

Document of
The World Bank

Report No: 31648

IMPLEMENTATION COMPLETION REPORT
(TF-23078 CPL-40410 PPFB-P2760)

ON A

LOAN

IN THE AMOUNT OF US\$80 MILLION

TO THE

REPUBLIC OF KAZAKHSTAN

FOR AN

IRRIGATION AND DRAINAGE IMPROVEMENT PROJECT

May 5, 2005

**Environmentally and Socially Sustainable Development Unit
Europe and Central Asia Region**

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 5, 2005)

Currency Unit = Kazakh Tenge (Tg or KZT)

US\$ 1 = 135 KZT

FISCAL YEAR

January 1 to December 31

ABBREVIATIONS AND ACRONYMS

APAP	Agriculture Post Privatization Assistance Project
CWR	Committee of Water Resources
CG	Consultants Group
ERR	Economic Rate of Return
EIA	Environmental Impact Assessment
FISD	Farmers' Information Services Desk
GOK	Government of Kazakhstan
ICR	Implementation Completion Report
I&D	Irrigation and Drainage
IDIP	Irrigation and Drainage Improvement Project
IDIP2	Second phase of IDIP
MOA	Ministry of Agriculture
MOF	Ministry of Finance
MOENR	Ministry of Environment and Natural Resources
MTR	Mid-Term Review
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PHRD	Policy and Human Resources Development
PPF	Project Preparation Facility
SAR	Staff Appraisal Report
SEE	State Ecological Expertise
SYNAS	Syr Darya Control and Northern Aral Sea
TA	Technical Assistance
TOR	Terms of Reference
QAG	Quality Assurance Group of the World Bank
ROK	Republic of Kazakhstan
WOP	Without Project scenario for ERR estimate
WP2004	With Project as in year 2004 (for ERR estimate)
WPF	With Project Future in about four years
WUA	Water Users' Associations
WUCC	Water User Consumer Cooperative

Vice President:	Shigeo Katsu
Country Director	Dennis de Tray
Sector Manager	Joseph Goldberg
Task Team Leader/Task Manager:	Masood Ahmad

**KAZAKHSTAN
KAZAKHSTAN IRRIGATION AND DRAINAGE PROJECT**

CONTENTS

	Page No.
1. Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	2
4. Achievement of Objective and Outputs	5
5. Major Factors Affecting Implementation and Outcome	11
6. Sustainability	14
7. Bank and Borrower Performance	15
8. Lessons Learned	17
9. Partner Comments	19
10. Additional Information	21
Annex 1. Key Performance Indicators/Log Frame Matrix	22
Annex 2. Project Costs and Financing	24
Annex 3. Economic Costs and Benefits	26
Annex 4. Bank Inputs	31
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	33
Annex 6. Ratings of Bank and Borrower Performance	34
Annex 7. List of Supporting Documents	35
Annex 8. Additional Information about the Subproject	36
Annex 9. Opinion of the Ministry of Agriculture of ROK on the Project (IDP)	44

MAP No. IBRD 33837

<i>Project ID:</i> P008510	<i>Project Name:</i> KAZAKHSTAN IRRIGATION AND DRAINAGE PROJECT
<i>Team Leader:</i> Masood Ahmad	<i>TL Unit:</i> ECSSD
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> May 5, 2005

1. Project Data

Name: KAZAKHSTAN IRRIGATION AND DRAINAGE PROJECT
Country/Department: KAZAKHSTAN
Sector/subsector: Irrigation and drainage (92%); Central government administration (8%)
Theme: Water resource management (P); Rural markets (P); Environmental policies and institutions (P); Rural services and infrastructure (P); Infrastructure services for private sector development (S)

L/C/TF Number: TF-23078; CPL-40410; PPFB-P2760
Region: Europe and Central Asia Region

KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 04/07/1993	<i>Effective:</i> 09/23/1996	10/21/1996
<i>Appraisal:</i> 11/07/1995	<i>MTR:</i> 10/31/1999	10/12/1999
<i>Approval:</i> 06/18/1996	<i>Closing:</i> 12/31/2003	12/31/2004

Borrower/Implementing Agency: REPUB. OF KAZAKHSTAN/MINISTRY OF AGRICULTURE
Other Partners:

STAFF	Current	At Appraisal
<i>Vice President:</i>	Shigeo Katsu	Wilfried Thalwitz
<i>Country Director:</i>	Dennis de Tray	Yukon Huang
<i>Sector Manager:</i>	Joseph R. Goldberg	Michael A. Gould
<i>Team Leader at ICR:</i>	Masood Ahmad	Van Roy Southworth
<i>ICR Primary Author:</i>	Masood Ahmad; Mahwash Wasiq	

2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S
Sustainability: L
Institutional Development Impact: H
Bank Performance: S
Borrower Performance: S

Quality at Entry: QAG (if available) ICR
S
Project at Risk at Any Time: Yes

A more realistic rating of the project outcome would be "more than satisfactory" considering the Highly Satisfactory rating as the top of the scale. This is so because all project development objectives were met as shown in Section 4, the outcomes are

likely to be sustainable and in particular the institutional impact of the project was high. However, conservatively it is rated as Satisfactory.

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The Project's main development objectives were to: (i) promote sustainable irrigated agricultural production through irrigation and drainage rehabilitation, improved water management, and better operation and maintenance; (ii) introduce improved agricultural practices and farmers' information services; and (iii) strengthen irrigation and environmental agencies. The objectives were consistent with the Bank's strategy to assist the Government of Kazakhstan (GOK) and the Agricultural Sector Review of 1994. The Project complemented the reforms incorporated in the Development Policy Letter for the FY95 Structural Adjustment Loan (SAL Ln. 3900) and it was consistent with the Bank's Environment and Water Strategy in Kazakhstan and with recommendations of the Bank Water Resources Management Policy.

The development objectives were appropriate, particularly keeping in view that the Project was to start in a very uncertain environment when the Kazakh economy and agriculture sector were going through transition after the country's independence in 1991. At the time of project appraisal, the process of transferring the Government farms to private farmers was still at its infancy, as was the restructuring of the institutions. The irrigation and drainage (I&D) systems were in a dismal state after years of poor maintenance.

3.2 Revised Objective:

The project objectives were not revised during implementation.

3.3 Original Components:

The Project was to support GOK's six-year irrigation and drainage investment program. It was appraised on the basis of pre-feasibility and feasibility studies for about 34 sub-projects prepared by the Ministry of Agriculture (MOA) with the assistance of foreign and local consultants. Selection criteria were agreed with the MOA to include subprojects in the investment program. Two of the most important considerations were that rehabilitation/improvement would only take place on the privatized successors to the state farms and it would aim at rehabilitating the existing irrigated areas and/or land previously irrigated but abandoned, thus specifically excluding expansion of irrigation to new lands under the Project. A feasibility study had been undertaken for each subproject to establish technical, economic and environmental viability. The main components of the Project are as follows (SAR estimate vs. actual expenditures):

Component 1: Rehabilitation of Irrigation and Drainage Systems (US\$108.14 million vs US\$90.19 million). This Component was to improve the reliability and efficiency of irrigation water use, involving rehabilitation of surface irrigation and sprinkler systems; and reducing waterlogging and salinity, including rehabilitation of collector drains and on-farm drainage improvements to surface, tile or vertical drainage systems. Project works included predominantly on-farm system rehabilitation (considering the state farm as one large farm) as well as selected improvements in inter-farm irrigation and drainage. A substantial part of what was initially assumed to be on-farm works became off-farm (or inter-farm) works after the state farms had gone through restructuring. The rehabilitation works were to cover an area of about 30,000 ha and were undertaken in three groups of subprojects, averaging about 10,000 ha. Out of 34 subprojects for which feasibility studies were prepared, a core program of nine subprojects was identified for construction to start in Year One (1996/97 with a base cost of US\$26 million) and Year Two (1997/1998 with a base cost of US\$17 million) of the Project. A list of 13 "reserve projects" was prepared for selecting subprojects to start in Year Three of the Project (with a base cost of US\$26 million). The detailed designs for these subprojects were to be prepared during project implementation.

Component 2: Promoting Agricultural Development in Privatized Farms (US\$2.27 million vs

US\$2.12 million). At the time of project appraisal most members of the subprojects farms appeared to prefer to be part of a functional group within their large farm unit and work under the aegis of the former State/Collective Farm management and specialists, rather than to take the risk of being the owner of a smaller private farm. The functional groups were former production brigades, groups that had been responsible for either on-farm water management, crop production, management of the machinery pool, or dairy production. The main reasons for the reluctance of the shareholders to restructure the larger farms into small units was: (a) lack of overall management skills; (b) lack of operating capital; (c) poorly developed marketing and input supply mechanisms; and (d) lack of inputs, spare parts, and equipment. Also, effective research, extension and agricultural information services did not exist in the country for private farmers. This Component was to address these shortcomings through: pilots for farmers' participatory training and information services; support for farm restructuring; and demonstrations for crop production technologies.

The Component was designed to cover training courses and workshops to be conducted at selected project farms for individual farmers or farmers' groups, farm managers and production specialists on topics of modern farm and business management, marketing and processing of produce, and environmental management. Together with training, relevant demonstrations on improved on-farm water management and new crop production technologies were to be conducted to show farmers how to increase efficiency of applied inputs, and how to intensify crop production. A Farmers Information and Services Desk (FISD) was to be established to provide technical pamphlets, videos and other materials on critical agricultural issues related to farm management, production and marketing. FISD was also to serve other irrigated farms not included in the Project and information was to be disseminated in Russian and Kazak through the existing TV and radio channels by MOA's Press Center and through a "Farmers Weekly" paper. The farm restructuring support sub-component was to develop a strong participatory process and empowerment of farm members by providing access to information and management skills. It was to encourage development of Water Users' Associations (WUAs) in conjunction with farm restructuring, thereby providing an institutional mechanism to operate and maintain the system and assure equitable access to water by all farmers.

Component 3: Institution Building (US\$5.65 million vs US\$4.46 million). The Component consisted of two crucial activities: (a) support for the MOA and the Project Implementation Unit (PIU) to upgrade its capacity for project implementation; and (b) strengthening the environmental capacity for preparation of Environmental Impact Assessments (EIAs) of the various subprojects and environmental monitoring. The Component also included a study to determine the feasibility of transferring irrigation management for a typical canal command area in Kazakhstan from government control to management by the farmers/water users.

The support for MOA and PIU was to upgrade their institutional capacity in planning, preparing, executing and monitoring the I&D investment program. The PIU was to contract management and engineering consultants to: (i) assist and train PIU staff in project planning, management, monitoring, procurement, and financial management; (ii) take responsibility for updating/preparing feasibility studies, preparing EIAs, undertaking field surveys and designs, preparing bidding documents; and (iii) assist PIU with farmers' participation, establishing WUAs, and construction supervision.

The support for the environmental capacity subcomponent covered: (a) institutional development and training including: (i) preparation of an improved Environmental Assessment framework for irrigation/drainage development; preparation of an EIA manual for I&D, and building environmental capacity in MOA; (ii) EIA preparation and State Ecological Expertise (SEE) review, including preparation of remaining project specific EIAs and SEE review as required by national environmental legislation and

governmental regulations; (iii) training for managers, I&D engineers, environmental staff, farmers; and developing an EA harmonization procedure to reconcile differences in the Bank and Kazakh EA requirements and procedures in order to foster EIA preparation for project processing in various sectors; (b) strengthening water/soil quality monitoring and pollution control, agro-meteorological programs and provisions for equipment and materials, including provision of field and laboratory monitoring equipment, computers, data processing and management, and chemicals for laboratory analysis; monitoring of soil contamination, drainage surface and groundwater quality, and residues and quality control of agricultural inputs/outputs; (c) special environmental studies, including development of cost-effective methods to prevent salinity and water-logging; (d) development and implementation of mitigation plans, including a pilot project to clean drainage water from agro-chemical residues; and afforestation within the boundaries of the sub-project area.

3.4 Revised Components:

The components were not revised during project implementation. However, there was a shift in emphasis on various project activities. The Project was the first investment in the sector after the country's independence and one of the few Bank projects in the agriculture sector in the region involving rehabilitation of infrastructure. Based on the lessons learned in the region, the Project included technical assistance (TA) and consulting services for introducing rigorous economic and environmental analysis, preparation of detailed designs, bidding documents and procurement procedures that were standardized for the country, development of water users' associations (WUAs), and strong oversight for construction supervision and contract management. The Agricultural Development Component, in particular, consisted of substantial TA and consulting services for establishing demonstration plots, farmers training, and the FISD. Even though the GOK was convinced of the need for consulting services, based on the demonstrated necessity for them in the field, it remained concerned with the level of consulting services during project implementation, particularly for the agriculture Component because of high foreign consultant's fees and the fact that the agriculture Component was considered as a soft component. Consequently, some of the TA and consulting services related to the agriculture Component were reduced, while the consulting services for engineering were slightly increased. Also, GOK placed higher emphasis on the development of WUAs during the Project's mid-term because it was giving increasing attention to the cost recovery and was mandatory that agreements for cost recovery were to be signed with the WUAs prior to the start-up of the construction. Project implementation was extended by one year, primarily to cover the defects liability period for a few subprojects that were completed in the year 2003 and enable final payments to the contractors from the project funds.

3.5 Quality at Entry:

Quality at entry was *satisfactory*. The Project was well prepared based on feasibility studies for about 34 subprojects. A rigorous set of economic and environmental criteria were agreed with the Borrower for selection of the subprojects. In addition to these criteria, some subprojects may have been selected, as the Borrower wished to spread the project investments country wide. To ensure project readiness for implementation, detailed designs of several subprojects were prepared before project startup. Sufficient resources and capacity were provided under the Project for carrying out high quality analysis, designs, and construction supervision during project implementation. The institutional structure for implementation was very well designed and together with the agreed procedures for subproject design, procurement and contract management, contributed significantly to the smooth implementation of the Project. At the time of appraisal, sectoral issues and constraints to production were thoroughly analyzed and incorporated in the project design. In retrospect the cost recovery rate was over ambitious, given experience elsewhere in the world and the very early stage of transition in Kazakhstan. The MOA and Bank project preparation teams had good collaboration and worked closely during project preparation and appraisal.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The project outcome is assessed as *satisfactory* as all development objectives have been met. The I&D system was rehabilitated in some 15 sub-projects in 9 oblasts of the country covering more than 32,000 ha of irrigated area. Prior to their rehabilitation, the I&D systems in most of these subprojects were nonfunctional due to years of neglect and land was degraded with very little production capacity. The farms in these subprojects were nearly abandoned and machinery stocks were depleted. After I&D systems rehabilitation the land is coming back under production. The crop yields have increased between 12-200% (compared to appraisal estimates of 20-139%) and the cropped area has increased in most subprojects --overall the cropped area has doubled with the Project. Water management has improved in the rehabilitated subprojects. There are substantial water savings annually in the rehabilitated subprojects, particularly in those with gravity schemes, and there are considerable energy savings in subprojects with pumped water supply and sprinklers (see Annex 8, Table 3). 2004 was the first year of cropping for several subprojects and the third year for those where rehabilitation started in the first year of the Project. Therefore, farm productivity is expected to increase further and reach its optimal level over the next three to four years (by 2008) as soil fertility improves, the farmers are able to invest in better farming technologies and practices, acquire better inputs and services, gain more experience, and better organize and manage other farm activities, including the marketing of their products. Thus, the first objective of promoting sustainable agricultural production, and better water management and Operation and Maintenance (O&M), has been achieved as envisaged at appraisal.

Similarly, the second objective of introducing improved agricultural practices has been largely achieved. Towards this goal, improved agricultural practices were introduced to the farmers, training courses were successfully carried out; field demonstrations for the introduction of improved agricultural practices were held in 10 subprojects; business plans for all subprojects were developed to provide guidance on developing financially viable farms; and farm extension services in the form of a Farmers' Information and Services Desk (FISD) were provided. Increasing cropped area, yields and water saving in subprojects provide credible evidence of positive outcome of various project activities towards this objective.

The aim of institutional development was fully accomplished under the Project. The Project had wide ranging impacts on institutional strengthening. The Government, MOA, and other concerned agencies and their staff have gained substantial experience in the preparation of irrigation and drainage improvement projects, formation of WUAs, design of rehabilitation works, preparation of cost estimates, procurement and bidding procedures, construction supervision and contract management. The environmental institutional capacity building objective was achieved and environmental Hydro-Amelioration Expedition centers/laboratories were modernized.

4.2 Outputs by components:

The component outputs were fully realized. The details by component are given below:

Component 1: Rehabilitation of I&D Systems. This was the largest component of the Project. Under this Component, I&D systems were rehabilitated in 15 subprojects spread all over the country. The list of subprojects rehabilitated, area covered and type of the I&D system is provided in Annex 8, Table 1, and the subprojects that were canceled are listed in Annex 8, Table 2. The description of works implemented in each subproject and other salient features are also given in Annex 8. The rehabilitation/improvement works consisted of repairs and installation of sprinkler systems (both pivotal and linear move), rehabilitation and installation of pumping stations, pipelines, irrigation and drainage wells, rehabilitation/reconstruction of irrigation and drainage channels, canalets or concrete flumes, land leveling, rehabilitation of rural roads,

water supply systems, etc. The rehabilitated and improved I&D systems cover more than 32,200 ha compared with the appraisal estimate of 30,000 ha. An area of 17,500 ha is covered by gravity schemes and 14,700 ha is under pumped schemes. The gravity schemes generally have open channels for water distribution, except in the case of Darkhan where enough pressure is available due to the elevation of the intake to distribute the water through sprinklers. The pumped schemes generally include various types of sprinklers for water distribution in the field, except in the case of Shengeldy where buried pipes discharge water into concrete flumes and earthen open channels for distribution to the field by gravity.

At the time of project appraisal, feasibility studies were prepared for about 34 subprojects. Out of these, initially 24 subprojects with an area of about 41,000 ha were selected for detailed studies and of those, five sub-projects were eliminated during the study stages due to environmental, economic and other reasons. For the remaining 19 subprojects comprising an area of 35,000 ha, the study and design stages were completed and bidding documents and engineers' estimates were prepared. After completion of the designs, two subprojects were canceled from the program, in one case the farm was in severe debt and in the other case, the owner decided not to proceed. By spring 2000, 17 feasibility studies and EIAs were completed and 16 bidding documents and O&M plans were completed. Business plans were prepared for several farms in various subprojects based on a sample farm for a typical unit. In total, 17 business plans were developed. Based on these plans, the areas of three subprojects were reduced. Two subprojects were cancelled from the final selection because of high per hectare rehabilitation costs and lack of reaching an agreement with the owners. The implementation of the subprojects started in three batches: (a) first stage or year one projects, consisting of four subprojects which had the highest priority and were most ready; (b) second stage projects, consisting of seven subprojects; and (c) four remaining subprojects, which were covered under the third stage. Most of the subprojects were completed in two years, except two which had a three-year construction period. All construction works were completed by end 2003.

The sequence of this Component's activities consisted of the selection of subprojects based on a pre-feasibility study, consultation with the farmers/owners followed by preparation of the detailed feasibility study and EIA, both of which were cleared by the State Expertise (in both Engineering and Environment) as well as the Bank. This was followed by the preparation of detailed designs and cost estimates and development of WUAs. Agreements for implementation arrangements and cost recovery were then signed with the WUAs, and the bidding documents and business/operational plans prepared. The contractors were selected through international competitive bidding procedures. After construction, the projects were taken over by the MOA/PIU and transferred to the farmers for operation and maintenance. The subprojects had a defect liability period of one year, after which the project works were checked by the technical staff of the MOA/PIU, Committee of Water Resources (CWR), other concerned agencies of GOK responsible for State Expertise, the engineering consultants, and the farmers. The contractors removed any defects identified during this inspection.

The procedure for forming WUAs was developed as part of a detailed study under Component 3 for Institution Building on the feasibility of transferring system management for a typical canal command to the farmers in Kazakhstan. The WUAs were organized in accordance with the new law for WUAs passed in September 1999. In large subprojects (such as Maktaral, Kurchum, Shengeldy, Akkumski) having a large number of farmers, a two-tiered organization was established. Water User Consumer Cooperatives (WUCCs) were established at the lower level of the systems and an association of WUCCs was formed at the upper tier of each system. As a part of the process of establishing WUAs, the Maktaral subproject was used as a pilot to establish procedures and for developing a standard form for the WUCC Charter and procedural methods. This initiative also included: assistance in establishing the WUAs and at least two weeks training for WUCC staff in administration and financial management, and management of the I&D systems.

The farmers/WUAs participated intensively in the rehabilitation/improvement of the I&D systems through all stages of the Project: during the planning and feasibility study phase, with selection of equipment and the final design, and during the construction phase. Many changes were made during the subproject preparation and implementation at the request of the farmers. The final design documents were countersigned by the owners/WUAs. This was possible because the technical capacity existed in these subprojects. The original farm managers and many of the technical staff responsible for water management and O&M of the I&D systems when these subprojects were operating as state farms were still present and functioning in some capacity in these subprojects. Some were farmer/owners, and others were engaged by the owners. Many of them were still living on these farms, some making a living through farm related activities such as livestock, machinery operation and maintenance, and trading agricultural commodities and inputs. The bidding documents were therefore structured in a manner that allowed flexibility in the selection of equipment (meeting the technical specifications) by the farmers/owners. In a few cases, the owners actually visited the equipment manufacturing factories outside Kazakhstan to check on the suitability and quality of the equipment, as well as the continued availability of spare parts e.g. the Kaiser 2 (near Astana) farmer visited sprinkler manufacturing plants in Russia.

As shown in the economic analysis section, the cropped area and crop yields have increased significantly after rehabilitation of I&D systems, yielding substantial employment and benefits to the farmers and the country's economy. These benefits are expected to increase further over the next few years. The Component was crucial for improving the systems' water management. Annual water savings in the rehabilitated subprojects are substantial (1,300 cubic meters per hectare on average), particularly in subprojects with gravity systems like Maktaral, Akkumsky and Kurchum, where water savings are much higher. (Annex 8, Table 3 indicates that in gravity systems water applications have been reduced to half). The annual energy savings in pumped schemes with sprinklers for water application in the field is also substantial (1,000 Kwh/ha on average). The employment is increasing in subprojects as a result of enhanced cropping activities. The physical and institutional outputs of this Component were demonstrably significant and vital for achieving the project objectives, hence they are rated *High*.

Component 2: Agricultural Development. Originally - during the preparation/pre-appraisal stage - this Component was intended to be a full-fledged farm restructuring and development component, including the provision of credit for farmers of the subproject areas. However, unfamiliar with and uncertain about the new development approaches, and wary about the value of foreign consultants, the GOK delegation reduced the scope of the Component during negotiations to a three-year pilot, with the current title of "Pilots for Farmers Participatory Training Services and Information Services." The most serious reduction took place in the farm restructuring part of the Component. The elements of the revised component consisted of: participatory training, demonstrations, provision of farmer's information services and consultancy services. Also, due to GOK's insistence to minimize the technical assistance and consulting services costs (particularly the costs for foreign consultants), the contract for consulting services for implementation of the pilots was limited to two years only. However, the consultancy contract was subsequently extended for one more year through a reallocation of the existing budget under the contract. Despite these limitations, the Component was very productive and effective in contributing towards the project development objectives.

For the "training of trainers," twelve training modules with 22 courses were designed. The trainers were drawn from agricultural universities and other organizations. For "farmers' training," 39 training courses were provided to over 1,000 participants in various locations in the field. For demonstration and field days, 10 demonstration plots were developed. The demonstration plots were used to show new technologies and crop rotations, economic and improved farm management practices and also served as training grounds for

other farmers in the area, as well as for farmers from other subproject areas. Based on the farmers' demands, on field days much attention was given to the costs and benefits of the various crop and farming systems. Under Component 1, a demonstration was also organized in Kaisar 2 subproject to demonstrate sprinkler technology.

The farmers considered the Farmers' Information Services Desk (FISD) extremely useful and, through its publications and broadcast service, became the most visible and successful part of the pilot program. Under FISD, 31 technical brochures, 70 technical videos, 22 paper articles, 23 TV broadcasts and 26 radiocasts were produced. What did not succeed under this sub-component, was the "Farmers' Weekly," which was to be carried out by two private agricultural newspapers "Selskaya Nov" and "Auyl," in the Russian and Kazakh languages respectively, as both papers ran into financial problems due to lack of a sufficient number of paying subscribers.

The Component was very successful and in high demand by the farmers of the subprojects, as well as other farmers. After three years of implementation, a revised version of the component was prepared with reduced costs, based on the services of national consultants. Along with this revised component, the Government also proposed to provide the subprojects' farmers with farm machinery under the project loan through the WUAs because banking services to farmers for medium term funds were not available at that time, and farmers had a serious need for new tractors. Although the demand for such machinery among the farmers was high, an arrangement satisfactory to both the GOK and the Bank for providing this machinery could not be reached, despite efforts by several Bank missions to resolve this issue. Notwithstanding its short duration, the Component contributed substantially towards the Project's success, particularly in improving water management and agricultural practices and thus increasing the profitability of the farms following the rehabilitation of the I&D systems.

Component 3: Institution Building. The Project Implementation Unit's (PIU) capacity was strengthened substantially in preparing, designing, and constructing I&D projects. However, in early 2000 following the PIU's move from Almaty to Astana, MOA dissolved the PIU as a semi-autonomous entity and most staff were re-employed in a Consultant Group (CG) in the MOA, under the overall supervision of the MOA. The technical staff of the CG were headed by a Chief Consultant but the procurement, accounting and financial management staff in the CG were placed under the direct supervision of MOA's Finance Department, while the environmental and agriculture staff came under the supervision of MOA. Unlike most countries in the region, CG was actually established within the MOA structure, reporting to the Vice Minister thus the MOA had ownership of the Project. As a result, the capacity building was more enduring. Additionally as the irrigation and drainage functions are now moved to CWR which is a very competent institution and an integral part of the Government structure, capacity building is more effective.

Throughout the implementation period, the PIU/MOA staff was given training in project design, procurement and construction management. They also received on-the-job training by working with the engineering consultants, consisting of international firms and national design institutes. The PIU/MOA staff worked as Project Managers for the civil works contracts and they were supported by construction inspectors and quantity surveyors. All were given training in quality control, material testing and overall site and contract management.

In 2002, in keeping with the latest Water Law, the responsibility for I&D planning and management was transferred to the Committee of Water Resources, following its own transfer from the Ministry of the Environment and Natural Resources (MOENR) to MOA. MOA's I&D staff was also transferred to CWR. Consequently, CWR, which has significant capacity for the management of water resources systems, large structures, canals and inter-farm canals, will now also be responsible for the preparation and

implementation of the second phase of IDIP (IDIP2). These institutional changes have further strengthened the institutional capacity of the water sector, since it is now located in one agency that deals with the entire water and I&D system. This allows it to address water issues in an integrated manner and will enhance the Government's interaction with the final water users through the already functioning oblast and rayon level branches of CWR.

The capacity of the water users and WUAs in O&M of the I&D systems has been strengthened under the Project through training and on-the-job experience at the subproject level. The WUAs have taken over the completed systems, and have made formal and informal arrangements for carrying out O&M. O&M manuals have been prepared for all subprojects.

The Project's institution building support has actually extended beyond MOA to many Government and private institutions involved in the sector, as well as the construction industry. The capacity of several design institutes and contractors that were involved in project implementation has been enhanced substantially. About ten design institutes have worked with international consultants in preparing engineering designs of I&D improvement works in various subprojects and most of these institutes are now private firms. As a result of their participation in the Project, these firms (as well as the MOA staff) were exposed to, and have acquired new techniques and computer systems for carrying out surveys, investigations, engineering designs, preparation of environmental assessments, business plans, as well as preparation of bidding documents, all aspects with which they were not familiar before. Similarly, the contractors gained experience in construction through competitive bidding, higher construction and management standards, and quality control.

Study for Transfer of Irrigation Management. A feasibility study for transferring system management for inter-farm canals from Government to the users was completed under the Project. It encompassed a case study for the Tashatkul Massif in the Shoo and Moyinkum districts in Dzhabul Oblast, covering an area of about 42,500 ha, and a case study for the Maktaral subproject with an area of about 10,000 ha (mentioned in Component 1). No area was included in the Tashatkul Massif for I&D system improvement under the Project as it was just taken as a sample for a typical large gravity irrigation system. The study formed, inter alia, the basis for developing the procedures and methodology for establishing WUAs in the subprojects. The study included detailed recommendations for the establishment of the Tashatkul system as a pilot for irrigation management transfer at the inter-farm canal level. It proposed a three-phase pilot transfer program to be implemented over a period of 12 months and also provided the cost estimates for its implementation. It recommended that the pilot be started only after the recommended amendments and adjustments to the legal and regulatory environment supportive of large scale WUAs were made. With recent legislation and adoption of a water code, it is now possible to implement the pilot and recommendations of the study. Therefore, the recommendations of this study for participatory management at the inter-farm level are likely to be included in IDIP2, which would cover a large area in the South Kazakhstan Oblast with I&D systems similar to Tashatkul and Maktaral.

Strengthening Environmental Capacity. Environmental capacity was strengthened through: (a) on-the-job training and technical seminars by the environmental consultants; involving PIU/CG staff, national consultants and farms in the preparation of EIAs for all subprojects; and demonstrating best EIA practices to the State Ecological Expertise (SEE). An Environmental Unit was established in the MOA for environmental sector policy making. An EA Harmonization Seminar was held in 1997 with the aim to harmonize the environmental requirements and procedures of the Republic of Kazakhstan (ROK) and the World Bank. Two documents were developed during the EA Seminar: (i) a document "On Understanding of Requirements and Procedures of ROK for EIA and SEE and those for EA of the World Bank:" and (ii) a letter on "Strengthening Environmental Assessment Management for World Bank-Financed Projects." The

final report of the Harmonization Seminar was formally accepted by the MOA and the Ministry of Environment and Natural Resources (MOENR) in 1998. The two mentioned documents thereby became the guidelines for EIA preparation and SEE review for the IDIP subprojects. Over time a streamlined procedure was developed for carrying out an EIA and SEE for each subproject; (b) strengthening the three existing hydro-amelioration expedition centers in the cities of Almaty, Kzyl Orda and Shymkent for water quality, soil salinity and environmental monitoring through the provision of the necessary equipment and materials. In addition, a new center was established in Astana. The laboratories are now operational and carry out monitoring in the subproject areas as well as in other areas. Detailed guidelines for subproject performance monitoring and evaluation system, based on GIS software, were also developed using the Shengeldy subproject as a sample area; and (c) the preparation of a pilot project to clean drainage water from agro-chemical residues for subsequent use in afforestation, was also prepared for Shengeldy by the Research and Production Association for Industrial Ecology (Kazmekhanobr), which is subordinate to the MOENR. This pilot has not been implemented yet but a project based on the same idea is now under implementation in Astana for treatment of sewage water and its use for afforestation outside the city.

4.3 Net Present Value/Economic rate of return:

The ex-post economic evaluation of the Project was carried out following the appraisal methodology. Farm models developed for each subproject rehabilitated were used for performing the economic analysis. The Project Economic Rate of Return (ERR) was estimated by adding all costs (including the costs of project management, construction supervision, agricultural and institutional components) and incremental benefits of all subprojects. During appraisal, the ERR was estimated only for subprojects that were to be implemented during the first and second year of project implementation and these data were used to estimate the overall Project ERR. The ERR for the remaining subprojects was estimated as a part of their feasibility studies prior to their inclusion in the Project, as the appropriate level of ERR was the main selection criteria. At project completion, the overall ERR is estimated at 32% compared to 27% at the appraisal stage. The ERRs for the individual subprojects range between 12% to 23% with the exception of Maktaral subproject that has an ERR of 51% (Annex 3, Table 4). Maktaral constitutes about 30% of the total project area and has lowest per hectare cost. Thus its impact on overall ERR is substantial. Ex-post ERRs for all subprojects and the projected ERRs for them at the appraisal stage and or during feasibility studies are presented in Annex 3, Table 4. ERRs for individual schemes reflect their diverse characteristics, including the cost of their rehabilitation. The ERR for subproject Maktaral is very high owing to favorable agro-climatic conditions for growing cotton which is a high value crop. The net present value, discounted at 10% over a period of 25 years is KZT 18,557.67 million (US\$137.5 million equivalent.)

Project benefits have resulted primarily from increased agricultural production with a combination of increase in cropped area, increase in crop yields and shift towards high value crops. About 70% of the benefits are due to an increase in cropped area and 30% is due to an increase in yields. Other benefits include savings in energy costs particularly for subprojects with pumped irrigation system which were quantified and included in the analysis. There have been considerable water savings which in many cases will be utilized within the subproject area. However, water savings in gravity schemes such as Maktaral and Akkumsky are so high that some of the water may be used out of the subproject area and/or for meeting environmental demands. These benefits are not quantified. The Project created direct employment for 6,600 people in 2004 (see Annex 3, Table 3 by subproject) in the farming sector and this is estimated to increase to more than 8,000 over the next three years. The secondary impact of direct employment by the Project has not been estimated. Based on the economic analysis, it is clear that the Project resulted in increased productivity and employment.

4.4 Financial rate of return:

Not applicable.

4.5 Institutional development impact:

The Project's institutional development impact was high as it had this as an explicit objective and included a component for institution building. The capacity of Government agencies involved in the I&D sector as well as in construction of infrastructure in other sectors has been enhanced greatly as a result of the Project. The MOA/PIU's capacity was strengthened in preparing, designing, and construction of I&D projects. The institutional building is also sustainable as the PIU was integrated into the MOA structure and CWR has now taken over the responsibility for future I&D development. The water users and WUAs were strengthened at the subproject level in carrying out O&M of I&D systems. As mentioned above, the Project also had a broader impact on institutional building and this was not limited to the MOA. The MOA staff that have worked as Project Managers of the civil works contracts are in high demand in the country because of their experience in procurement, engineering, construction supervision and contract management. After project completion, many of them are now working in other World Bank, Asian Development Bank and other donor funded projects. Some of them are working in the private sector, with companies involved in construction of urban and rural water infrastructure as well as in the oil industry.

About ten national design institutes have worked as sub-consultants under the supervision of the international engineering consultants to prepare the engineering designs for I&D improvement works in the various subprojects. Many of these are now private firms and are involved in construction projects all over Kazakhstan. Since the strengthening of these design institutes has substantially upgraded the technical capacity in the country, GOK now finances all consulting services for development projects from its own resources, though consultants are selected using guidelines similar to those of the World Bank Guidelines for Selection of Consultants.

The construction industry in Kazakhstan has benefited greatly from the Project by enhancing its capacity in carrying out construction works under international contracts. Many local contractors started working as subcontractors to the international contractors but they subsequently managed to win and implement ICB contracts themselves as main contractors, under the IDIP as well as other projects. A few of the IDIP national contractors are now involved in other projects supported by the World Bank, other donors and GOK.

The most notable institutional development impact of the Project is probably in the area of procurement and contract management capacity. Even for projects funded from its own resources, GOK has now adopted the Bank's procedures for procurement, bidding, forms of contracts and bidding documents. After approval by the MOF, all agencies of GOK are now using these procurement and contracting procedures. Although, all credit for these changes cannot be attributable solely to IDIP, it indeed deserves the most credit, since it was one of the first projects through which GOK gained experience in procurement and contract management,. Based on the above and its impact on private and public sector development, the Project deserves a *High* rating for institutional development impact.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

There has been no significant events outside the control of the Government or implementing agency that affected project implementation.

5.2 Factors generally subject to government control:

The Project experienced some delays in implementation, mostly related to budgetary problems, a

controversy about the mechanism for cost recovery, and the restructuring of the PIU following its move from Almaty to Astana (all of which are discussed in more detail below). Nevertheless, project implementation has generally been satisfactory mainly due to excellent project preparation, upfront preparation of feasibility studies and detailed designs for several schemes, the agreed upon institutional structure for implementation, and support from engineering and other technical consultants.

In the early stages of the Project, counterpart funding was a problem and this affected the implementation of a few subprojects. To address this issue, the Bank increased the disbursement percentage for works at the request of the GOK in 2000. During IDIP implementation, frequent changes in procedures for annual budgetary allocations created uncertainty and inflexibility, particularly, when a new budget system of “passports” was introduced in 1999/2000. Due to the requirement that the budget requests for the following year had to be submitted well in advance and unutilized funds from the allocated budget were perceived as a sign of incompetence of the implementing agency, the implementing agency tended to lower its estimates for the next budget year. In addition, the budget allocations were made against very detailed expenditure categories while the spending was strictly controlled by category without much flexibility for reallocation of funds among the categories. In early 2000, due to these budgetary problems, the MOA had to delay the signing of two contracts that had been awarded; the opening of bids received for three contracts; and the pre-bid conferences for two contracts. However, counterpart funding was not a problem during the later years (from 2001 onward) as the GOK had a budget surplus by then. It is unlikely to be an issue in future projects --the GOK is financing at least 50% of the cost of projects recently approved/negotiated.

The MOF had a very strict control over changes in the contracts for consultants and works, which left little flexibility for the MOA in project management. In addition, any changes to the contracts were also to be cleared by the local governments (maslihats) as part of the counterpart funds were provided by them. In practice, this often caused delays in approval and avoidance of beneficial changes during construction.

The strict requirement by the State Expertise for a very detailed feasibility for each subproject, requiring considerable time and resources for preparation upfront, and particularly the inflexibility in reallocation of budget during the year, meant that expansion of a subproject or addition of a new subproject was very difficult in the later years of project implementation. As a result, the savings from the cancellation of a subproject could not be utilized because the timely preparation of a new subproject was not deemed possible by the implementing agency. The Government has been reviewing its budget procedures and is making adjustments since the introduction of a new budget system so that such issues can be avoided in the future.

Even during project preparation, it was realized that the availability of farm machinery for the farmers of the rehabilitated subprojects would be necessary to achieve rapid production gains after the rehabilitation of the I&D systems. As some of the farms went out of production prior to I&D rehabilitation, the farm machinery of these farms had deteriorated drastically. Moreover, the farmers lacked capital and were not able to obtain loans because of stringent requirements for collateral by the financing institutions (land could not be mortgaged.) After the mid-term review in October 1999, the need for farm machinery was recognized by the Government, and it requested that IDIP loan funds be used to provide machinery to the farmers of the rehabilitated subprojects, at subsidized terms. Unfortunately, the terms and mechanism on how to provide farm machinery is a subject on which GOK and the Bank were not able to reach an agreement. More efforts could have been made by GOK to address this issue through its ongoing program of farm machinery financing or through the Bank financed Agricultural Post Privatization Assistance Project (APPAP).

Also, an extension of the consultants' contract for the Agricultural Development Component could have enhanced the project benefits further. Unfortunately, although efforts were made by Bank missions, no agreement could be reached to revive this Component, in part because GOK linked the revival of this Component to the provision of farm machinery from the project loan. Despite these various issues, the Government remained very committed and actually did quite well in project implementation.

5.3 Factors generally subject to implementing agency control:

Particularly during the early years of the Project, the PIU was effectively managed by a very dynamic and experienced engineer, quick to make decisions and instrumental in starting-up several subprojects. There have been no factors subject to the control of the PIU that have affected project implementation. After the PIU structure was dismantled and its staff was merged with MOA departments, the management efficiency of the Consultants Group was lower than that of the PIU as the project staff had to seek many clearances within the Ministry. However, this did not affect the implementation of already ongoing contracts or subprojects, which were already designed and included in the program, but it dampened their initiatives for starting additional subprojects with the available savings from the Project.

5.4 Costs and financing:

At appraisal, the total cost of the Project was estimated at US\$117.88 million equivalent of which US\$80.00m was to be financed from the Bank loan, and the remaining US\$37.88m was to be financed by the Government of Kazakhstan. At completion, the project cost was US\$97.7m of which US\$72.46m was financed from the Bank loan and US\$25.24m was financed by the Government (see Annex 2 for details). The unutilized loan amount of US\$7.54m was cancelled at the time of project closing. The reasons for under utilization of the loan funds was: (i) the ICB bidding procedure resulted in lower than planned cost of rehabilitation for the subprojects; and (ii) cancellation of three subprojects (Kaisar in Aktobe Oblast, Pastaev, and Saryozenski) from the final list of subprojects to be rehabilitated during project implementation period due to their very high per hectare cost of rehabilitation. Given the cumbersome budgetary and administrative procedures within the Government, as explained above, new subprojects were not added to the Project. However, the unutilized amount of loan funds is lower than it would have been because the disbursement rate for the civil works contracts was increased from 70% in the original Loan Agreement to 80% during project implementation.

About 92% of the cost of the Project, both at appraisal and completion, was for rehabilitation of I&D systems in various subprojects and remaining for agricultural component and institutional building. The disbursements proceeded according to the original estimates without major lag. The financial management system worked well under the projects. Payments were made to all contractors mostly on time with exception of a few cases when project implementation was halted to address the WUA and cost recovery issues. In addition to the GOK's contribution, a small amount of the rehabilitation costs were to be met by the oblast governments. The oblasts' involvement often delayed the decision making for design and contract management, particularly in making changes to the ongoing construction contracts.

Cost Recovery. Cost recovery has been central to the design of the Project and an important factor in its evolution in its final form. The planned cost recovery was to ensure that the farmers would make a strong commitment to the success of the Project while allowing them to make major decisions regarding the desired scope and extent of the subproject rehabilitation works - which was exercised very well by the IDIP farmers. However, the demanded level of capital cost recovery under the Project was unusually high when compared to similar projects elsewhere in the world, where contributions of between 5% to 20% are typical. For IDIP, GOK had required beneficiaries to repay 70% of the cost of rehabilitation/improvements (without VAT) in 30 years, with a grace period of five years beginning from the date of signing of the cost recovery agreement, prior to the commencement of rehabilitation works. The justification for such a high

recovery rate was that most of the I&D system rehabilitation works were assumed to be performed on the on-farm level, considering the then existing state and collective farm structure and returns indicated adequate margins to cover those amounts. However, the structure and delineation of on-farm and off-farm works changed considerably when the farms were privatized during the project implementation period, as many of the on-farm canals became off-farm canals and hence public works.

Immediately after the rehabilitation of the I&D systems, the farmers had to invest in farm machinery and had many other necessary expenditures for starting their own farming operations and bringing the land back into production. Also the start loan repayment after five years grace period from the signing of the loan and not from completion of works made period of actual earnings too short. This limited the farmers' ability to repay the loan for rehabilitation of I&D systems immediately after the subproject went into operation, even though the incremental benefits from rehabilitation far exceeded the cost. Therefore, in addition to the level of cost recovery, the terms of cost recovery should have been designed taking into account the farmers' anticipated cash flow during post rehabilitation period, and particularly as they are may be facing problems in securing credit.

6. Sustainability

6.1 Rationale for sustainability rating:

The principal objective of the IDIP, restoring the productivity of irrigated lands, is *highly likely* to be sustained. The private farmers in the rehabilitated subprojects are improving their farming practices every year. Different and more profitable crops are being introduced. These farmers/owners are also improving their response to the market economy, and their capacity to operate and maintain their on-farm I&D systems. With the now reliable irrigation water supply and improved drainage conditions, some outside investors are getting involved in the rehabilitated subprojects by making investments and growing specialized crops. For example, in Shengeldy, a private company is investing in soybean production, in Akkumsky in rice, and in "60 Years of October" a dairy plant is investing in fodder production. In most subprojects there is shift towards high value crops, e.g. towards cotton in Maktaral, potato seed production in Kaiser 2 (near Astana), and vegetables in most subprojects. This, together with higher income levels, makes backtracking very unlikely.

The farmers/owners and WUAs are well organized, improving their capacity to operate and manage the inter-farm I&D systems within the original state farm, and improving water management as indicated by the estimates of water savings in the rehabilitated subprojects.

The capacity for planning and designing I&D investments is anticipated to improve further as GOK is committed to support the program for rehabilitating irrigated lands. GOK has already allocated substantial resources for this program. A second phase of IDIP is planned for implementation with World Bank assistance and there are similar projects ongoing and in the pipeline with assistance from other donors (such as ADB) and also from GOK's own resources. The achievements in institutional development and the strengthening of irrigation and environmental agencies are likely to be enhanced further. The recent reorganization of the I&D sector and its merger with the CWR, which is responsible for the major water infrastructure, including main and inter-farm canals, and the increasing budgetary allocation for the O&M of this infrastructure has further added impetus to the sustainability of the I&D sector and its institutions.

6.2 Transition arrangement to regular operations:

Plans for the O&M of the rehabilitated subprojects were prepared during the detailed design phase and updated after completion of the construction works, along with the engineering drawings of the systems as built. The subprojects have competent technical staff for proper O&M and with the increasing profitability

of the subprojects and the healthy budgetary situation in Kazakhstan, O&M financing is not likely to be a problem. Upon completion, the I&D systems were transferred to the farmers/owners and WUAs who became responsible for O&M of the new inter-farm infrastructure within the former state farms. The I&D systems remained under warranty for a one-year period during which the owners were already responsible for O&M. The inspections at the end of the warranty period showed that the subprojects are running in good condition. Some of the earliest completed subprojects are now already a few years in operation. The increasing cropped area in these subprojects is an indicator of the proper O&M of the system. Also, with a single agency, CWR, now responsible for management of the major I&D and large water infrastructure (i.e. the whole water sector) there has been more interaction between the owners of the subprojects and the Government agencies in addressing any technical issues which arise in O&M. CWR has the competence and ability to continue I&D rehabilitation program in future. In conclusion, no serious difficulties are experienced in transition to regular O&M of these subprojects by the farmers/owners.

The institutions involved in the planning and development of the I&D systems, including the national consulting firms and contractors, now have increasing opportunities in Kazakhstan to participate in the further rehabilitation of the I&D systems in the country. The remaining area that GOK is planning to rehabilitate is large, potentially exceeding some 1.5 million ha. –such a program would continue to enhance the capacity of all institutions involved in the sector. GOK also has resources now to invest in such a program.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The Bank's performance during project preparation was satisfactory and actually crucial to the Project's success. The preparation team was competent and balanced, and covered the necessary skills in agriculture, economics, engineering, environment, and social sciences. The extensive experience of the team in preparing and implementing irrigation, drainage and agricultural development projects worldwide was likely the most important factor in the success of the Project. The team worked closely with the Government, attended to government priorities and experience, and contributed to best practices in prioritizing subprojects, preparing feasibility studies, designs, EIAs, and institutional arrangements for implementation and procurement. The team prepared excellent terms of reference (TOR) for the project preparation consultants funded under a PHRD Grant, and subsequently for feasibility studies and detailed designs financed using an advance from the Project Preparation Facility (PPF). The engineering consultant recruited for project preparation and design performed very well. Due to thorough and detailed preparation of several subprojects before loan approval and the proper design of institutional arrangements for implementation, project implementation proceeded without any major hurdles. The project preparation led to additional investment by ADB for rehabilitation of I&D systems in Maktaral region covering an area of about 35,000 ha using the feasibility study carried out for the Maktaral subproject. Even though Kazakhstan is fully capable of financing I&D system rehabilitation program itself, despite the relatively higher cost of funds, has selected IDIP2 as one of the few loans it wants from the Bank because of the high value GOK places on technical advice that comes with Bank financing. In retrospect, the Bank should have found a way to either link a credit operation more closely with IDIP or provide the farmers of rehabilitated subprojects with some capital to renew some of their farm machinery.

7.2 Supervision:

Project supervision is rated satisfactory. The supervision was based on the standard practice of two supervision missions per year. However, the intensity was increased during the 1999-2000 period when project implementation was rated unsatisfactory. The missions were staffed with appropriate skills, depending on the project implementation stage and expected issues. The supervision missions consisted of

expertise in engineering, economics, agriculture, financial management, procurement, social and environmental, and operational issues. When necessary, the Sector Manager participated in the supervision missions for discussions with high level officials in Government. The Bank responded to the requirements of the Government quickly in order to resolve issues that may have otherwise created major problems in project implementation, e.g. the need for increasing the disbursement rate; allowing advances to the civil works contractors, and extension of the loan closing date by one year. During implementation the Bank provided guidance about restructuring the PIU, issues related to capital cost recovery, development of WUAs, technical advice on various aspects of I&D system rehabilitation, agricultural services, as well as procurement and contract management. The Bank could have found a way and shown more flexibility in accepting the Government's proposal on the terms for providing farm machinery using IDIP funds when it was realized that farm machinery is essential for expediting the productivity gains from the rehabilitated I&D systems.

7.3 Overall Bank performance:

The Bank's overall performance is rated *satisfactory*, with good project design backed by sound supervision performance and follow up.

Borrower

7.4 Preparation:

The Borrower's participation in project preparation was satisfactory. This was the first donor funded irrigation and drainage improvement project in the country. Initially, there were high expectations that large amounts of funds would be provided quickly for carrying out rehabilitation works throughout the country. In the early stages, GOK staff also had difficulties in using procedures that were different from those used in the past, such as the Bank's requirements for recruitment of consultants and the application of strict economic, social and environmental criteria in selection of subprojects. However, the PIU staff quickly comprehended the concepts and coordination between the Bank and Government teams was excellent during the preparation phase. Project preparation consultants played a crucial role in streamlining what was initially a very complex project preparation exercise due to the new project preparation requirements, an economy in transition, and the ongoing privatization of the farms. Especially the latter was having an impact on the design concepts for the I&D systems of the subprojects and the envisaged structure for the O&M organizations.

The PIU was headed by a very dynamic and experienced engineer with great management and people skills and access to the upper tiers of Government, particularly to the Minister of Agriculture who trusted him and had delegated him with the responsibility for dealing with the project issues. During the preparation phase, the PIU was the main decision making body and thus it was quick in addressing the issues and responding to the problems that kept project preparation on track. The experience of PIU staff was a great asset in understanding the technical, environmental, social and institutional issues of subprojects spread thousands of kilometers apart all over the country.

7.5 Government implementation performance:

The Government's implementation performance is rated *satisfactory*. In the initial stages of the Project, decision making was quick and, as a result, the recruitment of consultants and the procurement of civil work contracts proceeded very fast. This was helpful in setting the pace for project implementation to be followed during the later years. In 1999, however, with changes in the MOA and GOK's decision to revert back to a more conservative approach to cost recovery involving an agent bank on behalf of MOF, the subprojects were required to sign complementary agreements on cost recovery. The implementation of ongoing contracts was halted to ensure compliance with the revised procedures. Also, during this time the MOA went through institutional reforms and decided to merge the PIU staff into the Ministry's

departments. This slowed implementation of the contracts initially but it appears to be proving beneficial in the long run. After the restructuring issues were settled, the Government's response to address financial, procurement, and administrative issues was again quick towards the later years of the Project.

7.6 Implementing Agency:

The implementing agency's performance is rated satisfactory. In the early years of the Project, the PIU was instrumental in quick project startup, development of WUAs, and the procurement and award of contracts for construction of several subprojects. The implementing agency was efficient in monitoring the Project's progress, addressing contractual issues and pursuing Government agencies such as MOA and MOF for timely actions. Audits were completed on time and satisfactorily. However, in later years, after a decision had been made to cancel a subproject and it had become obvious that the Project would have cost savings, the implementation staff was slow in starting up the preparation of feasibility studies for additional subprojects. The reasons behind this slow reaction are to some extent understandable and are explained in Section 5.2. On balance the implementing agencies performance is considered satisfactory.

7.7 Overall Borrower performance:

Overall Borrower performance is rated *satisfactory*.

8. Lessons Learned

As demonstrated in this ICR, rehabilitation of irrigation and drainage systems is highly beneficial, indeed crucial for improving the productivity of irrigated lands, generating employment, and increasing incomes. Kazakhstan's irrigated area had reached more than 2 million hectares in the past (during late 1980s) and then declined particularly after independence in 1991 during transition and economic restructuring. GOK is committed to continue the rehabilitation/improvement of I&D systems over a substantial part of these irrigated lands in line with its objective of diversifying and expanding the economy in the non-oil sectors. With the implementation of this first project in the sector (which actually serves as a large scale pilot), considerable experience has been gained and applying the lessons learned in future projects would make it possible to accelerate the coverage of improved I&D systems with reduction in per hectare cost and increases in the number of beneficiaries. Encouragingly, most of these lessons are being incorporated in the development of a second phase of IDIP which is now under preparation and is anticipated to cover an area of about 200,000 ha. The key lessons are summarized below:

Subproject Selection and Design. In order to maximize the benefits and returns to I&D rehabilitation investments:

(a) highest priority should be given to areas having more favorable agro-climatic conditions for increasing crop productivity. The southern areas in South Kazakhstan, Kzyl Orda (in the Syr Darya Basin), Dzhambul and possibly Almaty Oblasts with warmer weather and comprising large plains have a comparative advantage in cropping activities over the northern areas as they offer possibilities for growing higher value crops like cotton with export potential, and generating higher employment locally through the processing of cotton and manufacturing of related products. The farm sizes in these areas are smaller and the population density is higher so that I&D rehabilitation in this region would extend benefits to a large number of the country's citizens;

(b) lower cost I&D system rehabilitation works covering a large area and a large number of beneficiaries should be selected. The gravity irrigation schemes in the south have relatively lower per hectare cost as these systems are simpler and generally cover much larger areas. Addressing the rehabilitation issues in these gravity based I&D systems first, would therefore further accelerate the areal

coverage and the number of people benefiting from these investments;

(c) rehabilitation of I&D systems should not be seen in isolation from the rest of the agricultural production process. Although I&D rehabilitation is a pre-condition for improving agriculture production, a series of other agricultural interventions and processes are crucial before substantial productivity gains can be realized from the rehabilitated lands. Therefore, for project planning, a coherent integrated approach should be adopted, which should include, inter alia, introduction of improved cropping practices, farmers' extension/information services, training, business development, marketing, and provision of agricultural machinery. These issues were addressed in the IDIP, however, they need more emphasis in future operations, particularly the issue of access to farm machinery by the farmers of the rehabilitated areas;

(d) the project area should be concentrated around a few locations instead of spreading it over the entire country which makes management more difficult and overhead costs in terms of consultants, staff, operations and logistics, much higher;

(e) The nature of a rehabilitation project is that the condition of an I&D system may change during the time period from the date of preliminary project selection up to the actual start of construction. Selection and pre-feasibility study, preparation of the feasibility study, designs, EIA, State Expertise, bidding documents preparation, and actual bidding can take up to two years before the start of construction. During this period infrastructure may, and often, deteriorate faster than expected or may be vandalized. Also, farmers' requirements may change during that period particularly after seeing alternatives for construction on the ground. In addition, it is often discovered during construction that certain items need more repair than envisaged and other construction issues may arise as well for which solutions may need to be found. Consequently, the designs, construction contracts, and budget allocations for the Project need to be flexible enough to accommodate the inevitable changes required.

Development of Water Users' Associations. During IDIP preparation and startup, the Kazakhstan economy and the agricultural sector went through a rapid transition. The land, input and output markets and services are in the private sector and the growth of Kazakhstan's economy is accelerating. Despite some existing uncertainties in land tenure arrangements, and in the legal and regulatory environment for WUAs, the overall legal and regulatory environment has considerably improved in the country. The formation of WUAs under the IDIP subprojects has been successful. The WUAs are playing an increasingly important role in the O&M of the rehabilitated subprojects and will play a central role in the institutional structure for implementing, maintaining and operating future I&D improvement projects. Land rights have become complex since the breakup of the state and collective farms and this situation adds to the time required for the organization of proper WUAs. The important work of supporting the WUAs only really begins after I&D rehabilitation and can take a number of years. Therefore, adequate resources, consulting services and time for technical assistance have to be provided under the Project to establish the WUAs, as well as to provide them with support after I&D rehabilitation to startup the agricultural production activities and arrange for proper O&M of the system. Consequently for this type of investment, this would mean an implementation period longer than the usual five years.

Implementation/Organizational Arrangements. Incorporating the CWR into the MOA and transferring I&D responsibility back to CWR has corrected a long standing institutional anomaly in the management of the water sector in the country. The CWR, which was already responsible for major water infrastructure and main canals, has more capacity than any other agency in the country to design and coordinate I&D investments and deal with all issues related to irrigation projects and water distribution and management. The CWR has its own technical capacity and is now responsible for the water sector as a whole and has branches at the oblast and rayon level. CWR is, therefore, in a strong position to manage investments for

I&D system improvements, especially when aimed at accelerating the extent of rehabilitation in the country and enhancing the sustainability through proper O&M afterwards.

Although future construction expenditures are estimated, the nature of construction work is such that there are likely to be changes in the expenses incurred in a financial year. The construction work may proceed faster (as was the case in some IDIP subprojects) or slower during a specific year depending upon the contractor's capacity, the number of contracts it is handling at a given time and its organization. Therefore, there should be greater flexibility in revising the Government's budget for the projects by allowing appropriate revisions and reallocations among categories in order to respond to the subprojects' needs on the ground. The annual budget for the Project should also include an adequate amount of contingencies to cover any unforeseen developments during a financial year.

Due to various reasons mentioned above (in the Project Selection and Design Section), changes to the scope of the Project are inevitable during the design and construction phases, requiring a more flexible and streamlined approach to revising funding requirements and processing variation orders for construction contracts. Defining roles and responsibility upfront for the nature and scope of such changes and delegating these to the maximum extent to the engineers and project managers in the field would ensure the optimal outcome for I&D system improvement investments.

It is unrealistic to design a complex irrigation project with all of the issues outlined in the sections above related to: (a) development of WUAs and follow up with them during initial years of operations of subprojects; (b) meeting the requirements for detailed feasibility studies, EIA and social assessment preparation, state technical and environment reviews, detailed designs, procurement of often complex contracts; and (c) the construction period in the country which is limited to the summer season only. Also, often, the timing of award of contract cannot be controlled. A contract designed for two years of implementation, if awarded in winter as opposed to summer, would need to be extended till summer in order to check all works for taking over and issuing the completion certificates. Similar adjustments would be necessary for the defects liability period under the contract which should be within the project implementation period in order to remove all defects and clear all payments. Therefore, projects of this nature are likely to take 1-2 years longer than the standard implementation period of 4-5 years and this should be considered in designing future projects.

Cost Recovery/Sharing. The lessons learned regarding cost recovery are that: (i) a rational approach should be used for defining the on-farm and off-farm works. Unlike at the start of IDIP, this would now be possible since all farms are privatized, ownership is more clear and the farms are already under operation by private individuals; (ii) the Project should be designed to maximize the participation of the farmers in the implementation of the on-farm works, which would normally result in a lower cost per hectare for rehabilitation and thus cost recovery; (iii) the terms of the cost recovery, such as grace and repayment periods, should be based on the farmers' cash flows after completion of rehabilitation and additional investment needs; and (iv) a more streamlined process of cost contribution by the oblasts should be adopted, such as deduction of the oblast's share by GOK at source from its financial contribution to the oblast development projects.

9. Partner Comments

(a) Borrower/implementing agency:

The Borrower's (MOA) full comments are given in Annex 9, and the main points are summarized here. MOA endorses the findings, contents and conclusion of the ICR, and in its view the overall project objectives were achieved. MOA also concurs with the satisfactory rating of the project outcome.

In its comments, the Borrower notes that the Project has made considerable contribution to socio-economic development in the project area, including higher income and employment for the beneficiaries, as large areas of agricultural lands were brought back under production. Also, in the project area crop yields have increased, water use efficiency has improved and cost of water (particularly the energy use in pumped schemes) has reduced. In addition to the technical/engineering component of the Project covering rehabilitation of I&D systems, MOA rates highly the contributions of the agricultural and the institutional development components of the Project, including impact of the demonstration plots, development of the Water Code of Republic of Kazakhstan and Law of Republic of Kazakhstan on Agricultural Consumer Cooperatives of Water Users, and establishment of hydro-amelioration expedition centers. The institutional development and capacity building benefits are also confirmed by private institutions such as farm managers, consulting firms, design institutes and construction industry.

The major issues MOA highlights, and lessons learned that can be incorporated in the future Project are in line with the ICR team's findings:

- issues regarding financing of farm machinery to the farmers were not resolved during the project implementation. Provision of farm machinery to farmers was essential for proper operation of the farm activities. As a result, the gains from agricultural production activities are not at their potential levels, and consequently, the farmers are unable to fulfill their obligation in repayment of the loans;
- selection of farms was not always in accordance with the agreed criteria in a few cases because of political pressure, the local authorities had selected farms that were not highly promising; and
- high cost of consultancy contract for detailed design and construction supervision that constituted about 15% of the project cost, and that they were not always effective in convincing the farmers to use new and progressive technical solution at the time of subproject design and implementation of the construction process.

The comments conclude that the follow-up Project should take into consideration the lessons learned from the current operation, and it should include improvement of irrigated agricultural land in the Southern and Southeastern part of the country and should also assist in supporting rehabilitation efforts in farms close to large cities and industrial centers to grow vegetables and produce dairy products in the other parts of the country.

(b) Cofinanciers:

Not applicable

(c) Other partners (NGOs/private sector):

Comments on the Project were received from owners/farm managers of the two participating subprojects, Kerbulak and Kaiser; Kazgiprovdkhoz Design Institute, now Kazakshtan's major private consulting involved in design and construction supervision of water structures and irrigation and drainage networks; Idil-Aksu, a large Kazakh construction company; and a Union of Water Users Associations established in 2001. The comments are generally very positive and a summary is presented below:

Kerbulak and Kaiser subprojects' managers explained that prior to project implementation particularly between 1994-2002, the agricultural land in these subprojects was abandoned, and only after completion of the I&D rehabilitation works, the land was brought back to cultivation. The Project provided with the most fundamental element of farming, water through rehabilitation of the I&D system and therefore, in their view the Project is highly successful. The Kaiser subproject has now become a major supplier of potatoes

and vegetables to the capital city, Astana. They also highlight that with provision of farm machinery to the farmers of rehabilitated subprojects and initial working capital, the potential gains from the Project could have been realized faster. In addition, Kaiser subproject manager supports the MOAs proposal to change the repayment terms to start the grace period of the loan from completion of works instead of signing of the agreement.

Director of Kazgiprovdokhoz, appreciates the business the Project generated for national consulting firms at a time when Government-owned design institutes were in decline due to economic transition in Kazakhstan. The Project has created demand for services of national consulting firms, and built their capacity by familiarizing them with the international standards for construction design, the staff working with the international counterparts.

The construction company Idil-Aksu Ltd commented that it has become stronger due to its participation in the Project because of exposure to new technologies and ways of working. Idil-Aksu has become more competitive, as it is now bidding and winning contracts independently as a main contractor for other construction works. Also, with regards to the Project they further mention that before choosing an approach for rehabilitation, all alternatives should be studied and evaluated, especially the cost saving technologies.

The union of WUAs established under the Project in 2001 under the name of “Public Fund for Union of Ameliorators” is functioning as an independent entity with a main objective to protect farmers interest in areas of irrigation, drainage and water management through participation in the Parliament. The Chairman of the entity has provided a number of comments on how the Project provided with alternative ways of managing the irrigation system at the local level. Under the Project the land was rehabilitated which was out of production, and that farmers have greatly benefited from the training and farmers extension services provided under the Project, so for these reasons, Public Fund for Union of Ameliorators rates the Project very highly. They mention that the Project did not do enough for provision of farm machinery which is an essential element of farming large tracks of land, and that they support MOAs proposal regarding the changes in repayment terms of the loan i.e. starting grace period from completion of works.

10. Additional Information

See Annex 8.

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate
1. Sustainable irrigated agricultural production	<p>At the time of project appraisal in 1995, a logical framework was not developed for the Project. Key monitoring indicators related to crop yields, and other outputs of the Project were entered in the PSR and monitored time to time during supervision missions. These indicators were not based on a well developed logical frame matrix like this one.</p> <p>However, the Project outcome was assessed during the last supervision mission based on the available data collected as part of the Government's own monitoring program. It was indicated in the PSR the Project would achieve its development objective, which includes an increase in agricultural production, income and employment for the farmer, decrease in water use for agriculture and institutional development. The last PSR also contains several output indicators that are indicated in the output section below.</p>	<p>Agricultural production has increased in the subprojects in which irrigation and drainage systems were rehabilitated.</p> <p>Increase in agricultural production has resulted from three sources : (i) increase in irrigated land cropped area has doubled from 15,000 ha before project to 32,000 with project ; (ii) increase in crop yields; and (iii) shift in cultivation of high value crops.</p> <p>Crop yield increase ranges between 12-200% for various crops in various subproject compared to an appraisal estimate of 20-100%. . About 70% of the increase in production has resulted from an increase in irrigated land and the remaining 30% from an increase in crop yields.</p> <p>The Project Economic Rate of Return is 32% exceeding the appraisal estimate of 27%. In subprojects with higher individual ERRs, the shift in growing high value crops are high, such as cotton, soybeans, sunflowers, potato and vegetables.</p> <p>As described in Section 6 of ICR on sustainability the increased production levels are highly likely to be sustained in the future.</p>
2. Increased employment		<p>After rehabilitation of I&D systems about 6,622 people are directly employed in agricultural activities, this is estimated to increase to more than 8,700 at full development.</p>
3. Improved water management as reflected by water savings		<p>On average, the Project has resulted in savings of 1,300 cubic meter of water per hectare annually. Water savings are more in subprojects with gravity irrigation systems compared to the ones with pumped systems. However, in the schemes with pumped irrigation system there are substantial energy savings and in average they amount to about 1,000 Kwh (or US\$40) annually.</p>
4. Introduction of improved agricultural practices		<p>Diversification in crops, increased yields, and involvement of investors in the subprojects with rehabilitated I&D systems indicates the achievement of this objective.</p>
4. Institutional Development		<p>The Ministry of Agriculture's (MOA) capacity was strengthened in areas of (i) planning, design and construction supervision of irrigation and drainage projects; (ii) financial management and procurement; (iii) construction material testing, quality control and contract management; and (iv) more importantly the environmental capacity of the Ministry was strengthened by the establishment of a unit within the Ministry, modernization of 3 regional hydro-amelioration expedition centers and the establishment of one additional center in the city of Astana.</p>

		<p>In addition staff gained considerable experience in Environmental Impact Assessment and preparation of State Ecological Expertise (SEE) and SEE procedures were harmonized. Furthermore, the capacity of Water Users Associations (WUA) were strengthened through training and on the job experience in Operation and Maintenance of the I&D systems.</p> <p>Beside MOA, and WUA, the capacity of various engineering design institutes in sub-project design and the capacity of construction firms in subproject construction was strengthened. This impact is very obvious in the construction industry today in Kazakhstan.</p>
--	--	--

Output Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate
1. Irrigated area rehabilitated	30,000 ha.	32,282 ha.
2. Agricultural Training		
2.1 Farmers' Training		4
* Training Days	46,000	6,000
* No. of Courses	350	350
* Demonstration in Sub-projects	10 (sub-projects)	in 10 subprojects
3. Environmental Training & Seminars		
3.1 Environmental Harmonization Seminar	1 No.	1
3.2 Environmental Training Activities	17 Nos.	17 Nos.
4. Increase in crop yields	about the same as actual	12%-200%
5. Water Savings	about the same as actual	1,300 cubic meter per hectare annually
6. Energy Savings	about the same as actual	1000 Kwh per hectare annually (US\$40)

¹ End of project

Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
Irrigation and Drainage Rehabilitation	108.14	90.19	83
Agricultural Development	2.27	2.12	93
Institutional Building	5.93	4.46	75
Refinancing PPF	1.50	0.93	62
Total Baseline Cost	117.84	97.70	
Total Project Costs	117.84	97.70	
Total Financing Required	117.84	97.70	

Note: Appraisal estimates are tabulated as total cost instead of base costs as they provide real comparison with the actual costs at completion.

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	95.98 (60.88)	3.02 (2.00)	0.00 (0.00)	0.00 (0.00)	99.00 (62.88)
2. Goods	1.29 (1.07)	0.00 (0.00)	2.29 (1.90)	0.00 (0.00)	3.58 (2.97)
3. Services	0.00 (0.00)	0.00 (0.00)	12.65 (12.65)	0.00 (0.00)	12.65 (12.65)
4. PPF Refinancing	0.00 (0.00)	0.00 (0.00)	1.50 (1.50)	0.00 (0.00)	1.50 (1.50)
5. PIU Operation	0.00 (0.00)	0.00 (0.00)	(0.00)	1.13 (0.00)	1.13 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	97.27 (61.95)	3.02 (2.00)	16.44 (16.05)	1.13 (0.00)	117.86 (80.00)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	81.51 (57.56)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	81.51 (57.56)
2. Goods	0.00 (0.00)	0.45 (0.39)	0.13 (0.11)	0.00 (0.00)	0.58 (0.50)
3. Services	12.31 (12.31)	0.00 (0.00)	0.83 (0.69)	0.00 (0.00)	13.14 (13.00)
4. PPF Refinancing	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.93 (0.93)	0.93 (0.93)

5. PIU Operation	0.00 (0.00)	0.00 (0.00)	1.07 (0.00)		1.07 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.47 (0.47)	0.47 (0.47)
Total	93.82 (69.87)	0.45 (0.39)	2.03 (0.80)	1.40 (1.40)	97.70 (72.46)

^{1/} Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

^{2/} Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
Irrigation and Drainage Rehabilitation	72.00	34.10		67.08	23.08		93.2	67.7	
Agricultural Development	2.30	0.00		1.96	0.18		85.2	0.0	
Institutional Building	4.20	3.70		2.49	1.98		59.3	53.5	
Refinancing PPF	1.50	0.00		0.93	0.00		62.0	0.0	

Annex 3. Economic Costs and Benefits

This economic analysis was carried out following the same methodology used at the time of project appraisal. Crop budgets were prepared for each crop and farm models were developed for each subproject simulating three following scenarios: (a) without project (WOP) representing the production conditions prior to start of the rehabilitation of I&D systems; (b) with project 2004 (WP2004) representing production condition as in 2004 after rehabilitation of I&D systems. Currently, different subprojects are at different levels of development. The subprojects where rehabilitation started during the first year of the project implementation (such as Shengaldy, Kzyl Agash etc.) have achieved higher levels of production compared to those which were completed later and especially those completed in 2003; and (c) with project future (WPF), representing production conditions assuming full level of development about four years in the future. Estimation of this scenario is necessary because prior to the start of rehabilitation works, the condition of farms was considerably deteriorated, cropped area was reduced and some farm areas went out of production. As a result, for most of the rehabilitated farms, 2004 is the first or second year of production, so the crop yields are to increase further, as productivity of land increases with each production cycle, and as farmers are investing in improved farm technologies, such as better seeds, fertilizer and chemicals, and farm machinery for operation and management of their farms. Incremental benefits for the Project were estimated using these models and the results were incorporated in the calculation of ERR. The details are provided below.

Project Costs.

Project costs, their breakdown by subprojects and per hectare cost are provided below in Table 1. The economic costs were estimated by subtracting the taxes and duties and applying standard conversion factors. As project costs occurred during different years of project implementation, all costs were in addition converted to 2004 prices which is the base year for the project costs as well as for the estimated project benefits. In addition, incremental operation and maintenance (O&M) costs were estimated for each subproject and included in their respective ERR estimations. The project cost primarily consists of the cost of construction of I&D rehabilitation works in the subprojects. Other costs include the engineering designs and construction supervision, project management, the agricultural component and institutional development component.

Project Benefits.

The project benefits have primarily resulted from increased agricultural production. These were estimated using crop budgets for each crop and farm models for each subproject under three scenarios, WOP, WP2004 and WPF. Incremental agriculture benefits come from increase in crop yields, increase in cropping areas and shifts to high value crops. The cropped area has doubled i.e. increased from 15,111 ha. WOP to 32,282 ha with project. About 70% of the benefits are due for an increase in cropped area and about 30% is due for an increase in crop yields. Shift towards higher value crops is significant in most subprojects but more pronounced in Maktaral towards cotton, in Shengeldy towards vegetables and soybeans, and in Kaiser 2 towards potatoes.

Table 1: Project Costs (Million KZT)

Sub-Project	Total Area Hectares	Actual Costs	Economic Costs 2004 Prices	Actual costs Per ha	Economic Costs Per ha
<i>Shengeldy</i>	2,368	534.2	700.4	0.23	0.30
<i>Kzylagash</i>	1,420	538.2	633.6	0.38	0.45
<i>Akkumski</i>	1,034	305.7	359.1	0.30	0.35
<i>Maktaral</i>	9,936	914.6	1036.7	0.09	0.10
<i>Prirechny</i>	1,574	486.5	453.7	0.31	0.29
<i>Zhambul</i>	1,114	482.2	462.9	0.43	0.42
<i>60 Years of October</i>	3,574	1,299.1	1139.4	0.36	0.32
<i>Kerbulak</i>	2,915	856.8	781.1	0.29	0.27
<i>Kaisar 2</i>	1,170	462.6	420.8	0.40	0.36
<i>Chaganski/Zalik</i>	1,187	756.0	675.6	0.64	0.57
<i>Kurchum</i>	3,217	1,373.0	1239.4	0.43	0.39
<i>Krasnaya Polyana</i>	915	359.2	335.7	0.39	0.37
<i>Darkhan</i>	867	435.9	356.2	0.50	0.41
<i>Dusupov</i>	991	426.0	348.1	0.43	0.35
<i>Other costs</i>		1,594.51	1,270.41		
Total	32,282	10,824.5	8,942.70	0.29	0.28

Crop yield increases after rehabilitation of I&D systems vary from subproject to subproject depending on how long they have been under cultivation after rehabilitation and their specific agro-climatic conditions. Actual yield data for each subproject was gathered after project completion and was used in the economic analysis. Crop yields and comparison with the assumptions at appraisal stage are summarized in Table 2. As there are 15 schemes spread over a wide geographic area, the yields are not represented by a single number, rather by a range for each scenario. The crop yield increases observed at completion are higher than the appraisal estimates. Actual increases range between 12-200% compared to the appraisal estimate of 20-139%.

Table 2 also shows that crop yields assumed for “Before Project” scenario at appraisal were much higher than those observed just before the start of I&D rehabilitation. The reason for this is that the appraisal estimates are as of 1995 while the ICR estimates are just before the start of I&D rehabilitation. Also after 1995, farm privatization progressed faster than expected, the I&D systems deteriorated much further than expected, farm machinery stocks were completely depleted, and large farm areas were virtually abandoned. Thus, production conditions in the subprojects were much worse just before the start of the I&D rehabilitation than those assumed at appraisal in 1995. For most of the rehabilitated farms, 2004 is the first or second year of production, so the crop yields are still increasing, as productivity of land increases with each production cycle, and as farmers are investing in better farm technologies, such as better seeds, farm machinery, fertilizer, for better operation and management of their farms. At this stage, (WP2004) yields levels estimated for “After Project” during appraisal have been achieved in many cases. However, in some cases where rehabilitation of I&D has just been completed, the yield increases will still continue. Similarly, increase in cropped areas in various subprojects is continuing. However, for WPF scenario representing the production conditions at full development, the yield increases assumed are very modest.

Table 2: Crop Yield (Tons Per Hectare)

At ICR	At Appraisal
Crops	Before Project - With Project 2004 - With Project Future - Before Project - After Project
<i>Wheat</i>	0.8 – 1.51.5 - 2.02.5 - 3.02.44
<i>Soybeans</i>	Not grown 0.4 -1.62.0 - 2.51.52.5 -2.8
<i>Maize</i>	1.2 -22.5 - 3.54.03.66.3 - 6.5
<i>Rice</i>	3.34.35.04.55.2
<i>Cotton</i>	1.5 – 1.82.03.02.73.2
<i>Buckwheat</i>	Not grown 0.5 - 1.21.7 - 2.0New crop New crop
<i>Potato</i>	4.0 - 12.312.0 - 15.019.0 - 20.01115 -20
<i>Vegetables</i>	7.0 - 16.019.0 - 22.522 – 2517.830
<i>Maize Silage</i>	11 – 12.320302530-40
<i>Sunflower</i>	Not grown 0.4 - 1.62 New crop New crop
<i>Melons</i>	7.5 – 1515-19.519 – 209.215 -22
<i>Sugar Beet</i>	15.519.820 – 222835
<i>Alfalfa Mature</i>	0.1-3.65.5 - 7.38.7-1066-9

Other project benefits include substantial reduction in water use for irrigation in both gravity and pump schemes. The water savings in gravity schemes particularly in Maktaral, Akkumsky and Kurchum are substantial. On average, the annual water savings are estimated at about 1300 cubic meters per hectare. Some of the water savings would be utilized within the subproject area for increasing the cropping area. However, in some cases, the saved water would be more than required within the subproject, so it would benefit other areas as well as meeting the environmental demands. For example water saved in Akkumsky could be diverted to Syr Darya delta lakes and /or the Northern Aral Sea. These benefits have not been quantified. In case of pumped irrigation systems, there are substantial savings in energy use (Annex 8, Table 3), these benefits have been quantified and included in ERR estimates.

**Table 3: Employment in Farming Sector
Persons Directly Employed in each Subproject**

Sub-Project	Number of Jobs
Shengeldy	493
Kzylagash	352
Akkumski	136
Maktaral	4795
Prirechny	298
Zhambul	325
60 Years of October	506
Kerbulak	230
Kaisar 2	232
Chaganski/Zalik	214
Kurchum	564

Krasnaya Polyana	218
Darkhan	192
Dusupov	231
Total	8,786

Moreover, the Project has already created direct employment for more than 6,600 people in farming activities; this is expected to increase to 8,786 people at full development (see Table 3 for breakdown by subproject). Employment covers various skills such as agronomists, engineers, mechanics, farm machinery operators, unskilled workers and seasonal labor. The secondary impact of direct employment by the Project has not been estimated.

Economic Analysis.

The Project ERR at completion is estimated at 32% compared to an estimate of 27% at appraisal. The ERRs for individual subprojects range from 12% to 23% with the exception of Maktaral subproject that has an ERR of 51%. ERR for each subproject and comparison with appraisal or feasibility study estimates is given in Table 5. The ERR reflects diverse characteristics of each individual scheme and their cost of rehabilitation. Maktaral ERR is very high owing to favorable agro-climatic conditions for growing cotton which is a high value crop. The net present value, discounted at 10% over a period of 25 years is KZT18,577.67 million.

The ERRs are generally higher for subprojects in southern oblasts and those with lower per hectare costs. Also, generally schemes with gravity irrigation system and large irrigated areas have a higher ERR than those of the pumped schemes. The exception is Shengeldy which is located in the southern part of the country, close to Almaty and where the farmers are growing vegetables and soybeans. In addition, pumped schemes, such as 'Prirechniye' has better than average ERR because of diverse crops, including vegetables, and have a relatively lower cost of rehabilitation.

Table 4: Economic Rate of Return

Scheme	Location	Type of Irrigation	ERR at Appraisal	ERR Feasibility Study	Post Project ERR
Shengeldi	Southeast	PD	37%		23%
Kzylagash	East	GR	18%		18%
Akkumski	South	GR	18%		19%
Maktaral	South	GR		20%	51%
Prirechniye	Northeast	PS	33%		17%
Zhambul	Southeast	GR	42%		13%
60 years	Middle-East	PS	15%		13%
Kerbulak	Southeast	PS		12.4%	12%
Kaiser	Middle North	PS		12.6%	15%
Chiganski/Zahik	Northwest	PS		13.1%	12%
Kurchum	East	GR		12.5%	12%
Krasnaya Polyana	Middle North	PS	26%		12%
Darkhan	Southeast	GS		13.3%	16%
Dusupova	Northwest	PS		12.2%	13%
Overall Project			27%		33%

--	--	--	--	--	--

PD Pumped with water distribution through pipelines and concrete flume (covering an area of 2,368 ha)
PS Pumped with sprinklers (12,326 ha)
GR Gravity intake and distribution through canals or concrete flumes (16,721 ha)
GS is gravity with distribution through sprinklers (867 ha)

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation					
	11/24/1992	2	MISSION CHIEF (ECONOMIST) (1); IRRIGATION SPECIALIST (1)	S	S
	02/08/1993	2	MISSION CHIEF (IRRIG) (1); ECONOMIST (1)	S	S
	9/11/1993	2	MISSION CHIEF (IRRIG) (1); AGRICULTURALIST (1)	S	S
Appraisal/Negotiation					
	11/05/1995	7	MISSION CHIEF (ECON) (1); IRRIGATION ENGINEER (1); AGRICULTURALIST (1); ENVIRONMENTAL SPECIALIST(1); SOCIAL DEVELOPMENT SPECIALIST(1); CONSULTANT (COST/FINANCE) (1); OPERATIONS (1)	S	S
Supervision					
	03/26/1997	6	MISSION CHIEF (IRRIG) (1); IRRIGATION AGRONOMY (1); SOCIAL SCIENCE (1); PROCUREMENT (1); ENVIRONMENT (1); IRRIGATION (1)	S	S
	12/15/1997	4	MISSION CHIEF (IRRIG) (1); IRRIGATION (1); SOCIAL SCIENCE (1); PROCUREMENT (1)	S	S
	05/26/1998	3	MISSION L. (IRRIG) (1); AGRONOMY (1); SOCIAL SCIENCE (1)	S	S
	10/13/1998	3	MISSION L. (IRRIG) (1); AGRONOMY (1); SOCIAL SCIENCE (1)	S	S
	05/10/1999	3	IRRIGATION (1); AGRONOMY (1); SOCIAL SCIENCE (1)	S	S
	03/09/2000	3	TASK TEAM LEADER (1); IRRIGATION ENGINEER (1); RESOURCE ECONOMIST (1)	U	S
	05/29/2000	3	TEAM LEADER (1);	S	S

ICR	12/01/2000	5	RESOURCE ECONOMIST (1); IRRIGATION ENGINEER (1) TEAM LEADER (1); OPERATIONS ANALYST (1); DISBURSEMENT ASSISTANT (1); SECTOR MANAGER (1); ENGINEER (CONSULTANT) (1)	S	S
	06/20/2001	3	TEAM LEADER (1); OPERATIONS ANALYST (2)	S	S
	03/15/2002	4	WATER RESOURCES (1); ECONOMIST (1); IRRIGATION ENGINEER (1); OPERATIONS ANALYST (1)	S	S
	06/03/2003	5	TTL, WATER RESOURCE (1); ECONOMIST (1); IRRIGATION (1); OPERATIONS OFFICER (1); FINANCIAL MANAGEMENT (1)	S	S
	01/05/2004	2	TTL WATER RESOURCE SPL (1); OPERATIONS OFFICER (1)	S	S
	05/19/2004	1	TASK TEAM LEADER (1)	S	S
	11/08/2004	2	MISSION CHIEF (WATER RESOURCES SPECIALIST) (1); OPERATIONS OFFICER/ECONOMIST (1)	S	S

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	118.8	866.6
Appraisal/Negotiation	69.8	241.9
Supervision	222.1	910.9
ICR	14.6	47.8
Total	425.3	2067.2

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Physical</i>	<input checked="" type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Institutional Development</i>	<input checked="" type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<i>Social</i>					
<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance

Rating

- | | | | | |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

6.2 Borrower performance

Rating

- | | | | | |
|--|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Preparation | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

Annex 7. List of Supporting Documents

Studies and Feasibility Reports

Pre-Feasibility Studies for all Subprojects
Feasibility Studies for all subproject
Environmental Impact Assessment of all subprojects
Business plans for 10 subprojects, a total of 17 business plans
Operational Plans for all Subprojects
Study for Transferring Irrigation Management for a Typical Canal Command Area
Final Report of the Management and Engineering Consultancy Services Contract
Reports and data tables prepared by the MOA as part of GOK's project completion report.
Report on "Pure Drainage Water in the Shengeldi Farm community"

Monitoring Reports

Quarterly Progress Reports on implementation of Component 1 rehabilitation of I&D systems
Quarterly Progress Reports on Agricultural Component
Progress Report and Strategy for implementation of Agricultural Component, Participatory Training and Information Services Pilot Program.
IDIP, Management and Engineering Component, Studies and Design Stage Final Report (April 1997-April 2000)

Documentary video, showing construction progress on various subprojects and interviews with farmers, owners, and WUA representative on project impact.

Additional Annex 8. Additional Information about the Subproject

The list of subprojects rehabilitated under the Project is given in Table 1. The subprojects which were studied but their rehabilitation was not undertaken for various reasons are listed in Table 2. Table 3 provides estimates of water and energy savings by subprojects. Finally, a brief description of each subproject, rehabilitation works undertaken, and changes made during construction period are also provided in the sections below.

Table 1: List of subprojects implemented

Name of Sub-project (contract number)	Contract Number	Oblast	Area (ha)	Type of Scheme
1. Shengeldy	IDIP 02	Almaty	2,368	PD
2. Kzyl-Agash	IDIP 03	Almaty	1,420	GR
3. Maktaral	IDIP 04	South Kazakhstan	9,936	GR
4. Akkumsky	IDIP 04	Kzyl-Orda	1,034	GR
5. Prirechny	IDIP 05	East Kazakhstan	1,574	PS
6. Dzhambul	IDIP 06	Zhambul	1,114	GR
7. Kurchum	IDIP 07	East Kazakhstan	3,217	GR
8. Krasnaya	IDIP 08	Karaganda	915	PS
Polyana 9. 60 Years of October	IDIP 09	Pavlodar	3,574	PS
10. Chaganski	IDIP 10	West Kazakhstan	565	PS
11. Zhaik	IDIP 10	West Kazakhstan	622	PS
12. Kaisar 2	IDIP 12	Akmola	1,170	PS
13. Kerbulak	IDIP 13	Almaty	2,915	PS
14. Darkhan A	IDIP 15	Almaty	867	GS
15. Dusupova	IDIP 16	West Kazakhstan	991	PS
	Total	32,282		

PD- Pumped with water distribution through pipelines and concrete flume (covering an area of 2,368 ha)

PS- Pumped with sprinklers (12,326 ha)

GR- Gravity intake and distribution through canals or concrete flumes (16,721 ha)

GS- Gravity with distribution through sprinklers (867 ha)

Table 2: Subprojects studied but deleted from the program

Name of Sub-project	Oblast	Original Design Area (ha)	Notes
1. Patsaev	Aktobe	627	Per ha cost was too high
2. Company Ltd Kaisar	Aktobe	697	The owner was not interested
3. Astra	Karaganda	1,880	Could be implemented in future
4. Saryozenski	Kostanai	850	Oblast gov. was not agreeable
5. Pritobolskoye	Kostanai	950	Owner was not interested
6. Nura	Akmola	1,500	Environmental Problems
7. Mirny	Karaganda	1,302	Economic cost of supplied pumped water too high
8. Kuigenzhar	Akmola	900	Land was not privatized
9. Ardager	Kzyl Orda	250	Did not meet criterion of being previous irrigated land
Total	8,006		

Table 3: Typical Annual Savings in Water Use

Contract Number	Sub-project Name	Annual Water Saving ('000m3)	Annual Power Saving ('000 kWh)
IDIP 02	Shengeldy	1890-2520	2,740-3,660
IDIP 03	Kzyl-Agash	1780-2380	n/a – gravity system
IDIP 04	Maktaral	6950-9260	n/a – gravity system
IDIP 04	Akkumsky	4500-6000	n/a – gravity system
IDIP 05	Prirechny	1150-1540	1080 – 1430
IDIP 06	Dzhambul	2500-3340	n/a – gravity system
IDIP 07	Kurchum	5300-7000	n/a – gravity system
IDIP 08	Krasnaya Polyana	630-840	510-680
IDIP 09	60 Years of October	1900-2540	3500-4700
IDIP 10	Changanski/ Zhaik	390-520 420-560	320-420 350-460
IDIP 12	Kaisar 2	620-830	580-770
IDIP 13	Kerbulak	1180-2660	1180-1570
IDIP 15	Darkhan A	590-790	480-650
IDIP 16	Dusupova	680-900	550-740
Total	30,480-41,680	11,290-15,080	

Description of Subprojects Rehabilitated

Shengeldy

The Shengeldy subproject is located in Almaty Oblast. Under this subproject, an area of 2,368 ha. was rehabilitated. Distinctive features of the subproject were the reconstruction of the pumping station, an extensive irrigation flume distribution network and a buried drainage network. The rehabilitation works comprised the following: (a) rehabilitation of the existing pumping station, including the replacement of 6 pumps (with capacities from 350 to 825 l/s and pressure heads from 45 to 72 m); (b) installation of concrete pipe, diameter 800 mm, 1.02 km in length, and steel pipe, 3, 834 km in length; (c) rehabilitation and replacement of the existing open flume network, rehabilitation of a length of 2.15 km and replacement of a length of 5.27 km; (d) land planning and levelling, comprising 302, 000 m³ earthworks; (e) installation of horizontal underground drains over an area of 310 ha, including closed collectors of 150 to 300 mm diameter and 10.4 km of field drains, 125 mm in diameter; and (f) leaching of 12 ha of saline lands.

To improve the irrigation scheme, remedy certain design deficiencies and also in response to farmers' requests the works were subject to a number of changes, including: (a) additional monitoring wells; (b) replacement of part of the distribution flume networks with underground reinforced concrete pipes; and (c) an increase in the length of the flume network.

Kzyl Agash

The Kzyl Agash subproject, located in Almaty Oblast, comprised the rehabilitation of irrigation systems over an area of 1,400 ha. The distinctive features of this subproject were the construction of a water intake structure on the mountainous Kzyl Agash River, a gravity flow irrigation system and a buried drainage network. The following works were carried out: (a) completion of the partially constructed diversion on the Kzyl Agash River; (b) completing the main and secondary supply pipelines over 7.57 km (diameter 800-1400 mm); (c) constructing the main distribution network, 12.79 km (diameter 300-800 mm); (d) constructing an irrigation network of buried distributors and hydrants, 33.38 km (diameter 200-400 mm); (e) land grading and smoothing, 44 017 m³ of cut; (f) provision of gated pipe irrigation equipment; and (g) installation of a surface drainage network including the outlet scheme.

To improve the irrigation scheme, remedy certain design deficiencies and also following farmers' requests, the Kzyl Agash site was subject to a number of changes, including: (a) irrigation pipelines from asbestos pipes were replaced by steel pipes; (b) the irrigation scheme layout was fundamentally changed; (c) the diameters of main pipelines were increased; and (d) the quantities of works decreased as a result of the irrigation scheme change.

Maktaral

The Maktaral subproject, located in South Kazakhstan Oblast, covers 9,936 ha of irrigated land. The area is made up of a large number of small farms almost exclusively growing cotton. The scheme is characterized by open channel irrigation and drainage but with also a series of vertical drainage wells. Rehabilitation works included: (a) irrigation and drainage rehabilitation and improvement (9,607 ha); (b) canal rehabilitation (191 km) including associated structures; (c) collector drain cleaning (160 km) including associated structures; (d) installation of vertical drainage wells (57), including their electrical power supply, and; (e) rehabilitation of existing roads (328 km). To improve the irrigation scheme, remedy design deficiencies and also following farmers' requests, a number of changes were implemented. Overall, project costs reduced by some 16% resulting from the deletion of some works such as flow meters, roads and canal lining, while other changes did not affect the costs.

The design of the vertical drainage wells introduced new and up to date technology to Kazakhstan. The design allowed smaller diameter, more corrosion resistant wells to be used with lower power consumption. However, this raised problems as the standards and norms in use at the time did not cover such new technology. Concerns were therefore raised that the wells would not meet design standards. It required much protracted technical discussion and a series of trial wells to demonstrate the success of the new design.

Akkumsky

The Akkumsky subproject area, located in Kzyl-Orda Oblast, covered 1,014 ha. and is primarily used for the growing of rice. The rehabilitation works concentrated on the rehabilitation of open canals and drains. The works included: (a) irrigation and drainage rehabilitation and improvement over 1,034 ha; (b) canal rehabilitation (52 km) including associated structures; (c) collector drain cleaning (63 km), including associated structures, and ; (d) rehabilitation of existing roads (44 km). No major changes were made in the scope of works during implementation.

Prirechny

The Prirechny subproject is located in the East Kazakhstan Oblast. The rehabilitation works comprised an area of 1,574 ha. The distinctive features of this subproject are the construction of a pumping station, new antechamber, an extensive irrigation flume distribution network and installation of new and rehabilitation of existing center pivots (overhead irrigation sprinklers) of the Russian Fregat type. The following works were carried out: (a) rehabilitation and extension of a pumping station, including the replacement of electro-mechanical equipment; (b) supply and installation of 30 km of new pipelines: 200 mm to 1000 mm in diameter; (c) supply and installation of 7 new center pivots on 235 ha; (d) rehabilitation of 17 existing center pivots on 1,275 ha; (e) rehabilitation and installation of solid set irrigation systems on 85 ha, and; associated works, including land-levelling and road grading.

The water supply to the fields under the original design was provided by two existing main pipelines: 1 MTR and 2 MTR both 1,000 mm in diameter. Main pipeline 1 MTR with total length of 1,360 m, and main pipeline 2 MTR with total length of 2,140 m. Already before the start of the construction contract, the maintenance of the pipelines had become a real problem because of frequent breaks. The farmer therefore requested an investigation of the condition of the pipelines. The results revealed that these pipelines needed rehabilitation and a decision was made to do so. Also, following the farmer's request to minimize maintenance and power costs, the decision was also made to change seven high pressure Fregats to low pressure.

Dzhambul

The rehabilitation works for the Dzhambul subproject, located in Zhambul Oblast, covered an irrigated area of 1, 114 ha. Crops grown are primarily wheat, barley, maize and sugar beet. The rehabilitation works were characterized by the replacement of concrete flumes, rehabilitation of unlined canals, the installation of sub-surface drains and the rehabilitation of existing collector drains. The works included: (a) irrigation and drainage rehabilitation and improvement on 1,114 ha; (b) 12 km of precast flume canal and 19 km of unlined canal, including associated structures; (c) 11 km of subsurface perforated PVC drains and 19 km of collector drains, including associated structures; and (d) other works include 875 ha of land levelling; 30 km of farm roads; leaching; and 17 km of forest shelterbelts. The only significant change in the works was related to the design of the irrigation and drainage system around Kok Tobe village.

Kurchum

This Kurchum subproject, located in East Kazakhstan Oblast, comprised the rehabilitation of irrigation systems over an area of 3, 217 ha. The distinctive features of this subproject are the construction of a water intake structure on a mountainous river, a large quantity of land levelling works, earthworks on canals and drainage collectors, and works on earth canals and concrete lined canals. The following works were carried out: (a) river intake rehabilitation; (b) rehabilitation and construction of lined canals (41 km); (c) rehabilitation and construction of unlined canals (57 km); (d) land levelling on 1,800 ha; (e) collector drainage network (56 km); (f) field drains (59 km); (g) graded farm roads (126 km); and (h) shelter belts (39 km).

Following the farmers' request the irrigation scheme was partially changed. Also, the spring floods of 2001 seriously damaged several structures and completely destroyed the water intake structure on Kurchum River. Hence, the decision was made to: (a) rehabilitate the water intake and associated structures; (b) clean the main canal "Zhavgastinsky"; and (c) improve the conditions of the water intake.

In addition, following the contractor's recommendations, it was agreed to change – without any cost increase - the intended monolithic concrete canal lining included in the construction contract into lining with prefabricated reinforced concrete slabs. As the precast slabs were factory produced, this has resulted in a high quality, more durable and frost resistant lining, which is particularly important in this part of the country where the winters are long and severe. The main advantage of this design change for the contractor has been the savings in time as the prefabricated slabs could be installed quickly during a short construction season.

Krasnaya Polyana

Krasnaya Polyana subproject is located in Karaganda Oblast a short distance from the city of Karaganda. The rehabilitation works covered an area of 915 ha. Primarily wheat with some potatoes and vegetables are grown on the subproject area. The scheme is characterized by the construction of new small mobile pumping stations with new pipes to center pivots with overhead sprinklers. The rehabilitation works included: (a) rehabilitation and reconstruction of the 915 ha irrigation system; (b) one primary and three secondary pumping stations; (c) pipelines (concrete and PVC, 14 km); (d) center pivots (12 nos) for 915 ha; (e) high voltage overhead lines and transformers, 60 km; (f) farm roads, 14 km, and; (g) shelter belts, 27 km. There were no significant changes in the project scope.

60 Years of October

The 60 Years of October subproject is located in Pavlodar Oblast in northern Kazakhstan. The rehabilitation project covered an area of 3,574 ha with potato, wheat and vegetables as the main crops. The scheme is made up of a few large farms which obtain pumped irrigation water from the Irtish-Karaganda Canal. Secondary pumping stations supply water to the center pivot overhead sprinkler irrigation equipment and also to small canals for irrigation by tractor mounted sprinklers. The works included: (a) rehabilitation and reconstruction of 3,574 ha of irrigation and drainage system in Aksu Rayon of Pavlodar Oblast; (b) irrigation pumping stations, including associated works (5 nos); (c) irrigation pipelines (concrete and steel; 51 km); (d) center pivots (52 nos) for 3,148 ha; (e) tractor mounted boom sprinkler machines (7 nos); (f) drainage pumping stations, including associated works (4nos); (f) horizontal drainage network, field drains (42 km) and collector drains (40 km); (g) high voltage overhead lines and transformers (5 km); (h) farm roads (93 km), and; (i) forest belts (123 km).

There were no significant changes to the Project. At the request of farmers the amount of drainage works was reduced, additional works were carried out for the pumping stations, and some changes introduced in the contract documents for the tractor mounted sprinklers and center pivots. No significant technical issues were encountered. The farmers raised the issue that water charges for pumped water from the Irtish-Karaganda Canal were too high. A reduction in water charges was negotiated.

Chagansky

The Chagansky subproject comprises the Bahtiyar farm in Terktinskii Rayon, in West Kazakhstan Oblast near Uralsk. The farm grows wheat and barley. The rehabilitation comprised the rehabilitation and reconstruction of 534 ha of irrigation systems. The main work items included: (a) rehabilitation and reconstruction of funicular pumping station; (b) high voltage overhead line and transformers, 50 m; (c) center pivots (8 nos) on 534 ha; (d) pipelines (PVC and steel, 5.5 and 3.5 km respectively); (e) farm roads (19 km); and (f) shelter belts (3 ha). No technical problems were encountered.

Zaik

The Zhaik subprojects comprises the Zhaik farm in Terktinskii Rayon, in West Kazakhstan Oblast near Uralsk. The farm grows wheat and barley. The rehabilitation comprises the rehabilitation and reconstruction of 615 ha of irrigation systems. The main works items included: (a) rehabilitation and reconstruction of floating and mobile pump stations; (b) high voltage overhead line (50 m) and transformers; (c) center pivots on 471 ha (9 nos.); (d) sprinkler irrigation on 144 ha; (e) pipelines (PVC and steel, respectively 5.4 and 4.2 km); (f) farm roads (31 km), and; (g) shelter belts (10 ha).

The main technical issue encountered concerned a series of depressions that were discovered in the land surface during the detailed surveys for the design work and which required additional land leveling works.

Kaisar 2

The Kaisar 2 subproject is located in Akmola Oblast a short distance from the capital Astana. The rehabilitation works covered an area of 1,404 ha. The subproject is on a single farm, the Kaisar 2 farm, which produces mainly wheat and potato. The scheme is characterized by the rehabilitation of a pumping station on the Viacheslavsky reservoir (which is the water supply reservoir for Astana) with new pipes feeding overhead center pivot sprinkler irrigation equipment. The site was chosen to demonstrate the center pivot supplied and installed by Valley. The works included: (a) rehabilitation of the 1,404 ha irrigation system; (b) construction of a new pumping station, capacity 1m³/s; (c) construction of 20 km of steel and PVC pipeline; (d) supply and installation of 18 electrically driven center pivots; (e) construction of farm roads; (f) construction of forest belts (45 ha) and; (g) levelling and filling of old canal embankments.

Additional work was required to de-commission the old irrigation equipment. Rehabilitation of potato storage facilities was originally included in the designs, it was then decided by the farmer to omit this item from the works. At a later stage of construction this was re-considered by the farmer but ultimately it was agreed with the farmer not to include it in the works. No significant technical issues were encountered.

Kerbulak

The Kerbulak subproject is located in Almaty Oblast in South Eastern Kazakhstan. The Project involves the rehabilitation of 2, 905 ha of land owned by six farmers. The Project is characterized by the rehabilitation of existing tube wells which feed a series of small reservoirs. Water from the reservoirs is pumped to center pivot overhead sprinklers. The land is mainly cultivated in wheat and barley with some soya and other crops. The works include: (a) rehabilitation of the existing irrigation system at 10 separate sites, owned and operated by 6 farms in Kerbulak Rayon; (b) rehabilitation of existing tubewells and pumping equipment; (c) rehabilitation and replacement of pipelines (70 km); (d) rehabilitation/extension of existing reservoirs and construction of new reservoirs; (e) rehabilitation of existing center pivots and supply and installation of new center pivots on 2400 ha, both hydraulically and electrically driven; (f) rehabilitation and construction of associated electrical systems; (g) construction of farm roads (70 km); and (h) construction of forest belts (100 ha).

There were no significant changes to the Project other than changing the center pivots from the Valley (electrical) type to Freygat (hydraulic) type machines, and; the change of asbestos pipes to glass-reinforced plastic (GRP) pipes. No significant technical issues were encountered.

Darkhan A

The Darkhan subproject is located in the Almaty Oblast in the mountains bordering the Kyrgyz Republic. The Project covers the rehabilitation of 867 ha of land. The Project is characterized by the construction of an irrigation reservoir to warm snowmelt water so that it can be used for irrigation, and the installation of a new piped irrigation system to supply water to new center pivot overhead sprinklers. The works include: (a) rehabilitation of the existing irrigation system (867 ha); (b) repair of the diversion structure (replacement of monolithic concrete, sealing of expansion joints, painting of metalwork, etc.); (c) repair of main steel pipes; (d) replacement of pipes and construction of new pipes; (e) reinforced concrete pipes (diameter 800 mm, length 200 m); (f) PVC pipeline (diameter from 160 up to 500 mm, length 12 km); (g) construction of associated valve chambers, etc.; (h) supply and installation of 20 hydraulic driven center pivots on 867 ha; (i) construction of a balancing reservoir (capacity of 35,000 m); (j) construction of farm roads (10 km); (k) construction of forest belts (22 ha). There were no major changes in the works for the Project.

The only main technical problem occurred when during impoundment of the irrigation supply reservoir in June 2003 a breach opened in the earth embankment dam along the line of the spillway culvert. The cause of the breach was investigated and an inspection report was prepared. Significant remedial works were subsequently carried out by the contractor at his own expense and the reservoir was successfully impounded later in the year. No other significant technical problems were encountered.

Dusupova

The Dusupova subproject is located in West Kazakhstan Oblast near the city of Uralsk. The Project covers rehabilitation of 1,024 ha of irrigated land cultivated with wheat. The Project is characterized by the construction of a major new pump station with new pipelines supplying new center pivot overhead sprinklers. Works included: (a) rehabilitation of existing irrigation system (1,024 ha); (b) construction of new pumping station; (c) construction of steel and PVC pipeline (16 km); (d) supply and installation of electrically driven center pivots operated by independent power generator (15 units); (e) construction of farm roads (40 km); (f) construction of forest belts (15 ha); (g) leveling and filling of old canal embankment; (h) construction of 10 kV overhead power supply line (9.4 km) and transformer for the pumping station. There were no significant technical issues.

Additional Information on Cost Recovery and Machinery Issues

In the following paragraphs additional background information is provided on the resolution of the cost recovery issue and the attempts made to resolve the problem of providing agricultural machinery to the farmers.

Cost recovery. During the loan negotiations, it was agreed that the cost recovery would be through a per-hectare betterment fee that would be linked to the land and collected together with the land tax. Upon insistence of GOK this fee was to recover 70 to 80% of the investment costs. For the inter-farm works, an increased land levy was proposed for farms benefiting from the improvements. At the start of the Project, all potential farms for Year 1 and Year 2 subprojects had already signed Letters of Intent indicating their willingness to pay the cost recovery fee. However, in late 1997 MOF indicated its strong desire to change the agreed cost recovery system into a standard credit operation. It planned that the Eximbank, acting as the agent bank on behalf of the MOF, would sign sub-loan agreements with the participating farms. Further it was planned to have the new procedure described in a trilateral agreement between MOF, MOA and Eximbank. Following failed attempts to reach a compromise solution, i.e. by using Eximbank as a collecting agent only, the Bank concluded (in August 1998), that MOF's proposal would require certain

changes in the institutional arrangements. However, these changes were unacceptable to MOF and MOA. In April 1999, it appeared that the issue had been resolved when MOF agreed not to pursue its proposed on-lending mechanism. Still, in August 1999, MOA halted several key project implementation activities, as well as the procurement process for new contracts because of cost recovery concerns. Finally, in early 2000, the issue was resolved. Since then, agreements on sub-loans for the cost of rehabilitation have been signed between association of WUCCs, MOF and MOA, and Eximbank (the latter as the collecting agency of the MOF). This became possible when a decision was taken that association of WUCCs could be formed on the basis of a law on Rural Consumers Cooperatives. At the signing of its Charter, the AWUC becomes the owner of the I&D system, which then can be used as collateral for the sub-loan from MOF. The repayment schedule is in accordance with the terms in the Loan Agreement, while the Charter of the AWUC provides for annual cost recovery from the members on a per hectare basis.

Provision of agricultural machinery to the project farmers. The need to provide agricultural machinery and other working capital was clearly recognized during project preparation thus the agricultural component initially included funds for providing credit to the farmers. This Component was deleted during negotiations and the expectation was that this need may be met from the Agricultural Post Privatization Assistance Project (APPAP). Unfortunately, the provision of working capital and farm machinery remained an issue after APPAP became effective, the main reason being that the participating banks had conditions for collateral that could not be met by the farms, generally requiring real estate in the major cities as the agricultural land has almost no value. Therefore, late 2000, MOA proposed to channel funds for essential agricultural/farm machinery at an estimated cost of \$2 million to farmers in the subprojects through KAZAGROFINANCE (KAF) - an agency in MOA - under a hire-purchase scheme. However, the Bank was of the opinion that the APPAP was a better vehicle and suggested that further efforts should be made to use APPAP funds. In 2001 the loan agreement of APPAP was amended, inter alia, to extend the Project's coverage from two oblasts to the whole country and to cover leasing activities as well as credit for purchase but otherwise no concessions were made to accommodate the IDIP farmers. However, early 2003 the Bank agreed in principle to provide farm machinery from the savings under the loan and provided a set of conditions for the use of these funds. Although it was agreed that the equipment provided could be used as collateral, on the remaining conditions the Bank was more strict than the MOA (i.e. on the repayment period, interest rate and the size of the down payment) so unfortunately, no agreement could be reached. The farmers are mobilizing their own resources and in some cases with the help of investors to replenish their machinery stocks. As shown in Section 8 above the lessons learned for cost recovery as well as provision of farm machinery are being incorporated in the design of the IDIP2

Additional Annex 9. Opinion of the Ministry of Agriculture of ROK on the Project (IDIP)

Relevance of the Issue and Project Rationale

Agriculture is taking one of the leading places in the economy of the Republic of Kazakhstan. Kazakhstan can export not only grain but also sugar, processed vegetable products, meat, milk, and etc.. However, the limiting factor is the low natural moisture content, as the main part of the country's territory is characterized by arid climate. Recent practice has shown that under the market economy conditions dry land farming with the previous scope becomes risky in such zones.

Therefore, while continuing to use dry and rain-fed land, special attention should be given to the irrigated land which allows gaining high and sustainable yields, irrespective of the natural moisture content. This issue is becoming more and more relevant and urgent in view of the forthcoming accession of Kazakhstan to WTO, as we need to produce competitive products not only in terms of grains, but also in crops such as cotton, rice, sugar-beets, legumes and oil crops, corn, vegetable and cucurbitaceous crops, and fruits as well.

Furthermore, for the last 30-40 years irrigated agriculture in Kazakhstan has provided population in the rural areas with means for income and livelihood. In this respect, careful management of irrigated land and creation of conditions for its efficient use shall become a strategic objective of the Government, which ultimately will build the foundation for production of a competitive agricultural production and for effective social and economic development of densely populated regions of the country.

Total area of land prepared for regular irrigation amounts to 2.39 million hectares. Not so long ago, occupying only 6% of the country's crop land, this land provided for 30% of the entire agricultural output.

However, in early 1990s the efficiency of the irrigated land drastically decreased. Losses of irrigation water increased. According to Kazgiprovodkhoz research institute, annual total loss of irrigation water, which leads to deterioration of the irrigated land and economic situation as a whole, has reached 2.0-2.5 billion m³ annually, including losses in the irrigation systems, which require irrigation rehabilitation, up to 1.2-1.6 billion m³. Generally, under such circumstances, reclamation condition of soil deteriorates, and it is difficult to estimate the efficiency of the entire set of agricultural practices.

Key reasons of the described situation were, first of all, the following:

- 1) Increased deterioration and failure of the main water intake facilities;
- 2) Increased deterioration and poor technical condition, and in some cases failure, of the existing irrigation and drainage systems;
- 3) Inadequacy of the irrigation methods and equipment, breakdown of the irrigation equipment.

Thus, urgent need for radical reclamation measures occurred, i.e. measures on technical improvement and rehabilitation of the deteriorated and failed irrigation and drainage systems. This was also stipulated in the Government strategy on tackling the issues related to the need for environmentally safe use of water resources.

Prior to reforms, the irrigation and drainage systems were rehabilitated based on the special Government program at the budget expense. Nevertheless, these activities were ceased in the second half of 1980s. The current situation calls for resumption of the rehabilitation activities. Moreover, due to high deterioration rates, the level of financing of rehabilitation activities would not be less than 45-60 thousand tenge/ha based on 1 ha of the rehabilitated land.

Government Measures on Project Implementation

Taking these circumstances into consideration, in 1993 the Government of Kazakhstan requested the International Bank for Reconstruction and Development (IBRD) to finance the program for irrigation and drainage system rehabilitation. The Government program for irrigation and drainage system rehabilitation and technical upgrading on the area of 775,000 ha was based on the Republican Integrated Reclamation Program approved by the Government of ROK in 1991.

In this respect, it was necessary to examine initially the technical condition of the irrigation and drainage systems. In 1993, for this purpose IBRD allocated project preparation funds to the Government of Kazakhstan in the amount of US\$1.5 million. These preparation activities were undertaken during 1993-1995.

On June 25, 1996, the Loan Agreement between the Republic of Kazakhstan and IBRD was signed and ratified by the Law of the Republic of Kazakhstan as of September 27, 1996, No. 36 – I ZRK.

To follow the conditions of the Loan Agreement and to provide Government support for the development of the irrigation and drainage systems of the agricultural producers, the Government of RK passed the Resolution as of October 7, 1996, No. 1237 “On measures to follow the conditions to make the Loan Agreement effective between the Republic of Kazakhstan and IBRD on the Irrigation and Drainage Improvement Project” (Resolution No. 1237). Later on, Resolution No. 1237 was amended and supplemented by the Government Resolutions as of July 9, 1997 No. 1087, as of April 6, 1998, No. 287, as of January 25, 2002, No. 112 and as of March 18, 2004, No. 336.

Goal, Objectives and Cost of the Project

The main goal of the Project was to create the required reclamation conditions to increase the yields of agricultural crops by 1.5-2 times through rehabilitation and introduction of market principles to organization of the irrigation and drainage system operations taking into account the environmental requirements and norms.

Accomplishment of the objectives required to achieve this goal was broken down into three main project components:

- 1) Engineering component which included objectives related to organization of the irrigation and drainage system reconstruction works;
- 2) Environmental component which included objectives related to the organization of activities aimed at improvement of the environmental reliability of the irrigation and drainage systems;
- 3) Agricultural component which included objectives related to the organization of activities on training of farmers and demonstration of agricultural reclamation practices.

Cost of the project was estimated at US\$100 million, of which US\$80 million was borrowed from IBRD and US\$20 million was provided by the Government of Kazakhstan as loan cofinancing.

Key Information about the Project Implementation

Selection and approval of land to be included in the Project was carried out in accordance with the IBRD requirements and conditions based on 5 stages. During stage 5 conducted after the tender commissions selected the construction firm and prior to the rehabilitation works, farms/system owners made their final decision to rehabilitate the irrigation and drainage systems, concluded contracts for repayment of the subloans, though according to the project requirements these documents must be processed only after completion of the rehabilitation works and after final estimation of all the costs.

After the first stage, 34 farms were selected to be included in the Project and feasibility studies were undertaken for all of them. Out of this number, 22 farms in 11 regions of the country with an area of 40.2 thousand ha were selected and upon the approval of the local authorities included in the Irrigation and Drainage Improvement Project.

In the course of project implementation, for various reasons rehabilitation works were implemented only on 14 sites (Chagansk and Zhaik were combined into one site) in 9 regions of the country on the area of 32.0 thousand ha of the irrigated land. 22 ultimate borrowers operate on this rehabilitated irrigated land, including 7 rural water users' cooperatives (RWUC), 1 association of rural water users' cooperatives (ARWUC), 8 partnerships (LLC and limited partnerships) and 6 farms. A large number of farms, producers' cooperatives and in some cases limited liability partnerships are the founders of the RWUC.

Despite the availability of the feasibility study results, rehabilitation works were not conducted on 7 irrigation systems (sites), namely:

1. Saryozen site in Kostanai Oblast (reason: the farm has chosen rain-fed farming);
2. Pritobolsk site in Kostanai Oblast (reason: the new director of the farm considered the reconstruction to be premature);
3. Mirny site in Karaganda Oblast (reason: low expected efficiency due to the increase of the cost of irrigation water from the Irtysh-Karaganda channel);
4. Astra site in Karaganda Oblast (reason: the farm did not agree with the condition to repay the committed funds);
5. Nura site in Akmola Oblast (reason: unfavorable environmental appraisal);
6. Kaiser site in Aktobe Oblast (reason: the farm did not agree with the condition to repay the committed funds);
7. Patsayev site in Aktobe Oblast (reason: the farm did not agree with the condition to repay the committed funds).

Establishment of Water Users Associations and maintenance services

Establishment of **Water Users Associations and maintenance services** became a main issue under this Project, as in the course of the reform many former large collective farms were disintegrated into small farms. As a result, former intra-farm irrigation and drainage systems turned to be inter-farm and did not have any specific owner and orderly maintenance.

Such analysis allowed identifying those systems which need **Water Users Association** to be established and those which do not.

As a result, project irrigation and drainage systems could be subdivided into two groups. It was taken into account when conducting design and construction works.

Group 1. This group includes the irrigation and drainage systems located on the large farms' land (LLC, limited partnerships). There were 14 such irrigation systems which were owned by 14 individual farms. The farms/owners of such systems participated independently in the resolution of all the official issues concerned with the Project.

Group 2. This group includes 8 irrigation and drainage systems which turned to be inter-farm systems as a result of the disintegration of large farms (kolkhoz, sovkhoz, limited partnerships, etc.) into two or more new farms (peasant farms, etc.). There were more than 1,600 such farms. The total area of their land use was 21,920.6 ha or 69% of the overall project area.

In the course of project implementation, adequate attention was paid to the agricultural component of the

Project. Seminars on market organization of production were conducted on all sites, brochures were published, demonstrations and educational films were produced. More than 20 articles pertaining to the organization of production and operation of the rehabilitated systems based on the market approach were published in the mass media.

Adequate attention was paid to the environmental component of the Project. The main objective was to improve the process of decision-making and ensuring environmental substantiation and sustainability of the design processes. The environmental component provided for the resolution of environmental issues over the entire period of project implementation.

Moreover, the Center for Ecology and Monitoring in irrigated farming was established on the basis of the Zhetysu hydro geological meliorative expedition and KIO DGP “GosNPTszem”. To enhance the capacities of the environmental sector, monitoring equipment was procured based on the Loan Agreement. This equipment included field and laboratory devices, agro meteorological equipment, other auxiliary equipment and specialized machinery.

To pursue environmental monitoring using the budget funds, repair of the laboratory premises of the Kyzyl Orda hydro geological meliorative expedition was completed, a new laboratory for the Zhetysu hydro geological meliorative expedition was constructed, laboratory and production premises of the Northern branch of the Zhetysu hydro geological meliorative expedition were purchased and repaired.

Technical and economic evaluation of the initial results in the area of agricultural use of rehabilitated irrigation and drainage systems shall be conducted based on the following indicators:

- 1) restoration of production and growth of the area under crop;
- 2) reduction of irrigation water losses (savings);
- 3) reduction of power overuse (savings);
- 4) crop yield increase.

Based on a survey results of 2004 out of 32 thousand ha of land rehabilitated, only **28.02 thousand ha or 88% of project lands were cultivated.** Big portion of the irrigated lands covered by the Project were being abandoned due to the breakage of water intake facilities and irrigation network. Therefore, **only 17.9 thousand ha or 56% of all the project area were under production.** Since 1997-1998 more than 8.0 thousand ha were not cultivated at all and were almost transferred to the category of rain fed lands. The rest 6 thousand ha of the non-used territory due to unsatisfactory technical conditions of the pumping stations and irrigation network were used ineffectively and partially. Thus, **return of the abandoned lands to the category of irrigated lands is a major fundamental result of the Project.** Annual gross income on those lands saved from further desertification in 2004 exceeded 580 thousand KZT.

On the developed project irrigated lands with the total area of more than 28 thousand ha the crop yield increased in 1.45 times. As a result gross income comparing to pre-project indicators increased by more than 400 mln KZT. The bottlenecks for crop yield growth are not of the meliorative nature but lack of agricultural machinery and working capital. Once these problems are resolved, it is likely that the effectiveness of restored lands use will increase dramatically.

Reduction of irrigation water “overuse” is also a very important result. Project implementation resulted in reduction of irrigation water and power overuse compared to pre-project indicators was more than 3 thousand m³/ha and 7 thousand kw/h annually, respectively. This reduction allows farms to observe the required irrigation regime and use saved funds for agricultural improvements.

Potential agricultural, technical and economic opportunities of the project lands could be judged from the following data received **in the course of implementing the agriculture Project Component.**

In 1998-1999 the Shengeldy irrigation facility of PC “Gylym” (manager – D. Zhakupov) managed to raise the crop yield of sugar-beet up to 40 t/ha by introducing discrete irrigation technology and maintenance of agricultural technology on the testing and demonstration fields supported by the Project. During the same period, cotton crop yield on the testing and demonstration field at the Maktaral irrigation facility (CF of K. Apashev) reached 34.5 centners/ha. In 1999 on the demonstration field of Krasnaya Polyana cabbage crop yield exceeded 60 t/ha.

Social indicators are also critical. As a result of project implementation, more than 9 thousand jobs were either created or restored, including those requiring special knowledge and skills. 250 jobs were created only in the area of operating irrigation and drainage systems (electricians, motor-mechanics, operators etc.).

The Project also became an important vehicle for institutional and legislative development: (a) establishment of PIU under the Ministry of Agriculture of the Republic of Kazakhstan, and further establishment of the project implementation division in the Ministry of Agriculture is an example of positive institutional development. Around 50 experts were employed by those units as consultants, who accumulated sufficient international experience in project implementation under market conditions; (b) as it was noted, hydrogeology meliorative expeditions were significantly strengthened and received methodological support. Many businesses of local developers and construction firms that used to be in bad conditions in the middle of 90s, managed to improve their production and financial status and accrued international experience in project implementation; (c) while addressing organizational and legal issues that appeared in the course of project implementation, project consultants according to the instruction of the MOA’s management participated in the work of Working Groups on drafting the Law “On Rural Consumer Cooperatives of Water Users”, a new version of the Water Code of the Republic of Kazakhstan, legal enactments, and Concept for Water Economy Development of the Republic of Kazakhstan up to 2010. Compliant to the MOA’s application the project experience was considered when finalizing Method for setting subsidies’ size based on the cost of water supply services and instruction on approving and issuing permissions for special water use etc.

In a view of the above and considering the feedback and conclusions of project participants as well as other parties concerned the following judgments could be made regarding this Project.

Irrigated farming in south and south-east dry regions remains the fundamental basis for improving socioeconomic development of the major part of rural areas; and in the other regions – for establishment of vegetable and dairy production around large cities and industrial centers.

During the last 10-15 years a lot of irrigation and drainage systems **became obsolete**. Due to that **up to 60% of irrigation water is lost**. It is accompanied by **deterioration of melioration status** of irrigated lands (erosion, secondary salinization). Effectiveness of agricultural techniques (fertilizers, good seeds) is getting down, as a rule, what is not acceptable in the market conditions and **does not facilitate getting** competitive products.

To this end the initiative of the Ministry of Agriculture of the Republic of Kazakhstan on implementing IDIP on the total area of 32 thousand (ha) in 9 oblasts of the Republic was a timely and justified measure.

Actually the main Project goal appeared to be even larger that just “improvement” as one of the fundamental project results happened to be complete restoration and return to agricultural production of irrigation and drainage systems with the total area exceeding 14 thousand ha, which due to breakage of water intake facilities and irrigation network were almost out of use, while 17.9 ha or 56% of all the project area were only partially used.

It is worth noting that according to the results of 2001-2004, i.e. first 3-4 years of operating rehabilitated

system, annual irrigation water savings were at least 60-65 million m³, power savings – at least 30 mln kw/h, cost of gross annual products increased by 280 mln KZT, net income increased by 60 mln KZT comparing to the pre-project indicators. These indicators shall become even better in the future as the production capacity is increasing and agricultural techniques at the farms are improving. To do so **Akimats** need to arrange measures for **priority support** to the project farms in addressing the problem of effective disbursement (soft credits, leasing etc.). It is also critical to ensure reduced tariff for electric power for the farms that own the systems and use pumping irrigation and drainage.

We conclude by saying that in general the completed Irrigation and Drainage Improvement Project deserves **positive evaluation**, given its goal and objectives, and that similar projects shall be continued further.

At the same time the following **lessons of the Project shall be brought forward**:

- 1) The Project was not comprehensive, i.e. it did not include a component on equipping farms with agricultural and maintenance machinery. As a result today, lack of machinery has become a bottleneck in achieving project benefits faster, **which could lead to a biased evaluation of the true project achievements**. Consequently repayment of the funds invested in the Project for reconstruction of the priority facilities is nearing, and the farms have difficulties in meeting their repayment obligations;
- 2) When preparing their applications for inclusion of subprojects in the Project, not all the Akimats met the criteria on farms selections set forth by the Ministry of Agriculture of the ROK and IBRD, and insisted on including in the Project not very promising farms. For instance, CF “Darkhan” of Rayimbek Rayon of Almaty Oblast and “Kurchum” of Kurchum Rayon of East-Kazakhstan Oblast;
- 3) Services under the consulting component were provided by international companies. This Component appeared to be very expensive and made up around 15% of total project cost. At the same time, many project decisions were not of the modern sophistication, and the consulting firms did not propose up-to-date technical solutions. In the next project, these aspects shall be taken into account. More local consulting firms and construction companies should be hired. Experience shows that quality of local services is not worse than that of international ones, but the price is much lower.

Vice-Minister

D. Aitzhanov



KAZAKHSTAN IRRIGATION AND DRAINAGE IMPROVEMENT PROJECT

- SUBPROJECTS IMPLEMENTED UNDER THE PROJECT (TOTAL AREA = 32,282 HA)
- SUBPROJECTS STUDIED BUT DELETED FROM THE PROJECT (TOTAL AREA = 8,006 HA)
- SELECTED CITIES AND TOWNS
- ⊙ OBLAST CAPITALS
- ⊕ NATIONAL CAPITAL
- RIVERS
- - - OBLAST BOUNDARIES
- · - · - INTERNATIONAL BOUNDARIES



This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.