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A Short Glimpse to Environmental Management at Alborz Integrated Land and Water Management Project-Iran

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***Abstract*—**Environmental considerations have become an integral part of developmental thinking and decision making in many countries. It is growing rapidly in importance as a discipline of its own. Preventive approaches have been used at the evolutional process of environmental management as a broad and dynamic system for dealing with pollution and environmental degradation. In this regard, Environmental Assessment as an activity for identification and prediction of project's impacts carried out in the world and its legal significance dates back to late 1960. [8][9]

In Iran, according to the Article 2 of Environmental Protection Act, Environmental Impact Assessment(EIA) should be prepared for seven categories of project. This article has been actively implementing by Department of Environment at 1997.

World Bank in 1989 attempted to introducing application of Environmental Assessment for making decision about projects which are required financial assistance in developing countries. So, preparing EIA for obtaining World Bank loan was obligated.

Alborz Project is one of the World Bank Projects in Iran which is environmentally significant. Seven out of ten W.B safeguard policies were considered at this project.

In this paper, Alborz project, objectives, safeguard policies and role of environmental management will be elaborated.

***Keywords*—**AILWMP, EIA, Environmental Management, Safeguard Policies

I. Introduction

ENVIRONMENTAL Management and its policies in developed countries show a separation between economical policy and sustainable development. These countries don't have any obstacle in the exploitation of natural resources or environmental issues. In contrast, in developing countries, identifying instruments for modulation economical policy and sustainable development have become a major challenge. New approach to long-term and continuous exploitation of natural resources in the past four decades has been raised. In this view, sustainable development is the main result of environmental management. Beside this, economic instruments (such as payments duties by consumer, pollution offenses, taxes and…) cause the integration between economical and environmental policies. In this article, major environmental issues and the role of environmental management through the achieving sustainable development at one of the World Bank-Funded projects in Iran (as a developing country) will be described. It should be mentioned that Iran has a comprehensive legal framework guiding water resources management and environmental management and protection, and all of the projects should be implemented under the overall policies.

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Article 50 of the constitution of Islamic republic of Iran declares the protection of the environment a public obligation and therefore "*economic and any other activity, which results in pollution or irremediable destruction of the environment, is prohibited*". [5]

In addition, based on the agreement between Government of Iran and World Bank, considering safeguard policies are mandatory for implementing the World Bank-Funded projects.

Since the year 2000 till now, nine projects have been implemented in Iran byWorld Bank's technical and financial assistance. World Bank safeguard policies were considered at all of projects. These projects have focused mainly on the environment and poverty alleviation. Specially, priority areas such as low-income housing, sewerage, community-based infrastructure and employment creation schemes have been targeted.[7]

II. ALBORZ Integratedland and Water Management Project

A. Description

The Alborz Integrated Land and Water Management Project is the first of its kind in Iran to introduce an integrated river basin management approach and enable land and water resources to be managed in a sustainable manner. This project was built on the Bank's previous experience in Iran through its Irrigation Improvement Project (IIP) which closed in February 2002. Follow up to the IIP and also for transferring global knowledge and experience in sustainable Water Resource Management to the country, Government of Iran requested for World Bank finance and technical assistance in order to ensure that the Alborz Dam (which is constructed on Babol River by Government of Iran's funding) benefits communities both in the upper and lower watersheds of the dam.[4]

B. Project Area

The total project area is 1347 km^2. The population of the project area is almost 1 million, of which the vast majority live in the lower area. The project area (Fig 1) includes (a) the upper catchments, which are mainly rangeland or forest covered; (b) middle lands which are gentle hills with irrigated valley bottoms and degraded or semi degraded forests on hill sides; and (c) the lowlands, which are mainly irrigated plains, down towards the Caspian Sea, which is about 25m below ocean sea level.

Fig1. Alborz Integrated Land and Water Management Project Area

C. Alborz Project Development Objectives

Alborz project assist the Government of Iran in piloting a basin-wide Integrated Water Resources Management (IWRM) in Alborz Basin so that the lessons learned can be replicated in the rest of the country.

Development objectives of the project are to demonstrate the benefits of Integrated Water Resource Management at the river basin level by (a) sustainably increasing agricultural productivity through the improved irrigation and drainage system and participatory management mechanism; (b) reducing soil erosion and sediment yields into the Alborz Dam on the Babol River, through improved upper watershed management; and (c) protecting the water environment downstream of the Babol River through improved water quality monitoring, reservoir operation and pest management in the project area.

Five components in respect to above mentioned objectives were planned at the Project Appraisal Document (PAD) by World Bank. Table I shows the main components of Alborz Project and their objectives.

TABLE I
DESCRIPTION OF ALBORZ INTEGRATED LAND AND WATERMANAGEMENT PROJECT COMPONENTS

No	Description of Component	Objectives
1	Upper Watershed and Forestry Management	- Reducing erosion and sedimentation in the Upper Watershed, - Restoring and protecting biodiversity; natural rangelands and forests, - Increasing productivity and incomes of local communities and forest cooperatives
2	Irrigation and Drainage Management	- Rehabilitation, improvement and construction of diversion weirs, canals and pumping stations, - Acquisition of water monitoring equipment and participatory M&E activities, - Carrying out on-farm development including drainage, tertiary and quaternary canals and land leveling, - Demonstration schemes for on-farm development.
3	Integrated Water Resources Management	- Facilitating the coordination and planning across the entire basin, - Further developing tools required to achieve a higher level of integrated basin planning and management.
4	Environmental Management	*This component aims at ensuring the mitigation of adverse impacts of the GOIs ongoing Alborz Dam construction and irrigation and drainage rehabilitation and development project under AILWMP. Furthermore it aims to resolve the water-related environmental issues on a basin scale.*
5	Project Implementation and Coordination Support	This component provides support for project implementation and coordination at national and basin level.

All project components aim at achieving positive environmental impacts in the project area. Environmental Management Component (Component 4) is critical in ensuring the smooth implementation of the project and environmental and social benefits. In particular, the success of Integrated Water Resource Management approach is also a function of the extent to which environmental safeguard can be complied with and potential fallouts from the project mitigated.

D. AILWMP with associated World Bank Safeguard Policies [1]-[2]

The World Bank's environmental and social safeguard policies are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. The World Bank believes that the effectiveness and development impact of projects and programs it supports has substantially increased as a result of attention to these policies. Safeguard policies also provide a platform for the participation of stakeholders in project design and have been an important instrument for building a sense

of ownership among local populations.In essence, the safeguards ensure that environmental and social issues are evaluated in decision making, help reduce and manage the risks associated with a project or program, and provide a mechanism for consultation and disclosure of information.

AlborzIntegratedLand and Water Management project is classified as Category A project under the World Bank Operational Policy 4.01 (OP4.01). AILWMP triggers seven World Bank safeguards policies which are highlighted at Table II.

TABLE II
WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEGUARDS AND THEIR POLICY OBJECTIVES

OP/BP	Safeguard	World Bank Policy objectives[1]	Alborz Project Safeguards[2]
4.01	Environmental Assessment	Help ensure the environmental and social soundness and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process.	In order to take into account the new activities for the upper and lower watershed as proposed under this project, the supplementary ESA Report was prepared and disclosed by the GOI in compliance with all Bank safeguard policies.
4.04	Natural Habitats	Promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions .	As there are no critical natural habitats of international significance affected by the project, this safeguard is not trigged.
4.09	Pest Management	Minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, and environmentally sound pest management.	As AILWM project will develop new irrigated agricultural areas and the use of pesticides is an existing issue, OP 4.09 is trigged. A project specific Integrated Pest Management Plan (IPM) was prepared to address this policy and incorporated into ESA.
4.11	Physical Cultural Resources	Assist in preserving PCR and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, and religious (including graveyards and burial sites), aesthetic, or other cultural significance.	Environmental Assessment report addressed cultural property in the Dam site and upper watershed areas through a field-based inspection and prior review of the project by the Sari Cultural Heritage Organization. So, OP4.11 is trigged to protecting cultural property, shrines and tombs.
4.12	Involuntary Resettlement	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	The on-going construction of the Alborz Dam in the project site has resulted in the displacement of about 4000 people in 18 villages. The task team has reached agreement with the GOI regarding a course of action to retrofit the resettlement process for those that have already been compensated and relocated from the project area, so that the revised Resettlement Plan is consistent with the provisions of OP 4.12 for all affected people.
4.20	Indigenous Peoples	Design and implement projects in a way that fosters full respect for indigenous peoples' dignity, human rights, and cultural uniqueness and so that they (1) receive culturally compatible social and economic benefits, and (2) do not suffer adverse effects during the development process.	The social Assessment has not indicated any data to trigger this policy.
4.36	Forests	Realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.	This policy is trigged as there are many small communities with a total 7,000 people in the upper forested watershed actively using forest resources. An upper watershed master plan covering the forest and rangeland areas has been prepared in a participatory manner to introduce sustainable forestry management practices.
4.37	Safety of Dams	Ensure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam.	An independent Panel of Experts (POE) was constituted to oversee the preparation and implementation of the dam safety aspect and submitted a dam safety report. The recommendations of the report have been incorporated into the ESA.
7.50	Projects on International Waterways	Ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity and that riparians are notified of the proposed project and its details.	As AILWM Project involves construction of irrigation and drainage systems, and one dam on a river flowing into an international waterway (the Caspian Sea) as specified under the policy, and to conform to this policy, a notification of the proposed project has been issued to the riparian countries.
7.60	Projects in Disputed Areas	Ensure that other claimants to the disputed area have no objection to the project, or that the special circumstances of the case warrant the Bank's support of the project notwithstanding any objection or lack of approval by the other claimants.	Not applicable.
4.12	Involuntary Resettlement	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	The on-going construction of the Alborz Dam in the project site has resulted in the displacement of about 4000 people in 18 villages. The task team has reached agreement with the GOI regarding a course of action to retrofit the resettlement process for those that have already been compensated and relocated from the project area, so that the revised Resettlement Plan is consistent with the provisions of OP 4.12 for all affected people.

III. Environmental Assessment at World Bank-Funded Projects [1],[6]

The environmental assessment (EA) policy (OP/BP 4.01) facilitates the coordination between the Bank and the Borrower in the assessment of the impacts of proposed projects and activities on the environment. The consideration of the applicable safeguard policies and procedures occurs during the preparation of, and/or as part of, the environmental assessment report required by the Bank and prepared by the Borrower. Therefore, OP/BP 4.01 operates as an umbrella safeguard policy and the application of other Bank safeguard policies and procedures may also be required, such as those concerning natural habitats; pest management; indigenous people; physical cultural resources; involuntary resettlement; forests; safety of dams; international waterways ;and disputed areas. The normal World Bank Policy for Environmental Assessment is guided by Operational Policy/Bank Procedure (OP/BP) 4.01 and consists of seven basic elements: The table below outlines the elements and requirements for each of them. As it was mentioned at the firs, Alborz project is classified as a high risk project (category A). Table III shows the Alborz requirements in associated with the World Bank policy elements.[1]

TABLE III
Elements of World Bank Environmental Assessment

EA policy element	Policy requirement	Alborz Project requirement
Screening	Projects are categories as: **Category A:** (high risk-- likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented) **Category B:** (modest risk-- potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects) **Category C:** (likely to have minimal or no adverse environmental impacts), or **Category FI:** Financial Intermediary (FI) operation (involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts)	Alborz project is classified under Category A (high risk project)
Environmental assessment (EA) documentation requirements	**Category A:** Detailed Environmental Impact Assessment (EIA) **Category B:** Environmental Management Plan (EMP) **Category C:** No requirement **Category FI:** Environmental Framework	An environmental Impact Assessment (EIA) of the Alborz Dam was prepared in 1997 and complement the original EIA was written in 2004 by borrower.
Public Consultation	**Category A:** At least two consultations **Category B:** At least one consultation	Alborz project is implementing by advisory of four international plus five national consultancies.
Review and approval of EA documentation	**Category A:** At the World Bank Infoshop (English) In-country, accessible to local affected groups (local language) **Category B:** In-country, accessible to local affected groups (local language) **Category FI:** Framework disclosed at the World Bank Infoshop and appropriate in-country Web site (e.g. Ministry of Environment). Individual subproject disclosure requirements defined in Framework	The final draft of ESA was disclosed at government offices in Tehran and Sari and in the Bank InfoShop in September 2004.
Review and approval	**Category A:** Regional Safeguards Coordinator **Category B:** Sector Manager or Regional Safeguards Coordinator **Category FI:** Framework reviewed/approved by Regional Safeguards Coordinator; individual subprojectreview and approval arrangements defined in Environmental Framework	Basin Water Committee (BWC) was established to enhance coordination between related organizations and all stakeholders.
Conditionality in loan agreements	Borrower is obligated to implement EMP (Category A or B)	Government of Iran is responsible to implement EMP of Albprz project.
Arrangements for supervision, monitoring, and reporting	**Category A, B, or FI** Institutional arrangements defined in EA documentation (EIA, EMP, or Framework)	Institutional arrangement is outlined at ESA, ESMP and Alborz Logical Framework.

In the meantime, the implementation of the Safeguard Policies seeks to increase the ability of Borrower countries to apply environmental performance and monitoring, and to involve and consult with stakeholders, such as the general public, NGOs, government departments not directly involved, and other interested organizations. However, as Safeguard Policies implementation is a highly complex activity, much effort is needed to build capacity in developing countries at various levels ranging from government agencies to civil society. In this regard, training and capacity building is the most important part of Alborz project. International and national consultancies in collaboration with World Bank advisory staffs are responsible to train all of the stakeholders at the different levels (farmers, specialists, local managers and.…) for implementing safeguards policies.

IV. Environmental and Social Impacts Assessment of ALBORZ project[4]

The AILWMP has a strong environmental and social focus. The overall design of the AILWMP will ensure the sustainability of positive environmental impacts of the project and that negative environmental impacts will be minimal.

The most important environmental and social impacts at AILWMP are as follows:

1. Reliable irrigation water supply for increased agricultural production;
2. Impacts on the flow regime of the Babol River;
3. Impacts on soil, groundwater and surface water quality from intensified irrigated agricultural production;
4. Forest management and improvements in forest cover and quality in the upper watershed;
5. Socio-economic impacts, including resettlement and land acquisition.

For mitigation of above mentioned negative impacts of Alborz Dam and irrigation and drainage network development project, Environmental Management Component (Component 4) was structured based on World Bank Safeguards policies.

V. Environmental Management Component (EMC)

Environmental Management Component aims to help resolve water related environmental issues on a basic scale. The water quality of Babol River and Talar Rivers are deteriorating due to increasing pollution loads from cities, such as Babol and GhaemShahr, industries, agricultural pesticides and fertilizer use. Many factories are discharging wastewater including heavy metals without proper treatment.

Farmers are overusing pesticides and fertilizers due to inadequate agricultural extension services. This project is expected to significantly reduce biological and chemical pollution loads from cities and surrounding areas in that basin. However, it was difficult for the project alone to deal with pollution issues such as untreated effluents from many small villages and excessive chemical use in irrigation agriculture in vast areas of the basin as well as for aquaculture in abbbandans, which has been rapidly increasing over the past few years. In this regard, based on the analyses of all AILWMP impacts and projectalternatives an Environment and Social Management Plan (ESMP) has been prepared, comprising the following eight sub- components.

TABLE IV
Description of Environmental Management Component

Sub-Component	Description[6]	Achievement
Forests and Rangeland Management (OP 4.36)	The upper-watershed component of the AILWMP entails forest management and conservation activities where potential impacts on the environment have been identified. As a response to WB safeguard policy on forests (OP 4.36) the ESMP suggested a number of mitigation measures, mainly related to monitoring of impacts and capacity building.	Preparing Master Plan and Forest and Rangeland Monitoring Plan are two important achievement of this component. Monitoring of mitigation measures resulting from forest management activities is ongoing. This monitoring is about the monitoring and evaluation of outcomes and impacts of construction of new forest roads, soil erosion, construction and establishment of water pumps and forest cooperatives activities.
Water Quality Monitoring (O.P.4.01)	In response to the World Bank safeguard policy on Environmental Assessment (O.P.4.01), a water quality monitoring plan is required at AILWMP. Water quality monitoring was undertaken by several organizations, and project assists these organizations to improve inter-agency cooperation and share monitoring results. Within this task all collected data will be fed into a common database and necessary equipment and trainings will be secured to ensure proper completion of the activity.	Water Quality Monitoring Plan was prepared in response to WB safeguard Policy. This plan is implementing by related organization at Babol River and four selected Ab-bandans. In order to improving capacity of local specialists, several training courses were held by International Consultancies. Laboratory Equipments were procured for using new techniques of monitoring.
Ecological studies in rivers and ab-bandans including migratory fish and birds (OP 7.50& OP 4.01).	The Babol River is one of nine major rivers in Iran draining into the Caspian Sea. Thus river ecology monitoring and mitigation activities are included in The ESMP as response to the WB Safeguard policies on Projects of International Waterways (OP 7.50 & OP 4.01).Also, the Ab-bandans have been identified as important resting areas for a number of bird species, therefore monitoring bird species and impacts of the AILWMP on the ecology of the Ab-bandans has been included as part of the ESMP.	River Ecology Monitoring plan including the plans for monitoring Bird, Fish and Plant Species at Babol River and 12 sensitive ab-bandans was prepared by international consultancy and is ongoing by related local organizations. Capacity building of these organizations is doing while the plan is implementing.
Environmental Assessment Screening of Subprojects Financed by the Basin Water Fund	The establishment of a Basin Water Fund (BWF) is proposed as part of component 3 of the AILWMP to provide opportunities for stakeholders and community groups to undertake water and natural resource management projects. This Basin Water Fund will be managed by the Basin Water Council (BWC). In compliance with the	Environmental Guidelines Manual for Submission and Selection of Sub-Projects in Compliance with Safeguard Policies was prepared.

TABLE IV--Continue
DESCRIPTION OF ENVIRONMENTAL MANAGEMENT COMPONENT

Sub-Component	Description[6]	Achievement
(OP.4.01)	Environmental Assessment safeguard policy (OP.4.01), the ESMP has recommended that the screening procedure and selection criteria of projects submitted to the BWC comprise environmental considerations.	
Pest Management (OP.4.09)	In compliance with the World Bank Safeguard policy on Pest Management (OP 4.09) and the recent policy change in Iran with respect to pest management that requires efforts to: (i) reduce chemical control; (ii) expand non- chemical control; (iii) promote Integrated Pest Management: and (iv) phase out hazardous pesticides, a Pest Management Plan (PMP) was developed as part of ESMP. The baseline and impact assessment sections in the Environmental and Social Assessment Report clearly reveal a need to reduce the use of pesticides and agrochemicals to avoid additional negative impacts from the expansion of irrigated agriculture as foreseen in AILWMP.	Upgrading Pest Management Plan was completed and Pilot studies were conducted in different villages. Farmer Field School (FFS) for citrus crop has been successfully completed. And Integrated Pest Management (IPM) is under on going by related organization.
Dam Safety (OP4.37)	In compliance with the World Bank safeguard policy (OP 4.37) a set of recommendations has been included in the ESMP to ensure environmental and social viability of the Alborz dam.	Majority ranges of study have been completed and related reports have been prepared including: 1) reservoir slope stability analysis 2) seismic studies 3) Alborz quality construction review 4) safety survey for three dams 5) hydrometric data collection for PMP and PMF 5) PMP evaluation 6) PMF evaluation 7) model for dam break analyses and 8) dam break analysis incorporated in the EPAP.
Involuntary Resettlement (OP 4.12)	Land acquisition and resettlement issues under the AILWMP are divided into three resettlement mechanisms based on the foreseen activities and stakeholders impacted. These have been developed based on the World Bank Safeguard policy on Involuntary Resettlement (OP 4.12).	Resettlement activities in Dam area and Main Canals have been completed and Resettlement Action Plan has been prepared by International Consultancy.
Protection of Physical Cultural Property (OP.4.11)	In line with the WB safeguard policy (O.P.4.11) all precautions were taken to avoid any impacts and destruction of cultural heritage and historical monuments and the Mazandaran Provincial Authorities provided written assurances that Shrines and cemeteries were avoided with maximum consideration.	Initial rapid survey and mapping of physical cultural property in the dam area and properly excavations has been completed and some of these findings are on display in Sari and Babol museums.

VI. CONCLUSION

The overall impact of the project on the bio-ecological environment and local communities has been studied under the Alborz Environmental and Social Assessment (ESA). And it was determined that, Alborz project triggers seven safeguard policies of World Bank. For clarity and to assure that the issues under each safeguard policy being addressed and mitigated, the structure of the Environmental and Social Management Plan (ESMP) has been organized. Mitigation measures and protective activities designed and presented at various technical plans which prepared under Environmental Management Component (EMC). Master Plan (OP4.36), Water Quality Monitoring Plan (OP.4.01), River Ecology Monitoring Plan (OP7.50, OP4.01), Integrated Pest Management Plan (OP. 4.09), Resettlement Plan (OP, 4.12) are the most important achievement of Environmental Management Component of Alborz Project. Proven records show that this project increase Environmental knowledge of local communities by awareness raising among stakeholders and developing a spirit of cooperation between them. Creating GIS center for recording updated data, procuring equipment for upgrading laboratories, comprehensive capacity building activities for GOI staff and related beneficiaries were conducted according to World Bank Safeguard Policies. At last, it should be mentioned that the project support community-driven water and natural resources conservation initiatives in order to improve upper watershed management water use efficiency and water pollution prevention.

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