

Country Name	The Project for Improvement of Equipment for the Flood Control (Le Projet Aménagement des Equipement de Protection contre les inondations)
Morocco	

I. Project Outline

Project Cost	E/N Grant Limit: 782 million yen	Contract Amount: 685 million yen
E/N Date	August, 2007	
Completion Date	February, 2009	
Implementing Agency	State Secretariat of Water and Environment of the Ministry of Energy, Mining, Water and Environment (le Secretariat d'Etat Aupres du Ministère de l'Energie, des Mines, de l'Eau et de L'Environnement, Charge de L'Eau et de l'Environnement) (Former "le Secretariat d'Etat Aupres du Ministère de l'Aménagement du Territoire, de l'Eau et de l'Environnement, charge de l'Eau, current Ministère de l'Energie, des Mines, de l'Eau et de L'Environnement, Département de l'Eau, Direction des Aménagements Hydrauliques, since 2012)	
Related Studies	Basic Design Study: November, 2006 - June, 2007	
Contracted Agencies	Consultant(s)	Kensetsu Kikaku (succeeded by INGÉROSEC Corporation after the succession of trustee status on January 29 th , 2009)
	Contractor(s)	-
	Supplier(s)	(Lot A) Mitsubishi Corporation, (Lot B) Mitsubishi Corporation
Related Projects (if any)	<u>Cooperation by Japan</u> <ul style="list-style-type: none"> • The Projects of Procurement of Construction Equipment for Small Scale Multipurpose Dams (Grant Aid, 1986) • The Projects of Procurement of Construction Equipment for Small Scale Dams (Grant Aid, 1989) • The Ouergha River Basin Irrigated Agriculture Development Project (Grant Aid, provision of construction equipment of irrigation system, 1995) 	
Background	<p>In Morocco, heavy rains often induce floods, including flash floods and mud floods during the rainy season between April and October. The flood is one of the most serious natural disasters in the country with the largest frequency of occurrence and the largest number of victims. The number of persons killed or injured by the flood is the second largest after earthquakes. In addition, the damage of floods have been expanding due to underdevelopment of disaster prevention dams with function of flood control, insufficient drainage capacity of rivers and canals, the growing populations inhabiting in risk areas caused by the population growth, urban and agriculture development as well as the recent abnormal weather. The government of Morocco formulated an action plan for flood control to implement the "National Plan for Protection from Floods" and specific construction projects. Although the dam construction projects were forwarded step by step, the insufficient and aged construction equipment constrained its progress. Japan provided Morocco with construction equipment three times in the past (in 1986, 1989 and 1995). The equipment had been utilized for flood control projects for more than 10 years since their start of operation and over the economic life. Therefore, the government of Morocco requested Japan grant aid for procurement of necessary construction equipment for the implementation of the action plan of flood control.</p>	
Project Objective	Outcome To promote construction of medium and small scale dams and promotion of rehabilitate and construction of river canals and banks based on the action plan of flood control at 30 sites in Morocco by procurement of construction equipment for flood control.	
	Outputs Japanese Side <ul style="list-style-type: none"> • Construction equipment and machineries for flood control (construction of dams, river canals, river banks and so on.): bulldozers, hydraulic shovels, wheel roaders, motor graders, vibration rollers, dump trucks, trucks with crane, and sets of spare parts) Morocco Side <ul style="list-style-type: none"> • None 	

II. Result of the Evaluation

Summary of the Evaluation
<p>The government of Morocco promoted flood control projects, including construction of dams, canals and banks, in order to prevent human and physical damages by frequent floods. However, construction equipment had been insufficient against the planned total work volume of construction. In addition, the existing construction equipment had been considerably aged and becoming scraps: the newest equipment among the ones provided by Japanese grant aid projects had been operated over 10 years. The State Secretariat of Water the implementing agency had been made efforts to continuously operate them by using parts of scrapped equipment. However, those aged equipment had frequent troubles</p>

and lower operation rate of 50-70% as well as deteriorating operation capacity. Furthermore, it was anticipated that the further deterioration of equipment would rapidly reduce their operation rate and capacity and increase of the number of scrapped equipment.

The project has achieved the objectives of promotion of construction projects for flood control through construction of medium and small scale dams and river canals as planned. In addition, the equipment provided by the Project were utilized to reconstruction of flood damage which occurred in 2010. Also the Project contributed to employment creation by the construction projects for flood control as well as flow control of irrigation water by the dams constructed for flood control. As for sustainability, there was no problem observed in the project due to operation and maintenance of the equipment provided by the Project in good conditions and well-developed operation and maintenance system for the facilities constructed by using the equipment. For relevance, the project has been highly relevant with Morocco's development policy, development needs, as well as Japan's ODA policy at the time of both ex-ante and ex-post evaluation. For efficiency, the project period slightly exceeded the plan.

In the light of above, this project is evaluated to be highly satisfactory.

1 Relevance

This project has been highly relevant with Morocco's development policies of the National Plan for Protection from Flood (PNI: Plan national de protection contre les inondations), development needs ("construction of dams for disaster control with flood regulating functions and replacement of construction equipment and machineries"), as well as the one of priority areas agreed at the policy dialogue for economic cooperation between Japan and Morocco at the time of both ex-ante and ex-post evaluation. Therefore, its relevance is high.

2 Effectiveness/Impact

This project has mostly achieved its objectives of construction of dams and river canals and banks as planned though the quantitative data such as operation rate of the equipment provided by the Project are not available. The total number of dam constructions, including construction of rock-fill dams, masonry dams, and concrete dams, was 21 which was over the target number of 17. The number of construction of river canals and banks was 8, which was below the target of 8. The difference between the target and the actual values was attributed to intensive constructions of dams and river canals at the sites severely damaged by the floods occurred in 2009 and 2010. The actual number of constructions, which is higher than the possible number of constructions by the existing equipment before the Project, indicates that the Project contributed to improvement of implementation capacity for flood control projects through provision of construction equipment and machineries despite of the changes in the target sites to the areas damaged by the floods.

In the sites where the constructions of flood control facilities have been completed, no damage by flood was reported so far. Since the agreement between the Directorate of Water and the Ministry of Internal Affairs requires to employ the local people for 40% of construction workers of public work projects. As a result, the employments for the local people in the target sites were created by the constructions of the flood control facilities. At the site of construction of the Aharal Dam (masonry dam), where the site survey was conducted for the ex-post evaluation, a total of 40,000 workers, including the local people, were employed for the construction period between September, 2010 and April, 2012. On the other hand, the relatively large scale dams, such as concrete dams, in the target sites of the Project, have been utilized as control of irrigated water flows by the outlets for discharge. In addition, in the southern areas, the impounded water at the dams nourishes the ground water. Such water is supplied through "*Khattara*", a traditional underground canal system, and utilized for stable cultivation of dates and vegetables in some areas in the south. Besides, in Murilt where the river canals were constructed by the Project, spillover effects of the Project were observed. Local development of the river side areas with high flood risk were promoted by construction of trunk road and construction of community facilities along the road, such as multipurpose road, fire station and vehicle terminal. There is no problem related to resettlement and land acquisitions concerned about the flood control projects. Neither, no negative environmental impact has been reported while environmental monitoring after the completion of the constructions has been conducted by the agencies of river basin from the aspect of water resource management.

Therefore, effectiveness/impact of this project is high.

Qualitative Effects

	Baseline* (2006, Basic Design)	Target** (2007-2011)	Actual (2007-2011)	Actual*** (2012)
Indicator 1: The number of rock-fill dams constructed	4	7	6	1
Indicator 2: The number of masonry dams constructed	3	5	6	1
Indicator 3: The number of concrete dams constructed	4	5	9	2
Indicator 4: The number of river canals and banks constructed	6	13	8	1

(Source) Information provided by interview with the Directorate of Water of the Ministry of Energy, Mining, Water and Environment

(Note 1) * The baseline figure in 2006 is the number of possible construction project by the existing equipment at the time of planning.

(Note 2) ** The target values for the target year are the expected number of construction projects for the 5 year period from 2007 to 2011.

(Note 3) *** The figures for 2012 are the number of planned construction projects.



Concrete Dam
(Ain Kawachia Dam)



Masonry Dam
(Aharal Dam)



Arterial road constructed by a project for construction of river canal (Murilt)

3 Efficiency

Although the project cost was within the plan (88% against plan), the project period exceeded the plan (110% against plan) because the delay of procedure for tax exemption of custom duty caused the delayed delivery of the equipment provided by the Project to the construction sites. The outputs were as planned. Therefore, efficiency of this project is fair.

4 Sustainability

While the equipment provided by the Project are managed by the Warehouse Center of equipment for public works (Parc Central des engines de travaux publics), which is an independent institution under the Directorate of Water, constructions of flood control facilities are implemented by the Division of Medium and Small Dams (La Division des Petits et Moyens Barrages) of the Directorate of Water. The Center, which is responsible for the equipment, increased their staff from 46 in 2007 to 100 in 2011, including managers, engineers, mechanics, electronics, technicians for vehicles, and so on. Although the number of permanent staff increased by 5 from 23 in 2007 to 28 in 2011, the number of contract staff, in particular technicians for vehicle, significantly increased from 23 to 72 for the same period. It was to ensure flexibility of budgeting. Since the technical level of engineers and technicians in Morocco is generally high, the engineers and technicians of the Center, including the contract staff, have sufficient technical levels for adequate maintenance of the construction equipment and vehicles provided by the Project. The expenditure for repair and spare parts of the construction equipment amounted 9.5 million dirhams in 2006 and 5-7 million dirhams for the period between 2009 and 2011. Except vehicles with accident, there is no construction equipment which has been continuously malfunctioning among the equipment provided by the Project. The most equipment are adequately maintained and fully utilized for constructions of flood control facilities.

The Project has no problem in structural, technical and financial aspects as well as the current status of operation and maintenance due to the issues mentioned above. Therefore, sustainability of this project is high.



The construction machinery provided by the Project

III. Recommendations & Lessons Learned

Recommendations for Implementing agency

- It is necessary for the Directorate of Water to intensively cope with reconstructions in the flood damaged areas once floods occur. On the other hand, it is expected that more precise prioritization of high flood risk area enables earlier implementation of construction of flood construction facilities in order to minimize flood damage and to increase positive effects of the Project.
- It is recommended to collect and provide operational data of the construction equipment provided by the Project, including the operation rate at construction site, in order to directly verify effects of the Project.

Lessons learned for JICA

- In terms of constructions of flood control facilities by the construction equipment provided by the Project, it is possible to change the target sites from the planned areas to the areas unexpectedly damaged by flood. Therefore, it is better to use more direct indicator such as operation rate of equipment in addition to the number of completed constructions by using the equipment in order to verify effectiveness of project.
- The construction works using the equipment provided by the Project contributed to not only reduction of the number of flood damage but also positive social impacts, including employment creation for the local people due to employment of the local people for the construction works according to the agreement between the Directorate of Water and the Ministry of Internal Affairs.