiated corrective action. Donors recommended scheme-wide overhaul to overcome the institutional and managerial deficiencies, which the government resisted, fearing loss of its power. In view of the Bank’s findings on the unfeasibility of rehabilitation, donors did not propose it, although the government eagerly sought funding for improvements after its negative experience with expansion.

Donors and the government avoided a stalemate through the mutual trust that had developed between a team working with the minister for rural development and one working with the representative of the Netherlands. Both teams, led by entrepreneurial men willing to take risks for the public good, were convinced that the ON had significant potential. The Netherlands felt it had learned enough to conduct a test on the scale of a secondary canal. The minister wanted to see where the Dutch team could take the ON and asked the team leader informally if he was willing to provide rehabilitation funding. The Netherlands, a small player with no local colonial heritage, agreed, provided that small reform steps were made. These steps, described in chapter 3, used all the political space that was available at the time.

Members of the two teams quickly drafted a project proposal centered on a secondary canal called KL2. Thus began a decade during which donors traded hardware improvements for reform steps by the government. The agreement deviated from the Bank’s policy of committing funds only if the government committed to full reforms. Instead, it offered experiments in rehabilitating only the KL2 secondary canal serving 450 hectares, 1 percent of the total, if the ON would make small changes in several rules governing that canal.
This next phase can be compared to a journey. The travelers had the destination planted firmly in their heads but bickered occasionally about how to get there. In retrospect, the itinerary unfolded in four stages:

- 1978–82: reaching a diagnosis (this chapter)
- 1982–92: taking reform steps that shifted the power balance (chapter 3)
- 1993–96: piecing reforms into a comprehensive framework (chapter 4)

**Summary**

By 1982, donors had agreed on the root causes of Mali’s rice production problems and on the action needed. Farmers lacked incentives, and ON management was inefficient and costly. Reform was needed in rice marketing to create the needed incentives. Other priorities were rightsizing the agency, involving farmers in scheme management, and rehabilitating canals. However, the Malian government, whose maneuvering space was circumscribed by its stakeholder coalition, shared only the donors’ conclusions on rehabilitation and remained faithful to the ON’s self-imposed mission to develop 1 million hectares.

One donor, the Netherlands, induced the government to take small reform steps with respect to one secondary canal by providing funding for canal improvement in response. The potential of this process as a model for reform processes elsewhere depends on the outcome of this deal. Could it strengthen the donors’ hand by helping build a new stakeholder coalition that would allow the government to implement reform, or would it put the ON on a path toward partial reforms that would yield only partial results?

**Notes**

1. WARDA was established to alleviate the region’s dependence on rice imports.
2. ON working capital, comfortable in 1978, was CFAF 4.5 billion (US$15 million) in the red in 1982. Ongoïba was removed as director general in 1980 for lack of financial discipline. However, a few years later he was vindicated and honored when the canal that he initiated was renamed the Costes-Ongoïba canal.
3. Later investigation showed that this failure resulted from the poor supervision of the tests by the technical assistance personnel, who lived in Segu, far from the field.
4. This paragraph borrows heavily from Egg and Deme (2002).
3
Reform Steps That Shifted the Power Balance, 1982–92

Donors like to say that the key to success in irrigation reform is commitment at the highest level of government. Yet most speakers beg the key question (Mollinga and Bolding 2004)—where does that commitment come from? In this chapter, we explore how the government of Mali, despite initial resistance, conceded bits of reform as farmers responded to intensification incentives, obtained secure land tenure, and became organized players capable of protecting their professional interests.

How did this happen? Within the circle of decision-making stakeholders in 1982, only donors and some ministers and senior officials saw any need for reform. Did donors convince the rest of the government and the Office du Niger of the value of such reform, and did their persuasive powers make policy change politically feasible? Did the parties act according to a strategic plan, or did they improvise? Did donors stray from the World Bank policy of demanding upfront commitment to full reforms, and if so, how did their actions affect the reform process? Did the Bank’s status and policy help or hinder its reform efforts?

A pragmatic pilot at KL2

The teams working with the Malian minister for rural development and the Dutch representative agreed that they had obtained enough field insights to devise actions that would improve the farmers’ situation. To test their proposed remedies, they chose a secondary canal, KL2. The canal was in severe disrepair, and the land adjacent to it was farmed by the inhabitants of a single village, like most secondary canals. Average yield was less than 1 ton of paddy per hectare.

The test was low in cost and gradual. It combined hardware improvements, that is, canal and field improvements, with “software” improvements, such as incentives for farming intensification, services that might help farmers raise yields, and the creation of a user organization that might help farmers keep a check on the ON.

ON personnel went along with the reforms because their bosses wanted the deal and because the project brought canal improvements, which they appreciated. Also, the reform steps were tied to the life of the
project; if it wanted to, the ON could backtrack after the project was completed. Farmers were not party to the negotiations. They would react later—by raising yields.

Adapting the physical environment

The physical component consisted of a canal and a field improvement. On the canal, the nonmodular tertiary intakes were replaced by semimodular proportional ones that fixed delivery as a proportion of the total upstream discharge. Because these intakes delivered water automatically, they deprived the ON of control over farmers through water delivery (Willem Genet, personal communication, January 2003). Additional advantages were that the semimodular intakes gave users equitable access to the common pool of irrigation water and that their use was transparent and intuitively clear.

The field improvement consisted of land leveling. The donor divided each 12- to 24-hectare plot into half-hectare compartments. Farmers then divided these compartments into smaller ones by building bunds and leveling a little more land inside them each year. As farmers invested their labor, they gained a greater stake in ON handling of the scheme than be-fitted their status as tenants.

Improving the incentive and support environment

Both teams agreed to provide incentives and services. The donor would provide:

• Seasonal credit for fertilizers in low doses consistent with the farm economics of the time to ensure replicability
• A five-year credit for draft animals and implements. Most villagers were not eligible for ON credit due to indebtedness caused largely by ON strategies, and the donor deemed a new credit measure necessary to stop the downward spiral of poor husbandry-low yields-low ability to pay water fees.

The ON agreed to:

• Stop relocating farmers if they invested in bund building and land leveling.
• Increase the amount of paddy farmers could keep to 300 kilograms per person, from 250 kilograms.
• Eliminate policing from the tasks of the extension personnel assigned to the test village and appoint personnel trained at the donor’s agricultural training center.
• Open dialogue with the village association.
ON management could more easily commit to these small practical measures than to radical changes such as titling or long-term land leases. Small steps were intended to assist farmers at every stage of their shift from almost totally extensive to semi-extensive and then semi-intensive modes of paddy cultivation until they reached the intensive mode that is the agronomist’s standard in irrigated rice growing.

**Empowering farmers**

The donor explicitly sought to empower farmers by organizing them into a village association and helping adults become functionally literate. Both activities were intended to help farmers deal collectively with ON management. Here, the donor took the long view, just as it had done with hardware improvement and the incentive and support changes.

**Results**

Project personnel expected small productivity gains because farmers used long-stemmed, photosensitive rice varieties, low doses of fertilizer, and seed broadcasting rather than transplanting. To their surprise, the test raised yield from 1 ton of paddy per hectare to 2.5 tons in a single season. These results restored farmer confidence.

They also piqued the Malian government’s interest in reforms. With the crop still in the fields, the government asked the donor to replicate all components of the test on 4,000 hectares within three years. In 1983, Mali’s request led to a project called ARPON (Amélioration de la riziculture paysanne à l’Office du Niger [Improvement of Peasant Rice Cultivation at the Office du Niger]). ARPON expressed the view that solving farmer constraints would be a gradual affair and that this gradual approach would override disciplinary perspectives, be they rice agronomy, hydraulic engineering, or extension.

The Dutch staff had both the resources of a government and, until 1988, the freedom of action and aggressive commitment of a nongovernmental organization (NGO). A decision by the government of the Netherlands to raise its spending on development cooperation to 0.7 percent of GDP gave enterprising ministry personnel maneuvering room, further broadened by the ministry’s flexible program approach. Chris van Vught, an agricultural expert with the ministry, together with the desk officer for Mali and the field team, took full advantage of these circumstances.

In 1985, in its first phase of operation, ARPON overshoot its target by 45 percent: it modernized 5,886 hectares. Farmers gradually improved crop husbandry, switched to high-yielding nonphotosensitive rice varieties, and began to use transplantation and higher doses of fertilizer.
The small-step approach helped lift major production constraints. This became apparent during the drought of 1984/85, when the ON enticed farmers into growing a dry season crop of paddy for the first time by giving them freedom to market the entire dry-season harvest, for which consumers would pay high prices. The ON also waived the water fee. Using transplantation and nonphotosensitive varieties, farmers cultivated 1,260 of the 3,778 hectares that by then had been rehabilitated, achieving a cropping intensity of 1.33. Yields would have been 3.5 tons of paddy per hectare had birds not eaten half the crop. The farmers were unprepared to chase the birds, because they had never before grown paddy during the dry season. At that time, average wet season yields schemewide were 1,700 kilograms per hectare.

**Encountering another set of constraints**

With farm constraints easing, scheme constraints began to loom larger: how to tackle the disincentives generated by the ON grain marketing monopoly? Reformers anywhere would find it hard to take on an all-powerful agency with steadfast support in the top echelons of government. In Mali, the absence of a private sector that could collect, store, process, transport, and wholesale compounded this problem. In addition, the few private traders who might want to take over ON activities were deterred for fear of losing licenses for current business operations.

*The political party pokes a hole in ON’s defenses*

In the course of policy dialogue with the donor, the government of Mali made some donor views its own. In January 1983, Malian officials visited World Bank headquarters to explain the government’s new policy mix. The new policy recognized that tenant status and relocations gave farmers little incentive to intensify and that farms designed for semi-extensive cultivation were too large for the labor requirements of intensive rice cultivation. The Malian government agreed to shield tenants from arbitrary relocation and favored linking the water fee to the quality of water services. Officials also mentioned the idea of fostering an ON-farmer partnership that would define the rights and obligations of each. The government agreed that prices were too low to motivate farmers and that raising prices would encourage production. But it also reiterated that the ON monopoly could, and should, remain intact.

In January 1984, Traoré toured Niono, wearing his two hats as president of the republic and secretary general of the single political party. Farmers used this opportunity to make their grievances known, describing their plight graphically and complaining about their treatment by the
economic police and other ON personnel. They stated that the country had been freed in 1960 but that, in 1984, ON tenants were still slaves.

On the spot, the president took several actions:

• He abolished the economic police force
• He froze settler debt at the equivalent of CFAF 850 million (US$2.8 million)
• He decided that village associations were to be set up throughout the scheme
• He resolved to separate the sugar estate from the ON to allow the agency to concentrate on rice.

The president had visited the ON several times before 1984. On those occasions, though aware of the farmers’ plight, he had taken no drastic action. By 1984, however, his party was looking for ways to develop the kind of leverage that it had created in the cotton industry. As it happened, the president’s decisions were in keeping with the idea of an ON-farmer partnership. The decisions offered ARPON another opportunity to empower the farmers, beyond putting the village associations in charge of collecting the water fees.

ARPON sought to build farmer power, weaken the ON’s grip on farmers, and reduce agency revenue. To achieve these objectives, ARPON formed an alliance with a powerful actor outside the irrigation arena, the sole political party. Project and party shared only the goal of building organizations outside ON control. Their long-term goals conflicted. The project’s end goal remained to increase farmer autonomy, while the political party sought the opposite: to increase leverage over farmers who grew most of its main constituency’s staple.

The breakup of ON’s threshing monopoly

The ON had trouble funding replacements for its large, inefficient threshers. ARPON tested small threshers and found that they lowered the threshing cost from 120 kilograms of paddy per ton to 80 kilograms. After the president’s decisions, ARPON donated 340 small threshers to the village associations. ON management, understanding that its monopoly was being undercut, resisted, but it could not strongly oppose donor support to organizations that the president was promoting.

The distribution of threshers

• Broke up the ON threshing monopoly
• Reduced the cost of threshing by one third
• Gave village associations a cash-earning potential with which to accumulate savings they could tap to offer credit to producers or invest in health centers, mosques, or schools
• Preempted efforts to reestablish the threshing monopoly.
The small threshers, the first major encroachment on the ON monopoly, accelerated the economic obsolescence of its large threshers. By 1990, the small threshers processed 83,000 tons of the 144,000 tons of paddy harvested, giving lasting economic backbone to the farmers’ organizations. In 1990 alone, the village associations made a profit US$193,000. In 2000, there were 154 village associations, village funds, and village committees on the scheme.

Appreciation of these impacts should be balanced against insufficient organizational support to make more village associations viable. Many succumbed to poor bookkeeping, lack of transparency, poor decision-making, and embezzlement, each failure a missed opportunity to strengthen farmer power.

The breakup of ON’s hulling monopoly

In 1988, ARPON had another opportunity to break the ON monopoly. Rice marketing had been liberalized on paper in 1986, but farmers and traders could take little advantage of this decision because all rice mills were owned by the ON, and farmers and traders were unfamiliar with the small hulling machines that were common throughout South Asia and East Asia.

This time ARPON’s political entry point was the increased prominence given women’s daily chores in development discourse. Women spent hours each week pounding rice for the family meal. To reduce the women’s burden and weaken the ON, ARPON donated 80 small hullers to women’s groups. The groups then could offer hulling service at less than half the cost of hulling at the large ON mills—and closer to home. The small hullers turned out an end product that was one grade lower in quality than that produced by the ON mills, but consumers did not care.

A market in threshing and milling sprang up. Well-run village associations acquired larger hullers to compete with the ON. Rich farmers acquired threshers and hulling machines, and businessmen no longer feared losing their licenses for investing in rice processing. Competition drove milling charges down, from CFAF 9.4 (US$0.031) per kilogram of rice in 1989 to CFAF 7.5 (US$0.025) in 1992 (IOV 1992:144). Financial returns on investment in hulling dropped from 98 percent in 1989 to a still attractive 14 percent in 1992. By creating a critical mass of individuals with a commercial stake in threshing and milling, donors and the Malian government had made it all but impossible for the ON to reestablish its monopolies.

ARPON’s policy of technical interventions and pragmatic support

ARPON’s options in land leveling, threshing, and milling show that reform advocates can bring about institutional outcomes through a purposeful choice of technology. The project had the option of high-grade
canal modernization and precision, mechanical land leveling. Instead, it devised an approach to water management that would help level the playing field for farmers. Its approach to hydraulic improvement gave farmers a stake in ON handling of the scheme and some control over water management. Instead of providing funding to rehabilitate or replace ON’s ailing threshers, it deliberately introduced small, movable threshers.

The World Bank’s resident representative explained this philosophy in a March 1986 letter to the Bank task team leader by reporting the viewpoints of an ARPON technician:

In spite of minor problems with the engine and winnower, the technician remains convinced that the small thresher is the way to go, for sociological reasons as well as technical ones. He feels that the peasants should be entirely independent of the ON in this operation. The large threshers need as much maintenance as the small ones and the breakdowns are much more complicated to repair, certainly beyond the farmers’ capability. The small thresher is central to the functioning of the VA [village association]. He is sure that the cost of threshing will [be] considerably less with the small machines. And furthermore, his experience is that the farmers like the small machines. He also feels that the pressure for the large ones comes mostly from ON staff (World Bank representative’s letter to Headquarters, dated March 9, 1986, available in the World Bank archives).

In line with this policy, ARPON widened its array of support services to fill gaps left by the ON. It added four subsidiaries to the Agricultural Training Center it had set up in 1980:

• An input fund providing seasonal and medium-term credit to all farmers on the scheme. It decentralized into village development funds run by the village associations and later was implemented through village savings and loan associations
• A not-for-profit public works construction unit for rehabilitation and maintenance works, through which works were carried out by the ON against actual costs paid by ARPON
• A farm machinery assembly unit that produced and maintained affordable threshers, hullers, and farm implements, including land-leveling and puddling planks
• A seed farm and processing unit.

**High-grade modernization, intensification, and innovative institutions**

France initially followed the World Bank’s line of upfront commitment to schemewide reform. It watched ARPON’s interventions take off and
spread over 7,000 hectares until 1986, then started its RETAIL project, named after a primary canal. Since this donor’s two follow-up projects were located along the same canal, the expression “RETAIL” now refers to France’s approach to land rehabilitation, crop intensification, and institutional reform.

RETAIL designed its own approach. Project management stated that while ARPON aimed “merely” at improvement, the RETAIL project aimed at intensification (Jamin and Coulibaly, in Bonneval, Kuper, and Tonneau 2002:116), referring to the soil-, labor-, and input-intensive cultivation that is the norm in irrigated rice agronomy. This difference led to occasional arm wrestling between the two projects that some observers referred to as battles between the Batavians and the Gauls, after the tribes living in Holland and France during the Roman Empire.

**Capital-intensive turnkey canal modernization and field leveling**

The RETAIL format had the following features:

- All work executed by contractors, without farmer investment
- Primary, secondary, and tertiary canals rehabilitated in conformity with state-of-the-art engineering
- Water levels in secondary and tertiary canals maintained using horse-shoe weirs
- Tertiary culvert intakes replaced by baffle distributors requiring operation by ON staff
- Land leveled by graders aiming at a precision of 3 centimeters of difference in topography in each plot
- Fields divided by bunds into plots of 1,000 square meters
- Roads built to allow bullocks to pull carts up to the plots, even during the rainy season.

The project set its cropping intensity goal at 1.25. This implied that farmers would cultivate 25 percent of the command area during the dry season. This goal was to be achieved by saving scarce water during the dry season by lining the canals and installing volumetric control structures.

The RETAIL approach was expensive. During its first and second phases, it modernized 2,715 hectares at CFAF 2.25 million (US$7,500) per hectare (François, Tonneau, and Jamin 2002:112). This cost included surveying, works, and work supervision.

The costs of the RETAIL and the ARPON canal improvements cannot be compared easily, because the interventions were different in both content and procedure. For instance, the fact that only French firms could bid on RETAIL contracts raised prices. However, it is safe to estimate that RETAIL costs per hectare were approximately four times those of...
ARPON. This was hardly justifiable economically and hindered widespread replication.

The RETAIL project was favored by an environment where producer incentives to intensify had become rewarding. The same amount of investment could therefore have benefited more farmers and raised production more had the project opted for a less capital-intensive approach.

**Imposed intensification**

RETAIL developed a crop intensification policy that:

- Required high-yielding varieties, high doses of fertilizer, and transplantation beginning in the first year
- Demanded a cropping intensity of 1.25 beginning in the first year
- Provided high-quality extension staff
- Taught farmers how to improve their living conditions
- Reduced farms to manageable sizes for intensive rice cultivation by family labor.

The project achieved an average per-hectare yield of 6 tons and a cropping intensity of 1.23 in its first year. It increased reform momentum on the scheme as yield increases throughout the project began to influence farmers’ behavior.

**Innovative institutions and support**

RETAIL made three lasting contributions to the ON reforms. First, it obtained land-tenure security for farmers tilling upgraded land. RETAIL initiated a land registry and persuaded the ON to sign letters of attribution and put land allocation into the domain of the village associations. The ON agreed to create a two-step procedure for establishing land tenure. Farmers first received temporary land-tenure status; after two years’ probation, they obtained the right to farm the same plot indefinitely, if they paid the water fee and practiced intensive agriculture. This right, called a farming license, could be inherited but not sold or mortgaged. Its existence deprived the ON of its authority to relocate farmers. The settlers had finally attained farmer status 55 years after the establishment of the ON.

RETAIL’s second contribution was a mechanism for financing and implementing canal maintenance. The project created a dedicated maintenance fund to which it allocated 70 percent of the water-fee proceeds. A joint committee of ON and farmer representatives decided on the uses of this fund. ON personnel resisted this reduction of their powers and ma-
neuvering room, and often delayed transfers of the maintenance fees to the fund, but the project held firm. The dedicated maintenance fund was implemented throughout the Niono Zone in 1989 and spread to the entire scheme the next year. Its current operating procedures are described in chapter 5.

RETAIL’s third contribution was adapting farm size for intensive rice cultivation to available family labor. Previously, farm size had been based on family size: 1 hectare of rice per family member. RETAIL changed this to 1 hectare per man of working age and a half-hectare per woman of working age. RETAIL made this reduction palatable by obtaining land-tenure security for rice farms on rehabilitated land.

The innovations by RETAIL and ARPON cross-fertilized each other. ARPON did not invest intellectual resources in negotiating legal tenure formulas that balanced agency concerns about land ownership and control with farmer concerns about security, but promptly copied the tenure solution as well as the dedicated maintenance fund from RETAIL. Similarly, ARPON agreed on the need to resize farms but took little action until resizing was made schemewide policy. RETAIL offered solutions to problems on which ARPON, bent more on farmer empowerment than on new operating rules, had not focused.

The efforts by the mixed Malian and expatriate staffs of the two projects shaped the contours of the new ON. Both projects were driven by an NGO-type commitment to improve the situation of the ON’s small farmers, and both worked ever more harmoniously with ON personnel. Neither would have achieved such productive and lasting results without the other. Mali’s willingness to have two rival projects operating on its scheme paid off handsomely.

The role of farmers

Time and again after the 1982 test, farmers showed that they were neither resigned to their plight nor responsible for ON failures to intensify rice cultivation. Already in 1985, when ON management encouraged farmers to try a dry season rice crop, farmers demonstrated that they would intensify cultivation—level their land, use high-yielding varieties, apply fertilizer, transplant seedlings—if given incentives to produce and a correct technological package. Farmers readily understood that full control over water was needed for all elements of intensification: use of dwarf varieties, yield response to fertilizer, and labor investment in transplanting and weed control.

Farmers did not wait for donors to come to their fields and canals. Donors were moving slowly, partly due to the resource-intensive canal modernization. Many farmers, eager to benefit, implemented ARPON’s
Box 3.1 Walking backward into progress: From seed broadcasting to transplantation

Transplanting rice seedlings is an ancient technique widely used in rice cultivation in Asia. Its main advantages over direct seeding are that it gives rice seedlings an edge in the competition with weeds and that it reduces growing time in the main paddy field, which makes double cropping easier. In addition, transplanting, unlike intensive rice cropping under direct seeding, does not require fine leveling of the field every season.

ON management introduced the transplanting technique in the early 1960s, but farmers ridiculed it. They quipped, “No progress can be made by moving backwards,” referring to the fact that farmers walk backward when transplanting to avoid trampling the seedlings. This response forced ON management to stop trying to extend the technique. However, when producer price rose and fields were leveled, transplanting was reintroduced. This time, farmers massively and swiftly adopted it. Since 1997, transplanting has almost completely replaced direct seeding on the scheme.

<table>
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<tr>
<th>Year</th>
<th>82/83</th>
<th>83/84</th>
<th>84/85</th>
<th>85/86</th>
<th>86/87</th>
<th>87/88</th>
<th>88/89</th>
<th>89/90</th>
<th>90/91</th>
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<tr>
<td>Area transplanted (hectares)</td>
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<td>5</td>
<td>37</td>
<td>529</td>
<td>869</td>
<td>1857</td>
<td>2,721</td>
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<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>9</td>
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</table>

Malian rice farmers became as proficient as rice farmers in Asia, for their yields are now comparable. On the ON, the silent green revolution took place in just a few years.

*Source:* Adapted and updated from Aw and Dejou 1995.

manual land-leveling technique on their own, without waiting for canal improvement. Their investments raised yields from less than 2 tons of paddy per hectare in 1988–89 to more than 4.5 tons in 1991–92. Transplanting soared 200 percent between 1990–91 and 1991–92. The area transplanted became larger than the area formally rehabilitated.

This investment of labor on the part of farmers testified to the impact of small reform steps. How did the World Bank look upon these steps, and how did it act?
Responses to the partial reforms: World Bank, KfW, and EDF

In 1981, the World Bank technical assistance project had failed to demonstrate the feasibility of rehabilitating 35,000 hectares. Nevertheless, the Bank kept the ON on its priority list, as illustrated by this excerpt from a 1983 memorandum:

ON is here to stay, because of its size, its production potential, its economic and financial weight. . . . In a Sahelian country, like Mali, there can be little doubt that rehabilitation of an existing irrigation scheme, which will help ensure food security, is a priority goal. Rehabilitation of the Office is an urgent obligation for Government and helping it should be a priority for all donors. . . . The investments sunk in the Office are so large, and the goal of food self-sufficiency and security so important, that there is little doubt that a rehabilitation will present a high economic return (Division Chief Claude Blanchi, memorandum to directors D. Alisbah and S. El Darwish, April 22, 1983).

### Table 3.1 Adoption of transplanting, 1982–83 through 2001–02

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</table>

*Source: Adapted and updated from Aw and Dejou 1995*
The Bank’s procedures and practices forced it to ask the government of Mali to commit upfront to full reforms before funding was released, but the Bank could not help the government build support for such a commitment. The Bank’s main contributions therefore concerned reform aspects with macroeconomic implications. It engaged in macroeconomic policy dialogue with the government through the Project Preparation Facility and earmarked funds for consultants and studies in the gasohol project. Greater involvement came with the issuing of the consolidation credit in 1989, when at last the Malian government committed to reforms. The credit had been waiting since 1983, when preparation of the ON consolidation project started.

At nearly the same time, Germany’s development bank, the Kreditanstalt für Wiederaufbau (KfW), approved a project for which it appointed the World Bank the executive agency. The Bank, constrained by its procurement rules and absence of field personnel, took a turnkey approach to infrastructure rehabilitation. Use of international competitive bidding procedures kept costs below RETAIL’s for the same standard. The European Union’s development fund (EDF), entering the ON in 1989, suffered similar constraints. It settled in the Masina Zone and adopted the quick approach to intensification, investing little in institutional development.

**Liberalization and protection of the domestic rice market**

In 1985, farmers proved that they would increase production if given incentives to do so. Yet until 1992, the government was reluctant to trust the market. It seemed to be caught between a rock and a hard place. On the one hand, it sought to satisfy the military and the unionized civil servants, its main source of political support, and therefore manipulated rice prices to keep them low. On the other hand, the government’s partners in the cereal markets reform project (PRMC) urged it to give up control over ON and revitalize its failing food security policy by relying on producers and markets.

To donors, the ON processing and trading arm was not the lean and efficient organization that could generate incentives for producers. Its administrative, noncommercial status, its political protection, and its lack of incentives to handle paddy profitably made it an entity with redundant staff and obsolete, inefficient equipment that needed fat margins or operation subsidies. In the minds of donors, these factors, combined with the ON stranglehold over producers, explained why Mali produced little paddy and spent foreign exchange on rice imports instead of capital goods.

The government moved slowly. In 1982, it liberalized marketing of domestic millet and sorghum and rice imports while maintaining administrative control over domestic rice and the ON processing monopoly. In 1984, it
liberalized rice marketing on the small Mopti scheme and allowed small threshers on the ON. In 1986, it liberalized rice marketing on the ON and let the hullers come in. Also in 1986, it permitted PRMC to stimulate the private sector by guaranteeing credit to traders and village associations. In 1989, it established a public information system on domestic rice prices.

Through trial and error, the government found ways to regulate imports so as to stabilize consumer prices without hurting production. In 1987, it blocked rice imports because the ON was having trouble marketing its rice. Later, it again allowed imports but imposed duties and taxes. In another decision, the government linked imports to an obligation to trade domestic rice, and then replaced this linkage with a tax that fluctuated with world rice prices. In 1990, the government added to existing taxes and duties a special tax levied when imported rice reached a reference price (called \textit{taxe conjoncturelle à l’importation} \textsc{[TCI]}; see chapter 4).

The government’s problems regulating imports stemmed from difficulties in estimating production and availability, inexperience with world market prices, and the divergent economic and financial policies of its neighbors. Guinea and Mauritania had devalued their currencies. The overvalued CFA franc exchange rate made it very profitable for Guinean and Mauritanian traders licensed to import rice from Asia to sell some of it in Mali instead of at home. The government was unable to control those imports, partly because they were so profitable. In 1992, these imports depressed producer prices so deeply that Malian farmers became angry enough to prompt the government to consolidate the reform steps, as will be discussed in the next chapter.

**Malian government–donor dialogue**

Several issues appeared often on the agendas of meetings between the government and donors: diversity in hydraulic hardware, credit for defaulting farmers, claims by large landholders and absentee farmers, and agency restructuring.

**How to handle diversity in hydraulic hardware**

The coexistence on one scheme of three distribution technologies and canal management concepts using nonmodular, semimodular, and modular structures caused no operational difficulties, but it did create problems in the meeting rooms. ARPON and RETAIL emphasized different social and environmental values in the choice of structures that controlled water in the distribution system.

ARPON saw irrigation water as a common resource to be shared fairly among users. Its division structures—operated with little or no need for
ON personnel—automatically gave each tertiary canal in its command area its due and offered little potential for conflict and illicit tampering. The project did not value water saving, as the scheme had an abundant wet season water supply and any saving would flow into swamps or underground for reuse.

By contrast, RETAIL saw irrigation water as a commodity to be sold according to the volume consumed and water distribution as a service to be paid for. Its structures allowed personnel to tailor discharges and, on paper, save water by metering water and resetting the gates.

Government and donors sought to resolve this difference by merging the technical criteria of the two projects into a standard. The result was adoption of ARPON’s component of farmer investment in land leveling and RETAIL’s modular offtake structures and corresponding downstream controlled water-level regulators. In practice, however, donors stuck to their approaches.

A different resolution would have put the noncontiguity of the ON canal networks to advantage by benchmarking the approaches for performance (economic and operational) and development (equity, health, empowerment). Such benchmarking would have generated hard data with which to review and select options for the future.

**Whether and how to provide credit to defaulting farmers**

The Netherlands’ 1982 test on KL2 showed the negative effect on development of the farmer debt that resulted from ON policies. Many farmers were so heavily indebted to the ON that they had become ineligible for further credit. They had no cash to purchase draft animals and implements to plow their plots, buy fertilizers to get the most from their labor, or spend on the rehabilitation of land and canals. The issue was whether these farmers should receive new credit: Were the farmers’ defaults caused by their own lack of financial discipline, or were ON governance and management to blame?

The Bank, true to its mandate, believed that defaulting farmers deserved no credit, and all but one other donor concurred. ARPON deemed credit necessary so that farmers could buy the tools they needed to break out of the downward spiral. It argued that default by the ON spelled doom for tens of thousands of individuals and would not bring quick resolution. A defaulting ON therefore presented greater risks than granting small loans to small farmers.

All in all, several considerations argued in favor of giving farmers one last chance. However, from the start, ARPON should have demanded reimbursement. How the reforms oriented borrowers and lenders toward market-based behavior is discussed in chapter 4.
How to handle claims by large landholders and absentee farmers

Should absentee farmers benefit from land improvement investments? ARPON and the government clashed at least twice on this issue, which arose mainly from the reduction of farm sizes.

In one case, a former ambassador, claiming association with foreign investors, secured a promise for a 49-year lease of more than 500 hectares of abandoned land in the Masina Zone, where ARPON had an upgrading program. He asked ON management to make the project improve his newly leased lands for free. ARPON refused to participate in this rent-seeking arrangement and obtained the Malian government’s agreement to exclude the area from its program.

Another case concerned the reallocation of plots when farms were being reduced. Many new plots were given to nonfarmers: officials, traders, retirees, young graduates, and dry-land farmers residing outside the scheme, many of whom tended to produce less than resident farmers. ARPON initiated their eviction if they had not started plowing by the time specified in their contracts and proposed that the village associations reassign their lands to others. The ON did not support the project’s initiative, and many nonresident farmers returned the following year under different names.

How to proceed in agency restructuring

As noted above, the Malian government and donors disagreed about the need to restructure the ON. The government resisted staff retrenchment and, unmoved by the donors’ offer to pay 18 months’ salary as a severance allowance, laid off only low-level employees. Donors also disagreed among themselves. Germany, for instance, kept rehabilitation of the ON rice mills on its agenda until 1989 but financed none. The World Bank opposed rehabilitation investment in the mills on the grounds that it might make the Malian government more reluctant to accept privatization. In the end, France and the Netherlands funded rehabilitation and management assistance for two rice mills.

Miscellaneous issues

Donors also disagreed among themselves about other issues. France, for instance, harbored reservations about the Bank’s approach to extension. France and the Bank sent a jointly selected team of consultants to Mali, but little standardization came out of the venture.
Donors met frequently among themselves and with the Malian government to sort out these and other issues. The government-donor meetings were often confrontational, and the government used donor differences on strategy to resist reform or obtain more financial support. Not until 1988 did the donors achieve a united front, which helped them negotiate firm goals.

**Results**

In 1982, donors agreed that the key issues were the lack of production incentives for farmers, the insufficiency of water control, the inefficiency and expense of the bureaucracy, and the lack of farmer involvement in scheme operations. The Malian government concurred that water control was inadequate and rehabilitation was needed. It warmed to the partnership idea and still held hopes for the development of Mali’s physical irrigation potential of 1 million hectares, but dropped expansion from its wish list.

By 1990, donors and government had moved closer on the issue of intensification incentives. Production had begun to rise because prices had become attractive. The ON monopoly in threshing, milling, and marketing had been lifted, and the government was putting up fiscal barriers to shield domestic producers from unfair competition. Although the barriers were not yet fully enforced, the economic environment had vastly improved. Responsibility in rice marketing had been redistributed.

Donors and the ON had improved water control on one-third of the scheme. Schemewide, land tenure provided enough security to motivate farmers to invest in land leveling. A new support system had come into being, boasting important features:

- An agricultural training center with the potential to deliver demand-driven services
- Village development funds that provided seasonal and medium-term credit
- Twenty-three financially autonomous blacksmith shops that produced and repaired farming and processing implements and designed new ones
- A cost-effective, not-for-profit public works unit
- A seed farm and processing unit
- One hundred fifty-four village associations
- Several dozen formal and informal entrepreneurial partnerships engaged in threshing, hulling, marketing, and input supply
- Extension personnel who had shed their policing roles and implemented a new mandate focused on helping farmers improve productivity.
However, the ON had not been restructured or resized to match its new responsibilities and tasks. It still had four large rice mills that devoured cash. It ran guesthouses, a power plant, a rice seed production farm, storage facilities, and an equipment assembly plant. It still commanded heavy subsidies from the Malian government and donors. The water fee had not been adjusted to the improved physical condition of the canals and was too low to cover O&M costs, even if all farmers paid their dues. The ON collected only 80 percent of the fees.

Despite its minority shares in rice marketing and processing, the ON remained a major hindrance to market liberalization because it was inefficient and pushed the government into overprotecting national production. Donors and the government had negotiated a reform agreement with the ON that defined clear goals for 1988–91, but the agreement remained unimplemented. In 1988 and 1989, the ON and the government failed to submit to donors a satisfactory set of firm commitments to reform the ON.

The responsibilities of the new entities in rice marketing and scheme management had been redistributed but not yet consolidated in legally binding texts, although physical results were visible on the ground. Despite President Traoré’s decision to freeze debts in 1984, farmers had again become indebted, with total arrears equivalent to US$1.22 million in 1991. (In the end, the debts were forgiven.)

**Physical output and impact**

Physical output and impact were less ambiguous than the reform process, as table 3.2 demonstrates.

Since reform was the objective, the net area did not expand, and hardware investments focused on canal and field improvement within the established area. Between 1982 and 1992, donors rehabilitated and modernized nearly 17,000 hectares. This was almost half the area that in 1982 was under rice. Farmers, in the meantime, increased the area under paddy by nearly 10,000 hectares, or 27 percent, by reclaiming abandoned land that had been overgrown by bush.

Farmers on nonrehabilitated sections copied the gradual land-leveling and transplantation techniques. As a result, the area transplanted exceeded the area rehabilitated by donors by nearly 6,000 hectares. Yield and production of paddy increased by 190 and 270 percent, respectively. The ON collected 77 percent of the harvest in 1982, but only 1 percent in 1993.

During these 10 years, scheme population rose by 110 percent. Under conditions of natural growth without immigration, it would have increased by 27 percent. This growth was due in part to rising labor productivity:
Table 3.2 Wet season rice crops, 1982–93

<table>
<thead>
<tr>
<th>Year</th>
<th>Net area (ha)</th>
<th>Improved area (ha)</th>
<th>Area under rice (ha)</th>
<th>Area transplanted (ha)</th>
<th>Yield (kg rice/ha)</th>
<th>Production (mt rice)</th>
<th>Quantity delivered to ON (mt)</th>
<th>Number of holdings</th>
<th>Population</th>
<th>Production/person (kg rice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982–83</td>
<td>47,080</td>
<td>450</td>
<td>35,181</td>
<td>0</td>
<td>1,607</td>
<td>56,524</td>
<td>43,796</td>
<td>5,484</td>
<td>62,895</td>
<td>899</td>
</tr>
<tr>
<td>1983–84</td>
<td>47,080</td>
<td>1,773</td>
<td>36,920</td>
<td>5</td>
<td>1,751</td>
<td>64,663</td>
<td>43,148</td>
<td>5,741</td>
<td>67,122</td>
<td>963</td>
</tr>
<tr>
<td>1984–85</td>
<td>47,080</td>
<td>3,778</td>
<td>38,154</td>
<td>37</td>
<td>1,680</td>
<td>64,086</td>
<td>45,562</td>
<td>6,665</td>
<td>77,820</td>
<td>824</td>
</tr>
<tr>
<td>1985–86</td>
<td>47,080</td>
<td>5,886</td>
<td>39,433</td>
<td>529</td>
<td>2,104</td>
<td>82,957</td>
<td>54,111</td>
<td>8,490</td>
<td>99,038</td>
<td>838</td>
</tr>
<tr>
<td>1986–87</td>
<td>47,080</td>
<td>7,898</td>
<td>39,910</td>
<td>869</td>
<td>2,205</td>
<td>88,011</td>
<td>49,672</td>
<td>9,245</td>
<td>109,604</td>
<td>803</td>
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<tr>
<td>1987–88</td>
<td>47,080</td>
<td>9,617</td>
<td>42,125</td>
<td>1,857</td>
<td>2,331</td>
<td>98,194</td>
<td>47,522</td>
<td>9,272</td>
<td>110,954</td>
<td>885</td>
</tr>
<tr>
<td>1988–89</td>
<td>47,080</td>
<td>9,880</td>
<td>43,352</td>
<td>2,721</td>
<td>2,256</td>
<td>97,796</td>
<td>64,939</td>
<td>9,459</td>
<td>104,640</td>
<td>935</td>
</tr>
<tr>
<td>1989–90</td>
<td>47,080</td>
<td>10,872</td>
<td>44,251</td>
<td>4,166</td>
<td>2,409</td>
<td>106,593</td>
<td>50,794</td>
<td>9,621</td>
<td>111,929</td>
<td>952</td>
</tr>
<tr>
<td>1990–91</td>
<td>47,080</td>
<td>12,452</td>
<td>43,872</td>
<td>6,766</td>
<td>3,281</td>
<td>143,938</td>
<td>18,158</td>
<td>9,973</td>
<td>118,358</td>
<td>1,216</td>
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<tr>
<td>1991–92</td>
<td>47,080</td>
<td>15,637</td>
<td>44,435</td>
<td>21,462</td>
<td>4,071</td>
<td>180,909</td>
<td>41,521</td>
<td>10,465</td>
<td>122,976</td>
<td>1,471</td>
</tr>
<tr>
<td>1992–93</td>
<td>47,080</td>
<td>16,870</td>
<td>44,843</td>
<td>22,797</td>
<td>4,650</td>
<td>208,541</td>
<td>21,087</td>
<td>10,864</td>
<td>132,235</td>
<td>1,577</td>
</tr>
</tbody>
</table>

ha: hectares  
mt: metric tons  
kg: kilograms  
Source: Authors, from ON data.
paddy production per person increased by 75 percent. Population growth was also spurred by income opportunities arising from hardware modernization, new processing and trading arrangements, and new support services: a training center, input fund, equipment assembly, seed farm, and farming system research and development.

Some economic results

Farm income per capita increased by more than 600 percent in real terms (see chapter 5). This gain resulted from production growth and points to a significant reduction in poverty. The impact on poverty is even higher when the number of people who had moved into the area is taken into account. Mali’s food security was enhanced because production on ON lands was no longer subject to climate vagaries, so the country approached self-sufficiency in rice in normal years. New activities, such as transplantation, rice processing, and rice marketing, provided women and youth with new revenues.

Summary

Step by step, the partial reforms that resulted from ARPON and RETAIL activities weakened the ON and empowered farmers, shifting the power balance within the irrigation management process and creating space for more steps. Donors leveraged the Malian government’s growing interest in rehabilitation to obtain ever deeper reforms.

ARPON helped shift authority to manage the canals to farmer associations and away from the ON. It weakened ON’s monopoly and caused the agency to lose revenue by providing locally controlled threshers and movable hulling machines. It raised yields in part by offering short- and medium-term credit to all farmers, and it empowered farmers by having their associations administer it. RETAIL negotiated user-friendly changes in land tenure and transparent and user-accountable institutions to collect and manage the sizeable O&M fee income.

Action outside the irrigation arena proved crucial. The political party’s strategy of building leverage with the rice farmers led to the creation of village associations as a counterweight to ON power. Reforms in grain marketing raised producer prices and gave donors leverage to push for liberalization of the marketing of ON rice.

In the irrigation arena, most farmers remained passive. Politically, they could express their dissatisfaction, but they could not systematically press for improvements because they lacked information and were not organized as a profession. Economically, their production response helped create a fertile environment for full-fledged reforms.
The business community with a stake in the scheme consisted primarily of rice traders, who also remained politically passive. They continued to earn money by importing rice while being offered new opportunities. They could now operate on the national market and invest in profitable threshers and hulling machines. Others carved out a niche supplying agricultural inputs and equipment.

Change had come gradually, through technical and political improvisation when opportunities arose, through negotiation and pressure when they did not. The projects’ grassroots experience entered the meeting rooms through deeply committed field personnel close enough to donor officials to brief them. Negotiation breakthroughs reached the field quickly through donor representatives who briefed field project personnel.

The bilateral donors’ action on the ground helped the World Bank reach its strategic goal of introducing private sector incentives into ON management. In retrospect, this goal would have remained elusive had upfront conditions been the only instrument for achieving government commitment. The Bank’s requirements for tight covenants stood in the way of ground-level initiatives that eased reforms politically by demonstrating their practical feasibility while shifting the power balance. The Bank could not improvise to use windows of opportunity or build a stakeholder coalition for reform.

By 1990, the partial reforms were still without legal consolidation. The ON was in financial distress, primarily because it ran units that were now superfluous or nonessential. All donors wished to redefine the ON mission, resize its staff, and divest whatever was no longer core business. They felt that the advent of a democratic regime in 1991 offered a chance to consolidate the reforms and to divest what needed divesting. Yet in 1992, the government of Mali was still stalling on reform consolidation. What action to take?

Notes

1. The doses were 75 kilograms of urea and 50 kilograms of di-ammonium phosphate per hectare.
2. Chris van Vught was so dedicated to ON reforms that he stipulated in his will that his ashes were to be spread over the Molodo fula. After his sudden death in Kampala, Uganda, in 2000, his heirs honored this request.
3. The village associations had been initiated a few years earlier in the rainfed cotton area by the Malian company for textile development, Compagnie malienne de développement des textiles (CMDT). The associations collected their members’ cotton and sold it in one batch to the company. For this service, CMDT paid the associations a commission. The associations were free to spend this money to the extent that the Ministry for Rural Development did not oversee them. The political party appropriated these associations, which were important sources of cash
and favors, and made them part of the one-party system. It made membership mandatory.

4. ARPON archives for this period contain stacks of secret service–type reports on the political reliability of farmers (Musch 2001:73, 78).

5. During its first and second phases, RETAIL’s average modernization cost was CFAF 2.25 million per hectare. ARPON’s average cost on 5,828 hectares rehabilitated in the Niono Zone between 1982 and 1992 was CFAF 493,000 per hectare.

6. The extent to which insecure land tenure hampered farmers is illustrated by the case of Mamadou Sangaré, an interpreter in the French colonial service. In 1937, he was promised ownership of his 30 irrigated hectares after 10 years. He cultivated the land as instructed and paid his water dues. In 1947, he presented his receipts and records but the court in Bamako refused his claim, despite written supportive testimony by the scheme’s founder. Sangaré hired a prominent lawyer and won his case in the higher court of Dakar. He obtained ownership of 30 hectares of land, but the land awarded lay outside the ON scheme and lacked water control.

7. This paragraph borrows heavily from Egg and Deme (2002).
Developing new operating procedures went hand in hand with forging a new stakeholder coalition. By 1990, both of these processes had nearly run their course. At that point the donors wanted to solidify the gains that had been made and demanded consolidation. The government of Mali, however, did not follow up effectively on its commitment. It was still wary of losing what it saw as its political lifeline and feared that consolidation would concentrate losses on a noisy and prestigious support group, the Office du Niger staff, while focusing benefits on farmers who were unlikely to provide solid support in exchange. Farmers had already seen their situation improve beyond their imagination, and they gave more credit to donors than to the government.

Nevertheless, by December 1992, the Malian government began to follow up on its commitment to consolidate the reforms. This chapter analyzes how the government reached and implemented the decision to do this. It depicts how the agendas of the government and donors came into alignment, how the government began to contribute financial and human resources, and how the government, donors, and outside events reduced the risk that opponents would derail the reforms. The chapter also outlines the new O&M responsibilities of the government, the ON, and farmers and describes how the government and donors divested the ON of all commercial and industrial activities (paddy processing, rice marketing, infrastructure maintenance, credit, guesthouse management, seed production, and so on) and further reinforced the support system and farmer organizations.

A window of opportunity

In March 1991, an uprising toppled Mali’s one-party regime. The resulting caretaker government held important policy matters in abeyance until June 1992, when the first multiparty elections were held and a civil government took charge. The new government set a goal of economic liberalization, stressing individuals’ responsibility for their own well-being. This goal was consonant with consolidation of the ON reforms.
Mali was lucky enough to harvest bumper rice crops during its regime change. Rice import needs for 1991–92 were estimated at only 20,000 tons. Nevertheless, the government allowed 60,000 tons of official imports between July 1991 and August 1992. As if to ensure that rice prices would fall, it waived the tax that would have protected domestic rice. Over and above these official imports, an estimated 50,000 tons were illegally imported from neighbors with inconvertible currencies (Guinea and Mauritania) without protective taxes being paid. The result was price depression. Angry ON farmers threatened to march on Bamako to demand firm protection for their rice production and livelihoods.

Donors were disappointed by the government’s lack of follow-through on its stated commitment to consolidation of reforms. After a disappointing first contract with the ON, the government had agreed to negotiate a second contract that specified benchmarks. This contract was to run from 1991 to 1993. Three drafting procedures were tried. Throughout 1991, the ON was given a chance to draft the contract by itself. From January to August 1992, ON management was assisted by a crisis committee led by a donor-hired consultant. From August 1992 on, an interministerial committee was in charge. None of these arrangements produced a convincing outcome.

The ON did little to reduce its bloated staffing. In 1990 it agreed to lay off 736 employees, and donors made the necessary financing available, but at the end of 1992 more than 200 of the listed employees were still on the payroll. Their salary payments, together with ON losses on rice sales, created shortfalls that the ON addressed by diverting water-fee revenue to payroll. In so doing, it again neglected canal maintenance and undermined farmer confidence in the new joint management committees that were supposed to guarantee the sustainability of the donor investments in the canal system.

In March 1992, Germany’s development bank, KfW, stated in writing that it doubted a second contract would be worth pursuing. It proposed dissolution of the ON and creation of a new authority to be responsible mainly for canal O&M and to have no liability for its predecessor’s debts. Despite this sign of impatience from a donor known for its long-term perspective, progress was still stalled in December 1992.

In that month, donors agreed among themselves that it was now or never for consolidation of the ON reforms. Sending a joint mission that spoke with one voice, they met with ON management, the interministerial committee for the preparation of the contract, and the minister of rural development, but the meetings were inconclusive. Having decided that the government’s lack of commitment to consolidation meant complete and collective withdrawal, the donors told the prime minister that their meetings had failed.

The prime minister expressed a clear, unconditional commitment to consolidation—the first such commitment at so high a level of government. The government and the donors then gave up development of the
second contract and embarked on crash reforms. Donors submitted a joint, detailed policy note to the prime minister, who discussed it with the president. The prime minister then instructed the minister of rural development to issue a policy letter, dated January 15, 1993, committing the government to both ON reform and protection of the rice sector.

Why did donors and government reach consensus at this point in time, and how did the alignment of their agendas come about? On the donor side, the RETAIL and ARPON projects had each reached their main objectives, and the donors were seeking to consolidate them. For consolidation, they both needed the World Bank because of its multilateral status. Also, it was clear to all that a second opportunity for reform would not come for quite some time. It was now or never, and no donor wished to put its achievements at risk and wait an unknown number of years for another opportunity. This proved a forceful incentive for speaking with one voice.

On Mali’s side, the government no longer feared downfall if it lost direct control over the ON. It enjoyed broad popular support, and its term was just beginning. If it acted quickly, it could expect the pain of reform to come during its first two years in office and the benefits at election time. The government knew that farmers were not happy about the prospect of full O&M cost recovery but expected them to support it in exchange for control over the use of water-fee revenue. The benefits would go in part to the city voters. They would likely enjoy lower prices as production increased and would benefit from the increased government discretionary spending made possible by full O&M cost recovery and the divestiture of ON cash-consuming activities.

The prime minister, a former director of Mali’s branch of the West African central bank, trusted the workings of the market and was aware of the size of the present and potential role of the ON in Mali’s economy. The government was fully aware that lack of commitment to the proposed ON reforms would drive off donors, which in turn would alienate the increasingly influential rice farmers. After all, farmers had now proved organized and assertive enough to make a march on Bamako a credible threat.

Resistance to reform came mainly from ON personnel, a tiny but vocal minority in the national arena. Through their singular technical knowledge, skills, and resources, ON personnel possessed a nuisance power bordering on a veto over reform. The government would need to buy their acquiescence to the ON reform if it wanted to secure a viable future for rice cultivation in the inland delta, but it would need donor money to do so.

**Agency restructuring and sector reforms**

Drawing on the lessons of the previous 10 years, in December 1992 donors and the government established several principles: A reform unit would
be set up separate from ON management and reporting directly to the prime minister’s office. Its head and a small team would be assigned the sole task of working out the whole set of ON reforms. The unit would work in consultation with all stakeholders, have the reforms approved by the government and by the National Assembly, if necessary, and put in place all conditions for successful implementation. The whole process would be completed in three years.^

The ON mandate would be restricted to providing four public services, divided into two core and two noncore functions. The core functions would consist of O&M of the hydraulic infrastructure, with the provision that maintenance works would no longer be carried out by the ON but by contractors, and land administration, including assigning plots to farmers and evicting them if they failed to meet their obligations. The noncore functions would consist of agricultural extension, including advising farmers’ organizations, and conducting feasibility studies for and supervision of rehabilitation, modernization, and land development. All units carrying out other activities would be liquidated, leased, or privatized, depending on proposals to be worked out by the reform unit.

Funding of tasks and responsibilities would be specified to ensure that implementation was adequate and could be monitored. Funding would originate from sources that would provide appropriate efficiency and effectiveness incentives for each type of activity. For O&M and land administration, all funding was to come from the users except for funding for the maintenance of the main infrastructure: the weir at Markala, the Sahel and Masina main canals, and the Molodo and Boky Wéré falas. Maintenance of these system components was to be financed by the government of Mali because they were sized to irrigate more than the present 60,000 hectares. Farmers would be granted land-tenure security and control over use of water-fee revenues through formalization and refinement of the land use rights and the joint water management committees.

Funding of noncore functions would come from the government, but with the proviso that the government would contract with the ON for the implementation of these tasks only if the ON had a comparative advantage in carrying them out. The ON would no longer have a monopoly on assisting farmers and their organizations. If dissatisfied with ON performance, the government would be free to transfer activities to other public agencies or to the private sector.

Last but not least, the reform unit would downsize the ON’s 1,200-person staff. The needs of the new ON had been estimated at 600 employees. Donors had pledged to pay 18 months’ salary as severance allowance.

Right after approving the crash reform in December 1992, the prime minister asked Djibril Aw, coauthor of this report, to head the reform unit.
Aw had held management positions at the ON during the 1960s and 1970s, and at the time of the prime minister’s request he was serving at the World Bank. The Bank granted him a leave of absence, and the unit set up shop in April 1993. Almost simultaneously, the government appointed two other key players: Boubacar Sada Sy as minister of rural development and Fernand Traoré as ON general manager. (Both are now deceased.) Sy had been a strong general manager of the successful textile development firm Compagnie malienne de développement des textiles (CMDT). He was also a reform advocate, politically influential, and accessible to farmers. Traoré was a top senior civil servant who could always be trusted to put the public interest before his own. These appointments convinced donors and farmers that the government was serious about following through on its commitment.

Six factors helped the reform unit implement its assignment:

- Its direct link to the prime minister allowed swift and authoritative decisions
- Stakeholders’ high regard for the two successive heads of the reform unit as well as for the deputies, the first of whom was ON secretary general until 1990
- The knowledge base that allowed the reform unit and the prime minister’s office to hit the ground running—between them they held the institutional memory of 30 years of ON operations
- The wealth of knowledge and experience accumulated during the previous 10 years, which allowed the reform unit to work out proposals quickly
- Donors’ agreement to finance the major part of the costs of the reform unit and the studies that might be required
- The 50 percent devaluation of the CFA franc in January 1994 that eased negotiations with donors on financing the severance allowances and enhanced the competitiveness of ON rice.

But in retrospect, establishing communications with all stakeholders was the one factor that contributed most to the success of the reform unit. The unit consulted farmers informally in the fields and officially through meetings with their elected representatives. It liaised frequently with ON management and staff to obtain information and feedback on proposals. Every three months it held well-attended meetings with donors, ministries, and ON management to report on progress, solicit reactions to proposals, and define a work program for the next quarter. In short, the reform unit set the agenda and timetable and brokered consensus among stakeholders before submitting proposals to the government for approval. Because the stakes were high, negotiations were often delicate and long.
**Staff retrenchment**

Staff resizing was touchy for a number of reasons. First, the government still owed several years of salary payment to employees laid off from other public agencies that had been liquidated or downsized under the structural adjustment programs. Moreover, most former civil servants had not found jobs and had formed a vocal association. Their experience and reactions made retrenchment a hot political and social issue.

Second, a detailed assessment commissioned by the reform unit lowered the estimated 600 employees needed in the new ON to 365. In other words, 835 staff, or 70 percent of the payroll, had to be laid off in a depressed labor market. Among them would be high-level employees, for the first time in ON history. Third, the ON had fallen CFAF 365 million (about US$1.2 million) into arrears on its dues to the social security agency, and this amount had not been incorporated into the reform budget. If the ON did not liquidate these arrears, laid-off employees would be unable to receive their pensions, which would cause an uproar. Fourth, a disorderly retrenchment could derail the whole reform process.

The initial position of the ON employees’ union was to rule out cutbacks, and it tried to rally farmers in support of its position. The reform unit reacted by asking farmers if they would pay higher water fees to keep redundant employees. Naturally, they declined. The employees’ union then accepted the principle of retrenchment but raised the stakes, demanding severance pay equal to five years’ gross salary, payable upfront.

Discussions between the reform unit and the employees’ union stalled for seven months. In November 1993, the unit bypassed union leaders and convened general assemblies of all ON personnel at each location. At these meetings, the unit presented the following arguments:

- The union is right to reject the proposal of 18 months’ net salary for severance allowance, because it contradicts the government’s own regulations, which set three years’ net salary as severance allowance in such cases. For the same reason, the union’s proposal for five years’ gross salary is not defensible.
- The union’s request to have the entire severance allowance paid upfront is sensible, in view of experience. However, fulfilling the request would delay the reform process by exceeding the budget for severance allowances. It would be more realistic to pay the allowance in two parts: the first one upfront, the second by the end of 1994, if the layoff decision were made at the end of March 1994. No employees would be laid off before the reform unit and the employees’ union were satisfied with the donors’ commitments. Although his contract was initially due to expire in March 1994, the head of the reform unit pledged that he
would stay until the severance allowances were fully paid, and he promised to put in place a fair procedure for the selection of employees to be retained by the new ON (see appendix A).

- This package is the best the reform unit can offer, and it will strive to have it accepted. Its implementation would allow the ON to thrive and provide most laid-off staff with opportunities to become reestablished in the area as farmers, providers of services to be relinquished by the ON, or both.

- If, however, the union stuck to its request for severance allowances beyond the regulation, the reform could be stalled, with the certainty that in a few years the ON would be bankrupt, and no donor would be around to pay any severance allowance whatsoever.

The meetings were tense. The head of the reform unit had to swallow unkind epithets such as “accomplice of imperialist donors.” After the round of meetings, union representatives from all ON locations and union leaders for the overall ON met to decide the union’s final position. After lengthy discussions, they accepted the package. Their decision was a milestone in the ON reform.

At the same time, the reform unit negotiated with donors about funding the additional cost of the severance allowance. It enlisted the support of a new donor, the U.S. Agency for International Development, which offered co-financing severance allowances. However, by January 1, 1994, the budget for the severance allowances was still not fully committed. On January 10, 1994, the problem was suddenly solved: the CFA franc was devalued by 50 percent. The donors’ pledges instantly doubled their value in local currency, while the government decided on an adaptive general salary increase of only 10 percent to keep inflation under control. All conditions had now been met to implement staff retrenchment.

But there was also a legal prerequisite: passage of a reform bill drafted by the reform unit in consultation with relevant ministries. The prime minister requested that it be put on the fast track for the National Assembly’s agenda. The process started two weeks after the devaluation of the CFA franc, and the bill was passed two weeks later. This rapid pace was possible because all stakeholders, including the ON employees’ union, had been consulted, so no one demurred. Upon passage of the bill, the reform unit drafted a decree and a departmental order, in consultation with and for signature by the minister of rural development, providing details for rules and guidelines for O&M management and land administration (see appendix A).

The reform unit started the staff selection procedure immediately and issued the final list of employees to be laid off by the end of March 1994. A few employees challenged the decision in court but they lost
their case. The allowances were fully paid three months ahead of the deadline, and from then on the reform unit worked on other substantive issues in a less tense atmosphere. Severance allowances totaled CFAF 1.87 billion (US$3.12 million), an investment that was to earn a high yield.7

Water fee and water institution restructuring

In the crucial area of collection and use of maintenance fees, the reform unit sought first to clarify the purpose of the water fee. It suggested defining the fee as the price of O&M services only, excluding the amortization of the capital costs of developing and rehabilitating the canals and land. The reform unit argued that including amortization could justify future farmer claims of ownership or compensation claims from farmers who might be evicted. Adoption of the reform unit’s view led to amendment of the World Bank credit, because it had a covenant requiring payments over and above O&M needs.

When the government and donors decided that farmers were to pay the full cost of O&M, they had not involved farmers in the decision. Donors had made the continuation of financing contingent on establishing reliable mechanisms for funding maintenance of infrastructure. They did not want to be called in again in 10 or 15 years, under the guise of rehabilitation, to make up for deferred maintenance.

The government believed that high yields and liberalized marketing meant that subsidizing O&M was no longer warranted. However, farmers were already complaining about the water fee, then equivalent to 400 kilograms of paddy per hectare on rehabilitated land. They feared that full recovery of O&M costs would raise fees and reduce their income. To obtain farmer acquiescence, donors and government tied their decision that farmers would pay for O&M to a requirement that the ON become accountable to farmers for its use of their water-fee monies. Since the ON had earlier resisted such attempts, the reform unit consulted extensively with experts, farmers, and ON management on this issue and specified the arrangements needed to carry out the decisions concerning O&M in the government’s policy letter of January 1993.

Early in 1994, the reform unit commissioned an expert study to assess the cost of maintenance. Before completion of the study, a decision was needed on the rates for 1994–95, the first cropping season after the devaluation of the CFA franc. Consistent with the macroeconomic objective of keeping inflation under control, the government increased the fee by only 14 percent, from CFAF 28,000 to CFAF 32,000 per hectare for rehabilitated land. Another justification for this moderate increase was fear that a higher increase would endanger discussions with farmers. The reform
unit had initially proposed a rise to CFAF 34,000 (about US$57) per hectare but, after consultation with the minister of rural development, readily agreed to his proposal for CFAF 32,000. The unit did not want to engender hostilities with farmers before the expert study was ready. Reform unit and minister were in agreement that in the medium term farmers would have to bear the full cost of O&M.

After reviewing and amending the completed study, the reform unit was satisfied that a water fee of CFAF 48,000 (US$80) per hectare would allow proper O&M on the rehabilitated areas. This would mean an increase of 50 percent over the fee set for 1994–95. This rate would definitely be tough to sell to farmers, and success would hinge on thorough preparation and documentation.

In February 1995, when the unit had readied its package of reform proposals, it began the persuasion process with a week-long residential seminar at the Niono Training Center. Seventy-five individuals participated: 33 farmer representatives designated by elected zonal delegates; ON managerial personnel; representatives of relevant ministries, the High Commission for Women Promotion, and the Chamber of Agriculture; consultants; and the reform unit itself. Discussions were held in Bambara, the most widely spoken language in Mali. The atmosphere was convivial.

One main topic was farmers’ ability to pay the fee, the first prerequisite for full recovery of O&M costs. Farmers did not agree that they could pay a fee higher than the existing one of CFAF 32,000 (US$53) per hectare. In anticipation of the seminar, the Niono Chamber of Agriculture had prepared a report estimating the cost of paddy production on the ON scheme at CFAF 111 (US$0.19) per kilogram, which it compared with an average producer price of CFAF 78 (US$0.13). The biases of the report were obvious: production costs were inflated, and yield and market price were underestimated. The report also exaggerated household sizes and included their rice consumption, together with family labor valued at its opportunity cost, in the cost of paddy production.

To obtain farmers’ agreement to a fee increase, the reform unit had first to develop consensus on the cost structure and the cost level of paddy production. The unit’s first item on the seminar agenda was therefore to work both out in a participatory way (see box 4.1). The exercise made plain to all that paddy production on the ON scheme was profitable. This was especially true on rehabilitated lands, where the profit margin averaged 65 percent of production cost.

The exercise proved educational. A simple sensitivity analysis showed that a 50 percent increase in the water fee would still leave a hefty profit margin of 59 percent if yields were in Class 1. The exercise also made farmers aware that continuation of their high incomes depended on maintenance and that low fees would jeopardize their incomes.
Despite these positive outcomes, the reform unit recommended that the government spread the 50 percent increase over three years. This agreement would be contained in a contract among the government, farmers, and the ON. The reform unit volunteered to add the preparation of a three-year performance contract to its terms of reference. In this performance contract, the government, the ON, and the farmers would un-
derwrite their reform obligations for a three-year period and mutually monitor the implementation of reforms.\(^8\)

Under the new contract, the water fee per hectare of rehabilitated land would gradually rise from CFAF 40,000 (US$67) in 1995–96 to CFAF 43,000 (US$72) in 1996–97 and to CFAF 48,000 (US$80) in 1997–98.

*Decentralized O&M budgets, joint management committees, and farmer delegates*

The reform unit decentralized control of the O&M budget to the five 12,000-hectare zones. Farmers and the ON shared decision-making powers over the use of the budgets and the allocation of land. This was in keeping with the government’s request that the reform unit split ON scheme management into five profit centers, building on the dedicated maintenance funds created by RETAIL.\(^9\) Each zonal committee is now responsible for its own zone, because it cannot receive funds from other zones, and for paying its share of ON overhead.

Each zone collects the fee in its area and keeps at least 50 percent. The exact percentage depends on negotiations among the government, the ON, and the farmer delegates (see chapter 5). This fee income is spent under the supervision of joint committees for maintenance of the primary and secondary canals in the zone. They are called “joint” because they consist of both management personnel and elected farmer representatives. At the zone level, the director chairs the committees. At the secondary canal level, the ON staff member in charge of O&M at the primary canal level chairs the joint committee. Each year the secondary committees draw up maintenance priorities for consideration by the zonal joint committee. Since the latter decides the final program and budget, this setup gives each secondary committee an incentive to list all maintenance needs, if only to avoid getting less than its fair share of the zone’s maintenance budget.

All maintenance and repair are contracted out to make cost and output more transparent to fee payers. ON technicians prepare the bidding documents. Responsibility for awarding bids and checking compliance with bid requirements before final payment rests with the joint committee as a whole. ON personnel supervise the private contractors.

Farmers elected to the joint committees receive an allowance of CFAF 5,000 (US$8) a day for time spent on fulfillment of their responsibilities. They are offered training programs on bid evaluation and communication techniques and similar training to help them fulfill their responsibilities. With each round of elections, new members who need training join the committees. At present, however, the committees do not control their own training budgets, because training provisions are on the ON central budget.
The reform unit maintained the system of elected farmer delegates through which ON and the government negotiate policy issues with farmers. The procedures have been formalized as outlined in box 4.2.

### Box 4.2 How farmers’ representatives are elected

There are two categories of farmer delegates: delegates for general and policy matters and delegates for joint committees. The first group represents farmers on any matter and with any partner. The second group deals only with O&M or land administration. Different procedures govern the election of members of each group.

**Election of delegates for general and policy matters**

The process starts at the village level. A general assembly, made up of all heads of households in the village, elects 3 village delegates. In the next stage, the village delegates elect 3 zonal delegates. The 15 zonal delegates (3 from each zone) elect 3 general delegates with these provisions:

- The first one elected, the “principal general delegate,” sits on the board of the Office du Niger
- The three general delegates must reside in different parts of the ON scheme: east (Masina), center (Niono, Molodo and NDebugu), and north (Kuruma)

**Election of farmers’ representatives for joint committees**

- The zonal O&M and land administration joint committees consist of 3 to 7 farmer representatives. They are elected by the village delegates’ general assemblies in each zone.
- On the secondary canal O&M joint committees, one representative is elected for each tertiary canal. On average, each of these committees has 4 delegates, called “chefs d’arroseur,” responsible for O&M of the tertiary canal and representing the group on the joint O&M committee for the secondary canal. In 2001, there were 189 such committees.

*Source: Authors.*

The reform unit pursued two goals when working out the rules for O&M: a fee covering 100 percent of current O&M cost and a collection rate of between 98 percent and 100 percent. It considered farmer control over fee spending a necessary condition for reaching these aims. Its proposals were discussed at the February 1995 seminar. The final arrangements are as follows.

**Rules for setting and collecting fees**

Fee levels are negotiated by the government, the ON, and the elected farmer representatives (see also chapter 5). They take into account the sea-
son (wet or dry), the quality of land development, and the degree of water control. For reasons of convenience, the rates for each of the three quality classes are the same across the scheme, in spite of small cost differences. Table 5.4 in the next chapter shows the most recent rates.10

Billing is individual, and collection is the responsibility of the ON. Before the reform, these tasks were entrusted to village associations, but there were many instances of unintentional mismanagement as well as intentional diversion of water-fee monies to other uses. For this reason, it was decided that each farmer would bring payments individually to cashiers in the zonal office who would issue receipts. (During certain periods, the cashiers tour the villages.)

Because the ON was withdrawing from all commercial activities, farmers could no longer pay the fees in paddy and had to pay in cash. The deadline for paying fees for the main growing season is set by decree at the end of March. Because harvesting takes place between early October and the end of December, this schedule allows for maintenance work to take place in a timely way between January and June. The fee, based on land area, is easily administered and gives farmers an additional incentive to intensify.

Payment of the water fee is enforced as follows. Farmers with reasons to claim a waiver on payment present their case to the zonal joint committee. The committee may grant a waiver if the crop failed, in full or in part, for reasons beyond a farmer’s control. On average, 1 percent of farmers receive waivers each year. This step allows an assessment by peers knowledgeable about local and household conditions that may be undisclosed or unverifiable to outsiders. It increases fairness, makes the farming license more secure, and reduces transaction costs. Farmers who fail to pay the water fee by the deadline are punished by eviction from their land. Decisions to evict are made by the ON general manager at the request of the chairperson of the zonal committee for farming license enforcement. Under special conditions, this committee may extend the deadline. A farmer whose license is terminated but who refuses to vacate his plot can be taken to court by the ON.

The ON strictly enforces payment, for its income depends on fees. Enforcement is economically feasible, because demand for plots is strong, and legally possible, because farmers have to pay the fee to keep their farming licenses. The farming license has contract status and can be enforced through the courts. The ON reports its eviction and court actions to the zonal joint committees.

**Land-tenure consolidation**

The farming license initiated by RETAIL gave farmers an open-ended right to the use of their plots. The right could be transmitted as part of an inheritance, and the plots could be subdivided. Farmers could lose their
license only for failure to pay the water fee or to cultivate without good technical reasons.

The reform unit reinforced these rights. It extended the usufruct right to nonrehabilitated land, encouraging farmers to invest in land improvement without project assistance. It granted permanent permits for housing, which allowed evicted farmers and nonfarmers to reside in a village on the scheme. It also allowed farmers who voluntarily gave up farming to keep their houses. The unit regularized the farmer-initiated plots by authorizing their existence, but stopped short of granting a permanent permit. In return, plot tenure is subject to the payment of a water fee based on the lowest land class. When such a plot is made part of the official scheme, the farming license is awarded to the person who initiated it.

Because the usufruct right is not an ownership title, it does not allow farmers to sell or mortgage the plots. However, land ownership was not yet on the farmers’ agenda at the time the reform unit was engaged. Some farmers even opposed the idea. They argued that if farmers were granted ownership of the land they were cropping, most of them would give in to the temptation to sell, lured by the cash but making themselves and their children landless.

The reform unit debated with relevant stakeholders whether a minimum farm size should be set by regulation. Some feared that farms would become nonviable through successive inheritance. The issue was left in abeyance because no one could determine the appropriate minimum size or define what offer to make to people leaving the scheme or who should pay them compensation. These decisions were left up to the household.

Privatization of assets and activities

The law on ON restructuring stipulated that activities other than public services were to be carried out either by farmers—as individuals or in organizations—or by the for-profit private sector. Assets no longer controlled by the ON were divided into three groups:

- Assets to be transferred to other government bodies, such as buildings and urban plots
- Assets to be leased, such as units delivering services and goods (including the seed farm, the training center, and the guesthouses). Five-year leases were to be awarded through competitive bidding, with preference given to former ON personnel. Prospective lessees had only to demonstrate their capacity and commitment to deliver the services expected. All lease bids were awarded to laid-off ON employees, and service delivery has greatly improved
- Other assets, all of which have been sold or liquidated.

Table 4.1 lists specific activities and assets and describes their devolution.
Farmers and entrepreneurs swiftly and efficiently filled the economic space vacated by the ON. A case in point is paddy processing. The reform unit had to administer the former ON rice mills before their privatization. According to computations made just after the CFA franc devaluation, the rice mills could break even only if they processed 40,000 tons of paddy and purchased it at CFAF 78,000 per ton. The reform unit had cash from a PRMC loan. However, the mills purchased only 8,500 tons. The following year the mills offered to purchase at CFAF 100,000 a ton but bought only 2,000 tons, less than 1 percent of ON production. It became obvious that the ON rice mills could no longer compete with the small hullers (box 4.3).

After the ON’s complete withdrawal from paddy and rice marketing, it took farmers some time to adjust to a market economy. They often learned the hard way. In 1993, when the rice market was depressed, a large number of farmers and their village associations fell prey to dishonest traders from Bamako. Often using bogus identification documents, the traders lured farmers with attractive prices on large volumes of rice, but on credit terms. After the farmers had delivered the merchandise, the

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**Table 4.1 Devolution of assets and activities relinquished by the ON**

<table>
<thead>
<tr>
<th>Activities/assets</th>
<th>Action</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice mills (four)</td>
<td>Privatized</td>
<td>Idle since 1997</td>
</tr>
<tr>
<td>Threshers</td>
<td>Liquidated</td>
<td>Threshers sold as scrap; activity taken up by farmers and contractors</td>
</tr>
<tr>
<td>Paddy and rice marketing</td>
<td>Privatized</td>
<td>Taken up by farmers and merchants</td>
</tr>
<tr>
<td>Transport of paddy and rice</td>
<td>Privatized</td>
<td>Trucks sold; service performed by private truckers</td>
</tr>
<tr>
<td>Seed farm</td>
<td>Leased</td>
<td>Five-year, renewable term</td>
</tr>
<tr>
<td>Training center</td>
<td>Leased</td>
<td>Five-year, renewable term</td>
</tr>
<tr>
<td>Guesthouses</td>
<td>Leased</td>
<td>Five-year, renewable term</td>
</tr>
<tr>
<td>Niono power station</td>
<td>Transferred</td>
<td>To the National Electricity Company</td>
</tr>
<tr>
<td>Farm implement assembly</td>
<td>Privatized</td>
<td>Experiencing competition-induced problems</td>
</tr>
<tr>
<td>Infrastructure maintenance unit</td>
<td>Privatized</td>
<td>Greatly improved performance after purchase by Malian businessman residing abroad</td>
</tr>
<tr>
<td>Agricultural credit</td>
<td>Transferred</td>
<td>To networks of saving and credit associations; borrowing from banks</td>
</tr>
<tr>
<td>Procurement of inputs and farm equipment</td>
<td>Privatized</td>
<td>Taken up by farmers and private sector</td>
</tr>
<tr>
<td>Buildings and urban plots not required by the new Office du Niger</td>
<td>Transferred</td>
<td>To Ministry of Finance</td>
</tr>
</tbody>
</table>

Source: Authors.
traders vanished, leaving the farmers with losses estimated at CFAF 400 million (US$1.33 million) (Galtier, Dupressoir, and Koné 2002).

The next year farmers schemewide tried to impose a floor price of CFAF 115 (about US$0.19) per kilogram of paddy, which was above market levels. Faced with a market slump and strapped for cash, many farmers bypassed the agreement. In public they sold to traders at the cartel’s minimum price, and in secret they returned a “discount” of CFAF 15 (US$0.025) per kilogram. After a few months, the discounts became an open secret, and the price covenant was lifted. Learning from these bad experiences, farmers built efficient marketing networks that respected market laws (discussed in chapter 5).

Box 4.3 Small hulling machines make large mills obsolete

In the decade since reforms, rice processing by large mills owned by the Office du Niger plummeted.

Evolution of market share in paddy processing of ON’s large mills

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons of paddy produced</th>
<th>Tons of paddy collected by the large mills</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984–85</td>
<td>64,086</td>
<td>45,562</td>
<td>71</td>
</tr>
<tr>
<td>1994–95</td>
<td>208,541</td>
<td>2,000</td>
<td>1</td>
</tr>
</tbody>
</table>

The small hulling machines, nonexistent in 1984–85, wiped out the large mills. This development started in 1986, when paddy marketing was liberalized and allowed the introduction of small hullers. They outperformed the large ON mills for four reasons:

- The share of fixed costs was lower than for large mills.
- Milling outturn of hullers increased to the point of matching that of large mills.
- The quality of the rice processed by hullers came to match that of the large mills.
- Paddy processing by hullers allowed savings in transportation costs and of use of byproducts by farmers.

Hullers’ charges for processing quickly dropped under competition but still left hefty returns. Informal dealers established efficient after sales services: a retired nurse established direct links with suppliers in Asia and stored spare parts in mud huts to cut costs.

Source: Adapted from Aw and Dejou 1995.
It was fortunate that the crash reform coincided with the CFA franc devaluation, for it raised the competitiveness of ON rice. Rice production in the ON is labor intensive, relies heavily on animal traction, and requires little importation of expensive items such as tractors, mechanical plows, spare parts, and fuel. The coincidence of devaluation and reform made some room for mistakes. It also eased the acceptance of O&M cost recovery by farmers. The coincidence brought benefits to both farmers and consumers. Had the CFA franc devaluation preceded reforms, the benefits would likely have been pocketed by the handful of rice importers (Egg and Deme 2002).

**Overhaul of the agricultural credit system**

The credit system still suffered from large arrears on loan repayments. A survey commissioned by the reform unit found in 1995 that farmers had again accumulated arrears totaling CFAF 2.5 billion (US$4.17 million) with the Village Development Fund and the National Agricultural Development Bank. This amount did not include the CFAF 850 million (US$2.8 million before devaluation) in debts that President Traoré froze in 1984. By 1995 a few village associations had accumulated arrears of more than CFAF 300,000 (US$500) per hectare (Traoré and Spinat 2002:197). Most farmers handled the loans from organizations affiliated with the Malian government as if they were grants.

This situation was a time bomb that could destroy all of the reform’s achievements if it was not quickly defused. The reform unit convened meetings of all stakeholders in 1995 and 1996, at which time participants decided to channel all agricultural credits through private sector savings and loan associations because they could enforce full repayment. The implementation of this policy is reported in the next chapter.

**Results**

What was achieved during this phase? In terms of institutional change, a productive partnership arose between farmers, agency, and government resulting in collection rates of nearly 100 percent of fees, which allowed adequate O&M. This partnership established productive land tenure and put a stop to ON competition with farmers and traders in paddy processing and marketing. It also consolidated farmer involvement in making and enforcing policy. The intensification process initiated 10 years earlier resulted in higher cropping intensities and led to expansion of high-value crops.

Table 4.2 shows that, for the first time since 1965, the net area of the ON had begun to increase. Farmers’ demand for land had been building up with their rising incomes. The increase in areas with transplanted rice shows the contribution of the farmers themselves to rehabilitation (see
<table>
<thead>
<tr>
<th>Year</th>
<th>Net area (ha)</th>
<th>Rehabilitated (ha)</th>
<th>Wet season rice (ha)</th>
<th>Trans- planted (ha)</th>
<th>Paddy production (mt)</th>
<th>Yield (kg paddy/ha)</th>
<th>Vegetables (ha)</th>
<th>Orchards (ha)</th>
<th>Cropping intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992–93</td>
<td>47,080</td>
<td>16,870</td>
<td>44,843</td>
<td>22,797</td>
<td>20,854</td>
<td>4,650</td>
<td>650</td>
<td>420</td>
<td>190</td>
</tr>
<tr>
<td>1993–94</td>
<td>47,080</td>
<td>18,455</td>
<td>45,442</td>
<td>25,893</td>
<td>22,263</td>
<td>4,899</td>
<td>920</td>
<td>560</td>
<td>310</td>
</tr>
<tr>
<td>1994–95</td>
<td>47,272</td>
<td>19,362</td>
<td>44,964</td>
<td>29,487</td>
<td>20,978</td>
<td>4,670</td>
<td>1,378</td>
<td>947</td>
<td>447</td>
</tr>
<tr>
<td>1995–96</td>
<td>47,591</td>
<td>21,301</td>
<td>46,410</td>
<td>35,869</td>
<td>23,220</td>
<td>5,003</td>
<td>1,880</td>
<td>1,877</td>
<td>563</td>
</tr>
</tbody>
</table>

ha: hectares  
mt: metric tons  
Source: Authors, from ON data.
Table 4.3 Water fee collection and infrastructure maintenance (current terms), 1992–93 through 1995–96

<table>
<thead>
<tr>
<th>Year</th>
<th>Fee rate, Class 1 (CFAF/ha)</th>
<th>Fees collected: Fee rate (%)</th>
<th>Fee from water fees</th>
<th>From national budget</th>
<th>Total</th>
<th>Share of expenditures from water fees</th>
<th>Part of water-fee proceeds used for maintenance works</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992–93</td>
<td>28,000</td>
<td>823</td>
<td>80.0</td>
<td></td>
<td></td>
<td>0.45</td>
<td>0.42</td>
</tr>
<tr>
<td>1993–94</td>
<td>28,000</td>
<td>1,032</td>
<td>95.4</td>
<td>430</td>
<td>533</td>
<td>0.50</td>
<td>0.45</td>
</tr>
<tr>
<td>1994–95</td>
<td>32,000</td>
<td>1,216</td>
<td>97.7</td>
<td>553</td>
<td>562</td>
<td>1,115</td>
<td>0.50</td>
</tr>
<tr>
<td>1995–96</td>
<td>40,000</td>
<td>1,684</td>
<td>95.9</td>
<td>807</td>
<td>546</td>
<td>1,353</td>
<td>0.60</td>
</tr>
</tbody>
</table>

ha: hectares  
Source: Authors, from ON data.

table 3.1). In 1995–96, yields averaged 5 tons per hectare for the first time. Farmers were reacting to water-fee increases much as farmers on other reformed schemes had, by intensifying (raising yield and cropping intensity) and growing high-value crops (vegetables and fruits). Overall, dry season cultivation was moving toward crops that used much less water than rice.

Since 1995–96, no more subsidies have been required for O&M except for the maintenance of the oversized main infrastructure (Table 4.3).

Summary

As donors and the government of Mali shaped the new institutions between 1982 and 1990, they also forged a new stakeholder coalition. In a telltale sign of political change, organized farmers in 1992 presented a credible threat to government if it did not stop illegal rice imports.

In 1992, the new civil government made a commitment to consolidation of the reforms of the previous ten years. It trusted the market and did not fear overthrow if it relinquished direct control over the ON rice scheme. It was convinced that it could take on the agency because it could expect organized farmers to lend support. It also knew it would receive financial support from the donors. Its desire to further liberalize the economy and continue working with donors squared well with reform consolidation.

This political and financial foundation explains the government’s serenity when it appointed a reform unit and placed it directly under the prime minister’s office, overriding sector ministries. The government’s
unmistakable political commitment and the reform unit’s professionalism, knowledge of the ON, pragmatism, and ability to consult with all parties brought about success. The unit paced reform by setting a timetable and brokering lasting compromises. Consultations with the ON employees’ union, farmers, government ministries, and donors allowed consensus to be achieved, paving the way for quick passage of a reform law that enshrined the partial reforms in a framework for user funding and user comanagement. The timing of the devaluation of the CFA franc also helped the reform unit.

At the end of its tenure, the unit institutionalized the new coalition through a tripartite performance contract. This contract became the main tool through which government, the agency, and organized farmers could monitor and evaluate performance, adjust the institutions, and expand the scheme to meet the rising demand for land from farmers and for import substitution for rice and vegetables. These topics are discussed in the next chapter.

Notes

1. Prompted by the cereal markets reform project (PRMC), in January 1990 the government devised a measure to protect domestic rice production: imposing, on top of the normal duty of about 50 percent, a special tax (taxe conjoncturelle d’importation, TCI) based on the price difference between imported and domestic (mainly ON) rice. The TCI was initially set at 40 percent of the price difference. It would fluctuate with world market prices and ON production costs.

2. The Banque Centrale des États de l’Afrique de l’Ouest (BCEAO) is the central bank for a group of West African countries, most of which are French speaking.

3. The official name of the reform unit was Délégation Générale du Gouvernement Chargée de la Restructuration de l’Office du Niger (General Government Commission for Restructuring the Office du Niger).

4. After two years, El Hadj Oumar Tall, who for several years had been adviser for ON matters to the minister of rural development, succeeded Aw.

5. The first deputy had accumulated more than 15 years of experience at the ON. The reform unit’s main contact at the prime minister’s office, the principal secretary, had chaired the ON board from 1988 to 1991.

6. A donor offered the services of a human resources expert to test personnel for the selection of those to be retained in the new ON. This offer was declined, because it was politically unacceptable and contradicted Malian labor law, which allows testing for recruitment but not for laying off, since employers are supposed to already know the performance of their employees. Instead, the consultant was asked to write a paper on how to handle personnel evaluations, which the reform unit adjusted to its needs.
7. This amount excludes the severance allowances paid to rice mill employees and infrastructure maintenance and farm implement assembly units, which were privatized after the reform unit had completed its assignment.

8. Only the government and the ON had been party to earlier contracts.

9. Ten years after a joint 1983 donor mission recommended the creation of autonomous “profit centers,” the political and institutional landscape had been reshaped enough to allow their implementation.

10. Class 1 contains land rehabilitated with donor financing (60 percent of the total area). Class 2 consists of land that was not leveled with donor financing but that is located in portions where water delivery is satisfactory, sometimes because the primary canals were rehabilitated (32 percent of the total area). Class 3 consists of plots that were not rehabilitated and have unsatisfactory water delivery (8 percent of the total area). Fields irrigated outside the formal scheme are charged the Class 3 rate.
Irrigation schemes are designed to improve the livelihoods of farmers by raising their productivity and expanding the range of crops they can grow. Among other potential benefits are dietary and nutritional enrichment, as farmers take up vegetable and fruit cultivation. The first section of this chapter explores the degree to which reforms helped bring about these benefits. The second section looks at features of governance in the ON that ensure that the reforms will stay in place and adapt to new economic, social, and demographic developments. The third section lists risks and challenges the new institutions may need to address.

The development impact of ON reforms

The production performance of the ON scheme between 1995–96 and 2001–02 showed steady improvement, as farmers, searching for more income, expanded their vegetable and fruit crops (table 5.1).

Vegetable cultivation expanded rapidly, from 1,400 hectares in 1995 to 4,600 hectares in 2002. From its beginnings as a small-scale activity around the homestead, vegetable growing became fully commercial. The main vegetable crop is onion for import substitution and export.

Already in 1997, revenues from vegetable crops were estimated at CFAF 12 billion (US$20 million), representing 46 percent of wet season rice revenues (Koné and Diallo 1998). The crops also were having an intra-family balancing effect, as women were managing more than half the area under vegetables (Chohin-Kuper and others 2002:204). Young children, too, were receiving plots to cultivate for their own account.

Rising paddy yields had restored the energy balance of at least two-thirds of the households. The surge in vegetable cultivation likely improved the nutritional balance of men, women, and children. As a side effect, growing demand for labor to cultivate vegetables helped tie farm workers to the village, forestalling labor shortages during rice transplanting seasons.
<table>
<thead>
<tr>
<th>Year</th>
<th>Net area (ha)</th>
<th>Number of holdings</th>
<th>Rehabilitated rice (ha)</th>
<th>Transplanted rice (ha)</th>
<th>Paddy production (mt)</th>
<th>Production/holding (mt)</th>
<th>Wet season rice yield (kg paddy) /ha</th>
<th>Vegetables (ha)</th>
<th>Dry season rice and maize (ha)</th>
<th>Orchards (ha)</th>
<th>Total cropped area (ha)</th>
<th>Cropping intensity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995–96</td>
<td>47,591</td>
<td>12,923</td>
<td>21,301</td>
<td>46,410</td>
<td>35,869</td>
<td>232,206</td>
<td>18.0</td>
<td>5,003</td>
<td>1,880</td>
<td>1,877</td>
<td>563</td>
<td>50,730</td>
</tr>
<tr>
<td>1996–97</td>
<td>47,991</td>
<td>13,970</td>
<td>23,085</td>
<td>47,984</td>
<td>45,222</td>
<td>245,365</td>
<td>17.6</td>
<td>5,113</td>
<td>2,519</td>
<td>1,175</td>
<td>601</td>
<td>52,279</td>
</tr>
<tr>
<td>1997–98</td>
<td>48,431</td>
<td>15,441</td>
<td>30,457</td>
<td>49,314</td>
<td>48,058</td>
<td>267,186</td>
<td>17.3</td>
<td>5,418</td>
<td>3,095</td>
<td>1,976</td>
<td>603</td>
<td>54,988</td>
</tr>
<tr>
<td>1998–99</td>
<td>48,991</td>
<td>16,459</td>
<td>31,651</td>
<td>49,680</td>
<td>48,741</td>
<td>298,123</td>
<td>18.1</td>
<td>6,001</td>
<td>3,752</td>
<td>2,046</td>
<td>908</td>
<td>56,386</td>
</tr>
<tr>
<td>1999–00</td>
<td>50,093</td>
<td>19,470</td>
<td>33,053</td>
<td>51,040</td>
<td>50,333</td>
<td>306,036</td>
<td>15.7</td>
<td>5,996</td>
<td>3,807</td>
<td>862</td>
<td>1,000</td>
<td>56,709</td>
</tr>
<tr>
<td>2000–01</td>
<td>55,006</td>
<td>21,818</td>
<td>38,366</td>
<td>52,995</td>
<td>52,060</td>
<td>325,300</td>
<td>14.9</td>
<td>6,138</td>
<td>3,687</td>
<td>5,751</td>
<td>1,012</td>
<td>63,445</td>
</tr>
<tr>
<td>2001–02</td>
<td>56,506</td>
<td>21,827</td>
<td>40,166</td>
<td>54,404</td>
<td>54,093</td>
<td>332,078</td>
<td>15.2</td>
<td>6,104</td>
<td>4,592</td>
<td>7,072</td>
<td>1,012</td>
<td>67,080</td>
</tr>
</tbody>
</table>

ha: hectares
kg: kilograms
mt: metric tons

Source: Authors, from ON data.
Poverty decreases as yields, output, incomes, and hectares rise

Between 1981 and 2002, paddy yields increased by about 300 percent (table 5.2).

During this period, the ON scheme not only accommodated the dramatic growth of the native population, but also attracted immigrants, who now account for 55 percent of the total population. Despite the huge population increase, farmers’ incomes improved as yields and cropping intensity increased and the benefits of market liberalization materialized.

Between 1989 and 1998, net real income per household (GDP-deflator adjusted) increased by about 600 percent, from CFAF 84,000 to CFAF 565,000 (US$280 to US$1,900 in 1989 terms) (World Bank 1999:25). Producer prices rose 84 percent between 1993 and 1997, in part due to the devaluation of the CFA franc. Margins for producers also grew, spurred by vigorous wholesaler competition. According to ON master plan estimates in 2000, family labor was valued at between CFAF 5,000 and CFAF 7,500 (US$8.3 and US$12.5) a day, compared to an opportunity cost of hired labor of CFAF 1,000 (US$1.67) per day. The increases in both income and scheme population brought achievement of the country’s poverty reduction goal much closer.

As a result of these improvements, donors became willing to fund expansion because they expected new investment to prove sustainable. In 1996, nearly 20 years after the Malian government’s 1978 request, donors began to expand the scheme. By 2002, more than 10,00 hectares had been added, a growth of 20 percent (table 1.3).

The improved irrigation and drainage system contributed to a 600 percent increase in tradable rice, from less than 25,000 tons in 1983 to about 175,000 tons in 2002. This added to Mali’s food security and reduced its needs for imported rice. Since 1998 Mali has been almost self-sufficient in rice: it exports small quantities to its neighbors just after harvest and imports more or less the same quantities from Asian countries during the rainy season.

After the devaluation of the CFA franc in January 1994, total taxes on imported rice were reduced from 60 percent in December 1993 to only 20 percent in January 2000. This fiscal measure kept rice prices in check and combated inflationary pressures caused by devaluation through margin improvement that resulted from the competition in paddy processing and rice marketing. The policy was effective. After the 50 percent currency devaluation, rice prices rose only 20 percent.

The economic rate of return on the US$300 million investments associated with the World Bank–ON consolidation project was estimated at 30 percent (Banque Mondiale 1999:29).
Table 5.2 Evolution of demographic and agronomic benchmarks, 1982–2002

<table>
<thead>
<tr>
<th>Year</th>
<th>Total population</th>
<th>Number of holdings</th>
<th>Net area holding (ha)</th>
<th>Wet season rice (ha)</th>
<th>Rehabilitated (ha)</th>
<th>Transplanted (%)</th>
<th>Wet season paddy production (mt)</th>
<th>Wet season tradable rice (mt)</th>
<th>Wet season paddy yield (kg/ha)</th>
<th>Wet season paddy production/holding (kg)</th>
<th>Cropping Intensity (%)</th>
<th>Wet season paddy/person (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982–83</td>
<td>62,895</td>
<td>5,484</td>
<td>47,080</td>
<td>8.58</td>
<td>35,181</td>
<td>1</td>
<td>0</td>
<td>56,524</td>
<td>24,476</td>
<td>1,607</td>
<td>10,307</td>
<td>0.75</td>
</tr>
<tr>
<td>1986–87</td>
<td>109,604</td>
<td>9,245</td>
<td>47,080</td>
<td>5.09</td>
<td>39,910</td>
<td>24</td>
<td>2</td>
<td>88,011</td>
<td>35,834</td>
<td>2,205</td>
<td>9,520</td>
<td>0.85</td>
</tr>
<tr>
<td>1991–92</td>
<td>117,120</td>
<td>10,465</td>
<td>47,080</td>
<td>4.50</td>
<td>44,435</td>
<td>48</td>
<td>48</td>
<td>180,909</td>
<td>94,752</td>
<td>4,071</td>
<td>17,287</td>
<td>0.94</td>
</tr>
<tr>
<td>1996–97</td>
<td>151,839</td>
<td>13,970</td>
<td>47,991</td>
<td>3.44</td>
<td>47,984</td>
<td>48</td>
<td>94</td>
<td>245,365</td>
<td>129,879</td>
<td>5,113</td>
<td>17,564</td>
<td>1.09</td>
</tr>
<tr>
<td>1901–02</td>
<td>221,548</td>
<td>21,827</td>
<td>56,506</td>
<td>2.59</td>
<td>54,404</td>
<td>74</td>
<td>99</td>
<td>332,078</td>
<td>172,649</td>
<td>6,104</td>
<td>15,214</td>
<td>1.19</td>
</tr>
</tbody>
</table>

ha: hectares  
kg: kilograms  
mt: metric tons  

Source: Authors, from ON data.
Farmer responses

Not all farmers responded to the new opportunities in the same way (table 5.3). Responses varied depending on farm size.

The top row represents the 30 percent of households that did not initiate new crops or services. They tend to be small and indebted and follow the same strategy that nearly all households followed before 1978. Their nutritional status remains deficient. The bottom two rows represent groups that emerged after 1990. The households in the middle row adopted goals such as accumulating livestock and real estate, activities that are possible thanks to the ON reforms. The strategies described in the bottom row appeared during the second half of the 1990s. Family heads, together with the adult males in their extended families, developed new accumulation policies, using money made from rice to develop nonagricultural sources of income. This new nonagricultural revenue is then devoted to making rice and vegetable growing more profitable. Some members of the extended family take significant capital and income risks, which puts a premium on keeping the extended family together as an economic unit.

Table 5.3 Household strategies related to farm size per person of working age

<table>
<thead>
<tr>
<th>Area per person of working age (ha)</th>
<th>Approximate share of households</th>
<th>Goal and strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.6</td>
<td>1/3</td>
<td>Goal: safeguarding food supply. Main instrument: maintaining access to land. Nonfarm activities supply 40 percent of income through small amounts of irregular cash but compete with labor use for rice.</td>
</tr>
<tr>
<td>≥ 0.6</td>
<td>1/2</td>
<td>Goal: more financial security. Specialize in agricultural production, grow vegetables, and mobilize all family labor. Devote one-third of expenditures to increasing the estate (purchases of houses, livestock).</td>
</tr>
<tr>
<td>≥ 0.6</td>
<td>1/6</td>
<td>Goal: diversify income. Grow rice and vegetables; use sales to start up nonfarm activities requiring capital (threshing, milling, transport); use earnings to increase income from rice and vegetables; take formal sector jobs when offered.</td>
</tr>
</tbody>
</table>

Note: This table does not apply to households farming in Masina.

Source: Adapted from Sourisseau and Yung 2002.
Responses to two hydraulic improvement approaches

Figure 5.1 shows that yields rose in zones where donors rehabilitated the entire infrastructure (Niono), and also, more surprisingly perhaps, in zones where they did not.

The yield difference between the two areas evolved as follows: 2 percent before intervention, in 1982–83; 141 percent in 1993–94; and only 20 percent in 2000–01, with yields in Molodo still climbing. Farmers in both Molodo and Niono responded to the new incentives, but the projects reached Molodo later. The farmers in Molodo waited for the projects to come to their area but, when the wait grew too long, began leveling their fields themselves. They were rewarded by continued growth after the primary canal and drain had been rehabilitated. Inadequate primary canals and drains and inadequate field leveling were the main hydraulic constraints, so remedying these deficiencies gave an immediate cost-effective stimulus to yields. Rehabilitation addressing less pressing hydraulic constraints in the secondary and tertiary canals did not hurt reforms but did reduce the rate of return.

Figure 5.1 matches the results of an economic study that calculated that incentives in the ON reforms accounted for at least 75 percent of the yield increase and full-fledged rehabilitations for no more than 25 percent (IOV 1992). The results presented in figure 5.1 argue in favor of adopting a variety of approaches, because comparisons may help find the approach

Figure 5.1 Producer responses to minimum and maximum hydraulic improvement

Source: Authors, adapted from IOV 1992.
with maximum impact per dollar if some money goes to monitoring and evaluation. They also point to the value of rapid diagnostic analysis by highly qualified and very experienced irrigation engineers (FAO 1999, World Bank in press).

Is the rate of return the only gauge that matters? Could donors have avoided rehabilitating the whole canal network and have leveled land only? It is not certain that they had a choice. It was the 1982 agreement between the Netherlands and the government of Mali that allowed the donor to introduce reforms only if it rehabilitated secondary canal KL2, which pierced a previously impenetrable defense. The issue is therefore whether in later negotiations donors could have made hardware investments more cost-effective by calibrating them to the price the ON demanded to keep the door to reform open. The answer is probably yes. Once the reforms had been consolidated, all donors included manual land leveling, improving the cost-effectiveness of rehabilitation.

The impact on the Malian government and donors

The Malian budget benefited from the reforms. Its contribution to maintenance costs dropped from 40 percent in 1995–96 to 7 percent in 2000–01. The government now contributes only part of the upkeep costs of the main infrastructure, which is much larger than needed for the current scheme. Its other financing is now limited to the cost of contracting extension services and feasibility studies, costs the government also bears elsewhere in the country. Donors to the cereals market reform project (PRMC) are no longer asked to fund ON’s processing and marketing losses. In that sense, they, too, benefited from ON reform. But are the results achieved to date sustainable?

A chain reaction in institutions

ON’s current institutions are embodied in a performance contract and its associated steering committee, joint management committees for maintenance and land allocation, and land-tenure rules. Related institutions are savings and loan associations and an extension service. All of these depend on an environment respectful of the rule of law, some measure of democracy, and economic liberalization. This section describes these institutions and the impetus to change that full cost recovery gave to three areas: credit schemes, the extension service, and groupements d’intérêt économique (GIEs), a new type of entrepreneurial partnership with legal backing. In addition, this section addresses the impact of the reforms on water management.
The performance contract

At the end of its tenure, the reform unit suggested the negotiation of three-year, three-party performance contracts that combine the earlier two-party contracts between agency and government with the reform unit’s quarterly consultation and progress meetings with stakeholders. In the new performance contracts, government, agency, and organized farmers define their contributions to keeping the reforms in place, fulfilling their responsibilities in operating and expanding the system and in protecting paddy prices against market distortions, and adapting the reforms to emerging realities. The 2002–04 performance contract is summarized in appendix A.

A performance contract is negotiated among the ON, represented by management; the government, represented by the minister of finance; and farmers, represented by three elected general delegates. It has no legal status other than that of contract, and it assigns each stakeholder objectives and responsibilities that are in keeping with the principles of the reforms. A steering committee, whose nonelected members are appointed by the government, monitors the contract. The representative of the minister of finance chairs steering committee meetings, and donors are kept informed through regular meetings with ON management. Two performance contracts have been completed since the reform unit finished its assignment. They have been evaluated thoroughly by independent consultants whose findings provide most of the material in this chapter.

The donors remain major players in performance contract negotiations, since they foot part of the bills for expansion and follow-up activities for the reforms. The dynamics are that the ON, the government, and the donors make sure the farmers agree to high water fees. Farmers, government, and donors ensure that the ON limits its budget. The ON, the government, and the farmers unite to extract from donors as much investment in expansion and extension as they can. Each party achieves two goals. The general delegates have found that the negotiations give them a chance to deliver goods to their constituents. The basic dynamics of the negotiations are summarized in figure 5.2.

The performance contract instructs the ON to manage the scheme through the joint management committees for maintenance and land allocation and to use at least half of the water-fee revenue for maintenance. Here is how a general delegate summed up the situation:

We have become professionals, and we debate on the basis of current figures. Sometimes it works against us, but we also benefit for we are able to truly check if the ON uses half of the water fees for maintenance of the secondary canals. (Musch 2001:90)
The farmers on the joint committees inspect maintenance almost daily. There are two rounds of verification: by the farmers on the joint committees and by the auditors who perform the yearly inspection of the ON books, as required by the performance contract.

The performance contract is not just about money; it is also an arena where stakeholders bargain to adapt policies and institutions to emerging needs. An example is the increased demand for irrigated land. Farmers wanted additional land for themselves or their children, and the government concurred that they should have it. New rules for farmer investment were debated and decided during recent performance contract negotiations. Farmers were asked to contribute 20 percent of the total cost; they did, and the irrigated area has expanded. Many farmers residing on the scheme use savings to help develop additional land, while others invest in labor. The government coinvests from the national budget. This coinvestor approach has lowered land development costs to CFAF 1,511,000 (US$2,518) per hectare, calculated over 3,866 hectares (Coulibaly and Dissa 2002:220). Until recently, development costs of more than US$10,000 per hectare were commonly reported in West Africa. Moreover, since the first year, yields have averaged 6 tons of paddy per hectare.

**Figure 5.2 Dynamics of performance contract negotiations**

*Farmer delegates seek a limited budget for the Office du Niger and low water fees. They work with the Malian government and the ON to obtain donor funds for investment in canal improvement and extension.*

*The ON wants more budgeted funding, tasks, and personnel and works with the government to obtain high water fees and with the government and delegates to obtain maximum donor investment.*

*Donors want to limit the ON budget and work with the government and the ON to obtain high water fees.*

*Source:* Adapted from Musch 2001.
The joint management committees

The joint management committees shifted power to the farmers, partly with the help of donor aid for farmer-only briefings and training on outsourcing maintenance, legal procedures, and technical work. The training sessions helped delegates negotiate the new performance contract. Donors helped ensure that all farmers had access to their delegates. In 2001, the delegations in Niono and Masina were confident of their ability to check up on the ON (box 5.1). Delegations in the three other zones, aware of their gaps in information and skills, were interested in more training (Musch 2001:82).

Farmers now commonly send their complaints about the ON to their delegates. A feedback loop about decisions is well established; delegates regularly tour the villages in their zone. ON personnel accept proposals and solutions put forward by farmer committee members after onsite visits.

But not all is rosy. Farmers say some embezzling still takes place, but less than before. Not all ON personnel are equally open to working with the farmer delegates. In fact, the budget for training newly elected farmers is controlled by the ON, and new delegates complain that they do not get the training they need. Boundaries between farmers and ON representatives on joint zonal committees still tend to be drawn by the latter in both canal maintenance and land allocation. The land management committees find it hard to get anything done that has not been formally prescribed, and ON management is still not enthusiastic about sharing authority in this crucial field. Woman farmers do not sit on the committees and know little about them.

All told, the committees hold in check the ON’s natural tendency to use the water fee for its central overhead functions, thus improving canal maintenance considerably. The committees help keep the scheme out of the downward spiral that bedevils many government-owned irrigation systems.

Box 5.1  A farmer-leader investing in comanagement

A farmer member of the Niono maintenance joint committee spent three nights with paperwork and a pocket calculator to check each step in the calculation of water fees, maintenance requirements, and budgets for canals and roads. His diligence made him a full match for the officials.

Source: Musch 2001:82.
The land-tenure rules

The land-tenure rules (discussed in chapters 3 and 4) give license holders secure tenure and allow the ON to evict farmers who do not pay the water-use fee and do not use the land for intensive agricultural production. The rules also present new challenges, for they constrain farm accumulation strategies and are not suitable for attracting private investment in scheme expansion. Private investors cannot be attracted with conditional farming licenses. They want title to the land they develop, so they can do with it as they wish: farm it themselves, lease or sell it, or use it as collateral for loans. As a result, a black market in land has emerged. License holders lease out their land, and some of them sell it, using false identification documents and bribes (Bonneval, Kuper, and Tonneau 2002:60–61). Leasing rates (exclusive of water fees) are between CFAF 50,000 and CFAF 100,000 (US$83 to US$167) per hectare, and sales hover around CFAF 1 million (US$1,667) per hectare (Office du Niger 2001:32.)

The water fee: rates, evolution, collection and use

Table 5.4 shows how the water-fee rates have evolved since 1993–94, the year before the devaluation of the CFA franc. It shows that, during the first eight years after the 1994 devaluation, the water fee for Class 1 increased by 127 percent. During the same period, the GDP inflator for Mali was 81 percent. Despite this real increase in the water fee, the collection rate remained 97 percent. Three factors contributed to this result:

• Farmers were fully able to pay. In 2001–02, the fee as a percentage of the gross value of output for land in Class 1 was just above 8 percent (fee of CFAF 63,500 per hectare, average yield of 6.5 tons of rice per hectare, and rice valued at CFAF 120 per kilogram). In 1982, this ratio averaged more than 20 percent: the fee was 400 kilograms per hectare and yields were below 2 tons of rice per hectare.
• Farmers controlled the use of the water fee they paid.
• Farmers risked eviction if they defaulted on fee payments, because there was a long list of candidates waiting to replace evicted farmers and because, in the end, eviction was a matter for ON management rather than the village associations or the joint committees. This made eviction an impersonal process and gave it the coercive power of the state.

Table 5.4 also shows the fee unchanged from 1996–97 to 1997–98, but a 30 percent hike from 1998–99 to 1999–2000. The government of Mali had persuaded the farmers’ representatives (general delegates) to agree to a raise of 9 percent between 1996–97 and 1997–98 but refrained from enforcing it for electoral reasons. A farmers union was protesting the raise before the
general elections scheduled between March and July 1997. After the elections, the government put the fee back on track. In the general election year of 2002, the government again froze the water fee, despite the scheduled 5 percent increase set in the performance contract.

How much revenue does the water fee bring in, and how is it spent? How much of total maintenance costs does this revenue cover? How do maintenance costs balance with operating expenses at headquarters and in the zone offices? Tables 5.5 and 5.6 provide some answers.

### Extension

Unlike government-funded extension, donor-funded extension is demand driven to the extent that users pay a fee that covers 20 percent of the cost. Counselors are paid depending on the demand for their services. The donor-funded extension center helps dues-paying farmer organizations set up accounting and management systems and gives them organizational and legal advice. It also trains fee-paying, literate farmers to calculate gross margins, manage inventories, plan cash flow, and so on. The counselors also give advice on agronomic topics. The extension center’s board consists of producers.

### The savings and loan associations

Today, nearly all farming credit goes through three private savings and loan associations. Village associations flush with money are unwilling to lend to members because board members found it hard to collect from
Table 5.5 Fee collection and share used for maintenance, 1995–96 through 2000–01

<table>
<thead>
<tr>
<th>Year</th>
<th>Class 1 water-fee rate (CFAF/ha)</th>
<th>Water-fee proceeds (million CFAF)</th>
<th>Water-fee recovery rate (%)</th>
<th>From water fees (million CFAF)</th>
<th>Total expenditure from water fee (million CFAF)</th>
<th>Total infrastructure maintenance (expenditures)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995–96</td>
<td>40,000</td>
<td>1,684</td>
<td>95.9</td>
<td>807</td>
<td>1,353</td>
<td>60</td>
</tr>
<tr>
<td>1996–97</td>
<td>43,000</td>
<td>1,858</td>
<td>95.3</td>
<td>892</td>
<td>1,136</td>
<td>79</td>
</tr>
<tr>
<td>1997–98</td>
<td>43,000</td>
<td>1,878</td>
<td>96.7</td>
<td>684</td>
<td>881</td>
<td>78</td>
</tr>
<tr>
<td>1998–99</td>
<td>57,150</td>
<td>2,684</td>
<td>99.2</td>
<td>1,402</td>
<td>1,720</td>
<td>82</td>
</tr>
<tr>
<td>1999–00</td>
<td>62,000</td>
<td>2,950</td>
<td>97.1</td>
<td>1,670</td>
<td>1,828</td>
<td>91</td>
</tr>
<tr>
<td>2000–01</td>
<td>62,000</td>
<td>3,244</td>
<td>97.8</td>
<td>2,014</td>
<td>2,172</td>
<td>93</td>
</tr>
</tbody>
</table>

Notes:
(1) On average, a waiver of fee payment is granted on less than 1 percent of the total area cropped (François, Tonneau, and Jamin in Bonneval, Kuper, and Tonneau 2002:172).
(2) The discrepancies between this table and table 5.6 arise because the data come from different sources.

Source: Authors, from ON data.

Table 5.6 Sources and uses of funds by the ON, calendar year 2000 (million CFAF)

<table>
<thead>
<tr>
<th>Source of funds</th>
<th>Amount</th>
<th>Use of funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water fees</td>
<td>2,963</td>
<td>Maintenance works:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Main infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Primary and secondary canals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Subtotal maintenance works</td>
</tr>
<tr>
<td>Contractual services delivered by the ON to the government of Mali</td>
<td>421</td>
<td>ON operating expenses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*At headquarters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*On the zones</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subtotal, operating expenses</td>
</tr>
<tr>
<td>Malian government subsidy for maintenance of main infrastructure</td>
<td>176</td>
<td>Protection of crops against birds (quelea quelea)</td>
</tr>
<tr>
<td>ON revenues (from farming license fees and maintenance of canal for sugar cane estate)</td>
<td>57</td>
<td>Maintenance works, miscellaneous expenses</td>
</tr>
<tr>
<td>Total</td>
<td>3,617</td>
<td></td>
</tr>
</tbody>
</table>

Note: The discrepancies between this table and table 5.5 arise because the data come from different sources.

Source: Authors, from ON data.
borrowers who were also kin or political leaders. Outside credit agents can impose repayment discipline because they can refuse a loan next time and take their case to court. In addition, they can block access to the other credit associations by blacklisting a defaulting debtor with the credit rating agency maintained by the three associations. Credit repayment, like the payment of water fees, requires the threat of sanctions that only an impersonal outside agent can bring to bear on the user. The performance of the credit associations over time is summarized in table 5.7.

The savings and loan associations bring income opportunities to women. Loans to women grew 447 percent between 1994–95 and 1995–96, and another 533 percent the next year (Touré, Zanen, and Koné 1997:83). Yet the associations have not yet fully adapted to their rural surroundings. Credit is difficult to obtain for blacksmiths, women retailing fruits and vegetables, cattle farmers (except for short-term cattle fattening), and other tradespeople.

**Village associations, GIEs, and farmers’ unions**

The creation of the village associations in 1984 helped to bring about reforms, but around 2000 most of the associations were being phased out. In 2000, a third of them were bankrupt, another third carried out only one or two activities (fertilizer credit, threshing, or both), and the remaining third were doing fairly well. The successful group is enlarging its repertoire of activities and is becoming multifunctional. The leaders of those associations occupy most of the delegate slots on the joint committees and are clamoring for more responsibilities in water management. They successfully navigate the scams, cartels, and other challenges presented by traders and offer deals on credit for fertilizer, threshing, and hulling to lure larger farmers.

**Table 5.7 Performance of the savings and loan associations, 1996–2001**

<table>
<thead>
<tr>
<th>Year</th>
<th>Member deposits (million CFAF)</th>
<th>Loans (million CFAF)</th>
<th>Repayment rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>135</td>
<td>1,929</td>
<td>93.8</td>
</tr>
<tr>
<td>1997</td>
<td>239</td>
<td>2,361</td>
<td>95.9</td>
</tr>
<tr>
<td>1998</td>
<td>300</td>
<td>2,362</td>
<td>97.0</td>
</tr>
<tr>
<td>2001</td>
<td>946</td>
<td>3,000</td>
<td>98.6</td>
</tr>
</tbody>
</table>

*Note:* Members repaid not only their new credit but also CFAF 1,000 million (US$1.7 million) of old credit out of CFAF 2.5 billion (US$4.2 million) of arrears accumulated before 1996.

At the same time, farmers began to engage in a new type of economic partnership known as Groupement d’intérêt économique (GIE). The GIE has legal status and allows farmers to pool resources. Farmers team up mainly to buy fertilizer and procure credit for purchases. A 2000 survey counted 236 GIEs in the ON area.

Since 1997 two farmers’ unions have been set up. They are not parties to the performance contracts, and their primary activity has been contesting the level of the water fees. Their usefulness to the scheme will depend on the view that they take of low fees. If they view low fees as the primary objective, they could jeopardize adequate O&M. However, if they view low fees as a way of controlling the ON propensity to spend, they could become an effective countervailing power within the zonal joint committees, because their leaders are among the best educated farmers.

Water management

The crop production efficiency of water has improved. Around 1980, water deliveries from secondary canals amounted to about 30,000 cubic meters per hectare for wet season yields of less than 2 tons of paddy. Now they average 15,000 cubic meters. The objective is to lower water deliveries to 13,500 cubic meters while maintaining current yields (Sidibé 2002). Such improvements would reduce waterlogging and the need to expand into neighboring wetlands.

The typology of the hardware that controls water deliveries is summarized in table 5.8.

The new hydraulic hardware is no longer in its original state. Farmers have reshaped structures because water is often locally scarce, however abundant it may be at the aggregate scheme level. Many control structures

<table>
<thead>
<tr>
<th>Table 5.8 Typology of hydraulic hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unrehabilitated</strong></td>
</tr>
<tr>
<td>Intake</td>
</tr>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>Secondary</td>
</tr>
<tr>
<td>Tertiary</td>
</tr>
<tr>
<td>Quaternary</td>
</tr>
</tbody>
</table>

ARPON: Amélioration de la riziculture paysanne à l’Office du Niger
AVIO: water regulator responding to the water level downstream
RETAIL: see chapter 3
in primary and secondary canals have been tampered with: the floats of many AVIO structures have been tweaked, and the keys to locks on sliding gates often have several copies—an official one in the ditch rider’s pocket and others in farmers’ pockets. When regulators are closed to implement a rotation, some water passes through, because they were either pierced or poorly maintained. Nighttime stealing from tertiary canals is common during rotations imposed to combat shortages. Iron is also scarce, which helps explain why more than half the iron gates in smaller structures are missing.

These “reconstruction” practices provide part of the background to the findings of a case study of secondary canal N1 in the RETAIL area. During the 1998 growing season, discharge to this secondary was a little less than 1 liter per second per hectare, compared to a design discharge of 2 liters per second per hectare. The water levels in six tertiary canals at the tail of N1 were outside the functional range of the baffle offtakes 75 percent of the time.7

Extensive farmer reshaping and limited tertiary maintenance suggest that the special water management service and joint committees are not yet as effective as they should be. The role of the secondary canal operator is unclear to most farmers. Conflicts between farmers on the same tertiary occur, especially when crop stages and water demand differ in a haphazard way due to a lack of coordination (Adank 2002:44). Enforcement of farmer obligations for tertiary canal management is limited to threats.

Assessment of institutional framework

The reforms satisfy the basic tenet of management science that an organization will have the will to impose effective internal accountability only if its basic welfare depends on achieving its performance standards or goals (Vermillion and Sagardoy 1999:39). ON’s survival depends on its fee income. Its management is accountable both to the users, who review and help establish its budgets and cosign the maintenance contracts and payment orders, and to the government as scheme owner and principal. Through the performance contract process, the institutional framework combines user monitoring of maintenance spending with agency administration of the fees and government authority to force compliance on ON management. In addition, the performance contract negotiation process offers stakeholders an arena in which they can discuss development scenarios and adapt current rules to future challenges in a participatory manner.

Current ON governance is an effective and efficient solution to the key problems of underutilization of land and water in this inland delta. This solution takes into account a number of essential factors:

- The users’ literacy and numeracy skill levels
- The limited capacity of farmer organizations to manage large sums of money
• The obstacles to enforcing water-fee payment by kin or local politicians
• The government’s desire to tap the delta’s potential for development
• The need for accountability and transparency to make cash-rich farmers willing to pay
• The limited capacity of Mali’s administration to regulate and supervise water user associations.

User funding of O&M triggered a chain reaction of changes in credit rules, extension funding, and entrepreneurial partnerships that reinforced the stakeholders’ market orientation. In 5 to 10 years, it is likely to spur further professional development of users as trends continue toward user management of the primary and secondary canals and the transformation of the viable village associations into true cooperatives. Accounting skills within ON and the associations are likely to become stronger. As farmers become increasingly professional, the risks of unchecked unionization and politicization are likely to diminish.

Figure 5.3 summarizes the new accountabilities of the reforms. The figure portrays the levels of accountability that the reforms (arrows) added to the hierarchical accountabilities (arrowless lines). It shows that elected farmer representatives are now involved in both making and implementing policy. Farmer delegates indirectly elect (one-way arrow) three general delegates to the performance contract steering committee; one of these delegates also sits on the ON board. The steering committee is represented by the horizontal bar on the third level from the top. The zonal meeting of village delegates directly elects representatives to the joint committees for secondary canals and to the joint zonal committees for land tenure, the first line enforcers of farming license conditions. Two-way arrows between committees and the ON staff indicate shared responsibility.

The ON’s future: risks and challenges

The ON’s future contains risks that may threaten its current achievements and challenges that stakeholders may voluntarily want to meet in order to further development.

Risks

Risks result from events and trends that may set back the ON’s track record. Awareness of risks is a first step to averting or reducing them. Below we discuss some main ones and some preventive actions that stakeholders might consider.

Crop prices become unprofitable. When crop prices fall, farmers may lose their ability to pay the water fee, which would set in motion the down-
ward spiral of dwindling O&M and delivery services and falling yields, incomes, and collection rates. Should prices fall because the currency is overvalued, three factors offer protection. First, imports can reach the country only through costly overland transportation. Second, rice and onions are sold predominantly on domestic markets. Third, Mali has a
framework in place, and experience in using it, that offers fiscal protection to national rice production.

Farms become too small to survive. Through inheritance, holdings may become nonviable. Around one-third of the farming households are already indebted and lack the resources to use new opportunities in the swiftly changing environment. Their unit margins are smaller because their yields lag behind and their unit costs are higher than those of larger producers. Farms may no longer provide full employment or an adequate return on family labor. Rain-fed cultivation and nonfarm activities compete for labor needed for the wet season rice crop. The ability to pay the water fee may be jeopardized for a substantial segment of this part of the ON clientele.

This risk may be mitigated through development of high-value dry season crops. Water can be made available for high-value crops by raising the fee to discourage off-season rice growing. The performance contract may set a target for value added per cubic meter of dry season water. In addition, when off-season surface water becomes scarce, pro-poor treadle pumps or motor pumps may be distributed to take advantage of the high water table. Special assistance may be given to farms running a deficit and to women residents on the scheme. Farmers, the government, and the ON together may draw up time-bound action plans to eradicate poverty among the farmers still surviving precariously.

Maintenance spending is not probed. Maintenance funds may be diverted when divisions prevent farmers from exercising their right to hold ON management accountable or when contractors bribe zonal joint committee members. Current preventive action consists of peer monitoring and memories of a sad past. Because memories are short, the government may put a whistleblower policy into effect and occasionally commission audits when it suspects corruption in the ON or among farmer representatives on the zonal joint committees.

The government repeatedly freezes the fees. The government may not raise fees when the political party in power holds a small majority and farmer unions hold rallies and picket offices to oppose fee increases. This risk is real: freezing has already occurred twice, in the general election years of 1997 and 2002.

This situation may change through the following risk-reducing measures:

- Donors may want to shield the government from pressure to engage in frivolous maintenance policies by negotiating long-term agreements that inform farmers about the fees and allow donors to seek financial
redress under certain conditions when insufficient maintenance endangers their investments.

- Producer organizations may be given the right to sue the ON or the government for neglect or economic damage if the ON neglects maintenance.
- User fees will contain little political ammunition if maintenance standards to calculate the fee continue to be defined by irrigation engineers and users together and if, under every performance contract, the operations of headquarters and zonal offices are reviewed by organization management specialists who report to the joint committees and the performance contract steering committee.
- Users are sent summaries of annual reports that inform them about the services provided by the central agency and their cost.
- User satisfaction surveys are conducted at the start of every performance contract period and results are published widely in the form of report cards. Scores tell unions and politicians the extent of user (dis)satisfaction (see also chapter 6).

**Challenges**

The evolution of the scheme hinges on how stakeholders handle the issues set forth below.

*Adapting the land-tenure clauses for existing plots.* The development of an illegal land market points to inadequacies in land tenure. These may be repaired by offering license holders a chance to purchase their land, on terms to be agreed. Such transactions would allow farmers to do what they want with their land: crop it themselves, use it as collateral, lease it, or resell it. The sale of land would allow the government to set up an investment fund for scheme expansion.

The sale of land would rob the ON of its eviction sanction. Instead, providers of credit and extension could be mandated to demand proof of water-fee payment. In addition, law-abiding farmers could exert peer pressure and ask the ON to take the matter to court.

In keeping with agreements reached during reforms, farmers who want to continue their usufruct rights should be allowed to do so. The new tenure option would facilitate enforcement of the articles in the farming licenses prohibiting leasing and selling.

*Granting zonal joint committees control over training and communication budgets.* Newly elected farmer representatives need training, reelected members may need refresher courses, and all of them need to be able to com-
municate well with their constituencies in order to discharge their mandate. However, they have trouble obtaining budgets for these activities because they need to obtain ON consent and are unversed in the ON procedures for budget preparation and funds disbursement. The situation varies from zone to zone, depending on the zeal of the zonal directors. It is therefore suggested that farmer representatives be allowed to control a tiny but fixed percentage (less than 1 percent) of the water fee for training and communication purposes. Within that allocation, they could set up a small secretariat at the central location of Niono. Expenses under this allocation would be audited together with all ON accounts.

**Attracting private investors.** Donors can no longer be expected to fund the bulk of land development now that they have helped make it profitable. Private investment will be needed, but private investors have to be sure they can reap the benefits of their investment. A study commissioned by the government explores two avenues (Diallo and others 2000:8).

The first is a coinvestment approach that requires smallholders who are candidates for settlement on the irrigated scheme to contribute labor, financing, or both for land development. The government advances the rest of the cost, and farmers repay over 10 to 15 years. Upon complete reimbursement, they are given title to the land.

The second avenue aims to attract large commercial farms that would have to finance the cost of land development and meet technical requirements defined and enforced by the ON. Foreign investors would hold 30-year renewable leases. Malian investors would be given title to the land after the ON pronounced the development technically satisfactory.

These two avenues are being tested under a World Bank–assisted project. A Chinese state company has already developed a 1,000-hectare farm under this arrangement.

**Ensuring environmental stability.** Waterlogging, water table rise, alkalinization, and sodification constitute serious threats to the sustainability of the ON’s performance. The main solutions to all of these problems would be to enhance water efficiency and improve drainage. Those measures, together with increasing intensification, would also offer maximum protection to the wetlands located on the eastern side of the inner delta.

**Combating water-borne diseases.** Although households likely use part of their improved incomes to buy mosquito netting and drugs, some 170,000 area residents still suffer losses in quality of life and productive capacity from malaria and bilharzia. Government investment in land development needs to be weighed against the impact of public health investments on
productive capacity. These measures may include changes in canal and field water management.\textsuperscript{10}

\textit{Evolving joint management of O&M toward full-fledged water user associations.} A few donors want to put farmers completely in charge of O&M throughout the scheme. However, farmers’ leaders are cautious and resist taking up this responsibility on short notice.\textsuperscript{11} They prefer to improve the present arrangements and visit successful water user associations themselves to determine how to replicate them. Management transfer, first at the zone level and later of the entire distribution network, should be a long-term goal. It requires the ON to prepare itself for the tasks of regulating and supervising the associations by making regular technical, organizational, financial, and environmental O&M audits and defining maintenance conditions for future rehabilitation funding.

\textbf{Summary}

The ON reforms had a great impact on poverty. They raised the incomes and nutritional status of hundreds of thousands of people by empowering farmers in the face of a once all-powerful government agency. The reforms freed women from the daily chore of pounding grains, created new openings for them to farm and trade, and allowed households to devise new, more market-based economic strategies. User funding of O&M triggered a chain reaction in the production support system by introducing or reinforcing market discipline in credit, extension, and economic partnerships.

The reforms appear sustainable. The tripartite performance contract combines farmer monitoring of use of water fees with agency administration of the fee revenue and government authority to enforce compliance. In addition, the performance contract process creates a policy arena in which stakeholders can negotiate adjustment of current rules to emerging realities. The institutions create an environment in which stakeholders can manage risks and meet new development challenges.

\textbf{Notes}

1. In 1997, only 28 percent of the vegetable plots were located on the homesteads (Chohin-Kuper and others 2002:204).

2. These amounts were computed by subtracting from total production 300 kilograms of paddy for each household member for use as food, seed, and barter against foods not grown by ON farmers. The conversion ratio from paddy to milled rice is assumed to be 0.65.
3. This information is missing in the English-language version of the same report.

4. In 1998, farmers proposed having three rather than two general delegates to reflect the fact that the scheme consists of three main geographical areas that are distant from each other: east (Masina), center (Niono, Molodo and Ndebugu), and north (Kuruma). A general delegate now resides in each area, an arrangement that facilitates communication with the farmers.

5. However, these areas were adjacent to primary canals and some of them were already cleared (farmer-initiated developments, called *hors casiers*). A study has shown that land development from scratch, including construction of primary canals, in 3,000-hectare allotments, would cost CFAF 2.5 million (US$4,167) (Office du Niger 2001:64).

6. AVIOs, water regulators responding to the water level downstream, have gates whose opening is controlled by a downstream float. The discharge into the downstream section therefore automatically matches farmer demand. Besides ARPON, the German development bank, the World Bank, and the European Development Fund have also installed them. AVIOs reduce the need for intervention by agency staff. They keep the water level steady, especially when horseshoe weirs mitigate fluctuations. Water levels have to stay within a limited range for baffle distributors to operate correctly. By contrast, sliding gates require operation by the agency. To set the right opening, the operator has to find out how much water ditch riders or farmers plan to use and then apply a cumbersome iterative procedure.

7. F. Ouvry and S. Morlet are quoted in Adank (2002:46) as recommending the replacement of the baffle distributors by semimodular overflow weirs.

8. Labaste (1996:44) quotes Brahima Coulibaly, now principal general delegate representing farmers in the ON board: “We suffered too much in the past. We do not want to go back to the situation we lived in before 1985.”

9. The extreme situation occurred in the Philippines, where, during the 1990s, a president was elected partly because he promised to abolish the water fee. After his election, the agency scrambled to get him to halve the fee instead of eliminating it (see appendix C).

10. The *Anopheles gambiae s.l.* prefers sunlit pools for breeding. These are plentiful in fields that are not properly leveled. Recent research on the ON scheme demonstrated that the mosquito breeds predominantly during the first six weeks after seedlings are transplanted and quickly becomes reestablished after harvest if fields are irrigated just before and incompletely drained afterwards. These outcomes suggest that the incidence of malaria could be reduced by rotating transplanting, refraining from adding irrigation water to fields three weeks before harvest, and leveling and draining them correctly after harvest (Klinkenberg and others 2002:205–208).

11. A few farmers learned of bad experiences in neighboring countries after management was transferred to cooperatives without government oversight. Defaulting on water-fee payment and mismanagement became rampant and infrastructure fell into severe disrepair.
6
Relevance of the ON Experience to Other Countries

This chapter explores features of the process of reforming the ON that other governments may replicate without necessarily copying the outcomes. After summarizing the political economy of the ON process, we generalize about the political economy of irrigation management reform processes on the basis of recent case studies. Comparison of these studies with our own helps us identify building blocks that governments may put in place to develop support and improve performance. Implementation receives special attention. Last, we recall that, in many countries, user funding of O&M has already concluded the construction phase of government investment in irrigation infrastructure.

The political economy of the reform process at the ON

In 1982, reform of the ON was politically unfeasible, but in 1992 the government made a commitment to consolidate the reforms. Until 1982, the government and agency personnel were locked in a tight, needs-based alliance. The government needed a reliable rice supply for its urban constituents, and agency personnel demanded that their salaries be paid and agency losses be absorbed. How did this alliance come undone?

In retrospect, a first measure of political feasibility was forged when a bilateral donor and the government traded small reform steps (among them credit for indebted farmers, involving the village association in operation and maintenance of the canal) on a secondary canal for physical improvement (helping farmers level their fields and rehabilitating the canal). The deal raised yields beyond expectations. The government asked the donor to expand its intervention, including the empowerment of the farmers. The donor’s next step came in 1984, when, in alliance with Mali’s single political party, it distributed small threshers. The machines quickly broke the ON threshing monopoly and generated income for the farmer associations. These results encouraged the donor to introduce movable hulling machines in 1986. The machines saved farmers money, generated money for their owners (initially women’s groups), and deprived the ON of another monopoly. All of these actions broadened farmer support for reforms. The reforms shifted enough power away
from the agency that another bilateral donor could negotiate producer-friendly land-tenure rules and transparent and user-accountable institutions to collect and jointly manage water service fees.

Devising and spreading technologies with an eye to shaping new institutions went hand in hand with pressure to create institutions in which farmers obtained control of fee spending and land security. Together, the changes transformed an amorphous farmer population into an organized group that in 1992 replaced agency staff as the government’s main ally. Table 6.1 summarizes these changes.

### Table 6.1 Evolution of stakeholder positions between 1978–82 and 1993–96

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>1978–82</th>
<th>1993–96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice consumers</td>
<td>Might riot against shortages or high prices.</td>
<td>Supported new regime and gave it political credit.</td>
</tr>
<tr>
<td>Agency staff</td>
<td>Opposed loss of authority, jobs.</td>
<td>Accepted reforms and layoffs depending on terms.</td>
</tr>
<tr>
<td>Farmers</td>
<td>Dissatisfied but unable, through lack of professional organization, to push reforms; not vital to survival of regime.</td>
<td>Organized. Forced government to protect their production; leaders opposed to return of full agency control.</td>
</tr>
<tr>
<td>Traders</td>
<td>Interested in gains from rice imports.</td>
<td>Found new niches in domestic rice marketing, hulling, and threshing, in nascent rice and onion export markets, and in importing inputs.</td>
</tr>
<tr>
<td>Political clients</td>
<td>Made income from rice imports, supplies, and services to the ON.</td>
<td>Found other niches.</td>
</tr>
<tr>
<td>Donors</td>
<td>Willing to rehabilitate if government committed to reforms; frustrated by government and ON resistance to reforms.</td>
<td>Convinced of sustainability of scheme, resumed funding of expansion.</td>
</tr>
<tr>
<td>Committed officials</td>
<td>Unable to express support for reforms publicly.</td>
<td>Able to express support and collaborate.</td>
</tr>
<tr>
<td>Government of Mali</td>
<td>Sought to increase rice production without losing support from its vocal constituents (urban consumers, military, and ON personnel).</td>
<td>Committed to reforms. Saw their effectiveness, expected that rising production would keep price stable, opted for continued donor support at expense of agency staff.</td>
</tr>
</tbody>
</table>

*Source: Authors.*
Action outside the irrigation arena proved crucial in three ways:

- The reforms in grain marketing raised producer prices and gave donors the leverage to promote liberalization of ON rice marketing.
- The CFA franc devaluation in 1994 significantly improved the competitiveness of Malian rice production.
- The political party’s strategy for gaining leverage in the rice scheme created an opening by granting village associations autonomy and revenue.

From 1978 to 1982, farmers were passive players for the most part. Politically, they could express their dissatisfaction but, because they were not organized as professionals (as opposed to villagers) and lacked information, they could not systematically insist on improvements. Economically, their production response helped create a favorable environment for full reforms. Government officials with a personal commitment to development offered crucial collaboration, despite hesitations within the government and among colleagues. The business community remained neutral. A nexus with contractors, common in Asia, did not pose a threat, simply because there were no private companies for public works living on maintenance contracts.

When the government agreed to small reform steps, it was supported by a minority of ministers and officials who saw these steps as beneficial. However, the government remained unwilling to liberalize the rice market, resize the agency, or loosen control over the country’s rice-production machine. Only after a democratic government with vast political capital had come to power did Mali commit to reform. That government, which enjoyed the political support of the new domestic stakeholder coalition and the financial support of the donors, could take on the agency. Its desire to further liberalize the economy and continue collaboration with donors gave it additional incentives. Even then, commitment came only after the World Bank and bilateral donors indicated that refusal to commit would carry a penalty that could jeopardize the new government’s policies.

The new coalition of government, stakeholders, and donors provided a solid foundation. It brought a degree of serenity to implementation and ensured that the reforms stayed on track during consolidation. The law establishing the reforms passed without difficulty. Continued stakeholder consultation allowed the newly created reform unit to fine tune the new institutions, and no further struggle ensued after an agreement had been reached with ON employees on the terms for downsizing. Farmer leaders wished to consolidate their gains and could organize their constituents into action. Donors were unwilling to let go of their achievements. The government was convinced that it could make political gains if it paid the limited political cost of reform during the first half of its term. It was also convinced that the reforms would raise production and stabilize prices.
The only opposition came from agency personnel—vocal, but also condi-
tional and negotiable.

In sum, the rise in production, prompted by rice market liberalization and
technical innovations based on diagnosis informed by field tests, reduced
the risk that the government would alienate urban consumers by com-
mmitting to full reforms. The reform steps of 1982–90 dissolved the ON’s
monopoly almost completely and led to a solid stakeholder coalition in
which organized farmers replaced urban rice consumers and agency staff.
The democratic government took the risk of reform because it found the
direction of the reforms desirable, judged that the reforms had proven
themselves, saw no future for an unreformed ON under its economic lib-
eralization policy, expected to be able to tackle the once all-powerful but
now weakened agency, and knew that a refusal to reform would carry the
risk of a prohibitive penalty from the donors.

The political economy of irrigation reforms

As elsewhere, forces outside the irrigation sector drove the government’s
decision to commit (appendix C). Much-touted irrigation and water man-
agement reforms in Victoria, an Australian state, were initiated only after
the government, learning from earlier failed attempts at reform, had in-
stalled a bipartisan committee that consulted a wide spectrum of stake-
holders and built a political consensus that reforms were needed. The de-
bates and the publication of the report coincided with increasing demands:

• From the business community to adapt the economy to globalization
  by decreasing the tax burden
• From environmental groups to combat salinization caused by irrigation
• From grassroots groups to grant them more autonomy in managing
  local natural resources (Langford, Forster, and Malcolm 1999).

In Mexico, irrigation reforms were part of a reform package for integrated
water resources management that was triggered by drought. The package
had been designed by the water bureaucracy that built Mexico’s 3 million
hectares of public irrigation but had lost operational control to its func-
tional rival, the Ministry of Agriculture. The package implied that the
water bureaucracy would regain control. Transferring management au-
thority to water user associations granted the water bureaucracy over-
sight of these associations and responsibility for the infrastructure. The
president adopted the proposal in 1989 as part of his decision to liberalize
Mexico’s economy and agriculture (Rap, Wester, and Pérez-Prado 2004).

In Turkey, the 1954 law that established the irrigation agency contained
an article allowing it to transfer the management of its irrigation systems
to other entities. The agency made little use of this article until the World
Bank made transfer of existing systems a condition for a loan to develop
irrigation in the eastern part of the country. The agency responded by transferring management authority to water user associations and local governments, and so obtained the loan (Svendsen and Nott 1997:5).

In Indonesia, the irrigation bureaucracy for decades effectively thwarted reforms. However, after the downfall of the Suharto regime and the installation of a democracy, it became less able to do so, as officials, academics, and farmers demanded grassroots participation in the management of their schemes (Bruns 2004).

In the Indian state of Andhra Pradesh, the chief minister embarked on irrigation reforms that gave users control as he simultaneously began similar reforms in public health, education, and natural resources management. The four reform areas had a common goal: building constituencies for the minister’s reelection after he had acquired his position through a coup.

These few examples demonstrate that user involvement in O&M usually comes about in the wake of major decisions or major events outside the irrigation arena. Reform is rarely driven by the outcomes of policy analysis; if it were, all the world’s public irrigation sectors would have been reformed long ago. Why are outside events crucial? For an answer, we look at the stakeholder coalitions that underlie unreformed irrigation governance in many countries. They usually consist of the farming population, the ministry of irrigation and the irrigation agency, the business community (primarily contractors), and the government.

Farmers

Many farmers on irrigation systems complain about inadequate water service, unresponsive operations staff, redundant office personnel, and misuse of funds. At the same time, they opt for passivity and rarely invest in organizing action to improve the situation durably. There are at least four reasons for this behavior:

• The individual payoff is limited for many leaders, because they have other ways of coping with the deficiencies. They may dig wells, enlarge their inlets, obtain turns from smaller farmers, or bribe personnel to allow them to take water at night and reward operations personnel for exceeding the design discharge to their canal.
• Farmers are rarely organized in professional organizations. They do not have the communication and decision-making infrastructure that would allow them to take on the sustained struggle that would be needed.
• Farmers live dispersed in villages or isolated homesteads rather than in cities. It is not easy for them to contact each other or to stage demonstrations in the capital. Schemes may extend over tens of thousands of hectares, and farmers may live a day’s trip away from agency headquarters and even the district office.
Reforms usually reduce or withdraw the O&M subsidy, adding to farmers' expenses. Farmers' natural urge, whether organized or unorganized, is to keep the subsidies, not reduce or abolish them. Is this true also for commercial, export-oriented farmers, feudal landlords, and very small farmers? Commercial, export-oriented farmers usually favor reforms. They know that adequate, timely water service can improve the quality of their produce and increase their competitiveness, yields, and margins. However, they also have the means to find solutions on their own. Even if their own solutions are costlier, they may refrain from investing time and effort in organizing a constituency for reform.

Feudal landlords, by contrast, usually oppose reforms. They may have a good grip on the agency staff and get adequate water. They fear that transfer to farmer organizations might weaken their influence and give smaller farmers better access to water at landlords' expense.

Small subsistence farmers generally dislike additional cash expenses. Even if they could be convinced that reforms would improve their livelihoods, they would lack the means and information to engage in reforms, except those in their immediate area.

The conclusion is that farmers tend to be passive. They rarely push for reforms. They also rarely push for their repeal, because as a group they like having more control over a vital resource and the ability to make sure their monies go into maintenance. Commercial farmers usually provide active support, however, when government engages in reforms. On some schemes in Colombia and Mexico, they even initiated them.

Ministries, agencies, contractors, and consumers

Government ministers find it hard to reform irrigation agencies. First, the agencies usually repose on solid legal and administrative frameworks drafted to protect substantial public investments. This framework lengthens the reform process and offers reform opponents one opportunity after another to put obstacles in the way. Second, most high-level agency personnel are engineers. They share an esprit de corps.

The irrigation agency rarely initiates reforms. First, its staff fears that reforms might lead to downsizing. Staff know that decades of construction have inflated payrolls and that they were not deflated upon completion of construction. They also know that reforms reduce the agency's tasks and need for personnel. Second, staff fear a loss of status because reforms usually transfer management authority to farmers. Personnel prefer working for government to working for farmers. Third, staff know that increased transparency and accountability to users reduce opportunities for illicit income. This is especially important for middle and top management, who may look to bribes or "rents" for between 25 and 100 percent of their income.
Thus, in short, agency personnel are solid stakeholders in the coalition for the status quo and have the means to fight off reformers. Contractors are also important stakeholders. They never initiate reforms, but they may oppose them fiercely, for they, too, often hold solid stakes in the status quo. Nontransparent bidding and verification procedures for construction, rehabilitation, repair, and maintenance make for fat profits. In Andhra Pradesh, contractors waged a campaign against a reform architect. Contractors have ample funds and may pay substantial bribes to high-placed gatekeepers, such as ministers, to thwart reform proposals or implementation.

Although consumers had a primary stake in the ON case, they normally do not. O&M costs rarely exceed 10 percent of the gross output value of farmers. This share may even drop as yields rise, as happened in the ON. Savings on the government budget do not necessarily benefit consumers.

Governments are the major stakeholders. Infrastructure is one of their major tools for producing public goods, such as cheap staples and decent farm incomes, and they are usually its formal owners. However, formal government ownership does not preclude ministers from holding competing views. Some may favor reform, while others oppose it. Ministries of finance or economic policy may favor user funding and user responsibilities for O&M, while the supervising ministry may shun them.

In countries where no law allows agencies to transfer management, governments need to see a stakeholder coalition for reform that is solid and forceful enough to overcome agency and farmer resistance. They would rather not end up with partial reforms that might deprive them of the benefits while saddling them with political costs. Partial reforms may also make the government look ineffective and beholden to special, if not corrupt, interests.

Coalitions for reform emerge rarely. They may arise in the wake of political changes, such as economic and political liberalization or regime change. Irrigation reforms in Central Asia, for instance, became necessary when the Soviet empire broke up and the newly independent countries switched from central planning to market-based economies. Such basic changes provide an opportunity for irrigation reforms but do not necessarily make them feasible. In the next section we look at actions governments may take to promote irrigation reform.

**Building support**

Few interest groups outside of irrigation care about the governance and performance of the sector. Chambers of agriculture prefer activities with bigger and more immediate payoffs to their members and less cost to themselves than improving the irrigation sector. Besides, they cannot advocate a reduction of subsidies. Ministries of finance, which on paper
have a great interest in improving performance, in practice stay in the background. Farmers’ unions have no interest in lobbying to abolish subsidies on O&M, even when such subsidies make agency personnel unresponsive and unaccountable.

Are there any possible allies outside the sector? Yes. They include environmental groups that seek better performance to allow reallocation of water from irrigation to wetlands and environmental services or to combat salinization; public service groups that want to make government provide better services to its citizens; and poverty-fighting nongovernmental organizations. In countries where water is scarce, utilities and industrial water users may become allies as well if they perceive that changes in irrigation would help them obtain access to more water. In countries where the business community seeks to reduce the government’s hold on services, business advocates may take aim at irrigation service provision as well.

Where none of these potential allies is in view, governments have no choice initially but to build support within the sector. Their situation is often similar to that of the ON in 1982, where outside events and actors came on the scene only after some steps had already been taken. Government strategies may try to subtly weaken the agency and create new institutions, keeping an eye on shaping or reshaping interventions to enroll nonirrigation players. Governments may take their inspiration from the section below.

**Widening the arena**

A first step might be to enlarge the arena in which final decisions are made on irrigation funding. In many countries, agency funding is negotiated and performance discussed in restricted circles composed of the country’s top political leaders and the agency’s top administrators. Inside this arena, governments are under intense pressure and often lack leverage because opportunities for political tradeoffs are limited.

Governments might respond by enlarging the arena (with representatives from environmental groups, poverty-fighting NGOs, and other groups) and putting the irrigation management challenges higher on the national political agenda. It is where they belong: most countries are democracies now, and assets in irrigation infrastructure have become a sizable portion of the government’s balance sheet and are vital to agricultural production and human development.

**Building support on definition of the problem**

Instead of proposing clear-cut solutions for which there is no support, governments might embark on a policy of gradually building support
and developing solutions. A first step would be to build consensus that the yield on public investment in irrigation is much too low. Several tools may be useful, especially the ones listed as 1, 2, 3 and 7 in the next section. The next step might be to chart a course to diagnose the causes by testing solutions.

Once the need for a diagnosis is put on the agenda and provisional agreement is reached on its scope and funding, ON-type experiments on several schemes at various levels would bring in perspectives on managing irrigation that take users rather than canals as their point of departure. Government could start a program—run outside the irrigation department and possibly partly donor funded—that invites farmer leaders, training institutes in public and business administration, technical training institutes, NGOs, and agency personnel to collaborate in testing new management methods and developing new institutions. The immediate benefit for government might be to turn the liability of frozen irrigation funding into the asset of tackling the issue of unsatisfactory irrigation management.

During the diagnosis and experimentation phase, reform advocates could sketch the political economy profiles of reform itineraries. These profiles would be useful if they went beyond identifying losers and winners to indicate the means stakeholders might use to effect each type of reform and the cost. Reform advocates also need to assess how much support and opposition groups can mobilize, how powerful each group is likely to be, what action each group can take, and in what sequence.

Answers depend on location, organization, and socioeconomic status. Concentrated irrigation stakeholders, such as agency personnel, have easier access to political leaders and opinion makers than dispersed actors such as farmers. Groups organized around common interests have internal communication and leadership systems that will quickly respond and rapidly mobilize members, while unorganized groups rarely have such capabilities. Literate people are more likely to be informed about issues that affect their self-interest than illiterate people. Explicit political analysis of implementation must be part of any policy and reform analysis to identify the changes most likely to bring about the goals of the reform advocates (Thomas and Grindle 1990:1170, 1174).

Other studies have shown the potential usefulness for irrigation reforms of both analyzing the power distribution and inviting experts to assess the likelihood of full, partial, and minimal implementation for each type of reform (Dinar, Balakrishnan, and Wambia 2004). Such studies may help design counterstrategies. If, for instance, it is found that large landlords have the means and willingness to orchestrate a media disinformation campaign, budgeting and outsourcing a forceful pro-reform public communication drive could be the obvious government response.
Step-by-step improvements, subtle power shifts, budding coalitions

Other activities besides experiments might feed the debate, further widen the policy arena, and keep irrigation management problems on the national agenda. We present a list below from which reform advocates may choose depending on their analysis of the political economy of the likely reform itinerary.¹

(1) **User satisfaction report cards.** These are used in the Indian state of Karnataka to monitor the quality of service delivery by government monopolies. They have been successful in improving municipal services in cities in the United States and in Bangalore and other Indian metropolises (see http://www.pacindia.org).

The idea is to survey user experience with service rather than user evaluations of the agency. Typical irrigation questions would be Did your last turn for water come when it was due? Did you get the discharge that was scheduled? When did you receive the season’s first turn? Was it in time? Was it adequate? How much would you pay for an adequate turn on time? The last question aims to probe how much users are willing to pay for correct deliveries.

Marketing companies are best equipped to design, test, and administer such questionnaires. They have the expertise and—because they make most of their money in the private sector—a natural interest in protecting their reputation for objectivity. The agencies should analyze, summarize, and publicize the data in easily understandable report cards.

Next, a group of reform advocates might discuss the results with the officials and politicians in charge and publish the outcomes. If the user satisfaction survey is repeated every two years, farmers, other taxpayers, and politicians can evaluate for themselves any improvements. This method would also allow comparisons of delivery by the agency with delivery by experimental arrangements. In Pakistan in 2001, such surveys cost an estimated US$20,000 to US$30,000.

(2) **Participatory budget analysis and public expenditure tracking.** Participatory budget analysis in the Indian state of Gujarat attempts to ensure that allocations to disadvantaged groups actually reach them. A member of parliament (MP) representing a district with many disadvantaged voters asks them to monitor how the government departments use their allocations. The district residents tally, for example, the number of officially sponsored trees planted, kilometers of road laid and repaired, and numbers of classrooms built and teachers assigned. The MP reports any shortfalls to the ministers, proposes new budget allocations, and negotiates with fellow MPs.
This procedure is akin to the public expenditure tracking that the World Bank has exercised. In Uganda, that procedure increased the share of the public education budget for equipment that reached rural primary schools from 10 percent to 90 percent. Service providers, such as teachers, and service users, such as local parents, played key roles in the procedure.

Budding water user associations could quickly develop organizational capacity from these activities, if strong field teams supported their findings. They could help rehabilitation projects resize outlets and make water distribution more equitable among their members.²

(3) Remote sensing. Remote sensing can produce irrefutable analyses of water delivery to irrigation schemes. As space images of Earth’s surface become less expensive, photoimagery of served and unserved areas becomes accessible as a tool to calculate the part of the command area that the agency actually serves as opposed to the area that it says it serves. A set of images, together with their analysis and a report, would cost around US$5,000 depending on the size of the scheme.

(4) Step-by-step improvement of service delivery. Stepwise improvement is usually feasible in selected locations. Examples are the middle reaches of the long tertiary canals in India’s and Pakistan’s irrigation systems, where unreliable service can be made more reliable through farmer organization work, at an estimated cost of eight months of organizer time and expenses per tertiary. Other areas are the unserved portions of the command area, where groundwater is high and treadle and other pumps can be usefully introduced, as they may be on the ON scheme in the dry season. A third option may be the collection and storage of surface water in the upper reaches of the microwatersheds transected by the main irrigation canals. Water could be conveyed to the irrigated part of the watershed during the dry season, when irrigation water becomes scarce. Such interventions might have the additional benefit of reaching the poorest inhabitants on the scheme (Datye, Paranjape, and Joy 2000:55–76).

(5) Outsourcing maintenance. Outsourcing maintenance is another practical step. It consists of transferring maintenance from the agency to farmer associations that cosign contracts and do the work themselves or outsource it. For this, farmer representatives and agency personnel would need training in bidding procedures at a cost of US$100 or less per participant. On a World Bank project in Java, outsourcing maintenance improved the quality of work and lowered its cost. At the same time, it shifted power away from agency to users and created a group of users who might ask for more reforms.
Bottom-up linkages were crucial to the ON reforms: the technical field personnel and bilateral donors’ policy staff were always in close contact. These close relations allowed field personnel to implement meeting results quickly, and it allowed policy staff to provide feedback to other donors and the ON on field experience with policy decisions. Similarly, Bank loan supervisory missions may have a member elected by the water user associations.

The shape of such linkages can vary, as shown by an NGO in the Indian state of Karnataka. The NGO, known locally as Sahayoga, is a federation of water user associations that was “established” by the government in a top-down fashion in the 1980s but never became functional. The Sahayoga convenes meetings where water user association chairpersons discuss cases of poor water service and the need for changes in the law. The Sahayoga field coordinator leases the venue and reimburses participants for their transportation expenses, using funding from bilateral development assistance. He also publishes meeting reports in the local press.

The NGO board consists of water user association chairpersons as well as officials and citizens interested in reforms. One board member is a retired high-level official with access to the government and top administrators in the irrigation department. He links bottom and top by relaying to the minister Sahayoga meeting resolutions and feedback on his department’s management of the canals and by offering practical steps toward reform that can be speedily implemented. Annual expenses (salary and operational items) do not exceed US$15,000.

Benchmark competition allows users, decision-makers, and others to assess an agency’s performance by comparing service delivery, productive efficiency, and environmental performance of any local irrigation agency against data entered by sister organizations elsewhere in the country according to a protocol that ensures comparability.

Benchmark competition may promote reforms by ending the insular nature of irrigation systems, especially if data are published. Without publication or onsite visits, managers and users cannot compare the performance of different schemes. Publication also allows nonagency professionals to assess scheme performance (World Bank, in press).

Third-party monitoring may keep reforms on the national agenda, especially where agency resistance is stiff and the government is not overly powerful. The idea is to commission independent consultants or units such as university public administration departments to take regular stock of the progress made by the government entities involved in the implementation of reforms. If a department is to draft a new ordinance, the
unit may assess the department’s progress against an agreed-upon time-
line. If the revenue department will no longer collect the water tax, it may
need to reorient the tax collectors. The unit may assess the progress the
revenue department is making in doing so. If the reform unit plans to
train and install 50 water-user associations a year, the unit may assess the
quality of training as well as user satisfaction.

Every 6 to 12 months, reform advocates and other stakeholders meet to
discuss each stakeholder agency’s progress. Such meetings help maintain
momenum and keep the reforms on the national agenda through reports
in the media. The meetings also reveal any stumbling blocks to reform
that need government involvement. The ON reform unit has used this
tool extensively.

(9) Creating and informing a unit to explore integrated water resources manage-
ment options. In 1973, the government of Mexico, the World Bank, and the
United Nations Development Programme created a unit to come up with
nonstructural measures to keep the growing water scarcity from becom-
ing a crisis. The unit, composed of Mexican and international personnel,
proposed a new water culture among users and increased user participa-
tion. Its engineers said that water had to be managed at the level of river
basins, that a single water agency had to be created to unify water-related
responsibilities, and that a financial system for water had to be created.
Their ideas helped shape a reform package for the 1990s in which the gov-
ernment transferred O&M of its irrigation schemes to the users.

(10) National and international study tours and seminars. Tours are valuable,
classic tools. Turkey’s reforms were enabled in part by a visit by agency
officials to learn about Mexico’s reforms. Indonesian engineers visiting
Andhra Pradesh in India saw with their own eyes that farmer organiza-
tions were capable of operating tertiary canals, and some gave a push to
Indonesia’s reforms upon their return. International seminars allow
agency staff and farmers to exchange views with counterparts, as well as
to discuss key topics such as monitoring implementation and using pri-
ivate sector incentives. These national and international seminars are or-
genized by an NGO established by the World Bank Institute in 1995 under
the name International Network on Participatory Irrigation Management
(INPIM) (www.inpim.org).

As the irrigation management issue rises on the national agenda, orga-
nizations and individuals with no direct interest may enter the policy arena,
helping to counterbalance vested interests. After a decade or so, national
opinion leaders may come to judge the department’s management of the
schemes ineffective, costly, or outdated. Farmers will have experienced
the benefits of reforms, and their leaders may be ready to support change.
When outside events open a window of opportunity, the government may find the nation’s power balance tipping toward reform.

**Implementation and consolidation**

During implementation, reforms are particularly vulnerable. Established institutions rest on a domestic stakeholder balance, and reforms that upset that balance will elicit responses, especially from losing stakeholders. These stakeholders may react at any point in the process, but are more likely to unite when implementation and consolidation make the effects of reform visible. Countering their actions requires a view of implementation as interactive rather than linear.

The linear view presents implementation as a purely technical and administrative task. Government and donors painstakingly analyze and then select policy and reform options. After the decision to reform has been made, administrators are put in charge of carrying it out. This image is not, however, true to type. Research on policy change and reform processes shows that implementation is shaped significantly by the actions of individuals in strategic locations (Thomas and Grindle 1990:1165), a finding in keeping with our analysis of the ON reform process. Implementation is therefore best achieved when policymakers and implementers continue to analyze political feasibility by examining conflicts and modes of resolving them and sequence time and tweak reform components accordingly.

Implementation and consolidation of reform are rarely entrusted to the agency being reformed. Unless it has compelling reasons and incentives to implement the mandated changes, the agency will resist them, if only because the costs are short term and concern its staff, while the benefits may be long term and concern other stakeholders. As the Sindh reform leader remarked during the World Bank Water Week of 2003, “An irrigation department cannot be expected to sever its head and serve it on a platter.”

To overcome this impasse, implementation may theoretically be entrusted to an interagency task force, but in practice it is assigned to a special agent reporting to and trusted by the president and respected by engineers and farmers. The special agent’s first task, often assumed before accepting the appointment, is to ensure that the government makes enough money available to implement the changes.

Once funding is assured, the agent’s time-bound assignment is usually best characterized as a brokerage. He or she paces the reforms by establishing their legal and administrative framework and by negotiating deals with losing parties and the conditions under which winning parties take
up their new responsibilities. He or she makes sure that information is collected on the progress of reform implementation, formulates emerging implementation issues, consults with relevant stakeholders, and decides and acts upon these issues in such a way that stakeholders continue providing political support. In the meantime, he or she liaises with other agencies and departments to ensure that they generate enabling regulations or policies vital to implementation.

**User funding of O&M as normal practice**

Implementation of reforms should result in the integration of the nation’s irrigation schemes into the ranks of government-owned schemes where users fund O&M. This is the normal end-stage of investment in the construction of government-owned hydraulic infrastructure.

Nearly half the world’s irrigation systems result from private investment (Vuren and Mastenbroek 2000:7). Private systems include the multi-user systems that farmers build, inherit, and manage on hillsides (for example, in Bolivia, Indonesia, Mexico, Nepal, Peru, Philippines), in desert oases (for example, the edges of the Sahara and Arabian deserts), in coastal swamps (for example, West Africa, Vietnam), and elsewhere (for example, Afghanistan’s and Iran’s underground channels). Other private systems are installed on private farms and operated by a single user. The users maintain these systems because they own them.

From this perspective, government funding of O&M can be understood as a temporary measure that buys time while effective management institutions are built. User funding of O&M signals the end phase of government investment in irrigation infrastructure. User funding of O&M is practiced in countries on every continent. It is also a goal of governments in many countries where public funding for O&M has become deficient, among them Brazil, Cambodia, the Dominican Republic, Ghana, India, Kenya, Nepal, Niger, Pakistan, South Africa, Tanzania, Thailand, Vietnam, and Zimbabwe.

Government O&M funding usually switches to user funding only decades after construction (table 6.2 and box 6.1). This time lag underscores the strong resistance prompted by most irrigation management reforms. First, generations of engineers have worked within a paradigm of government-funded O&M. They may therefore find it hard to switch to user funding, which, from their perspective, puts both the infrastructure and their livelihoods at risk. Second, generations of farmers have also become accustomed to what they see as an entitlement that they are initially unwilling to relinquish.
Table 6.2 Timeline for switch from government to user funding of O&M

<table>
<thead>
<tr>
<th>Country</th>
<th>Construction era</th>
<th>Switch to 50–100% user funding</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mali, Office du Niger</td>
<td>1935–1945</td>
<td>1995</td>
<td>50–60 years</td>
</tr>
<tr>
<td>Mexico</td>
<td>1930–1950</td>
<td>1990s</td>
<td>40–60 years</td>
</tr>
<tr>
<td>China</td>
<td>1950s</td>
<td>1990s</td>
<td>40 years</td>
</tr>
</tbody>
</table>

Source: Authors.

Box 6.1 From agency to user management in the American West

Frederick Newell, a U.S. Bureau of Reclamation irrigation engineer, wrote a book in 1916 about his experience with irrigation development in the western United States. His observations may also apply in Africa, Asia, and South America. He said it would take many years of hard work to reach the point where additional farm income from irrigation would cover interest charges and recurrent costs for operation and maintenance. “Ultimately these will be met, but in the first few years, perhaps during ten years, the outgo so far exceeds the income that bankruptcy threatens” (quoted in Roelofs 1998:16).

Other illuminating quotes follow.

“Under earlier pioneer conditions . . . irrigation canals were built by cooperative effort and thus operated. . . . Where the government builds canals, the same degree of community life is not possible at the outset. Settlers do not have the same interest in each other’s success and it has rarely been possible for them to join together in distributing water fairly among themselves” (Roelofs 1998:17).

“The irrigation project built by . . . a Government is destined ultimately to go into the hands of the water users. . . . The manager who is thus acting as agent of the original builders must look forward to the time when the water users themselves will exercise more direct control and make such provisions as may be necessary toward aiding the water users in appreciating the responsibilities which they should assume” (Roelofs 1998:15).

Only during the 1960s and 1970s did the U.S. agency transfer management of most of its schemes to the users.

Summary

The political economy of the ON reform process is typical of irrigation reform processes elsewhere. The main stakeholders were farmers and agency personnel. Both were passive players. Farmers were dissatisfied
but dispersed and unorganized, unable to do more than express their dissatisfaction. Most agency personnel opposed reform initiatives in accounting, land tenure, and fee management. The ON reform process was atypical to the extent that the regime depended for its survival on the support of urban consumers who might riot if reforms made rice scarce and expensive.

Not until 1980 did some Malian government officials share the donor diagnosis that the ON needed reforms. These officials were crucial, for they helped the process take off. Their numbers rose as reform advocates, through trial and error, devised politically feasible solutions. Farmers responded by increasing production and securing the supply of affordable staples to urban consumers while the emerging institutions lowered the prestige of the once-powerful agency. When donors demanded that the government consolidate the reforms, it could oblige with little risk, because a new stakeholder coalition had replaced the earlier one. Implementation took the path of other reform processes when the government appointed a unit responsible to the highest political level.

Likewise in countries other than Mali, few political actors take an interest in the performance of the irrigation sector. This lack of interest leaves governments little choice but to build support within the sector in the hope of attracting nonirrigation players who can help tip the balance. To promote changes in the existing stakeholder coalition, governments may, as a first step, broaden the arena in which they make decisions on O&M funding by taking the issue of unsatisfactory performance to parliament and to the public. When after some years a sizeable portion of the political community agrees that the management of the nation’s irrigation systems presents serious problems, government may encourage farmers, national management institutes, NGOs, and other secondary stakeholders, as well as the irrigation department itself, to test solutions that bring in modern management perspectives.

Governments may make this testing phase more useful by monitoring the political feasibility of the test output. Where water is becoming scarce and a debate is emerging on the need to build institutions for integrated water resources management, governments may persuade forceful players, such as utilities, domestic and industrial water users, and environmental groups, to join the stakeholder coalition for irrigation reform. When at last an opportunity to consolidate or implement reforms materializes, governments may preempt or reduce resistance through analysis of and planning for the political feasibility of implementation.

Notes

1. Several are posted on the website of the World Bank’s Social Development Department.
2. Van Halsema and Murray-Rust (1997:175–187) recorded the “as built” dimensions of 49 outlets on the Kalpani distributary of the Lower Swat Canal in Pakistan’s Northwestern Frontier Province. They report that five months after rehabilitation only 5 out of 49 outlets were built as designed and that 29 had dimensions that would result in discharges at least 10 percent greater than design. Expatriate construction engineers said that they had been unable to resist pressure by their client, who probably had taken bribes from farmers.
Appendix A
Summaries of Major Official Documents

Appendix A.1
Terms of Reference of the Government General Delegate in Charge of Office du Niger Reform

1. Goals

- Streamline the functions of the Office du Niger (ON), focusing on operation and maintenance (O&M) and extension, including assistance to strengthen farmer organizations
- Strip the ON of all commercial and industrial activities
- Downsize the ON staff
- Provide farmers with land-tenure security and control over the use of water fees

2. Working Conditions and Relationships

- General delegate reports to the prime minister’s office
- General delegate has ON reform as his full-time, sole assignment
- General delegate has no involvement in ON day-to-day management
- General delegate is empowered to manage the budget of his unit and to recruit personnel from within or without the civil service
- General delegate completes ON reforms within three years

3. Expected Output

- Completion, enactment, and implementation of the set of laws, decrees, and ministerial orders defining ON institutional reform
- Smooth management of staff retrenchment
- Firm commitment on and initiation of implementation of the status of the units and assets taken from the ON; transfer to other government agencies, leasing, liquidation, or privatization
4. Appendixes

- Schedule of activities
- Three-year budget estimate with sources of financing for the general delegate’s unit and the costs of reform, including staff severance allowances

### Appendix A.2

**Financing Reform of the Office du Niger**

**Table A.1 Budget and funding of the reform unit, April 1993–March 1996 (in thousands of CFAF)**

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Government of Mali</th>
<th>France</th>
<th>European Union</th>
<th>Netherlands</th>
<th>World Bank</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>6,746</td>
<td>107,471</td>
<td>14,949</td>
<td>64,575</td>
<td>193,741</td>
<td></td>
</tr>
<tr>
<td>Office renting</td>
<td>4,500</td>
<td>4,500</td>
<td></td>
<td></td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>Equipment</td>
<td>4,505</td>
<td>10,933</td>
<td></td>
<td>18,395</td>
<td>33,833</td>
<td></td>
</tr>
<tr>
<td>Operating costs</td>
<td>13,716</td>
<td>4,346</td>
<td>21,677</td>
<td>16,221</td>
<td>55,960</td>
<td></td>
</tr>
<tr>
<td>Consultants</td>
<td>17,029</td>
<td></td>
<td>11,812</td>
<td>2,226</td>
<td>31,067</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,246</td>
<td>142,721</td>
<td>30,228</td>
<td>98,064</td>
<td>319,101</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Approximate exchange rate: US$1 = CFAF 300 before January 10, 1994; CFAF 600 after that date.*

*Source: Adapted from Aw, Tall, and Diallo 1996.*

**Table A.2 Cost and financing of severance allowances (in thousands of CFAF)**

<table>
<thead>
<tr>
<th>Netherlands</th>
<th>France</th>
<th>European Union</th>
<th>United States</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>623,817</td>
<td>598,196</td>
<td>348,505</td>
<td>299,999</td>
<td>1,870,517</td>
</tr>
</tbody>
</table>

*Note: Approximate exchange rate: US$1 = CFAF 300 before January 10, 1994; CFAF 600 after that date.*

*Source: Adapted from Aw, Tall, and Diallo 1996.*

### Appendix A.3

**Act No. 94-004 Reforming the Office du Niger**

**Chapter 1. Missions of the New Office du Niger**

Core mission: operation and maintenance (O&M) of overall infrastructure Public services contracted to the Office du Niger (ON):

- Feasibility studies and supervision of investment works
- Land administration
- Extension, including assistance to farmer organizations

Initial capital provided from the assets of the former ON
Financing of ON operations

- All O&M costs will be recovered from farmers through water-fee payments, with one exception: the maintenance costs of the oversized main infrastructure will be borne by the national budget.
- The cost of public services contracted by the government to the ON will be borne by the national budget.
- The ON is allowed to receive subsidies from the government and grants from external donors.

Chapter 3. Further Regulations Required

Details of ON organization and operation will be provided by forthcoming decrees.

Signed by
The President of the Republic of Mali
March 9, 1994

Appendix A.4
Decree No. 94-142 on Office du Niger Organization and Operation

Chapter 1. General Provisions

The director general of the Office du Niger (ON) reports to the minister for rural development and environment.
ON headquarters are located in Segu.

Chapter 2. Management of the ON

- The ON board of directors is chaired by the ON general manager. Other members are one representative from the prime minister’s office; one representative from each of the ministries in charge of rural development, finance, water, interior and environment; and one representative each for farmers and for ON personnel.
- The board of directors decides on agency policy, the annual work program and budget, and staff salaries and benefits, and reviews audit reports.
Appendix A.5

Decree No. 96-188 on Land Administration and Management of Operation and Maintenance

Chapter 1. General Provisions

The government, owner of the Office du Niger (ON) infrastructure and land, entrusts the ON with operation and maintenance (O&M) of infrastructure and administration of developed land and land earmarked for development with water abstracted from the Markala Dam.

This mandate covers nonirrigable lands such as village sites in the scheme area that may be required for the use of irrigated land.

Chapter 2. Assignment of Responsibilities for O&M of Various Hydraulic Units

Main infrastructure (enumerated in the decree): financing by the government, implementation by the ON.

- Primary and secondary canals: financing by farmers, through the water fee; implementation by the ON-farmer joint committees (see below)
- Tertiary canals: to be maintained by farmers, each for the land served by these canals, under the oversight of ON management

Chapter 3. Land-Tenure Types

Land-tenure types authorized on the ON scheme are annual farming contracts, farming licenses, long-term leases, and housing licenses.

Common features of annual farming contracts and farming licenses

- No discrimination based on gender is allowed.
- The water fee is meant to recover the full costs of O&M (except the maintenance of main infrastructure). These costs include the maintenance of
primary and secondary canals, salaries and operating expenses of ON personnel assigned to O&M, and a share of ON overhead costs.¹

- The zonal O&M joint committee (see below) can waive payment of the water fee in case of crop failure for reasons beyond a farmer’s control.
- Failure to pay the water fee when the fee is not waived results in the farmer’s eviction from the irrigated land.
- Land under these two land-tenure types cannot be sold, mortgaged, or leased.

**Special features of the farming license**

- The farming license is meant to provide land-tenure security by providing an open-ended usufruct right on the same plots of a farmer’s holding.
- Any farmer who has met his/her obligations under an annual farming contract for two successive years is eligible to upgrade it to a farming license.
- The farming license is transferable to the holder’s heirs who, in turn, have the right to divide it.

**Features of the long-term land lease**

- The lease can be granted only on undeveloped land.
- The maximum term is 50 years.
- The licensee pays a special tax to the government and a water fee to the ON, depending on the services delivered: water alone or water and maintenance of the primary and secondary canals serving the leased land.
- The land reverts to the government at the end of the lease unless the lease is renewed.

**Features of the housing lease**

- Housing license is granted for a piece of land to a farmer holding an annual farming contract or a farming license.
- A holder of a housing license who is evicted from the irrigated land has the right to keep his/her house or to sell it.

**Chapter 4. Joint Committees**

- In each zone, two types of joint committees will be set up: one for O&M management and the other for land administration.² Both are chaired by the zonal director and are made up of equal numbers of ON ex-officio personnel and elected farmer representatives.
- For each secondary canal, there is a joint O&M committee.
- A zonal land administration joint committee is entitled to make recommendations for allocation and reallocation of lands in case of new development, rehabilitation, or eviction.
• A zonal O&M joint committee has the power to decide on the annual program and budget for infrastructure maintenance in its zone, award bids, oversee contractors, and authorize payments. The committee can waive water-fee payment and propose evictions when warranted (see above).

• Joint committees for O&M at the secondary canal level are made up of the ON officer in charge of operating the primary canal serving that secondary canal, the personnel in charge of operating the secondary canal, and farmer representatives appointed by their peers for tertiary canal operations. Those joint committees are in charge of day-to-day management of O&M, water-fee waivers, and evictions and of submitting annual work programs to the zonal O&M joint committee.

Chapter 5. Further Regulations Required

Details on the organization and operation of the joint committees will be provided by a forthcoming ministerial order.3

Signed by
The President of the Republic of Mali
The Prime Minister
The Minister of Rural Development and Environment
The Minister of Finance
The Minister of Interior
July 1, 1996

Appendix A.6
2002–2004 Performance Contract

Preamble

Refers to the evaluation of the previous two performance contracts since the completion of the comprehensive reform of the Office du Niger (ON) in early 1996,4 the 1993 national policy for the rice sector, and the objectives set for the ON since its comprehensive reform.

Chapter 1. Objectives and Schedule

Define commitments of the three partners (the government, the ON, and the farmers) for three years, starting on January 1, 2002.
Appendix A: Summaries of Major Official Documents

Chapter 2. ON Missions

Refers to Act No. 94-004 of March 9, 1994, reforming the ON.

Chapter 3. Partners’ Commitments

Commitments by government
• On policy matters—Devise a coherent set of policies to provide incentives for farmers’ participation, private investments, and foreign aid in land rehabilitation and development; storage and processing of vegetable crops; financing access roads throughout the scheme; and promoting awareness of environmental issues
• On support to farmer organizations—Strengthen savings and loan associations and village associations through adequate regulations and their enforcement
• On institutional and regulatory matters—Provide tax exemptions for maintenance works and imported farm equipment; carry out a study on promotion of private investments in irrigation; complete the ON development master plan study; provide the performance contract steering committee with the means and working conditions it needs to exercise its functions

Commitments by ON management
• On operation and maintenance management—Minimize water use (target 14,000 cubic meters per hectare of wet season rice on rehabilitated land); strengthen O&M joint committees at both zone and secondary canal levels; evaluate contractors’ performance and blacklist poor performers; and put every effort into eradicating water hyacinth.
• On land administration and tenure—Perfect the tests for evaluating beneficiaries’ financial ability to participate in land development; promote an environment conducive to private investment and land ownership; foster effective farmer participation in land administration through relevant zonal joint committees.
• On financial management—Meet the objective of earmarking 62 percent of water-fee proceeds each year for infrastructure maintenance; refine cost accounting procedures to better monitor O&M expenses; strengthen internal and external audits; make adequate provision for depreciation; keep farmers’ representatives in the zonal joint committees properly informed; and readjust the O&M budget to actual water-fee proceeds by end-May each year
On extension and assistance to farmer organizations—Promote high yields, cropping intensity, seed quality, and diversification by all categories of farmers on the scheme; develop synergy with nongovernmental organizations, donor projects, and other institutions working in this field; and use monitoring and evaluation systems effectively as a tool for improving performances

Commitments by farmers

• On partnership—Strengthen and professionalize farmer organizations; elect the best-educated and dedicated members to represent farmers on the joint committees; work out and implement a communication strategy between ON staff and farmers and between farmers’ representatives and their constituents

• On farming—Adhere to all intensification and diversification objectives while protecting the environment

• On O&M management—Set and collect a separate fee for the maintenance of tertiary canals, the proceeds of which would be managed by the secondary canal joint committees; abide by the rates and deadlines for paying water fees; strictly enforce the rules for the eviction of farmers defaulting on water-fee payment; and agree to bear an increasing share of the main infrastructure maintenance costs

• On land rehabilitation and development—Agree to contribute in labor and financially to the costs of land rehabilitation and development

Chapter 4. Steering Committee

Mandate—Monitor performance contract implementation and report to ministers of finance and rural development any problems requiring urgent action.

Composition and chair—Twelve members, including representatives of six ministries whose prerogatives cover matters under ON operations; the Chamber of Agriculture; the ON employees’ union; the ON director general; and the farmers’ three general delegates. The representative of the Ministry of Finance serves as steering committee chair.

Reporting—The ON director general has to submit a series of reports (listed in the performance contract) to the steering committee, which prepares semi-annual and annual progress reports.
Appendixes

List of performance indicators
Water-fee rates for the three years
National budget allocation requests for the three years
Land rehabilitation and development programs for the three years
Crop areas, yields, and cropping intensities planned
Adult literacy targets
Targets for allocating rehabilitated and newly developed land to women

Signed by
The Minister of Finance
The ON Director General
The Farmers’ Three General Delegates
February 8, 2002

Appendix A.7
Management of Staff Redundancy

1. Framework

Staffing requirements for the new Office du Niger (ON) compared to the old ON were as follows. Categories refer to skill levels; positions requiring professionals with university degrees are A, unskilled positions are E.

<table>
<thead>
<tr>
<th>Category</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old ON, at end of 1993</td>
<td>104</td>
<td>82</td>
<td>398</td>
<td>473</td>
<td>136</td>
<td>1,193</td>
</tr>
<tr>
<td>New ON</td>
<td>52</td>
<td>46</td>
<td>116</td>
<td>113</td>
<td>38</td>
<td>365</td>
</tr>
</tbody>
</table>

Source: Adapted from Aw, Tall, and Diallo 1996.

Agreement about severance allowances was reached after eight months of negotiations between the government’s general delegate and the ON employees’ union. The outcome was the equivalent of three years of salary funded by donors. One third was to be paid upon separation, and the second and third payments were to be made within six months after separation.
2. Procedures for Selecting Staff for the New ON

Procedures
- Publication of list and qualifications required for all positions
- Abolishment of all positions in the old ON. Recruiting for positions in the new ON through competition, except for posts of director general and financial controller, both to be appointed by the government
- Requirement for all staff to stay on duty until completion of the selection process
- Option for all old ON staff to separate voluntarily or apply for one or several positions in the new ON with the assurance that nobody would be denied voluntary separation
- Full compliance with Mali’s laws and regulations concerning redundancy
- Emphasis on fairness and transparency
- Use of six criteria for selecting personnel: three for qualifications—education/training, experience, and aptitude; three for behavior—assiduity, evaluation of past performance, and professional conscientiousness

Grading. Each applicant was graded for these six criteria from +2 (highest grade) to -2 (lowest grade). The applicant with the highest average grade was hired for the position considered.

Order of selection. Posts were filled from the highest to the lowest category and in descending hierarchy. Personnel for similar positions, for instance the five zone directors, were selected at the same time and the decision on their assignment left to the ON director general.

Selection committees. Each committee had two groups of members: those with grading powers and observers. The observers were representatives of the ON employee union and Mali’s Labor Department. They were entitled to comment on the grades.

The composition of the group of members with grading powers changed as lower positions were being considered:
- For the selection of the six directors: government general delegate for ON reform (chair), ON general manager and the adviser for ON matters to the minister for rural development and environment
- For the selection of 13 section chiefs: same members as above plus the newly selected director or group of directors who would supervise the section chief or group of section chiefs to be chosen
For the selection of other category A personnel (33), and all category B personnel (46): the ON director general (chair), the government deputy general delegate for ON reform, the director(s) or section chief(s) who would supervise the holder of the position under consideration.

For the selection of personnel in categories C, D, and E: each group of section chiefs who would supervise the group of positions being filled. Each committee group elected its chairperson.

3. Results

The whole selection process was completed in three weeks.

All severance allowances were paid three months ahead of schedule.

Only a small group of laid-off employees challenged the decisions in court. They lost their cases.

Notes

1. Total overhead costs of the ON are paid from the proceeds of water fees and from the national budget in proportion to their share of ON staff costs.

2. A zone covers on average about 12,000 hectares of irrigated land.

3. Comment: this was accomplished through Ministerial Order No. 96/1695, dated October 30, 1996.

4. Major innovations of the present performance contract are making participation by beneficiaries a standard approach for land rehabilitation and development; promoting private investment in land development by devising appropriate land-tenure and financing mechanisms; and securing adequate maintenance of tertiary canals by collecting a separate fee, which is managed by secondary canal O&M joint committees.

5. In total, 183 staff opted for voluntary separation.

6. If all applicants scored grades below 0 for a position, it was to be filled through external recruitment. However, in practice that situation did not occur.

7. For instance, all five newly selected zone directors participated in the selection of the five O&M zonal section chiefs.

8. For instance, the group of five zonal extension section chiefs participated in the selection of the village extension workers for the whole ON.
Appendix B
Concepts and Institutional Options in Irrigation Reform

This appendix discusses concepts and institutional options for reforming irrigation management institutions. It is intended to help readers assess the need for reform, devise the next steps, and contribute to debates on institutions and incentives.¹

Governance

Improving irrigation institutions is usually about changing governance: the definition and distribution of responsibilities, accountability, incentives, and controls that govern the behavior of managers, users, ministry officials, contractors, and others in the irrigation sector. Governance is usually distinguished from management. A governance framework is the institutional environment in which farmers, field personnel, and managers run a system. It reposes on a coalition of stakeholders in society at large and usually changes only when that coalition changes.

New coalitions usually arise when the economic and political landscape is shocked. In the case of the Office du Niger (ON), the first shocks came in 1960, with the end of colonial rule. They resulted in irrigation reform in 1993, as economic liberalization and multiparty democracy were on their way. In other countries as well, irrigation governance remained unchanged for decades. While independence brings immediate formal changes in relations between a government and its citizens, the responsibilities of irrigation personnel and farmers usually change only decades later.

Institutional options

Because governance is about institutions, institutional options are all important. We define institutions as the rules that stakeholders negotiate or impose to constrain access to resources (power, authority, prestige, water, money, knowledge, expertise, housing, food, and so on). These rules usually express the interests of the parties with the greatest bargaining power.

In irrigation, institutions form a seamless web with infrastructure. Infrastructure connects people to resources. It may do so in several ways:
through open canals or pipes, interconnected or hydraulically autonomous canals, automatic or agent-operated gates, fixed or adjustable tertiary inlets, and other mechanisms. User access to water is therefore regulated by both institutions and infrastructure. Hardware as well as institutional choices express the interests and values of the parties with the greatest bargaining power. Reform advocates may therefore seek to shift the balance of power by reconfiguring hardware as well as by reshaping institutions. (For examples of the hardware point of entry, see chapter 3.)

Institutions should be distinguished from organizations. Organizations are groups of people who band together to exploit the opportunities offered by institutions and infrastructure. Organizations have their own internal rules, some official and some unofficial. Officially, departments of irrigation are vertical organizations with hierarchical controls and a mix of incentives dominated by civil service–type security of tenure, professional satisfaction, and social prestige. Unofficially, they may have understandings with farmer leaders not to meddle with farmers’ nighttime management of the canals or to allow certain personnel to auction off water to the highest bidders.

Irrigation institutions differ in the location of ownership of the infrastructure, in the way they raise resources for operation and maintenance (O&M), and in their capacity to handle tasks. Eight institutional arrangements are current in irrigation management (table B.1).

People may merge types into new combinations. They do this during reforms, as they bargain for new rules. For example, some provinces in China are modifying their departmental agencies. These agencies used to manage systems from intake to tertiary, but now are being split into a public utility part called a “water supply company” that manages the main, primary, and secondary systems, and a water user association part that manages the tertiary canals. A key component of this change is the establishment of a supplier-client relationship between the water supply company and the user associations for the delivery of bulk water at the tertiary intake.

Another example of combined types is found in the water supply sector. In Chile, the Netherlands, and Poland, water supply companies are owned by local governments but managed under private company law. The idea is to spur cost effectiveness and client orientation by making the companies operate on the market for private capital.

Institutional change may require changes in the infrastructure. In the reforms in China, measurement devices (Parshall flumes) were installed at the heads of the tertiary canals to allow water user associations and the water supply company to determine the discharge flowing into the tertiary. In Australia, the shift from supply- to demand-driven delivery required the installation of telecommunication lines between users and
### Table B.1 Institutions current in the management of multiuser schemes

<table>
<thead>
<tr>
<th>Type of institution</th>
<th>Governance</th>
<th>Owner of system</th>
<th>Source of funding</th>
<th>Management capacity</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Irrigation</td>
<td>Staff accountable to minister</td>
<td>Government</td>
<td>General taxes and small contribution from user fees</td>
<td>Limited: civil servant status and intervention by politicians</td>
<td>India, Pakistan, Indonesia, China</td>
</tr>
<tr>
<td>Public utility company</td>
<td>Board named by line departments and regional governments Sometimes with user representation General manager accountable to board</td>
<td>Government or company</td>
<td>Start-up capital from governments Income from water fees, possibly augmented by subsidies</td>
<td>Specialized and professional Can handle complex tasks on large schemes</td>
<td>Italy, Morocco, Macedonia, Asian republics, Mali, Kenya, Sudan, Nigeria</td>
</tr>
<tr>
<td>Local government</td>
<td>Manager accountable to local or state council</td>
<td>Local government</td>
<td>Land taxes, water fees, other local revenues</td>
<td>Limited due to other responsibilities Possible outsourcing of O&amp;M</td>
<td>Turkey</td>
</tr>
<tr>
<td>Irrigation district</td>
<td>Board elected by users Government oversight on upkeep General manager accountable to board</td>
<td>National government</td>
<td>Working capital by user fees, some subsidies</td>
<td>Complex technical tasks through hired specialized, professional staff</td>
<td>United States, Mexico, Argentina, Italy, Senegal</td>
</tr>
<tr>
<td>Private shareholder company</td>
<td>Board elected by investors/owners Manager accountable to board</td>
<td>Investors</td>
<td>Working capital from owners Income from fees May be profit making (hydropower)</td>
<td>Depends on scale</td>
<td>United States, France</td>
</tr>
<tr>
<td>Mutual company</td>
<td>Board composed of holders of land, water rights Manager accountable to board</td>
<td>Right holders</td>
<td>Working capital by right holders Income from water fees, other sources</td>
<td>Scale usually small to moderate</td>
<td>United States</td>
</tr>
</tbody>
</table>
agency. As these examples show, usually only slight modifications are needed.

### Effects of reforms

Reforms generally reduce government spending on O&M enough to make system management financially sustainable. Few improve water delivery, despite claims that reform advocates tend to make at the start of the process. Reliability and adequacy remain the same, as does the lack of water in the tails (Kloezen, Garcés-Restrepo and Johnson 1997; Vermillion 1997). Until research explains why this is so, it may be supposed that water user association chairpersons elected by farmers in the head and middle reaches have little interest in reducing their water supply for the benefit of a few voters in the tail reaches. The water-fee income that tail-enders would contribute is of little importance to the others, because water fees are only 5 to 10 percent of the gross value of output.

By contrast, transfer of water service to private, profit-motivated entrepreneurs may rapidly improve water delivery to the tailenders, as happened in a 592,300-hectare irrigation scheme in China’s Northwestern Shaanxi Province. In 1998, the province began to turn over the management of the tertiary canals to private operators. Third-party monitoring showed that within three years, 19,400 hectares of abandoned but topographically irrigable land were recovered, representing more than 3 percent of the command area and benefiting more than 52,000 farming households. In addition, the physical conditions of the irrigation works improved significantly, since operators invested an average of US$825 per tertiary in lining and rehabilitation (Li and Liu 2000).

The province obtained these quick results by turning the agency’s lateral heads into private operators working on their own account. The former heads are now paid a service fee per cubic meter of water sold to

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### Table: Concepts and Institutional Options

<table>
<thead>
<tr>
<th>Type of institution</th>
<th>Governance</th>
<th>Owner of system</th>
<th>Source of funding</th>
<th>Management capacity</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water user association</td>
<td>Board manager elected by users from their midst</td>
<td>Users</td>
<td>Labor, cash, or both supplied by owner/users</td>
<td>Scale usually small</td>
<td>Kenya, Tanzania, Ethiopia, Sudan, Guinea</td>
</tr>
<tr>
<td>Outsourcing to management companies</td>
<td>Through contract with principal, courts</td>
<td>Principal, usually government</td>
<td>User fees, sometimes government grants</td>
<td>Can handle complex management tasks</td>
<td>China, Niger (test), Ghana</td>
</tr>
</tbody>
</table>

Source: Adapted from Vermillion and Sagardoy 1999.
farmers. The operators raise their income by increasing sales. They invest money, saved or borrowed, in canal repairs and lining, and invest time prodding farmers to stagger planting dates. In this way, the former heads extend the period of peak demand, allowing water delivery to more farmers. As lateral heads, they had invested neither money nor time.

An evaluation of this experiment shows that organized farmers have to be included in the contracts of the former lateral heads. If a former head has a contract only with the agency, the excluded farmers are vulnerable to extortion. Many former lateral heads are political strongmen, and their laterals are usually several hours away from the system manager’s office. For both of these reasons, individual farmers cannot count on protection by any city-based regulatory authority. They must therefore have immediate and collective control over their service provider.

Private sector incentives in irrigation management

Because water user association–based reforms often do not improve water service by themselves, donor officials are now looking at other ways to improve irrigation management. One possibility is linking pay to performance through private sector mechanisms, which has spurred rapid improvements in irrigation management in China and Vietnam. In China, it has also brought private capital to government-owned irrigation systems and relieved agency payrolls. Public-private partnerships in urban water supply have also generated substantial management improvements.

The experience of the water supply sector with public-private partnerships can enrich debates on irrigation management reforms if participants take into account that in gravity irrigation, water demand, as an input in economic activities, depends on many factors. In urban water supply, however, water is an essential commodity with a predictable demand and low price elasticity.

- It is physically impossible to deprive a nonpaying rural user of water (more than 90 percent of all irrigation systems use open canals). Conversely, in cities water is piped in, and consumers can be cut off.
- Volumetric individual charging is impossible in the countryside, whereas consumers in cities have individual meters.
- Breaks in water supply cannot be temporarily addressed in the countryside, unlike in cities, where improvised trucking may be possible.
- City-based regulation to protect farmers against abuse is ineffective because most farmers are far removed from the regulators. By contrast, urban water consumers’ relations with the suppliers are impersonal. They can make visits and send complaints to the regulators, who can come and inspect.
## Table B.2 Private participation in water utilities and irrigation management

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service contract</td>
<td>A utility hires a private company to perform specific tasks, such as read meters, collect bills, and maintain networks. Duration: 1 to 3 years</td>
<td>May help agency become acquainted with outsourcing, develop market of service providers, and initiate debate on reforms.</td>
</tr>
<tr>
<td>Management contract</td>
<td>A utility hires a company to manage services, such as operating and maintaining the network. The contract specifies whether the company is also responsible for large repairs and replacements. The company’s client is the utility. The utility pays the company. The utility retains most risks but may shift some to the company through performance standards and bonuses. Duration: 3 to 5 years</td>
<td>Same as above.</td>
</tr>
<tr>
<td>Lease contract</td>
<td>A utility signs a contract with a company to take over operation and maintenance, including replacement of components with a short economic life. The company is paid through the fees that it collects from the users. The contract contains clauses for price revision, for protection against inflation, and against injurious government actions. The utility retains legal ownership, responsibility for system expansion, asset replacement, and the financial risk of capital investments. Duration: 20 to 30 years</td>
<td>Yields many of the benefits of outright privatization through sale of assets but avoids the complexities of lawmaker approval or capital market financing because the utility retains legal ownership. Government finances major investment.</td>
</tr>
<tr>
<td>Concession contract</td>
<td>Similar to a lease contract but, in addition, the private company assumes responsibility for investment in long-term fixed assets. The contract sets out an investment program to meet service goals. The concessionaire must return the infrastructure in good condition at the end of the contract period.</td>
<td>Common. Cost of private capital can be high, given the risk profile of foreign companies in emerging markets. Assumes contract is not contested, regulatory authority and sizeable capital market are in place.</td>
</tr>
<tr>
<td>Build-operate-transfer contract (BOT)</td>
<td>Variant on concession contract. Company builds and finances a facility that reverts to public ownership. The concessionaire generally does not take commercial risks. Foreign companies may require risk premiums.</td>
<td>Expensive to put in place due to need for costly expertise to solve financial and legal complexities related to risks and payment schemes. Cost of private capital can also be high, given the risk profile of foreign companies in</td>
</tr>
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When delivery is unreliable, farmers respond by changing gate openings at night to protect their crops and investments. This requires nighttime monitoring of gates, a rare task in urban water supply. The introduction of private operators into water delivery raises the issue of water rights. Bulk operators can sign water contracts with user associations only if they know they can get the volumes their contracts require from rivers or reservoirs. Irrigation agencies usually lack such formal rights. Resolution of this issue becomes urgent when water becomes scarce and operation becomes based on demand management. Resolution of the water rights issue is not a precondition for reform when water is not scarce, as the ON case demonstrates.

For concessions and build-operate-transfer (BOT) contracts to attract private investors, demand for irrigation water has to be predictable and farmers’ willingness and capacity to pay well established. Where these conditions are not met, management contracts, service contracts, and leases can help improve labor productivity, customer orientation, and financial and human resources management of an irrigation utility. In due course, the utility may be able to meet the conditions for concessions and BOT.

Sale of hydraulic infrastructure to private agents is rare and unlikely for three reasons. First, outside investors are not attracted by returns that depend on agricultural prices, whose fluctuations are outside investors’ control yet affect farmers’ ability to pay fees. Second, the value added on systems used by farmers growing subsistence crops is minimal, which

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**Table B.2 Private participation in water utilities and irrigation management—continued**

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<thead>
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<th>Type</th>
<th>Description</th>
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<tr>
<td>Full private ownership</td>
<td>Sale of utility ownership to private investors.</td>
<td>Assumes sale is not contested, regulatory authority and sizeable capital market are in place.</td>
</tr>
<tr>
<td>Joint venture company</td>
<td>A province or city enters into a joint venture with a private company. The joint company often has a service franchise through a leasing or concession contract.</td>
<td>Attractive when full operating responsibility cannot be passed on to a private company or the company cannot float bonds. Downside: public accountabilities are obscured.</td>
</tr>
</tbody>
</table>

*Source:* Greg Browder, personal communication.
limits the revenue potential. Third, most investors avoid the liability contingent in owning large hydraulic assets. Only the government of New Zealand has transferred ownership of its irrigation systems to farmers.

**Triggering and feeding “out-of-the-box” thinking**

Irrigation is not only about canals, people, or crops. It is an interactive process among hydraulic, institutional, and biological mechanisms, and the resultant whole cannot be explained by any single discipline. Piecing the three mechanisms into a new working whole is the reform challenge. A look at how this challenge was met during the ON reforms, without any manual for guidance, may be helpful.

The ON case shows the importance of

- Beginning with a survey of users’ views and analyses
- Creating field units of professionals from the three disciplines who are personally committed to reform to reach a common goal, can be aggressive if necessary, operate at a distance from agency control, and have guaranteed access to resources
- Securing an aggressive commitment from donor officials
- Providing for direct links and face-to-face exchanges between the field unit, the government, and its main sources of reform funding (ARPON and RETAIL staff participated in high-level meetings, presented their field experiences, and proposed interventions that were initiated as experiments.)
- Shaping technical interventions with an eye on the reform dimension (chapter 3)
- Monitoring results, preferably through a third party, and evaluating them with stakeholders.

**Transparency and financial accountability**

In irrigation management, the term “transparency” refers primarily to user access to agency accounting figures. Such access is necessary for sustainability, because farmers who can pay the water fees may not want to do so if they suspect that the fees will not be used for maintenance. Access to financial reports is also needed for accountability. Only if farmer representatives know how much money the agency received, and how it was spent, can they question the agency or department about allocations and actual use.

Transparency measures have a preventive impact. They move the center of gravity somewhat toward the users. They differ in terms of the expense and skills needed to enforce them.
Among the countries with the most transparent systems for financial accountability are the United States, France, Italy, Spain, Argentina, Colombia, Mexico, Japan, and Korea. Transparency measures used at this high end include circulation of annual reports by accredited external auditors concerning the agency’s financial, hydraulic, and environmental performance; the establishment of an open and independent complaint procedure; and user satisfaction surveys.

An intermediate accountability measure would be giving watchdog user groups resources to hire the technical expertise needed. Another would be the publication of a newsletter reporting reform progress. One newsletter in the Indian state of Andhra Pradesh, for instance, published news on reform progress but also on obstruction by staff and on sanctions for collusion with contractors.

At the lower end of transparency, people-friendly units of measurement are used in maintenance contracts, and farmers are involved in handling maintenance bids, as practiced by Andhra Pradesh, the ON, and the World Bank’s Water Resources Sector Adjustment Loan project in Indonesia.

Window of opportunity

Opportunities for reform may arise suddenly. A head of state who acquires power through a coup may seek legitimacy and voter support by decentralizing management of irrigation schemes. The sudden replacement of an autocratic military regime may oblige an irrigation department to cave in to long-standing demands from farmers and reform advocates to decentralize operation and management and transfer power to users.

Reform advocates can seize such opportunities if they made adequate preparations during the period of stagnation. These preparations would include public debates on monitored tests of institutional arrangements, trips by farmer leaders and staff to countries with completed or ongoing reforms and to international conferences on participatory management, user satisfaction surveys, and satellite imagery and analysis of areas served.

Windows do not remain open indefinitely, so reformers must quickly take advantage of reform opportunities. Reform opponents might regain control of positions in the irrigation department and deny “unfriendly” organizations access to irrigation schemes. Then the window would slam shut, and reformers would have to hope to catch the next chance.

Notes

1. This appendix relies heavily on North 1990, Vermillion and Sagardoy 1999, and the World Bank’s toolkit on public private partnerships in water supply (World Bank 1997a, b, c).

2. Expressed, for example, in easily verifiable units, such as the number of truck-loads instead of harder to verify metric or imperial units of volume and weight.
Appendix C
Toward Political Feasibility:
Five Country Histories

Long-lasting operation and maintenance (O&M) deficits do not automatically precipitate change. All 22 of India’s states run O&M deficits, but only two are reforming. Pakistan’s four provinces all run large deficits, but only one is reforming, and one other has halted reforms. Kenya’s irrigation schemes have had large budget shortfalls for decades, but the government has not committed to reforms, despite donors’ offers to help fund them. These are just a few examples from a long list. Loans and projects with institutional reform as a goal do not automatically result in reform, as seen in a growing number of World Bank loans (Diemer 2002). Policy analysis could often usefully be combined with analysis of ways of making reforms politically feasible (Brinkerhoff 1996).

Why deficits do not generate reform and why reforms are usually long in coming are questions explored in this appendix through the histories of five countries. The appendix focuses on what made reforms politically feasible or infeasible and takes the policy merits of reforms for granted. Its point of departure is that reform implementation is a process in which stakeholders shape and reshape proposals on the basis of the strength of their positions. It scrutinizes alliances between stakeholders inside and stakeholders outside the irrigation arena, the momentum these alliances lend to reforms, and the options to counter reform that they deny to reform opponents. It is concerned with long-term power shifts in the political community, not with the day-to-day politics of scheme water management or even the day-to-day politics of reform. It analyzes how debates and studies by reform advocates on reforming government schemes helped Indonesia seize its moment of opportunity, and how the lack of such focused debates helps explain why the Philippines missed its window.

Environmental issues help drive reforms, as this appendix shows. In the Australian state of Victoria, environmentalists combating soil and water degradation formed an alliance with business leaders seeking to improve the business climate and with grassroots activists intent on more local autonomy. In Mexico, water scarcity helped drive institutional recasting of water resources management. Together with drivers originating in bureaucratic turf fights, it led to irrigation management transfer. In
countries eligible for World Bank loans, ministries of finance are rarely active players, although donor officials often assume they are interested in stemming the losses caused by O&M deficits. Not only in Mali but also in Madagascar, an aggressive bilateral project with committed field staff pushed through reforms, using an opening afforded by the dominant political party.

Reforms are most vulnerable when implementation gives losers a full view of their losses and prompts them to mobilize allies. The five cases here show that democratic governments can hold the line only if their reform policies rests on active stakeholder coalitions that create political space. (What government and reform advocates can do to help such coalitions come about and stay alive is discussed in chapter 6 of the main text.)

Australia

Reform momentum is usually hard to generate inside the irrigation arena because there are only two players, and neither is interested. Farmers tend to be wary of losing O&M subsidies and taking on responsibilities. Agencies fear losing authority, prestige, resources, and jobs. Governments can often overcome farmer resistance if they grant farmers control over water, even when the farmers’ professional organizations initially oppose the reforms. Agencies are usually more resilient, for personnel are concentrated in a few locations, share outlook and esprit de corps, control substantial material and human resources, and have access to high-level decision-makers.

Simultaneously overcoming farmer and agency resistance generally requires an alliance with forces outside the irrigation arena. In the case of the successful reforms in the Australian state of Victoria, an outside push came from business, environmental groups, and a grassroots movement for increased local autonomy (Langford, Forster, and Malcolm 1999:25, 26).

In Victoria, and in Australia generally, irrigation was developed to promote closer settlement in the rural areas and to help war veterans reintegrate. As a result, the unreformed irrigation sector and agency

- Had little incentive to apply commercial discipline to water allocation: farmers used large volumes for low-value crops, such as pasture
- Had many small farms whose profit margins depended on the subsidy for irrigation water
- Recovered only 74 percent of current O&M in 1984
- Showed a budget deficit of $67 million
- Entrusted the largest user with the function of regulator
- Accumulated debt of $400 million and arrears in payments to employee pension funds
- Focused on engineering and construction rather than management.
The role of government had become complex. The Australian State Rivers and Water Supply Commission was responsible for policy and regulation as well as operational tasks, such as managing rural and urban water supply businesses and natural resources. It suffered from the contradictions between the earlier social imperatives and the contemporary demands of a new economic agenda. Pre-1980 efforts to improve the situation all failed. In response, the state’s liberal government established a parliamentary committee that, with bipartisan support, came up with a strategy to reform the rural water industry. The committee thoroughly examined many industry aspects, published extensively, and consulted widely. Its preparatory work generated a strong bipartisan willingness to make difficult decisions. Developments outside the irrigation arena helped forge a powerful pro-reform coalition of three stakeholder groups: business, environmental groups, and a grassroots movement for increased local autonomy.

Business, with its agenda of economic rationalism, led the reform movement. The globalizing world economy was forcing federal as well as state governments, on both Left and Right, to rework their economies. In 1984, Australia’s Labor government deregulated the banking industry and floated the currency, exposing the country to global competition. Tariffs and subsidies had protected manufacturers and many agricultural industries. Lowered barriers and reduced subsidies brought to light the low profitability of these enterprises. Reduction of the large public debt and of production costs became policy imperatives. Highly subsidized transportation and water utilities were early targets of government attempts to improve financial management and win the approval of the international capital markets that now largely determined interest rates. Industries were reorganized to separate regulatory from commercial functions.

Environmental groups came in a close second to the business leaders. Community concerns about the environmental effects of building dams and diverting large volumes of water were growing. In 1983, the “green” movement blocked a dam building site and made construction highly contentious. The action put a premium on nonstructural demand-management measures. Concerns about waterlogging and salinity caused by irrigation were also increasing. Debates about the imperative to reverse environmental degradation reinforced negative views of irrigation in society at large that were strengthened by the economic failure of a scheme in northern Australia. This backlash put the irrigation industry on notice to improve its economic and environmental performance—or else.

The third group consisted of the grassroots movement for broadening local autonomy. This group exerted considerable pressure for devolving authority to the lowest appropriate level of management and breaking down tightly centralized management systems. Local communities were
demanding greater involvement in decisionmaking through consultation and participation. During the second half of the 1980s, this decentralization trend tied in with the Land Care Movement. Rural Australia had a strong ethic of social cooperation, especially in emergencies, and heightened awareness of environmental threats at the grassroots level channeled this ethic toward local cooperation in meeting environmental threats.

In Victoria, a Labor government had come into power in 1982. It had an advantage in reforming rural activities because rural communities were not part of the political constituency of the Labor Party, so difficult decisions would have little impact on its electoral support. In June 1984, the Labor government introduced a law to improve service to consumers and initiate modern financial and resources management. It split the responsibilities of the expert-based State Rivers and Water Supply Commission into a policy formulation function, to be fulfilled by experts in a new Department of Water Resources, and an operational arm for the rural water industry in the form of a new Rural Water Commission (RWC). The commission was to be governed by a board composed of professionals appointed for their skills as well as representatives of rural water users. Its mission was to make the delivery of services more commercial. The commission chair was a biologist who was both an environmentalist and an agricultural water user.

The RWC’s first task was to draw the clear lines of accountability needed for effective management. Noncore functions were identified and separated, and subsidies and cross-subsidies were identified, although not all of them were removed. All urban water boards were separated except for the small town supplies. The RWC decentralized operations into nine centers and devolved authority to the community to design and implement salinity plans. In addition, the commission transformed tasks such as monitoring groundwater and salinity levels into contracts subject to competitive bidding.

The RWC developed a vision in which irrigation water supply would contribute to the wealth of the state by improving profitability while addressing the problems of financial and ecological sustainability. It set goals for customer service, productivity, and commercial viability and attempted to close the gap between revenue and expenditure in 20 years, making adequate provision for renewal of the infrastructure, primarily by reducing costs but also by raising prices. Ecological sustainability was to be achieved by providing the salinity programs with technical resources and by improving water allocation policies through environmental entitlements and transferability of commercial water entitlements.

The government and the RWC debated how to calculate O&M costs, weighing accounting arguments against considerations of political feasi-
bility. The government excluded from the calculus the opportunity cost of the original capital, although it had been acquired through loans. This decision helped make the reforms politically feasible because it lowered O&M costs by 75 percent and avoided a quadruple increase in water prices. Regarding the depreciation of the infrastructure, the government decided to base the capital component of the water fee on the replacement cost of the infrastructure (current cost depreciation). With 8 percent inflation, the first-year price increase would be 11 percent.

However, the government’s estimate of political feasibility had not allowed for an outside event that intruded. Falling commodity prices made the increase so unpalatable that users refused to pay their water bills. Users contested the calculations, arguing that the RWC’s accounting ledgers did not allow for the commercial calculation of cost and cross-subsidies. The government hired a consultant who proposed basing the capital cost component on renewal cost instead of current cost depreciation. This recommendation shifted the debate from what designers once thought was needed to what managers and users now felt was necessary to keep the system working. It allowed managers and users to find smarter ways of replacing service capacity and to negotiate trade-offs between prices and levels of service. Application of the new accounting principle lowered the capital cost component of the fee and hence the price increase. Above all, it ended the rate protest.

Political closure was reached. By 1992, the RWC had reduced operating costs by $33.4 million: 62 percent through improved performance, 22 percent through increased water fees, and 16 percent through new sources of income. It had built an environmental and water resources management knowledge base by funding research and had empowered 18 communities to set up salinity plans. It had decentralized and deconcentrated its operations.

Together, the three drivers—globalization, environmental restoration, and the quest for local autonomy—generated the political energy that the government needed to implement reform. Before 1984, these three drivers were not there, and every attempt at improvement failed. After 1992, the coalition stayed put, because the stakeholders who had helped shape the new institutions now nurtured an interest in maintaining and strengthening them. This consensus allowed the government—peacefully and without political controversy—to transform the commission into a state-owned corporation, financed solely by client payments.¹

Indonesia

Can failure to achieve full implementation of a reform trigger debates with stakeholders outside the irrigation arena? Can it also prompt them to help
prepare the ground for the day a reform opportunity comes around? Can these outsiders be vital allies in combating vested interests? These questions are answered by analyzing the reforms in Indonesia (Bruns 2004).

Between 1968 and 1993, Indonesia spent US$10 billion on irrigation, of which it borrowed 70 percent abroad. It now has 4.8 million hectares of government-owned schemes, most of them smaller than 5,000 hectares, and 1.5 million hectares of local schemes built by farmers. The collapse of oil prices in the mid-1980s caused a fiscal crisis that exposed the limits of construction and strengthened official voices emphasizing O&M. Scheme engineers responsible for O&M were joined by officials concerned about broader nonirrigation objectives in the ministries of home affairs and finance, the provincial governments, and the national planning board, known as BAPPENAS. Donors had become concerned as well.

The World Bank set a precondition for its first Irrigation Sub-Sector project loan (ISSP 1): that government adopt an irrigation O&M policy. The government obliged with its 1987 policy statement, committing it to raising budget allocations for O&M, turning over management of small schemes to water user associations, establishing water fees, reforming the administration of property taxes, and raising more resources from users. ISSP 1 and 2, which ran from 1989 to 1995, and the better-known Java Irrigation and Water Resources Management project (JIWMP), which ran from 1995 to 2001, supported implementation of irrigation O&M from, as well as spin-off projects funded by, the Asian Development Bank (ADB) and bilateral donors.

A variety of agencies and donors were involved in the design of the turnover program. But, once implementation began, most decision-making was concentrated in the Irrigation Department because it was the implementing agency, and decisions came to reflect priorities that differed from the ones pursued by the stakeholders who had designed the program. The design proposed to classify the schemes into three categories:

- Category A schemes, with no government-built components that could be “turned over” by revising administrative records
- Category B schemes, with government-built infrastructure that had recently been improved and would need only to be turned over to a water user association
- Category C schemes, with government-built infrastructure that needed both physical improvements and a water user association to which they could be turned over.

The national and provincial irrigation agencies had little interest in turnover, if only because their O&M budgets were based on the area under their management. They were more interested in construction, partly for purposes of rent seeking. Consequently, the national agency de-
veloped another classification, based on the need for physical improvement only. The agency concluded that all category A schemes needed improvement and that nearly all category B schemes were inadequate or incomplete and required construction. Bank project officials acquiesced. They could not find domestic support to counter the agency’s redefinition and were also wary of canceling the loan, partly because of Indonesia’s allies at the Bank.

A turnover pilot for setting up water user associations met a similar fate. The procedure started at the quaternary-block level of between 10 and 30 farmers. It built on local relationships and was to be linked to farmer involvement in setting priorities for improvements. Progress was to be monitored by steps such as formulating the charter and bylaws, electing officers, and receiving formal recognition from village and district authorities. During implementation, however, the agency ignored this bottom-up organizing process. Instead of being elected, the association officers were appointed by the authorities, and their constitutions and bylaws followed pet formulas. The water user associations were real on paper only, except that they became channels for collecting the water fee. Fee income declined after fees became part of the district budget and were no longer returned to the schemes. The shortfall was increasingly being offset by large subsidies from the central government. These subsidies blunted any remaining incentive to make irrigation self-financing and involve farmers in management.

Funding provisions for hardware were similarly thwarted. According to the turnover planners, construction would be an incentive for farmers, and farmer coinvestment would raise quality and promote ownership. But during implementation the agency started to refer to cost sharing as farmer “contributions.” Agency officials found farmer coinvestment hard to solicit and argued that it was unfair because farmers were also being burdened with the responsibility for O&M. Over the years, farmer investment dwindled.

During ISSP 2, O&M engineers lost control over project funds to personnel from large construction projects who were appointed to newly minted agency positions. Their appointment steered more and more World Bank and Asian Development Bank loans to construction, at the expense of institution building. When scheme O&M officers requested detailed maintenance assistance based on priorities they had painstakingly identified with farmers, the new project managers stuck to agency routine and allocated resources on an area basis. Also, they often awarded contracts for work that did not match these priorities but offered such opportunities for rent seeking as lining canals and building division structures. Their reactions destroyed all willingness among farmers and well-intentioned O&M officers to repeat the exercise.
Reform advocates came to understand that their approach of giving scheme personnel and farmers greater voice in defining O&M needs had failed. In addition, it had not reduced expenditures, for more than half of all O&M spending still went to staff payments. They concluded that control over expenditures should be taken from agency officials. During the 1990s, they held workshops and seminars to discuss what had gone wrong with the development of water user associations. Academics published research in a journal on irrigation studies, nongovernmental organization (NGO) workers communicated their field experiences, and they jointly published a newsletter. Donors introduced new approaches in surface, groundwater, and small-scale irrigation. Officials publicly supported them and privately criticized their official programs. At the 1996 national seminar called by the international network on participatory irrigation management, broad consensus became apparent among mid-level and senior officials about the shortfalls of the mainstream approaches and the need to apply the irrigation O&M policy principles and make more radical changes. Many intellectual battles had been won, yet implementation was retrogressing.

The wait was for a window of opportunity. It opened in 1998, when Indonesia’s autocratic New Order regime was replaced by a democracy, and changes in the leadership of the agency and the ministry put advocates of top-down, construction-focused approaches on the defensive. Laws on regional autonomy adopted in April 1999 laid the foundation for shifts in power and money flows from the central government to districts. Criticism of waste, corruption, and abuse of power brought wide acceptance of the need for (more) accountability and transparency in government programs and greater willingness to put money and decision-making in local hands.

Preparing new lending in late 1997, the World Bank intensified its dialogue on reforming the policy and institutions for irrigation and water resources management. The ADB had funded a study on options for sustainable irrigation development. Their efforts caught the attention of senior officials at BAPPENAS and other government agencies. The collapse of Indonesia’s currency gave the banks leverage, and the reform atmosphere generated support. In late 1998 and early 1999, an interagency working group led the formulation of reform ideas for irrigation and water resources management. It drew heavily on earlier discussions and studies, particularly a series of seminars organized by BAPPENAS with officials, NGOs, and academics as participants. The group also held public consultations in the capital and provinces. University experts helped it synthesize and clarify key principles. In April 1999, the key principles of an irrigation reform program were laid out in a Presidential Instruction and speech.
Five principles were enunciated in the Presidential Instruction:

- The government irrigation institutions were to be redefined as enabling rather than implementing. They were to regulate and provide advice as follow-up to technical audits. Farmers were to become the decision-makers.
- Water user associations were to be autonomous and self-reliant, have legal status, and be able to enter into contracts and open bank accounts. Water rights would give them a clear claim to water and a basis for negotiating water allocations within the basin.
- Transfer would be phased in and democratic. It would involve both small and large schemes. Areas not yet transferred would be put under joint governance, not left to “business as usual.” In the longer run, water user associations would be able to contract their own service providers.
- Fees would defray both O&M and rehabilitation and construction, for fear that limiting fees to O&M would encourage user associations to follow the agency’s example of deferring maintenance. Taking an incremental approach to improvement would work for the associations, in contrast to the agency’s capital-intensive “all in one shot” approach.
- User participation in irrigation would be coupled with user participation in basin management and pollution control.

In 2000, three models of participative construction were tested. According to an audit, contracts awarded directly to water user associations improved quality and raised output between 10 and 20 percent more than agreed, yet left savings for the association maintenance fund. Economic life expectancy increased two to four times. The audit also found that increased social control raised quality on the two other models as well. In one, only the associations supervised bidding and construction; in the other, between 85 and 90 percent of the work had been awarded to contractors who subcontracted between 10 and 15 percent of it to the water user association.²

Farmer empowerment is beginning to pay off financially for both government and farmers. It has come a long way—a dozen years ago, it could only be whispered about privately. All is not won, however. Old agency hands, with stakes in the prestige and rent seeking afforded by top-down management, are on the lookout for positions that thwart the new mode. But their odds of finding such positions are less favorable than during the aftermath of 1987. They now face both a government with an interest in protecting decentralization and a domestic reform coalition of senior BAPPENAS and Home Affairs Ministry officials, university academics, and NGOs ready to defend their achievements and able to speak publicly through a free press. The boards of water user associations are not likely
to willingly relinquish control over infrastructure that is vital to farmer livelihoods. All are allied to World Bank and ADB staff and are more certain now of receiving support in their struggle for user empowerment and against rent seeking.\footnote{1}

**Madagascar**

Donor officials tend to mention political parties only in relation to populist fee politics. Are political parties never helpful, and is Mali an exception, or can alliances with political parties help pierce the defenses of agencies? The reform of the Betsiboka scheme in Madagascar offers an insight (Musch 2001).

This 15,000-hectare rice scheme is located in northwestern Madagascar, in the floodplain of the Betsiboka, the country’s largest river. The scheme was built during colonial times for the benefit of a handful of French companies run by colonists who were shareholder, employee, and settler at the same time. They would cultivate approximately 1,000 hectares or operate a rice mill. The companies saw to O&M with almost military discipline, giving their canal managers the title of corporal. After independence, the companies merged into COMEMA, a semi-public Malagasy company owned by village cooperatives. The new company also prepared the soil and operated and maintained the hydraulic system. Yields averaged 4 tons of paddy per hectare. COMEMA retained its monopoly on rice processing and marketing, and land tenure remained unclear.

After a military coup in 1975, COMEMA changed its name to FIFABE and became a tool in the hands of politicians and central economic planners. Its staff ballooned, from 100 employees to 1,000. A water fee was introduced but kept low for political reasons: only 60 kilograms of paddy per hectare. Maintenance deteriorated, and with it the reliability of irrigation and drainage services. Rice prices were set so low that farmer purchasing power dropped to 60 percent of its 1971 level. Farmers switched to low-yielding semi-local varieties, harvesting 1 to 2 tons per hectare. FIFABE operated at a loss and became unsustainable. Small farmers became fearful of FIFABE corporals and their links with political party officials and big landlords. Some farmers left, and others survived by defaulting on credit.

In 1983, responding to this dire situation, the government asked Germany’s development bank for assistance. The bank funded a project team that rehabilitated canals, built a rice mill, and did some extension work. By 1986, liberalization of the rice market, negotiated by the International Monetary Fund and bilateral donors, reached the scheme. FIFABE lost its monopoly on marketing and processing, and the new rice mill was semi-privatized. Losing these sources of revenue, FIFABE ceased soil prepara-
tion and refused maintenance responsibility for the distribution system. Farmers and FIFABE personnel remained at loggerheads, and maintenance continued to be a huge problem.

The donor attempted to fill the institutional vacuum when designing a second phase. It coupled rehabilitation with building farmer management groups from the grassroots up. It invited farmers to form groups that would take into account the social criteria they thought crucial for collaboration and trust. Farmers were then invited to make suggestions for rehabilitation that could include redrawing hydraulic boundaries to match social ones. With the help of facilitators, the groups met with engineers and gradually took upon themselves such responsibilities as calling meetings and electing board members. Structuring the water user associations and redesigning the scheme proceeded in tandem: if one process fell behind, the other would stop until it caught up.

Participatory design began to spread throughout the scheme. Local politicians of several parties, however, promised to reinstate FIFABE and make it resume maintenance and credit. Their populist discourse made it hard for water user association boards to keep maintenance and water management going. To shield the associations from future election maneuvers, the project embarked on a strategy to give them a legal foundation and make them owners of the distribution infrastructure. It hired lawyers and, with the Ministry of Agriculture, FIFABE’s parent, set up a transfer committee. The first transfers took place in 1997, in the presence of the minister of agriculture himself.

We now return to the question posed at the start of this section: How did political parties contribute to this radical reform? The short answer is that the right wing of the main political party saw a chance to weaken the left wing. An advocate of liberal economic policies, the right wing dominated the Ministry of Agriculture. The left wing espoused Marxist policies and dominated the state enterprises. Right wing and ministry allied themselves with the donor to weaken the left wing and its stronghold, FIFABE. A front stretching from the aggressive field staff of the donor’s participatory program to committed personnel in donor headquarters and the parent ministry convinced cash-strapped FIFABE management to trade reform steps against rehabilitation funds when the second and third phases of the donor-supported project were negotiated. Of course, the project only informally and verbally allied itself with the right wing, without leaving incriminating written traces.

**Mexico**

Persons familiar with Mexico’s autocratic, centralized bureaucracy have wondered why it transferred to users its authority to manage the govern-
ment-owned irrigation systems (3 million hectares). They thought it was probably impelled by pressure from the World Bank, but the transfer was homegrown. How did it come about (Rap, Wester, and Pérez-Prado 2004)?

A salient feature of policymaking in Mexico is that it does not result from pressures exerted by mass publics, nor . . . derive from party platforms or ideology, nor from legislative consultation and compromise. Rather, it is an end product of elite bureaucratic and political interaction. (Grindle [1977] in Rap, Wester, and Pérez-Prado 2004)

This peculiarity made the location of ultimate responsibility for the government’s irrigation systems the unstable outcome of struggles between the elites of two rival bureaucracies: the Ministry of Agriculture and the water bureaucracy that built the dams and canal networks. Bureaucratic stakeholders were concerned about four issues: how to govern the irrigation systems, where to locate ultimate responsibility, how to keep the rival at bay, and how to maintain, or regain, administrative and financial autonomy.

The Ministry of Agriculture was responsible for the systems between 1946 and 1951, but the water bureaucracy was responsible before 1946 and again between 1951 and 1976. Both operated under a 1929 law that conferred legal status on water user associations as well as under a 1949 law that stated that the operation of the irrigation systems would be turned over to water boards and water user associations. However, after 1951 the water bureaucracy consolidated its control over the irrigation systems. In 1972, it had another law passed that made it fully responsible for the construction and management of the systems and forbade user management.

In 1976, the water bureaucracy received a blow from the president: he made the water agency an under-ministry of the Ministry of Agriculture. The agency head lost his direct access to the president and had to submit his policy initiatives to the minister of agriculture and hydraulic resources instead. At the end of this president’s six-year tenure, in 1982, influential groups of civil engineers began to lobby for restoration of their autonomy. During the election campaign, they held meetings on water issues, but their bid for autonomy was unsuccessful.

At the 1982 meetings, they proposed ideas and measures developed by the National Hydraulic Plan. This unit was established in 1973 by the government of Mexico, the World Bank, and the United Nations Development Programme to develop nonstructural measures that would keep the growing scarcity of water from turning into a crisis. The engineers proposed a new water culture among users and increased user participation. They spoke of the need to manage water at the level of river basins, create a single water agency to do away with the dispersal of water-related responsibilities, and establish a financial system for water. The system
would help restore financial and administrative autonomy to the water bureaucracy.

Lack of results, and the new president’s decision to merge the irrigation districts with rainfed districts, a move that hastened the deterioration of the canals, incited the head of the water bureaucracy in 1985 to speak openly about experiments with the transfer of management responsibility to the users. He initiated experiments with user management and the formation of a river basin council and negotiated a loan from the World Bank to transfer management of a limited number of systems.

During the 1988 presidential election campaign, the engineers were successful. They held meetings again, during which they negotiated a reform package with the future president. This is the phase of policy adoption. The new president, an economist, was intent on modernizing state-citizen relationships and on liberalizing agriculture and other economic sectors. The reform package was aligned with his priorities and consisted of the creation of an independent financial system for water resources management, the establishment of a single agency, and the transfer of O&M of irrigation systems to users who would pay fees for bulk water to the agency, instead of O&M fees to the national treasury.

Less than six weeks after his installation, the new president created a deconcentrated authority supervised by the Ministry of Agriculture and Hydraulic Resources. His decree made the new authority responsible for all water use: urban and industrial use, water quality, hydropower, irrigation, and environmental services. It also gave the new authority its own financial resource base. He did not create the independent ministry that the civil engineers had in mind, but did grant them the financial autonomy that they craved and enlarged their domain to water resources management. The financial autonomy of the water bureaucracy entailed O&M autonomy for the irrigators on the government-owned schemes and an obligation to pay for O&M.

Due to Mexico’s political process, the irrigation reform did not appear on the national agenda until 1990, when the first mass meetings were held in an attempt to obtain the farmers’ cooperation. A law was drafted and adopted, but only after implementation had begun. The law and the actual management transfer to farmers were part of a reform of the entire water sector that gave Mexico the institutions it needed to integrate the management of its water resources. It was nearly the same framework the engineers had proposed in 1982, based on work by the National Water Plan unit.

The Philippines

The Philippine experiments in irrigation reform were well known in the 1970s and 1980s but had nearly ossified by 2000—only 5 of the 190 na-
tional systems were completely responsible for O&M, and even they still had agency personnel. The country has a nearly comprehensive legal framework for water. The agency, called the National Irrigation Agency (NIA), has financial and administrative autonomy and a charter to recover both recurrent and capital O&M costs; the water user associations have legal standing; there is a statutory basis for the service fee, and at least two laws mandate management transfer. Yet transfer has not happened. The case demonstrates that the existence of a legal framework is not a sufficient condition for a switch to user funding of O&M if the laws and decrees do not rest on a solid stakeholder foundation (Panella 2004).

The government systems were built by an alliance of the populist president Marcos and two development banks: the World Bank and the ADB. Marcos generated the political capital. In 1965, he was elected on the slogan “Irrigation is the crying need of the hour.” Until his downfall in 1986, he threw his political weight behind the agency, prodding it to build both large national and small communal irrigation systems. Between 1969 and 1999, foreign sources lent the Philippines US$2 billion for irrigation system construction.4

The loans helped keep the rural population satisfied, voter stomachs full, and the president in power. They extended the government presence in the provinces at the rate of nearly 200,000 hectares per decade. Donors welcomed the chance to reach lending targets by funding this productive development. An iron triangle was forged: vote-seeking politicians allying themselves with agency managers found a listening ear with a government willing to build systems to keep its majority in Congress. Users naturally liked politicians who brought cheap water.

As the irrigated area expanded, the agency faced increasing challenges to ensure system sustainability through fees. In response, it convinced the government in 1974 to triple the water fee on the national irrigation systems. The government also brought all communal irrigation systems under the agency’s purview, doubling the agency’s area of responsibility.

Table C.1 Evolution of the area under command in The Philippines, 1964–99

<table>
<thead>
<tr>
<th>Systems</th>
<th>1964</th>
<th>Total area (hectares)</th>
<th>1999</th>
<th>Total area (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>79</td>
<td>217,500</td>
<td>190</td>
<td>678,500</td>
</tr>
<tr>
<td>Communal</td>
<td>771</td>
<td>393,000</td>
<td>6,692</td>
<td>486,066</td>
</tr>
<tr>
<td>Private or pump</td>
<td>2,540</td>
<td>51,500</td>
<td>4,001</td>
<td>174,200</td>
</tr>
</tbody>
</table>

To meet the mounting financial challenge, the agency embarked on cost cutting. As one of its strategies, it initiated participatory irrigation management programs on both the national and the community irrigation systems.

On the national systems, the goal was to use water user associations for O&M to reduce personnel costs. The agency assumed that participatory irrigation management would improve O&M because farmers have greater incentives than agency personnel to keep systems clean and well maintained. It also assumed that improved service would raise the collection rate. Participatory irrigation management was tested on the Magat system, where field personnel organized farmer irrigator groups at turnouts. Farmers were at least as interested in possibilities for group marketing, credit, and input purchasing as in water management. The test received support from an Agricultural Development Council, made up of representatives of government agencies for agricultural support. By 1981, 22 water user associations had signed canal-clearing contracts.

The participatory management program on the community systems had a different goal. Since farmers were supposed to contribute labor toward construction or rehabilitation and upon completion take responsibility for O&M, they were not expected to pay water fees. Participatory management therefore was intended to improve the effectiveness of agency rehabilitation and construction and of farmer O&M. In 1976, the agency started two pilots using institutional development officers and collaborating with the Ford Foundation, the Institute for Philippine Culture, the Asian Institute of Management, the International Rice Research Institute, and others. They established a communal irrigation committee that thoroughly documented the change process and its results and widely circulated reports in the academic and development communities. The publications raised the credibility of participatory irrigation management inside and outside the agency and helped make it an agency routine for community systems.

Agency personnel who were not directly involved in participatory irrigation management remained neutral until they realized that it would lead to substantial job and revenue losses on the national systems. The agency’s three-stage program for 26 mainly small, unviable systems consisted of a first stage that compensated water user associations for canal maintenance and gave them a 2 percent share of the water fee. A second stage gave the associations full responsibility for O&M at the lateral level and a 50 percent share of the fee, and a third stage transferred system management to farmers. Under the plan, the farmers no longer paid the agency any water fees, but they still had to pay an annual fee for depreciation.

This case demonstrates clearly that reform is most vulnerable when losers can see what implementation costs them. Job and revenue loss worried
agency personnel who were not involved in the participatory management arrangements. They found an ally in Bank concerns that canals would not be properly maintained. The Bank’s worries gave agency personnel a chance to reframe stage 2 contracts. They reduced the authority and scope of the water user associations, cut their share of fee income, and focused association efforts on fee collection. Attempts to reframe stage 2 contracts were also aided by the departure from top management of two main advocates of participatory management. Their successors reshaped the three stages when they understood that stage 2 did not allow the agency to reach revenue targets agreed in a Bank loan and that stage 3 would cause significant revenue and job losses on the larger, viable systems.

Bank and agency interests were easily aligned. The Bank was satisfied that an obstacle to new funding had been removed by assurances of adequate maintenance. The agency was happy to safeguard its business and enhance construction at a moment when capital funding was tight. On the community irrigation system component of the loan, however, neither the Bank and nor the agency sought any modifications because this component threatened no Bank, agency, or personnel interests.

Work on the stages and on the community system did too little to train and arm intellectually a group of domestic and donor reform advocates. A reform window opened in 1986, when Marcos’s authoritarian regime was replaced with a democratic government. This event weakened an agency that was already demoralized when, in 1983, the World Bank demanded that it emphasize rehabilitation and small projects and scale back construction. However, no organized reform advocates were there to use this opportunity to bring reform to the national irrigation systems.

Another chance came in 1992, when all community irrigation systems were transferred to local councils, but it, too, was missed. Devolution never took place for three reasons. First, no reform think tanks were available to test and define credible alternative institutions for service delivery. Second, local agencies kept soliciting the irrigation agency for technical services in the absence of other known providers and out of fear of deviating from technical norms. Third, donors kept channeling their community system funding through the agency, denying local councils direct access. In June 2000, a coalition was emerging that favored nothing less than the return of the community system to the agency. The councils found the schemes too expensive. The recently founded National Confederation of Irrigation Associations (NCIA) requested the return, as did the National Irrigation Agency.

A third opportunity came along in 1997, when the Agriculture and Fisheries Modernization Act (AFMA) introduced yet another mandate to transfer all national irrigation systems. Political and administrative lead-
ership in the Ministry of Agriculture, the agency’s parent, supported this legislation, yet implementation was slow. The law gave the agency August, October, and December 1998 deadlines to submit proposals for building water user association capacity, turning over assets, building capacity for local councils, and instituting new water rates. The agency submitted nothing but a proposal for new rates. Ministerial pressure was too slight to ensure compliance with deadlines for plans that ran counter to agency interests.

AFMA is now being implemented only where World Bank and ADB projects couple turnover with improvement of water distribution (installation of proportional weirs, reduction of pipe sizes, and canal rehabilitation). This observation shows that in the current political and institutional landscape, irrigation management transfer will not happen without external pressure. Implementation of all other national irrigation system matters has been halted by the populist election slogans of the current president, who offered farmers free water. After agency and development banks reinstated half the fee, collections dropped from 47 percent to 36 percent, demonstrating, once again, that even when farmers can afford to pay, they do not pay, if the government leaves them an out.

An opportunity to forge a constituency for reform might be around the corner. The National Confederation of Irrigation Associations held its first meeting in June 1997. The confederation is funded by the agency but sits on the fence. It supports transfer, if agency personnel stay on board for expansion, but also advocates operating subsidies for the agency. Some board members have agro-businesses that give them a stake in transfer, while others have contractor businesses that tie them to the status quo.

Government and development banks may help the NCIA secure a source of unrestricted income—from a foundation or a bilateral—and involve it in the design and supervision of loans. They may enroll NCIA, university researchers, and pro-transfer staff in the collection of independent performance data for input into debates on management as the “crying need of the hour,” as Marcos once did for construction. Government, development banks, bilateral donors, and private foundations may fund NCIA and researchers to apply the communal irrigation committee documentation and dissemination format to national irrigation system transfer experiments. With subsidies contributing 73 percent of the operations budget, staff payments making up 80 percent of O&M expenses, and field personnel spending up to 40 percent of their time on fee collection, tax-paying citizens are likely to pay some attention.
Notes

1. This assessment from May 2003 proved optimistic. Later that year, vested interests dealt blows to water-sector reforms such that the Bank considered putting the loan on hold.

2. According to Don Blackmore, chief executive officer of the Murray Darling Commission, unemployment in some villages dropped from 15 percent to 3 percent due to water trading, now permissible within a 1,500 kilometer range (World Bank Water Week, April 4, 2000).

3. Guy Alaerts, personal communication, based on a study conducted by Ir. Setyo Maharanto in May and June 2002.

4. In addition to the 3 million hectares of government-owned irrigation systems, Mexico has another 3 million hectares of privately owned canal networks, including systems built and managed by farmers.

5. This figure is nominal. Adjusted for inflation, it would be much higher. Of the total, the World Bank contributed 48 percent, ADB 32 percent, and Japan 18 percent.
Appendix D
Office du Niger Area

Source: Adapted from Touré, Zanen, and Koné 1997.


Boxes, figures, notes, and tables are indicated by \( b, f, n, \) and \( t \) respectively.

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Real incomes of Mali’s rice and vegetable farmers have risen dramatically since 1989, when reform of Mali’s irrigation scheme ensured maintenance of the irrigation infrastructure, gave farmers rights to land, and allowed them to process and market their products. *Making a Large Irrigation Scheme Work* analyzes how, over a 14-year period, Mali’s government made a commitment to share maintenance fees and authority for irrigation operation with users. The authors describe how Malian and expatriate irrigation experts shaped technical and institutional change that led to increased yields and income and reduced opposition to the payment of full water-delivery costs. They also describe how democratization and liberalization have led to mechanisms for farmer representatives, agency managers, and departmental ministers to negotiate responses to reform and emerging challenges.

*Making a Large Irrigation Scheme Work* will be of interest to irrigation professionals involved in the transfer of irrigation management authority from a government to users. They will learn how government commitment to this transfer can be generated and how components of the process and resulting scheme in Mali may be relevant for their own countries.