CHAPTER 11

IMPLEMENTATION AND O/M PLAN

CHAPTER 11 IMPLEMENTATION AND O/M PLAN

11.1 Implementation Plan

11.1.1 Implementation Schedule

Implementation of the proposed projects will be commenced in 2002, after completion of the Master Plan Study, and will be completed in 2020. The implementation schedule of proposed projects are as shown in Table 11-1-1~5. The respective periods required for the detailed design, and financial procedures are included in the duration of the implementation schedule.

It is recommended that relevant government should select one or two pilot projects in prior to implementation of other projects, based on political priority, villager's needs, and impact for other M/P areas. The result of the pilot project should be open to other provincial government officers and village peoples related to other M/P areas. It is important that selection of next project and expansion to other M/P areas is carried out based on the villager's and government officer's willingness to development. All projects proposed in the M/P are necessary to implement to overcome current situation in the M/P areas, and is urgent matter. But it is also necessary to assure people's better understandings and participation into project implementation to attain sustainable development in the Karoon watershed area. All project proposed in the Master Plan are not intended to commence at the same time, therefore, should be commenced step by step.

Table 11-1-1 Implementation Schedule (K4-1-9 Vastegan)

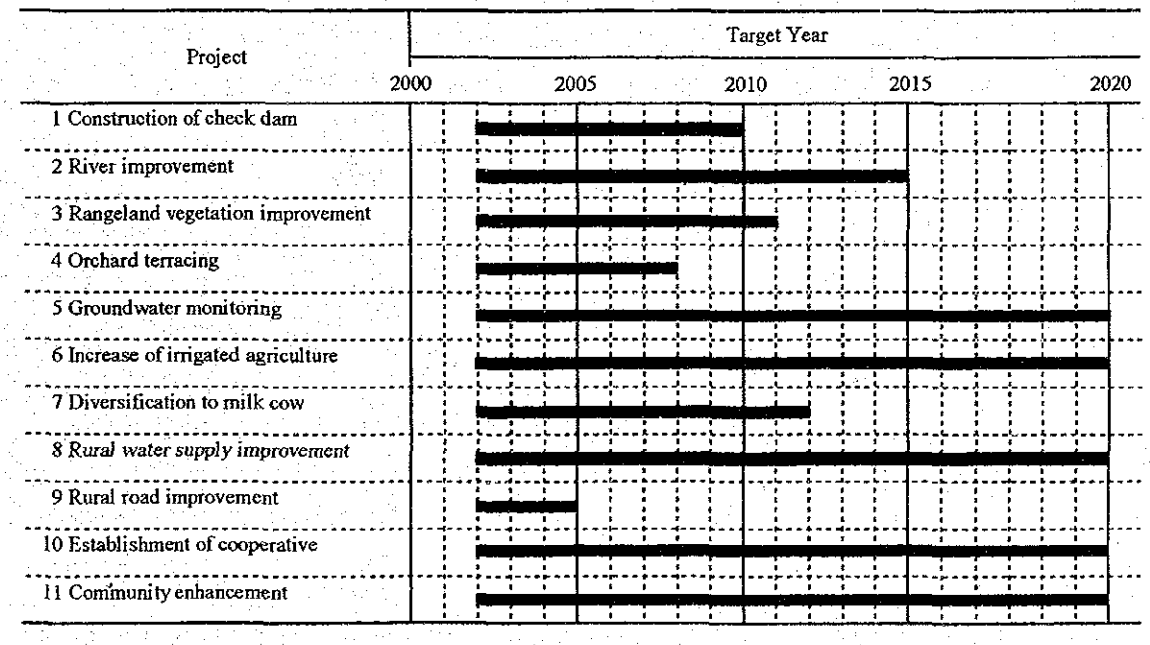


Table 11-1-2 Implementation Schedule (K5-19a Chaman Goli-Bazoft)

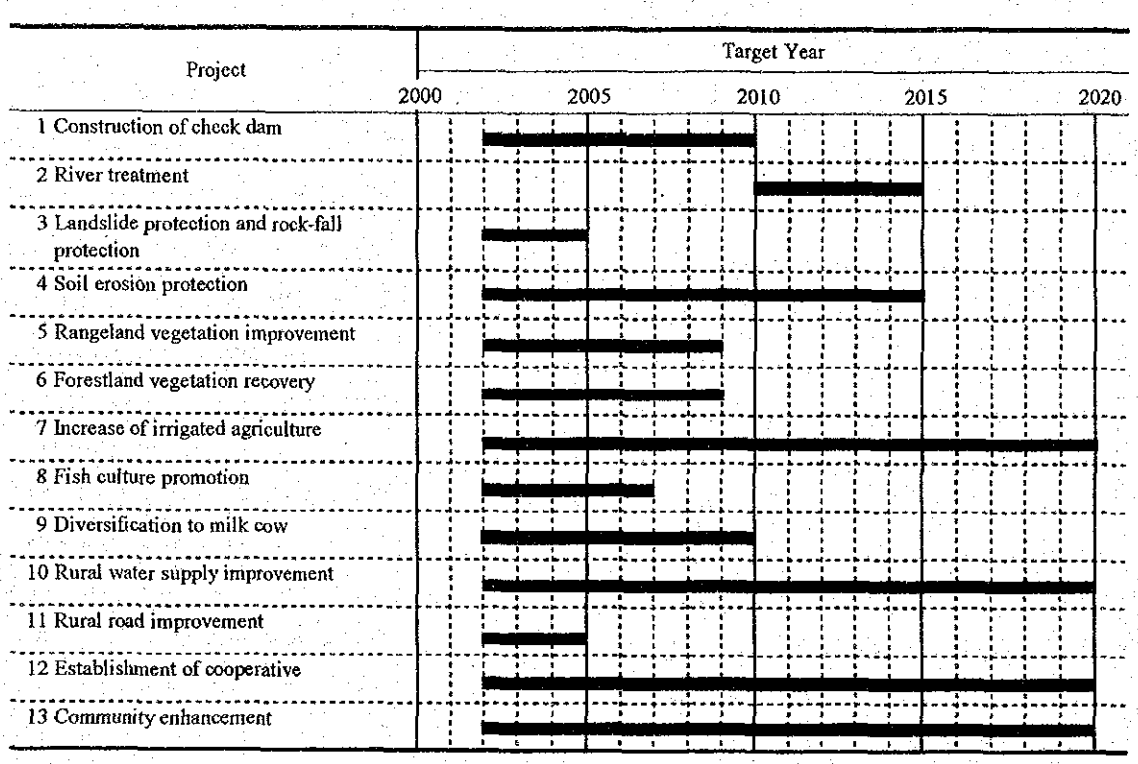


Table 11-1-3 Implementation Schedule (K7-0-19-1 Sarbaz)

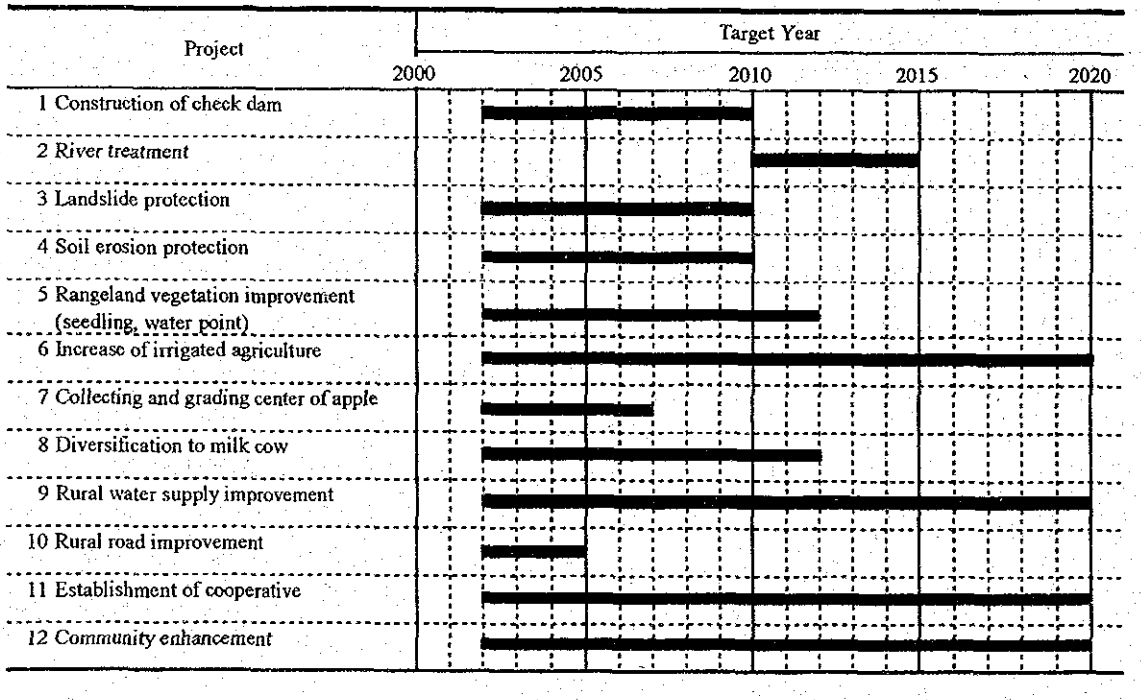


Table 11-1-4 Implementation Schedule (K7-48 Tang Sorkh)

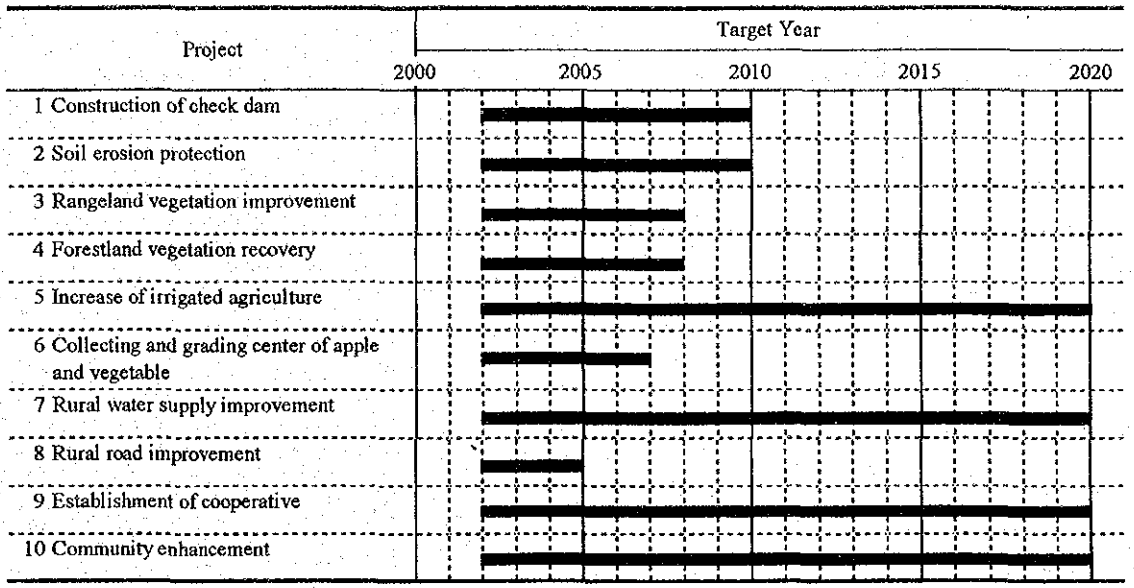
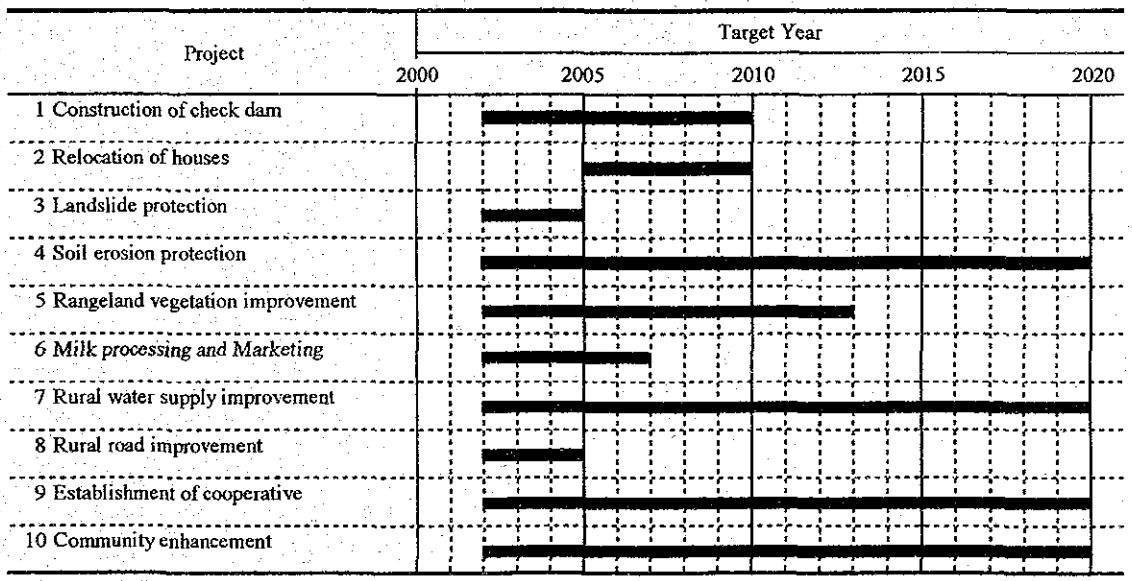


Table 11-1-5 Implementation Schedule (K8-28 Zeras)



11.1.2 Implementation Organization

(1) Project Coordination Committee (PCC)

Under the leadership of Watershed Management Deputy, Ministry of Jihad Agriculture, Project Coordination Committee (PCC) for project implementation should be established. Purpose of establishment of PCC is to coordinate tasks and roles of relevant government organizations, and to

procure and allocate budget for the projects. Relevant government organizations both in the local and central level, such as Fishery Organization, Forest and Rangeland Organization, Ministry of Interior, Provincial Jihad Agriculture Organization should be organized into the PCC. The tasks of the committee are as follows;

a) To explain purpose and contents of M/P to relevant provincial officers,
b) To procure and allocate budget for the project implementation,
c) To coordinate roles and tasks among relevant government organizations,
d) To manage and supervise project implementation organization, and
e) To provide necessary administrative and technical assistance to the project implementation organization.

(2) Project Implementation Committee (PIC)

For smooth implementation of the projects, Project Implementation Committee (PIC) should be established. The main implementation body is Provincial Jihad Agriculture Organization, Ministry of Jihad Agriculture. The Organization has enough capability and experience for the implementation of the watershed management project. Such organization as Forest and Rangeland Office, Livestock Office, and representative of villager's organization should be organized into the PIC. The PIC is to entrust the consultant with the detailed design of main facilities, to give the contractor an order of construction works by means of tendering, and to coordinate relevant provincial organizations, and to supervise and assist village organization for the implementation, operation and maintenance of the projects. The Project Implementation Committee has the following duties;

a) To establish villager's organization,
b) To facilitate villager's participation into the project implementation,
c) To establish rules and regulations for the management, operation and maintenance,
d) To provide a training course representatives of the village organization. Subject of the course is the techniques of the operation and maintenance of the project facilities, and the budget management, etc,
e) To implement the projects in cooperation with village peoples, and
f) To conduct monitoring and evaluation pf the projects.

(3) Village Organization

To maintain expected function of facilities as long as possible, and to assure sustainable development in the project area, villager's participation in the project implementation is quite important. To make villagers feel a sense of ownership on the constructed facilities, the project implementation Committee should act with villagers from the beginning of plan formulation. If village peoples feel the ownership of the facilities, they will be willing to maintain and improve the facilities by themselves.

In order to promote villager's participation into the project implementation, village organization should be established. The project implementation Committee should take leadership to establish the village organization, and supervise and support organization's activities. The project implementation committee should discuss and make a plan with the village organization how they realize villager's participation into the project implementation. Following is proposed organization of the project implementation

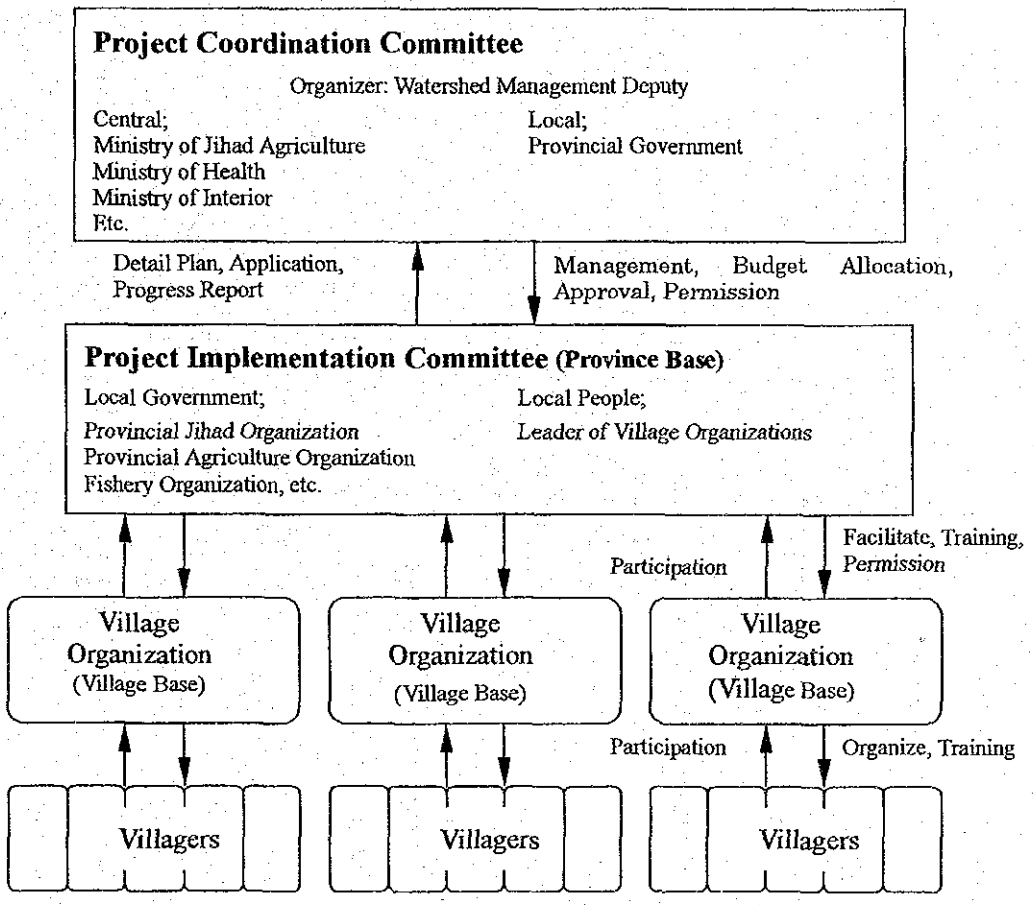


Figure 11-1 Proposed Organization of the Project Implementation

11.1.3 Project Implementation

(1) Disaster Prevention Facility

Relevant provincial Jihad organization will draft the project implementation plan on disaster prevention facilities to be implemented by public works, and submit to the Project Coordination Committee. Based on the plan, the Committee will select preferential projects and budget for the implementation.

With those budgets, provincial Jihad organizations (the Project Implementation Committee) will conduct detailed survey, investigation, design, and draft tender documents. Then getting the approval of the Project Coordination Committee, the provincial Jihad organizations will call local contractors for tender on the projects. Under the supervision of the provincial Jihad organizations, the selected contractors undertake the construction.

On the other hand, the process of project execution on disaster prevention facilities to be implemented by people's participation is the same as those of by public works, the construction will be carried out by the labor of village organizations under the supervision and supply of construction materials by the provincial Jihad organizations.

Disaster prevention facilities aim at protection of villages, farmland and orchard gardens, and there may be no discrepancies in the community development. However, village organizations are to be participated and well informed at the early stage of the project in order to maintain and manage the facilities by village organizations themselves independently and permanently.

(2) Community Development

The Project Implementation Committee will draft the project implementation plan on community development keeping close relation with village organizations. The plan will be submitted to the Project Coordination Committee for approval and budgeting. After the approval and budgeting, the provincial Jihad organizations (the Project Implementation Committee) will conduct necessary survey, feasibility study and detailed study.

The provincial Jihad organizations will call local contractors for tender on the community development projects to be carried out by public works. Under the supervision of the provincial Jihad organizations, the selected contractors undertake the construction.

On the other hand, the process of project execution on community development to be implemented by people's participation is the same as those of by public works, the construction will be carried out by the labor of the village organizations under the supervision and supply of construction materials by the provincial Jihad organizations. Village organizations as the representatives of the beneficiaries will burden the cost of labor and maintenance among the projects, which yield high return.

(3) Budget Allocation

Basically, the source of budget should be derived from the national funds. The process for the implementation is the same as that of the present system, i.e. the projects are to be incorporated with

the provincial implementation plan and to be submitted to the central government for approval. The Project Coordination Committee should support for approval. On the other hand, other sources of funds are deemed to be FAO, UNDP and bilateral funding agencies.

The possibility of funds acquisition is certain if the projects are incorporated with the provincial scheme, however, other funding sources are not clear at this stage.

11.2 Operation and Maintenance Plan

11.2.1 Methodology and Organization

The structural measures taken in the projects are comprised of various works and facilities such as flood and debris flow control facilities, irrigation facilities, roads and terracing, etc. These are classified into two types of works from managerial aspect; operation management type and function management type. Irrigation facilities, milk-processing facility and agricultural related center belong to the former, while flood and debris flow control facilities, soil erosion protection works and roads are function management type. The subjects of operation and maintenance for the projects are as follows;

(1) Operation program and collection of operation fee
   a) Establishment of organizational structure for operation.
   b) Establishment of means of operation.
   c) Collection of information needed for operation such as irrigation area, market price, etc.
   d) Training of operational engineering technologies.
   e) Collection of operation fee such as fuel expenses and electricity charges.

(2) Maintenance program and collection of maintenance fee
   a) Establishment of organizational structure for maintenance.
   b) Establishment of means of inspection and maintenance.
   c) Training of maintenance engineering technologies.
   d) Collection of maintenance fee.

Operation for milk-processing facility, and collecting and grading canter should be carried out by established cooperative through the project implementation. Such facilities as ground water monitoring and water supply are to be operated by Provincial Jihad Organization. Village organization and relevant government officers should hold regular meeting to exchange information about operational conditions, and to maintain the project facilities.

Maintenance of such project facilities constructed under the participatory approaches as check dams, orchard terracing, etc., should be carried out by village organization in principle. The project implementation committee (PIC) is to prepare the rules and regulation for management and maintenance of the project facilities so that village organization maintains the expected operational function and development effects.

For successful operation and maintenance of the projects, PIC should conduct monitoring and evaluation under the participation of village organizations. The objective of participatory monitoring and evaluation are to guide the village organization to grasps progress of the project and problems raised in the project implementation, and then, to improve their original plan and activities by themselves based on result of the monitoring and evaluation. Through these activities, the village organization can formulate and enhance a sense of ownership for the pilot project. It is important to attain sustainable development through that the organization recognizes their problems by themselves and improves their project activities through their discussions. Monitoring and evaluation is also important from a view of accountability to project sponsors.

Monitoring should be conducted once per month during construction period, and once per year after completion of the construction. The main procedure of the monitoring is to grasp progress of the projects and problems raised in the project implementation, and to revise and improve their further activities. PIC has a responsibility for making a report on the result of monitoring to PCC and, if any, project sponsors. PIC also has responsibilities for taking measures against problems and for adjustment of next activities with the beneficially group.

Evaluation should be carried out once after completion of the construction, and once around 5 year after construction. The member of evaluation team should be composed of persons from third parties such as representatives of PCC and, if any, donor organizations, to ensure objectivity of the project evaluation. PIC will organize the evaluation team and hold a workshop under participation of the village organizations. Such aspects as achievement degree of the project purpose, efficiency of the project inputs, choice and adaptation of technology appropriate to the local condition, impact of the pilot project on local society and environment, organization and management system/ abilities, should be discussed and analyzed in the evaluation workshop. Result of the evaluation will be put into latter activities and next projects. Organizational structure of operation and maintenance is as follows

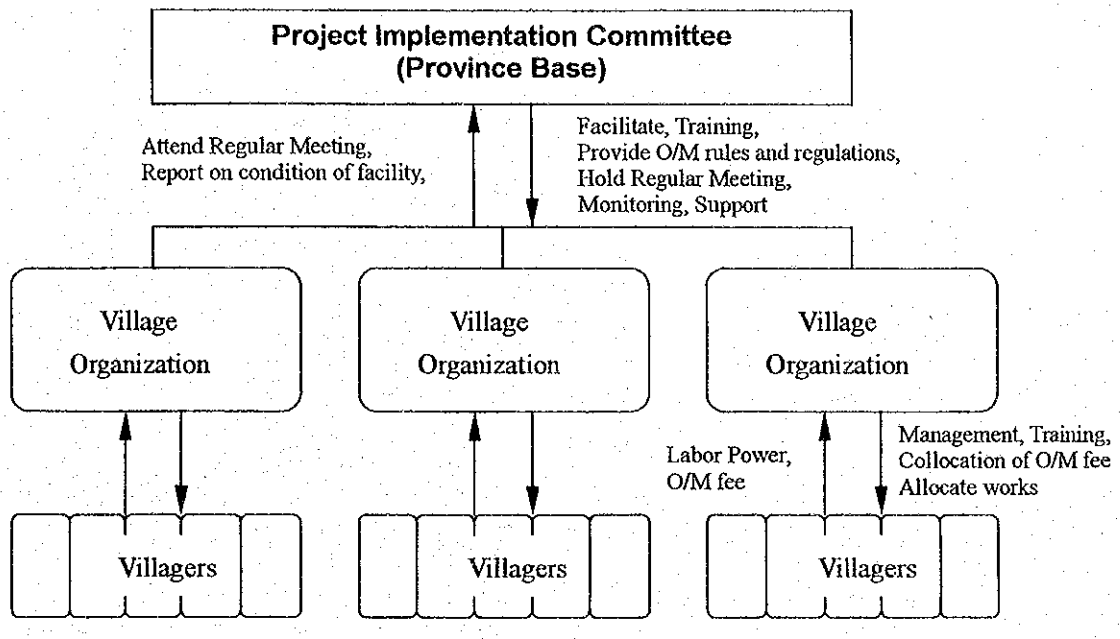


Figure 11-2 Proposed Organization of Operation and Maintenance

11.2.2 Operation and Maintenance Cost

The operation and maintenance cost for the proposed projects is as shown in Table 11-2-1~11-2-5.

(1) K4-1-9 Vastegan

Table 11-2-1 Operation and Maintenance Cost of the Projects : Vastegan

Project	O/M Cost (1000Rls.)
1.Construction of check dam	41,500
2.River improvement	101,300
3.Rangeland vegetation improvement	7,250
4.Orchard terracing	73,400
5.Groundwater monitoring	91,600
6.Increase of irrigated agriculture	35,200
7.Diversification to milk cow	1,868,130
8.Rural water supply improvement	46,800
9.Rural road improvement	50,200
10.Establishment of cooperative	938,020
11.Community Enhancement	9,600
Total	3,263,000

(2) K5-19a Chaman Goli-Bazoft

Table 11-2-2 Operation and Maintenance Cost of the Projects : Chaman Goli-Bazoft

Project	O/M Cost (Rls.)
1.Construction of check dam	40,500
2.River treatment	35,200
3.Landslide protection and rock-fall protection	35,300
4.Soil erosion protection	46,000
5.Rangeland vegetation improvement	7,300
6.Forestland vegetation recovery	2,800
7. Increase of irrigated agriculture	141,700
8.Fish culture promotion	2,681,500
9.Diversification to milk cow	1,868,130
10.Rural water supply improvement	104,100
11.Rural road improvement	125,500
12.Establishment of cooperative	1,633,480
13.Community Enhancement	16,800
Total	6,738,310

(3) K7-0-19-1 Sarbaz

Table 11-2-3 Operation and Maintenance Cost of the Projects : Sarbaz

Project	O/M Cost (Rls.)
1.Construction of check dam	49,400
2.River treatment	70,086
3.Landslide protection	59,003
4.Soil erosion protection	10,300
5.Rangeland vegetation improvement	7,300
6. Increase of irrigated agriculture	265,300
7.Collecting and grading center of apple	6,704,610
8.Diversification to milk cow	1,868,130
9.Rural water supply improvement	113,200
10.Rural road improvement	144,500
11.Establishment of cooperative	1,634,050
12.Community Enhancement	26,400
Total	10,952,279

(4) K7-48 Tang Sorkh

Table 11-2-4 Operation and Maintenance Cost of the Projects : Tang Sorkh

Project	O/M Cost (Rls.)
1.Construction of check dam	71,600
2.Soil erosion protection	2,800
3.Rangeland vegetation improvement	7,300
4.Forestland vegetation recovery	2,800
5. Increase of irrigated agriculture	Included in construction of check dam
6.Collecting and grading center of apples and vegetable	1,114,520
7.Rural water supply improvement	70,400
8.Rural road improvement	48,800
9.Establishment of cooperative	570
10.Community Enhancement	4,800
Total	1,323,590

(5) K8-28 Zeras

Table 11-2-5 Operation and Maintenance Cost of the Projects : Zeras

Project	O/M Cost (Rls.)
1.Construction of check dam	23,200
2.Relocation houses	37,100
3.Landslide protection	16,800
4.Soil erosion protection	123,900
5.Rangeland vegetation improvement	6,800
6.Milk processing and Marketing	797,460
7.Rural water supply improvement	137,100
8.Rural road improvement	142,900
9.Establishment of cooperative	140,560
10.Community Enhancement	7,200
Total	1,433,020

CHAPTER 12

PROJECT COST ESTIMATION

CHAPTER 12 Project Cost Estimation

12.1 Method of Cost Estimation

Cost of proposed projects will be estimated in this section. The unit prices were provided by Study and Evaluation Department, Water shed Management Office, Ministry of Jihad Agriculture. In addition, basic price lists in 2001 prepared by Management & Planning Organization were referred.

The project cost is estimated under the following condition.

- Unit prices of civil works and construction materials are adopted as the prices on August in 2001.
- The civil works are contracted on the contract basis. The construction machinery and equipment required for construction works will be provided by the contractors. Therefore, depreciation costs of machinery and equipment are included in the estimated cost.
- The exchange rate between Rial and U.S.Dollar is as follows.
  1 U.S.Dollar = 8,000 Rials
- Governmental tax is excluded in each construction cost.

12.2 K4-1-9 Vastegan

Table 12-2 Project Cost : Vastegan

Project	Cost (1000Rls.)
1.Construction of check dam	3,426,000
2.River improvement	11,722,800
3.Rangeland vegetation improvement	12,000
4.Orchard terracing	1,088,700
5.Groundwater monitoring	2,556,100
6.Increase of irrigated agriculture	160,600
7.Diversification to milk cow	669,200
8.Rural water supply improvement	154,100
9.Rural road improvement	850,900
10.Establishment of cooperative	997,400
11.Community Enhancement	—
Total	21,637,800

12.3 K5-19a Chaman Goli-Bazoft

Table 12-3 Project Cost : Chaman Goli-Bazoft

Project	Cost (1000Rls.)
1.Construction of check dam	3,272,100
2.River treatment	2,489,600
3.Landslide protection and rock-fall protection	346,000
4.Soil erosion protection	936,800
5.Rangeland vegetation improvement	11,800
6.Forestland vegetation recovery	—
7. Increase of irrigated agriculture	1,996,100
8.Fish culture promotion	4,553,200
9.Diversification to milk cow	669,200
10. Rural water supply improvement	348,200
11.Rural road improvement	1,353,100
12.Establishment of cooperative	1,317,800
13.Community Enhancement	—
Total	17,293,900

12.4 K7-0-19-1 Sarbaz

Table 12-4 Project Cost : Sarbaz

Project	Cost (1000Rls.)
1.Construction of check dam	4,496,700
2.River treatment	5,370,600
3.Landslide protection	1,074,800
4.Soil erosion protection	222,300
5.Rangeland vegetation improvement	16,500
6. Increase of irrigated agriculture	3,904,800
7.Collecting and grading center of apple	3,924,900
8.Diversification to milk cow	669,200
9. Rural water supply improvement	430,700
10.Rural road improvement	3,872,700
11.Establishment of cooperative	1,399,800
12.Community Enhancement	—
Total	25,383,000

12.5 K7-48 Tang Sorkh

Table 12-5 Project Cost : Tang Sorkh

Project	Cost (1000Rls.)
1.Construction of check dam	3,342,500
2.Soil erosion protection	60,400
3.Rangeland vegetation improvement	8,300
4.Forestland vegetation recovery	—
5. Increase of irrigated agriculture	Included in construction of check dam
6.Collecting and grading center of apples and vegetable	906,200
7. Rural water supply improvement	100,600
8.Rural road improvement	968,200
9.Establishment of cooperative	82,000
10.Community Enhancement	—
Total	5,468,200

12.6 K8-28 Zeras

Table 12-6 Project Cost : Zeras

Project	Cost (1000Rls.)
1.Construction of check dam	915,200
2.Relocation houses	2,859,900
3.Landslide protection	60,400
4.Soil erosion protection	2,759,200
5.Rangeland vegetation improvement	11,200
6.Milk processing and Marketing	329,400
7.Rural water supply improvement	3,009,000
8.Rural road improvement	3,605,900
9.Establishment of cooperative	668,000
10.Community Enhancement	—
Total	14,218,200

CHAPTER 13

PROJECT EVALUATION

CHAPTER 13 PROJECT EVALUATION

13.1 Methodology

In evaluating any development projects, generally the following thinking is adapted that the project effects of the specific project are :

1. whether Direct or Indirect, and,
2. whether Tangible or Intangible

Table 13-1-1 Effects of a Project

	Direct Effects	Indirect Effects
Tangible Effects	DT	IT
Intangible Effects	DI	II

Direct and Tangible Effects (DT) are quantitatively estimated as the benefits and, in comparison with the project costs, such economic indicators as Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Economic Internal Rate of Return (EIRR) are calculated. Some part of Indirect and Tangible Effects (IT) and Direct and Intangible Effects (DI) could be quantitatively estimated and would be incorporated to the benefits according to the cases, while remaining part would be discussed qualitatively. Indirect and Intangible Effects (II) are difficult to estimate quantitatively and will be explained qualitatively.

Other than the above mentioned groupings, effects of a project are analyzed from the view-point of measures taken by the project. If the measure taken is "structural", the effects of the measure can be quantitatively estimated and used for economic evaluation. On the other hand, the measure taken is "non-structural" case, such as increasing the accuracy of measurement and/or forecasting, improvement of consciousness of personnel and offices in charge, etc., the effects will be discussed qualitatively and, in most cases, incorporated to the field of social evaluation.

It should be realized that a decision for or against projects couldn't be taken on the basis of Direct and Tangible Effects (DT) alone since this is only one of the criteria of assessment. A very profitable project, which would have the effect of aggravating disparities between incomes, is not necessarily justified from the standpoint of the general interest. Conversely, projects which is less profitable, but is designed to open up a poor region and give it better chance of taking part in the general economic grows of the country, may be justified if it has a good chance of succeeding.

Table 13-1-2～6 shows overall project effects of Master Plans. Proposed projects are evaluated from the viewpoint of economic aspect, social aspect, and natural environmental aspect. In the economic aspect, income improvement, generation of job opportunity, and improvement of productivity, etc. is discussed. The effects and impacts on understanding of conditions/ issues, improvement of social bond, and social cooperation, etc. is included in the social aspect. The aspect of natural environment is divided into four impacts/ effects, which are prevention of natural disasters, stabilization of water resources, improvement in security, and improvement in sanitation/ health.

The effects and impacts derived from implementation of proposed projects in the Master Plan are categorized into four types, which are 1) most significant effects/ impacts expected, 2) significant effects/ impacts expected, 3) some extent of effects/ impacts expected, 4) not much effects/ impacts expected, as is shown in the table.

In the following sections, 1) the most significant effects/ impacts expected is analyzed in detail.

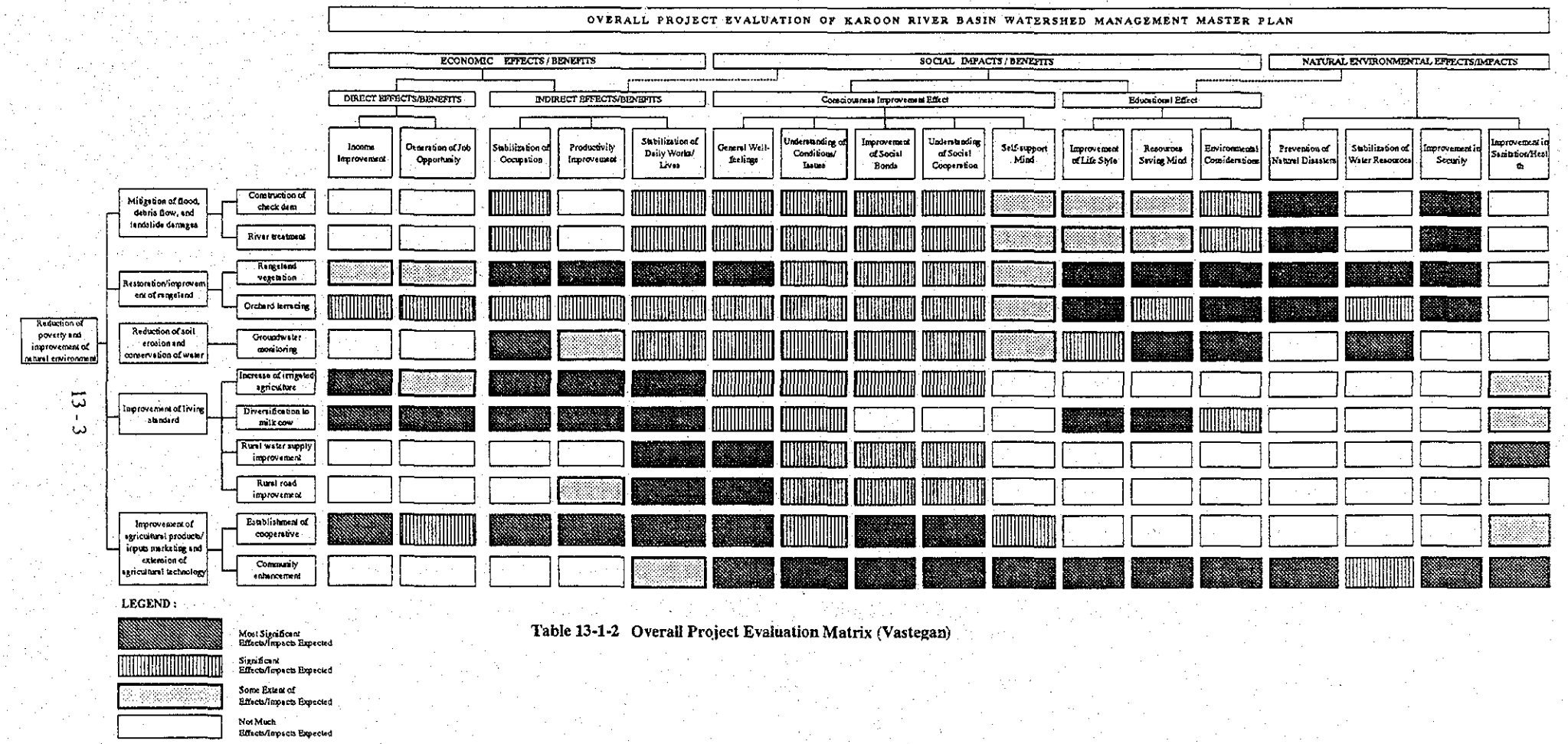


Table 13-1-2 Overall Project Evaluation Matrix (Vastegan)

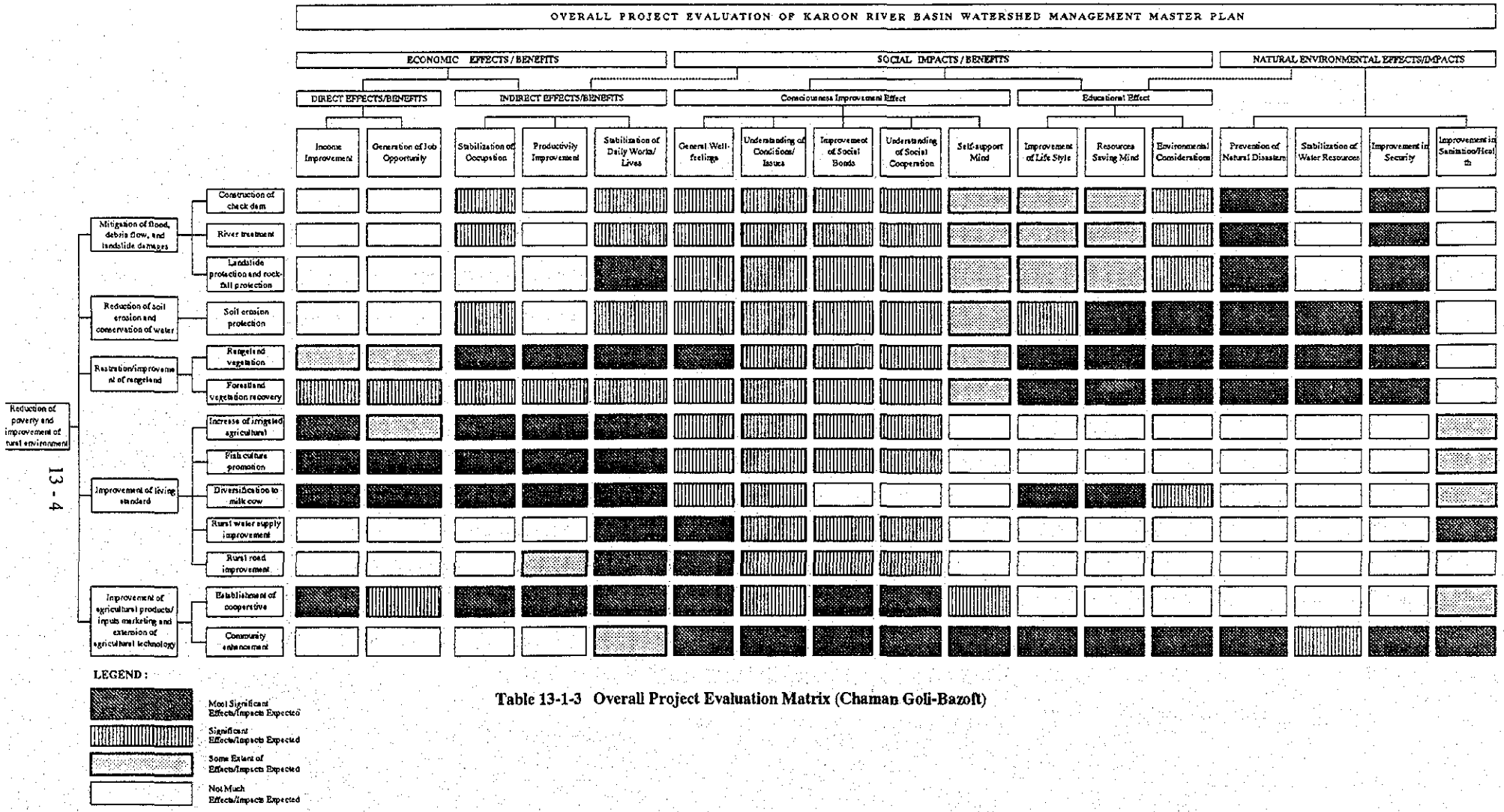


Table 13-1-3 Overall Project Evaluation Matrix (Chaman Goli-Bazoft)

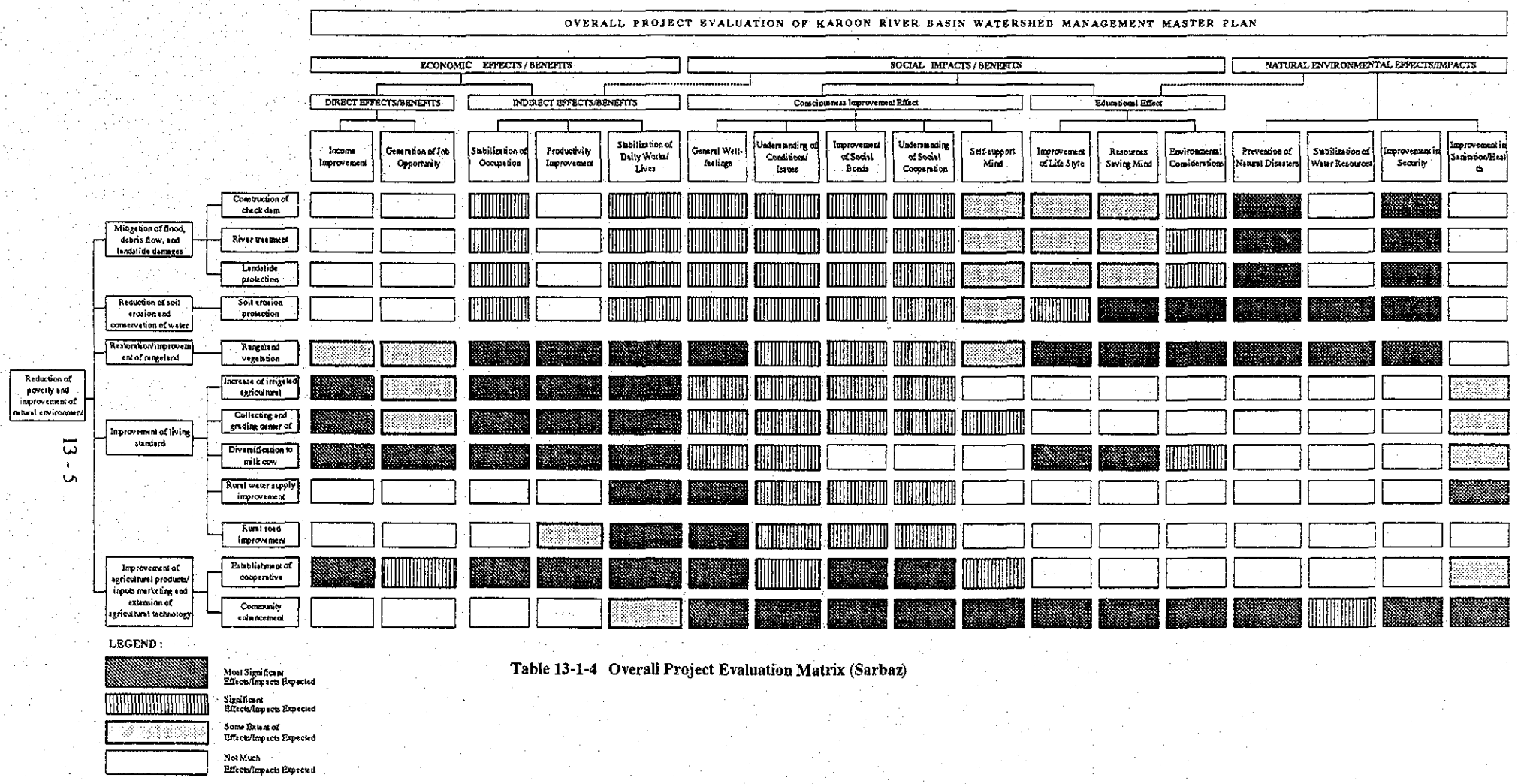


Table 13-1-4 Overall Project Evaluation Matrix (Sarbaz)

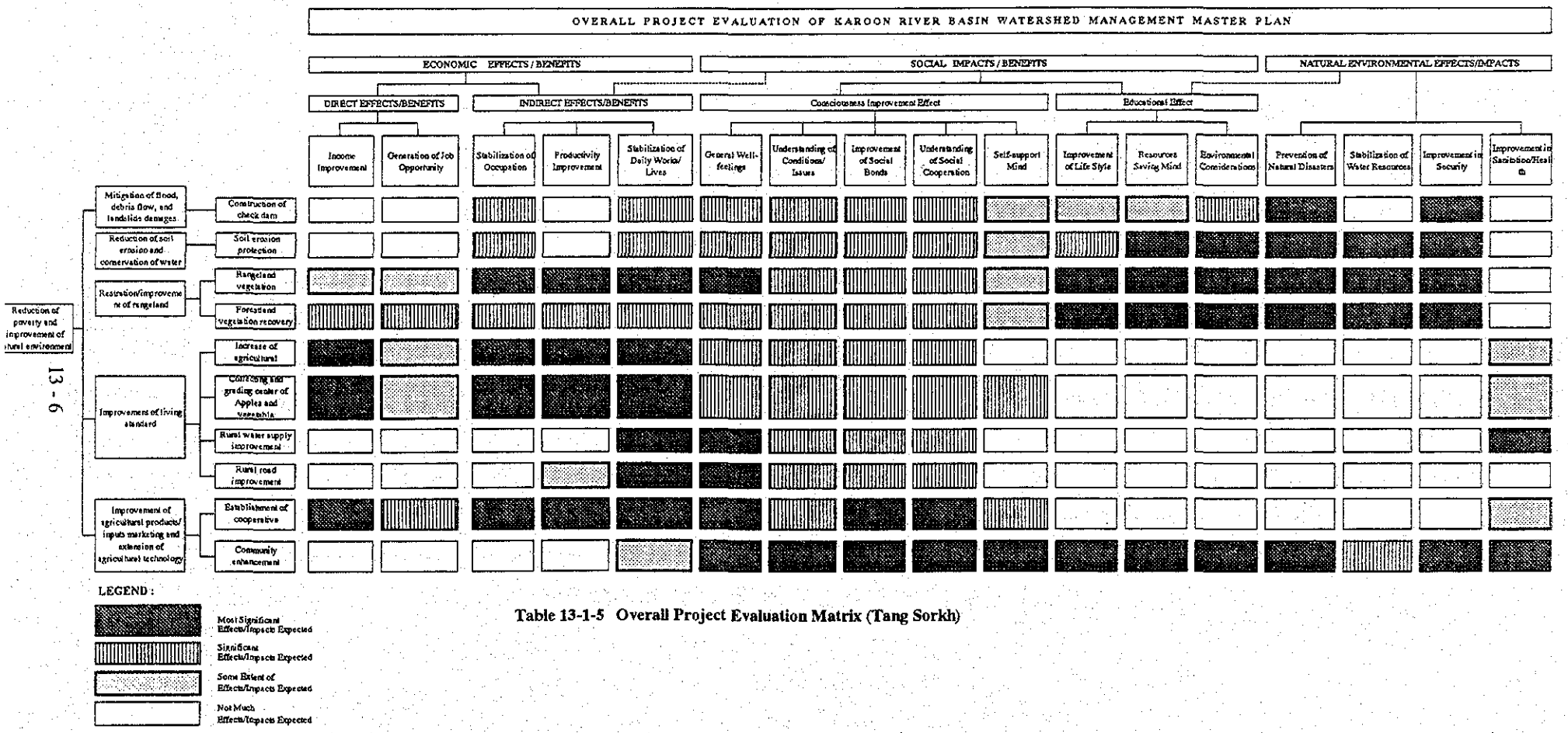


Table 13-1-5 Overall Project Evaluation Matrix (Tang Sorkh)

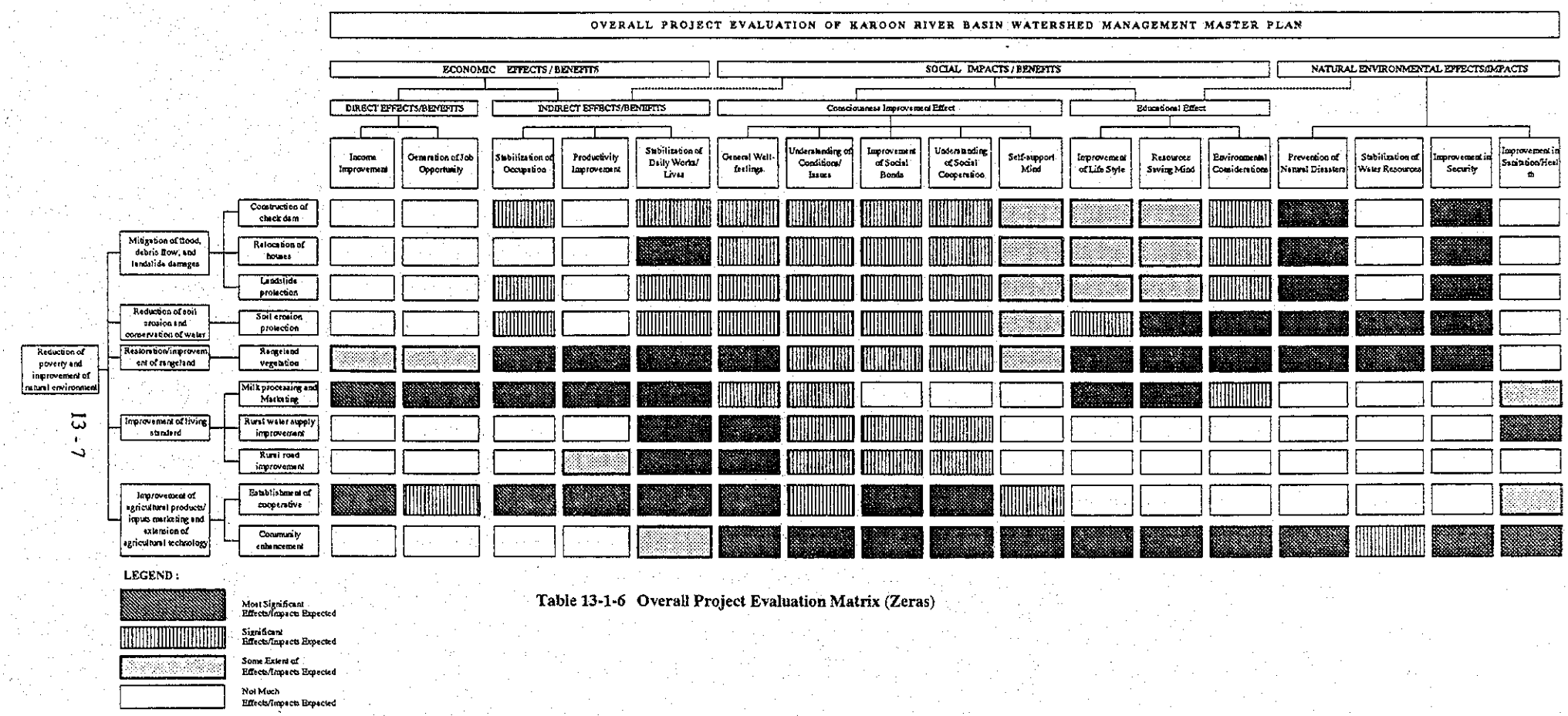


Table 13-1-6 Overall Project Evaluation Matrix (Zeras)

13.2 *Project Benefit*

The project will give rise to many kinds of tangible and intangible, direct and indirect benefits. Tangible benefits are those that can be expressed in monetary terms. Following are expected benefit derived from implementation of the proposed projects. In the financial and economic analysis, only tangible benefits are assessed by using three criteria, NPV, B/C Ratio and IRR.

(1) Expected direct and indirect benefits from the project implementation

a) Mitigation of flood, debris flow, and landslide damages

To mitigate damages caused by flood and debris flow, check dam construction and river improvement will be implemented. These projects would directly contribute to prevention of personal and communal property losses such as farmlands and roads, and would indirectly contribute to stabilization of villager's living conditions. Relocation of houses and rock-fall protection will be carried out to prevent damages on villager's houses located in hazard area, and would provide safety living conditions to village peoples.

Benefits from mitigation of natural disaster are tangible, and could be express in monetary terms by assessment of damaged properties.

b) Reduction of soil erosion and conservation of water

Soil erosion protection, such as counter band work and water way work, would directly contribute to decrease of soil erosion at steep slope farmland. As a result, farmer's activities are stabilized. Benefit from reduction of soil erosion can be express in monetary term by means of assessment for value of land.

Through the implementation of ground water monitoring, appropriate utilization of ground water would be promoted. By adjustment of utilization of groundwater resources, distribution of irrigation water would be equalized, and agricultural production would be stabilized. These activities would indirectly contribute to increase in volume of deposited ground water in the project area. However, all those benefits cannot be accounted in monetary terms. Therefore, they are dealt with as intangible benefits in the analysis.

c) Restoration/ improvement of rangeland

Project for rangeland vegetation and orchard terracing will be carried out to restore and improve rangeland productivity in the project areas. Through the implementation of these projects, reduction of soil erosion and increase in carrying capacity in the project area could be expected. These projects would indirectly contribute to mitigation of damages on farmland,

and indirectly promote stabilization of farmer's daily activities.

Almond tree plantation in forest vegetation recovery project, and orchard tree plantation in terracing project would provide new income source to villagers. Through the shipment of these products, villager's income would be increased. Benefit from almond and orchard tree plantation is categorized into tangible and indirect effect, and is able to express in monetary terms.

d) Improvement of living standard

To improve villager's living standard, livelihood development such projects as increase of irrigated agriculture, fish culture promotion, and establishment of collecting and grading center for apple and vegetable would be carried out. Benefits from these projects are derived from increase in agriculture and fish culture production. Fish culture promotion would provide new job opportunity. However, the number is not so large, and is not accounted as benefit, but as project input, both in the financial and economic analysis.

Promotion of animal productions such as milk cow, would directly contribute to villager's income generation. Direct benefit from improvement of animal production will be evaluated in the financial and economic analysis.

e) Improvement of agricultural products/ inputs marketing and extension of agricultural technology.

Cooperative will be established to improve procurement and shipment process of such inputs as seed and fertilizer, and agriculture and livestock products. At present, there are middlemen in the process of procurement and shipment in the project area. Through the activities of agricultural cooperative, price of agricultural inputs and products would be adjusted to appropriate prices, and farmer's income would be increased.

Established cooperatives also promote to receive such extension services as agricultural/ livestock technologies and information. Villagers, who introduce these services positively, would be able to increase agricultural/ livestock production, and could earn more incomes.

Village organization will be established through the implementation of community enhancement program. The organization is to promote villagers participation into the project implementation, and to strengthen villager's living environment. Villager's participation in the operation and maintenance of the project facilities would directly contribute to extension of utilization life of the project facilities. Enlightenment activities such as disaster drills will be carried out, as one of main activities of the village organization, to increase villager's

capability against disasters. These effects are intangible, but very important to realize sustainable development in the project areas.

Following is a summary of expected direct and indirect effects generated by implementation of the projects. Tangible effect/benefit categorized in the table can be expressed in monetary terms.

Table 13-2-1 Direct and Indirect Effect of the Project

Project	Effect	
	Direct	Indirect
Construction of check dam	Sediment is reduced, and damages on farmland, etc. are mitigated	Villager's living condition is stabilized
	Riverbed gradient is reduced, and riverbed and it's banks are stabilized	Agricultural production is stabilized
River improvement (Vastegan, Chaman Goli-Bazoft, Sarbaz)	Damages caused by flood on farmland along the river are mitigated	Villager's living condition is stabilized
Relocation of houses (Zeras)	Damages caused by floods, debris flow or rock-fall on houses in hazard area are reduced	Villager's living condition is stabilized
Landslide protection (Chaman Goli-Bazoft, Sarbaz, Zeras)	Landslide-resistance on villages, farmland, roads, etc. are increased	Agricultural production is stabilized
Rock-fall protection (Chaman Goli-Bazoft)	Damages on houses caused by rock-fall are reduced	Villager's living condition is stabilized
Soil erosion protection (counter band, water way) (Chaman Goli-Bazoft, Sarbaz, Tang Sorkh, Zeras)	Soil erosion at steep slope land are decreased	Agricultural production is stabilized
Groundwater monitoring (Vastegan)	Volume of deposited ground water is increased	Distribution of irrigation water is equalized in the field
Rangeland vegetation improvement (seedling, water point)	Carrying capacity of rangeland is increased	Environmental condition of Karoon watershed is improved
	Damages on farmland caused by soil erosion are decreased	Agricultural production is stabilized
Orchard terracing (Vastegan)	Orchard production is increased	Environmental condition of Karoon watershed is improved
	Damages on farmland caused by soil erosion are decreased	
Forestland vegetation recovery (almond tree plantation) (Chaman Goli-Bazoft, Tang Sorkh)	Damages on farmland caused by soil erosion are decreased	Environmental condition of Karoon watershed is improved
	Orchard production is increased	
Increase of irrigated agriculture	Agricultural production is increased Farmer's income is increased	Employment opportunity is increased
Fish culture promotion (Chaman Goli-Bazoft, Sarbaz, Zeras)	Fish production is increased Fisherman's income is increased	Consumption of fish is increased, and protein source shift from goats and sheep to fish
	Employment opportunity is increased	
Collecting and grading center of apple, vegetable (Sarbaz, Tang Sorkh)	Production is increased Farmer's Income is increased	Employment opportunity is increased

Rural water supply improvement	Safety water is stably provided	Sanitary condition of villagers is improved
Rural road improvement	Transportation cost of agricultural products are decreased	Information and commodity flow are activated
	Time required for villager's movement is decreased	
Diversification to milk cow (Vastegan, Chaman Goli-Bazoft, Sarbaz, Zeras)	Dairy production is increased	Number of livestock in rangeland are decreased
Milk processing and Marketing (Zeras)	Dairy production is increased	Villager's nutritional condition is improved
Establishment of cooperative	Amount of handicraft products, etc. are increased	Price of agricultural products are adjusted to appropriate prices
	Extension services for agriculture and livestock are implemented	Agricultural and Livestock production is increased
Community enhancement	Villager's participation in project implementation is promoted	Utility life of the facilities is extended
	Enlightenment activities against natural disasters are carried out	Villager's capability against disasters is increased
	Health service are promoted	Villager's living environment is improved
	Activities to improve villager's living conditions are promoted	

Remarks: Tangible effect/ benefit

(2) Estimation of the project benefit

Followings are estimated project benefits in each Master Plan Area.

a) K4-1-9 Vastegan

Benefit from construction of check dam is generated by mitigation of flood and debris flow damages on agricultural area, located in the fan area of Vastegan, and is estimated at 159 million Rials in economic price. By constructing series of proposed check dams, damages on farmland, a part of orchard land, irrigation facility, and fishpond are mitigated. The purpose of river improvement is to mitigate flood damage on farmland along Marl River, and the benefit is estimated at 612 million Rls. By the implementation of orchard terracing, apple tree is planted to prevent soil erosion. The benefit of orchard terracing is estimated from apple products produced by the project, and is estimated at 1,242 million Rls. (economic price).

The benefit from rangeland vegetation improvement is generated by the assessment of herbage products. The amounts of products are estimated at 12.8 t/year by seed sowing, and 3.0 t/year by herbage protection, and the project benefit is estimated at 104 million Rls. in economic term. As for rural road improvement, reduction of transportation cost is estimated as benefit, and the value is evaluated at 104 million Rials. In case of livelihood development projects, such as increase of irrigated agriculture and diversification of milk cow, generated income from each project are estimated. Detail calculations for the project benefits are shown in the Annex-L (page L-106 ~ L-132).

Table 13-2-2 Project Benefit : Vastegan

Project	Project Benefit (1000Rls.)	
	Financial Benefit	Economic Benefit
1.Construction of check dam	—	158,970
2.River improvement	—	611,510
3.Rangeland vegetation improvement	—	104,240
4.Orchard terracing	1,351,600	1,241,900
5.Groundwater monitoring	Intangible	Intangible
6.Increase of irrigated agriculture	98,425	84,963
7.Diversification to milk cow	2,263,000	2,127,950
8.Rural water supply improvement	32,740	30,770
9.Rural road improvement	110,300	103,680
10.Establishment of cooperative	1,262,000	1,186,280
11.Community Enhancement	Intangible	Intangible
Total	5,118,065	5,650,263

b) K5-19a Chaman Goli-Bazoft

Benefit from construction of check dam is generated by mitigation of flood, debris flow damages on farmland and orchard land in the area, which are estimated at 858 million Rls in economic price. Damages on farmland and orchard land are expressed in monetary terms by making assessment of damaged amount of agricultural products. Agricultural products are represented by wheat in farmland, and apple in orchard land. By rock-fall protection and landslide protection, damages on village house, which located in hazardous area, and village road is mitigated. Both benefits are estimated by assessment of household properties and cost for road rehabilitation, and the estimated amount is 73 million Rls as a total.

The benefit from rangeland vegetation improvement is generated by the assessment of herbage products, and is estimated at 17.7 t/year by seed sowing, and 6.5 t/year by herbage protection. The price of herbage production is converted to the value of alfalfa, and is estimated at 112 nillion Rls. (economic price). As for rural road improvement, reduction of transportation cost is estimated as benefit, and the value is assessed at 66 million Rials in economic price. In case of livelihood development projects, such as fish culture promotion and diversification to milk cow, generated income from each project are estimated. Detail estimation of the project benefits is shown in the Annex-L (page L-106 ~ L-132).

Table 13-2-3 Project Benefit : Chaman Goli-Bazoft

Project	Project Benefit (1000Rls.)	
	Financial Benefit	Economic Benefit
1.Construction of check dam	—	858,390
2.River treatment	—	35,610
3.Landslide protection and rock-fall protection	—	73,440
4.Soil erosion protection	—	135,760
5.Rangeland vegetation improvement	—	112,020
6.Forest land vegetation recovery	—	90,240
7. Increase of irrigated agriculture	342,108	300,924
8.Fish culture promotion	3,400,000	3,196,000
9.Diversification to milk cow	2,263,000	2,127,950

10. Rural water supply improvement	,109,180	102,630
11.Rural road improvement	70,050	65,840
12.Establishment of cooperative	2,104,000	1,977,760
13.Community Enhancement	Intangible	Intangible
Total	8,288,338	9,076,564

c) K7-0-19-1 Sarbaz

Benefits from construction of check dam, and river treatment are generated by mitigation of flood and debris flow damages on orchard land in the Sarbaz area, and are estimated at 915 million Rls as a total. Damage on orchard land is assessed by the estimation of damaged amount of apple products. Landslide protection is also expected to mitigate damage on 14 ha of orchard land, and the project benefit is estimated at 397 million Rls.

The benefit from rangeland vegetation improvement is generated by the assessment of herbage products, and is estimated at 44.1 t/year by seed sowing, and 13.0 t/year by herbage protection. The price of herbage production is converted to the value of alfalfa, and is 173 million Rls. in the economic term. In case of livelihood development projects, such as collecting and grading center of apple and diversification to milk cow, generated income from each project are estimated. Detail estimation of the project benefits is shown in the Annex-L (page L-106 ~ L-132).

Table 13-2-4 Project Benefit : Sarbaz

Project	Project Benefit (1000Rls.)	
	Financial Benefit	Economic Benefit
1.Construction of check dam	—	914,550
2.River treatment	—	367,240
3.Landslide protection	—	397,480
4.Soil erosion protection	—	38,070
5.Rangeland vegetation improvement	—	172,770
6. Increase of irrigated agriculture	2,628,211	2,334,323
7.Collecting and grading center of apple	9,331,200	8,771,340
8.Diversification to milk cow	2,263,000	2,127,950
9. Rural water supply improvement	109,180	102,630
10.Rural road improvement	1,349,650	1,268,640
11.Establishment of cooperative	2,104,000	1,977,760
12.Community Enhancement	Intangible	Intangible
Total	17,785,241	18,472,753

d) K7-48 Tang Sorkh

By construction of check dam, 102 ha of farmland and orchard land are benefited. The benefit generated by check dam construction is estimated at 160 million Rials. in economic price. Damage on farmland is expressed in monetary terms by making assessment of damaged amount of agricultural products, which is represented by wheat. As for orchard land, the cost for sediment removal is estimated as project benefit. The benefit from rangeland vegetation improvement is generated by the assessment of herbage products, and is estimated

at 13.3 t/year by seed sowing, and 17.7 t/year by herbage protection. The price of herbage production is converted to the value of alfalfa, and is estimated at 89 million Rials in economic price.

As for rural road improvement, reduction of transportation cost is considered to be benefit, and is estimated at 95 million Rls. In case of livelihood development projects, such as collecting and grading center of apples and vegetable, generated income from each project are estimated. Detail calculations of the project benefits are shown in the Annex-L (page L-106 ~ L-132).

Table 13-2-5 Project Benefit : Tang Sorkh

Project	Project Benefit (1000Rls.)	
	Financial Benefit	Economic Benefit
1.Construction of check dam	282,850	159,850
2.Soil erosion protection	--	10,250
3.Rangeland vegetation improvement	--	88,700
4.Forest land vegetation recovery	--	56,400
5. Increase of irrigated agriculture	Included in construction of check dam	
6.Collecting and grading center of apples and vegetable	1,322,400	1,243,050
7. Rural water supply improvement	13,640	12,820
8.Rural road improvement	101,330	95,250
9.Establishment of cooperative	Intangible	Intangible
10.Community Enhancement	Intangible	Intangible
Total	*1,720,220*	*1,666,320*

e) K8-28 Zeras

Benefit from construction of check dam is generated by mitigation of flood and debris flow on farmland and orchard land in the Zeras area, and is estimated at 470 million Rls. By implementation of landslide protection, damage on village road located in the hazardous area is mitigated, and the cost for road rehabilitation is considered to be the project benefit, and is assessed at 5 million Rials. The benefit from rangeland vegetation improvement is generated by the assessment of herbage products, and is estimated at 25.2 t/year by herbage protection. The price of herbage production is converted to the value of alfalfa, and is 113 million Rials in the economic price.

The benefit from rural road improvement is derived from reduction of transportation cost, and the value is estimated at 1,058 million Rls. in the economic price. In case of livelihood development projects, such as milk processing and marketing, and establishment of cooperative, generated income from each project are estimated. Details of the project benefits are shown in the Annex-L (page L-106 ~ L-132).

Table 13-2-6 Project Benefit : Zeras

Project	Project Benefit (1000Rls.)	
	Financial Benefit	Economic Benefit
1.Construction of check dam	—	470,490
2.Relocation houses	—	547,330
3.Landslide protection	—	4,850
4.Soil erosion protection	—	456,460
5.Rangeland vegetation improvement	—	113,030
6.Milk processing and Marketing	1,022,000	960,680
7.Rural water supply improvement	14,570	13,700
8.Rural road improvement	1,125,140	1,057,620
9.Establishment of cooperative	240,000	225,600
10.Community Enhancement	Intangible	Intangible
Total	2,401,710	3,849,760

13.3 Financial Evaluation

(1) General

Financial analysis is to assess the profitability of individual household economies. Such project as increase of irrigated agriculture, fish culture promotion, and collecting and grading center for apple, which generate profit to villagers, are the target of the analysis. Financial analysis is carried out based on market prices. Evaluation criteria adopted in the analysis are Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Internal Rate of Return (IRR). These three criteria can be summarizing as follows;

NPV = Discounted benefits – Discounted costs

B/C Ratio = Discounted benefits / Discounted costs

IRR = such discount rate as [Discounted benefits = Discounted costs]

(NPV = 0, B/C Ratio = 1)

(2) Basic Conditions of Financial Evaluation

a) Project Life

Project Life will be set up with considering the utility life of the proposed facilities.

b) Discount Rate

Discounting is a key process in economic and financial analysis and is the technique that enables proper account to be taken of differences in the timing of benefits and costs over project's lifetime. For the correct analysis of a project, it is necessary to bring together on to a common time base its initial capital costs, its subsequent annual costs and the benefits that accrue during its lifetime.

Discounting is then used to relate costs and benefits occurring at different points of time

(years) onto a common time base, usually the present. It takes account of the fact that a given sum of money is worth more now than the same sum some years in the future, because of the interest or income it could generate in the meantime. Discounting reduces all benefits or costs, regardless of when they occur, to their 'present worth' or 'present value' by applying to the costs and benefit values in each year a discount factor based on the selected discount rate.

Discounting at the rate of 12% applied in the financial and economic analysis.

c) Pricing Basis

All prices to be applied have been estimated on the basis of the recent available information and data so far obtained as of the beginning of year 1380 (2001/02). Therefore, all costs and benefits in this analysis have been expressed on a constant 2000/01-price basis. Table 13-3-1 shows inflation rates and price index, estimated by Central Bank of Iran, that are applied for the updating of historic costs and benefits to 2000/01 levels.

Table 13-3-1 Price Trends of Islamic Republic of Iran

(%)

	1375 (1996/1997)	1376 (1997/1998)	1377 (1998/1999)	1378 (1999/2000)	1379 (2000/2001)
Inflation (GDP Deflation) (1369 Price)	24.4	14.2	15.6	24.2	N.A.
Consumer Price Index (1369=100)	23.2	17.3	18.1	20.1	13.0
Goods	16.9	12.2	16.7	20.2	8.5
Services	40.4	21.4	18.8	22.9	4.7
Housing, Fuel & Lighting	35.0	30.4	20.8	18.7	7.2
Wholesale Price (1369=100)	25.1	9.9	11.6	23.1	11.1
Domestically Produced Goods	23.7	12.2	16.4	22.2	12.8
Imported Goods	29.1	6.9	7.0	20.9	7.9
Exported Goods	13.8	7.7	-5.3	50.1	13.8
Producer Price Index (1369=100)	26.4	15.6	17.8	21.7	15.7
Agriculture	18.5	13.9	21.0	27.1	15.6
Industry	29.2	11.0	13.4	20.8	15.0
Mining	36.9	11.1	13.2	29.6	28.5
Water, Electricity and Gas	19.8	49.4	32.1	26.4	14.4
Services	30.0	25.0	21.9	17.6	17.1

Source: "Economic Trends", Central Bank of Iran

(3) Cash Flow in Market Price

The cash flows of project costs and benefits are examined and tabulated in Annex L, applying the project cost (Chapter 12), operation and maintenance cost (Chapter 11, 11.2.2) and project benefits (Chapter 13, 13.2). Those applied costs and prices are expressed in terms of the market prices.

(4) Financial Analysis

The following is the result of financial analysis made in the respective project plans comparing with the aforementioned cash flows in terms of market prices.

a) K4-1-9 Vastegan

Table 13-3-2 Results of Financial Analysis : Vastegan

Project	NPV	B/C	FIRR
1.Orchard terracing	6,655,403	6.68	93.0%
2.Increase of irrigated agriculture	308,029	2.13	92.1%
3.Diversification to milk cow	1,198,541	1.17	143.9%
4.Establishment of cooperative	1,508,183	1.25	80.2%

b) K5-19a Chaman Goli-Bazoft

Table 13-3-3 Results of Financial Analysis : Chaman Goli-Bazoft

Project	NPV	B/C	FIRR
1. Increase of irrigated agriculture	377,483	1.23	22.8%
2.Fish culture promotion	865,656	1.05	15.3%
3.Diversification to milk cow	2,228,591	1.31	—
4.Establishment of cooperative	2,243,007	1.22	85.9%

c) K7-0-19-1 Sarbaz

Table 13-3-4 Results of Financial Analysis : Sarbaz

Project	NPV	B/C	FIRR
1. Increase of irrigated agriculture	12,356,911	4.94	121.7%
2.Collecting and grading center of apple	12,335,189	1.30	55.5%
3.Diversification to milk cow	1,198,541	1.17	143.9%
4.Establishment of cooperative	2,206,625	1.22	82.1%

d) K7-48 Tang Sorkh

Table 13-3-5 Results of Financial Analysis : Tang Sorkh

Project	NPV	B/C	FIRR
1. Construction of check dam	2,382,994	1.96	28.5%
2.Increase of irrigated agriculture	Included in construction of check dam		
3.Collecting and grading center of apples and vegetable	546,880	1.08	22.0%
4.Establishment of cooperative	Intangible	Intangible	Intangible

e) K8-28 Zeras

Table 13-3-6 Results of Financial Analysis : Zeras

Project	NPV	B/C	FIRR
1.Milk processing and Marketing	1,058,918	1.22	56.3%
2.Establishment of cooperative	317,170	1.29	39.0%

(5) Results of Financial Evaluation

The above results show that all profitable projects proposed in the 5 Master Plan are financially feasible. The B/C ratios for all projects analyzed in the financial analysis are more than 1.00, and FIRR are more than 15.0%. Major benefits are come from increase of irrigated agriculture, diversification to milk cow, and collecting and grading center of apple and vegetable.

13.4 Economic Evaluation

(1) General

Economic analysis is carried out for the purpose of evaluation for economical adequacy of the proposed projects in Master Plan study areas. Compared with financial analysis, which is to analyze the profitability of individual household economies, economic analysis aims at assessment of the projects in view of contribution to the national economy, and is carried out based on economic prices. Economic prices are converted from market (financial) prices with application of conversion factor.

The economic viability of the proposed projects is examined in terms of the three criteria of Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Economic Internal Rate of Return (EIRR).

(2) Basic Evaluation Criteria

Project life and discount rate, pricing basis adopted in the economic evaluation are same as financial evaluation. The other basic evaluation criteria such as Standard Conversion Factor (SCF), Shadow Exchange Rate (SER), etc. in the economic evaluation are as follows.

a) Standard Conversion Factor (SCF)

0.94 is applied to convert financial/ market prices to economic prices in this analysis, and is calculated based on the amounts of import and export, custom duties and subsidies of Islamic Republic of Iran as is shown in Table 13-4-1.

Table 13-4-1 Estimation of Standard Conversion Factor

Item	Year					Total
	1374	1375	1376	1377	1378	
	(1995/96)	(1996/97)	(1997/98)	(1997/98)	(1998/99)	
① Export Value (billion Rls.)	35,827	43,141	35,865	34,592	55,839	205,264
② Import Value (FOB, billion Rls.)	19,631	23,938	24,354	24,893	22,202	115,018
③ Export Duties (billion Rls.)	0	0	0	0	0	0
④ Import Taxes (billion Rls.)	1,250	2,934	4,289	4,432	5,805	18,710
⑤ =① +②	55,458	67,079	60,219	59,485	78,041	320,282
⑥ =⑤ -③ +④	56,708	70,013	64,508	63,917	83,846	338,992
⑦ SCF =⑤ /⑥	0.98	0.96	0.93	0.93	0.93	**0.94**

Source: "Iran Statistical Year Book 1378 (Mar. 1999 - Mar. 2000)", Statistical Center of Iran.
"Economic Trends No. 16-1st Qtr, 1378","No. 21-2nd Qtr. 1379", Central Bank of Iran

Note: Export Value are converted from US$ to Rials with applying oil national exchange rate and non oil export rate.
Import taxes comprise customs duties, cmmercial profit tax, and others.

b) Shadow Exchange Rate (SER)

The foreign exchange system of Iran is based on the dual exchange rate of official rate (fixed official exchange rate of so called "oil national rate" and floating official exchange rate of "non-oil export rate") and the free market rate. Oil national rate is applied to import goods of essential food commodities and agricultural inputs such as chemical fertilizers and agro-chemicals. Accordingly, an average of the oil national rate and the free market rate are adopted in the economic analysis and is estimated at 4,900 Rials/US$.

c) Shadow Wage Rate (SWR)

The normal wage rate is applied for the financial analysis. In case economic analysis, SCF (0.94) is applied for skilled labor, and 0.47 as the medium value of SCF is applied for unskilled labor because of the unemployment conditions in the Master Plan study areas.

d) Valuation of traded goods and non-traded goods

Valuations of traded goods, such as wheat and fertilizers, will be estimated based on import or export parity (border parity) values, in terms of present and projected prices. The latter are derived from the World Bank Commodity Price Forecasts of April 2000. For conversion from US dollar import (CIF) or export (FOB) prices into Rials prices, SER of 4,900 Rials/US$ will be applied. For non-traded goods and services, such as minor crops, which are not imported or exported, the SCF will be applied to convert financial value to economic values.

(3) Economic Cost

The economic costs of the construction works are converted from financial prices by applying

standard conversion factors.

(4) Economic Analysis

Economic validity of potential interventions and projects is assessed on the basis of three criteria, Net Present Value (NPV), Benefit/Cost Ratio (B/C Ratio) and Economic Internal Rate of Return (EIRR).

The results of the economic analysis are summarized as follows.

a) K4-1-9 Vastegan

Table 13-4-2 Results of Economicl Analysis : Vastegan

Project	NPV	B/C	EIRR
1.Construction of check dam	-1,280,354	0.42	1.9%
2.River improvement	-2,153,616	0.37	—
3.Rangeland vegetation improvement	562,841	13.21	—
4.Orchard terracing	6,090,412	6.53	91.5%
5.Groundwater monitoring	Intangible	Intangible	Intangible
6.Increase of irrigated agriculture	244,927	1.96	83.5%
7.Diversification to milk cow	1,194,769	1.18	162.5%
8.Rural water supply improvement	-167,670	0.52	—
9.Rural road improvement	-350,114	0.63	4.8%
10.Establishment of cooperative	1,862,699	1.36	93.9%
11.Community Enhancement	Intangible	Intangible	Intangible
Total	4,710,051	1.22	23.5%

b) K5-19a Chaman Goli-Bazoft

Table 13-4-3 Results of Economic Analysis : Chaman Goli-Bazoft

Project	NPV	B/C	EIRR
1.Construction of check dam	2,884,381	2.37	33.5%
2.River treatment	-667,394	0.11	—
3.Landslide protection and rock-fall protection	43,467	1.10	14.2%
4.Soil erosion protection	107,976	1.16	16.5%
5.Rangeland vegetation improvement	607,819	14.05	—
6.Forestland vegetation recovery	508,805	34.71	—
7.Increase of irrigated agriculture	233,064	1.15	18.9%
8.Fish culture promotion	899,234	1.05	15.6%
9.Diversification to milk cow	2,163,348	1.32	—
10. Rural water supply improvement	-231,562	0.74	—
11.Rural road improvement	-1,354,511	0.24	—
12.Establishment of cooperative	2,533,438	1.28	95.5%
13.Community Enhancement	Intangible	Intangible	Intangible
Total	7,911,475	1.19	24.1%

c) K7-0-19-1 Sarbaz

Table 13-4-4 Results of Economic Analysis : Sarbaz

Project	NPV	B/C	EIRR
1.Construction of check dam	2,446,843	1.85	25.4%
2.River treatment	-759,151	0.53	—
3.Landslide protection	1,383,803	2.49	42.7%
4.Soil erosion protection	35,336	1.19	15.9%
5.Rangeland vegetation improvement	960,222	20.57	—
6.Increase of irrigated agriculture	10,812,517	4.67	117.0%
7.Collecting and grading center of apple	14,342,269	1.40	76.2%
8.Diversification to milk cow	1,194,769	1.18	162.5%
9. Rural water supply improvement	-345,793	0.63	—
10.Rural road improvement	3,580,594	1.97	24.6%
11.Establishment of cooperative	2,499,216	1.27	91.5%
12.Community Enhancement	Intangible	Intangible	Intangible
Total	36,809,221	1.56	49.7%

d) K7-48 Tang Sorkh

Table 13-4-5 Results of Economic Analysis : Tang Sorkh

Project	NPV	B/C	EIRR
1. Construction of check dam	1,394,596	1.60	22.3%
2.Soil erosion protection	9,084	1.18	15.7
3.Rangeland vegetation improvement	473,447	11.59	—
4.Forestland vegetation recovery	311,528	21.69	—
5.Increase of irrigated agriculture	Included in construction of check dam		
6.Collecting and grading center of apples and vegetable	992,650	1.16	34.2%
7. Rural water supply improvement	-381,800	0.16	—
8.Rural road improvement	-445,710	0.55	3.2%
9.Establishment of cooperative	Intangible	Intangible	Intangible
10.Community Enhancement	Intangible	Intangible	Intangible
Total	5,248,358	1.51	31.0%

e) K8-28 Zeras

Table 13-4-6 Results of Economic Analysis : Zeras

Project	NPV	B/C	EIRR
1.Construction of check dam	1,465,814	2.15	30.0%
2.Relocation of houses	740,944	1.49	18.6%
3.Landslide protection	-97,106	0.22	—
4.Soil erosion protection	713,196	1.36	22.4%
5.Rangeland vegetation improvement	616,979	15.24	—
6.Milk processing and Marketing	1,170,970	1.27	62.3%
7.Rural water supply improvement	-2,925,091	0.03	—
8.Rural road improvement	2,580,109	1.74	22.0%
9.Establishment of cooperative	563,808	1.74	58.3%
10.Community Enhancement	Intangible	Intangible	Intangible
Total	5,076,950	1.30	18.4%

(5) *Results of Economic Evaluation*

The above result shows that the proposed projects in the 5 Master Plan areas are economically feasible as a total. Results of economic evaluation in view of EIRR are Vastegan: 23.5%, Chaman Goli-Bazoft: 24.1%, Sarbaz: 49.7%, Tang Sorkh: 31.0%, and Zeras: 18.4%. Major benefits are come from increase of irrigated agriculture, diversification to milk cow, and collecting and grading center of apple and vegetable. Details of the economic analysis are shown in the Annex L.

It must be mentioned again that a decision for or against projects couldn't be taken on the basis of direct and tangible impact alone since this is only one of the criteria of assessment. There are so many intangible impacts/ benefits that are not expressed in the monetary terms. For example, such kind of project as mitigation of natural disasters are to provide safety living conditions for villagers, as a result, villagers would be encouraged for their future and start thinking a constructive way for the development of their personal economy and of their community. This kind of impact is difficult to express in monetary terms, therefore, financial and economic analysis can assess only some part of the project impacts. Thus, from other point of view, intangible impacts are discussed in the following section.

13.5 Social Evaluation

Social Evaluation of the Project by each Master Plan Areas is conducted to evaluate the expected impacts/changes on;

- residents' living environment
- production and income generation measures

As are summarized Tables 13-5-1 to 13-5-5, following aspects are examined as matrix of "Present Conditions", "Issues and Problems" and "Initial Social Environmental Evaluation".

- Existing Social Structure including tribal/nomadic people,
- *Existing Way of Life*
- Landholding system
- Existing Institution and Customs
- Productive and Economic Activities
- Existing Communication Means
- Impacts on Educational and Health Facilities
- Historical Remains, Cultural Assets, Natural Grand-Views, etc.

In all the Master Plan Areas, proposed projects are solely aiming to protect the residents against

natural disaster thus stabilizing their living environments, and the scale of individual projects is not so big that not much disturbing impacts is observed.

There is no resettlement either "Planned" or "Involuntary" proposed. No significant adverse impacts on the way of life is anticipated. In general, positive effects on every social environmental issues are expected by the implementation of the proposed projects.

However, it is also recognized that such national level issues as "Urbanization of Population"(in case of Master Plan Areas, social decrease of the most economically active age-groups) and "Equal Distribution of Public Services especially for Health-care, Education and Information Dissemination" cannot be solved without the national level countermeasures.

Furthermore, there is another factor of limited availability of farmland/rangeland that the Project cannot cope with as its main purpose is to prevent natural disasters.

Those issues are suggested as in the column of "Remarks" of Tables 13-5-1 to 13-5-5.

Table 13-5-1 Initial Social Environmental Evaluation Matrix - Vastegan Area -1/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(1) Residents' Lives	1. Planned Resettlement	* No plan in this Project. * At present, upstream erosive area is utilized for grazing and apiculture by Nomads, while downstream farmers are conducting irrigated apple orchard. Villagers are mainly living living in downstream alluvial flat plain where they cultivate farmland with abundant groundwater.	* Once flood occurs, farmland is buried by sediment and debris which needs many years of efforts for removing and recovering. * During these years, fodder production may decrease. It will cause overgarazing problems both for Villagers and Nomads.	* Even if a severe flood occurs, there will be not much necessity for planned resettlement for the part of Villagers. * In case of Nomads, not much consideration is needed for the issue of resettlement because of the nature of their lives. However, if the Government to promote "settling" of them, measures for motivating them to do so will be needed.	* By the present projects for prevention of natural disaster, there will be less chances of planned resettlement in this area.
		2. Involuntary Resettlement	* Very few needs/necessities of involuntary resettlement here.	* If a severe flood occurs, not only farmland but also residential area may be damaged. However, the issue may be limited for "reconstruction" and not for "resettlement"	* Same as above mentioned, there will be not much necessity for involuntary resettlement here.	* -ditto-
		3. Substantial Changes in the Way of Lives	* If there is no damage from flood and debris flow thereof, a good income can be obtained from irrigated crops and livestock production.	* However, natural disasters from time to time prevent a steady development of income generation and causing over-grazing issue which may bring about conflicts between Villagers and Nomads.	* With the projects for prevention of natural disasters, there will be better chances of tightening community bonds. * The effects of present projects will positively promote better relationships between Villagers and Nomads. * A positive improvement of the Way of Life can be expected.	* There will be not much changes in both the Way of Lives of Villaers and Nomads.
		4. Conflicts among Communities and People	* Over-grazing and soil-erosion thereof may be the cause of conflict between Villagers and Nomads. * However, most of Nomads are already half-settled within the area that there seemed not much conflicts come to surface.	* Not only the over-grazing issue but also the difference of the Way of Lives between Villagers and Nomads is the causes of conflicts among them.	* Not much conflicts are observed even now and not expected to become more evident.	
		5. Impact on Native People, Minority Groups and Nomads	* At present, 17% of total popuation is Nomads. * However, most of them are transferring within the area and not to be considered as complete outsiders.	* Nomadic People are loosely bonded with wider concept of clans and/or tribes and their relationships and/or motivation with the (range)land may slightly different from those of Villagers.	* At present and in the near future, there will be not much adverse effects and/or impacts on the Nomadic People is expected.	* A positive impacts can be expected by the present project.
		6. Sensitization and Enlightenment	* With the development of medias and diffusion of education, both residents well associated with the present social condition. * They are well aware of their present conditions and desiring to improve the social environment.	* Lack or shortage of means/access to sensitization and actual action to obtain them.	* Present projects will bring about better impacts both on accessess and motivation formation for this isuue.	* Promotion of mobilizatio of residents in the implementation of projects is recommended.
	(2) Demographic Issues	1. Popluation Increase	* Average annual growth rate of population during 1966/2001 indicates 2.12 % that is far below the national average. * Furthermore, it dropped to only 0.89 %/annum during 1986/2001 due to a large exodus from rural area to urbanized areas.	* Urbanization of population is a common problem. * Shortage of social innformation and services is the major reason which cannot be coped with the area alone.	* Not much sound increase of population is expected even if the present projects are impiemented.	* National level countermeasures will be needed.
		2. Drastic Change in Population Composition	* Because of urbanization of most economically active age-groups, population composition of these age-groups are decreasing. It means that only children and higher-aged people are left behind.	* Urbanization tendency seems to be stabilized in recent years. However, it will revive again when a better chance of access to information and social services are provided.	* With the better income brought about by the implementation of projects, present tendency of social-decrease of the most economically active age-groups may be mitigated.	* -ditto-
		3. Family Planning Issues	* After the Islamic Revolution, family planning activities are checked and both the Villagers and Nomads are reluctant to participate.	* Ther will be less chance of agricultural occupation in the near future in a limited available land with many children. * It will bring about smaller size of landholding and less productivity of unit land.	* As this issue is having traditional and religional origin that the present projects will not give much impacts even if they include mobilization and sentisization of residents.	* -ditto-
	(3) Economic Activities of the Residents	1. Changes in Bases of Economic Activities	* This area's economic activity is basically based on agriculture and livestock production and getting relatively higher income from those sources.	* There is no other way to seek for another field of economic activities if people is to live within the area.	* There will be not much changes in the bases of economic activities. * However, the present projects will enhance much more stabilized present economic activiries both in their daily lives and income generation.	* Positive impact on maintainance of present activities
		2. Occupational Changes and Unemployment	* As the nature of the area, not much occupational change is observed. * Presently, unemployment ratio of the area is less than 4 % which is rather a better performance compared with other Master Plan Arens.	* People should have to emmigrate outside the area if one is to find out another type of occupation.	* There will be not much occupational changes in the near future. * However, as amentioned in the above, urbanization of the most economical active age-groups may bring about less productivity in the present structure of occupation. * Unemployment condition will maintain present sound level as there is not much change in the occupational structure expected.	
		3. Increase in Income Disparities	* Significant income disparity is not observed. * In nominal income, Nomads are getting comparatively higher income than Villagers.	* Price control of agricultural crops is checking farmers' incentive to improve and increase their products thus checking better income generation. * Nomads who have nominally better income should have to spend much more to obtain foodcrops.	* Not much impact on income disparity is expected.	
		4. Changes in Income Structure	* Not much tendency is observed	* Not much changes is expected	* Not much impact on income structure is expected.	

Table 13-5-1 Initial Social Environmental Evaluation Matrix - Vastegan Area -2/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(4) Institution and Custom	1. Adjustment and regulation of Water/Fishing Rights	* Not required.	* There will be no need of adjustments and/or establishment of new regulations.	* Existing institutional and customary system can cope with the implementation of projects.	
		2. Changes in Social and Institutional Structure	* Not expected	* Not required	* Existing institutional and customary system can cope with the implementation of projects.	
		3. Changes in Existing Institutions and Customs	* Not required	* Not required	* Much better adaptation and utilization of exiting institutinal and customary procedures can be expected.	* With better provision of administrative and public services.
		4. Changes in Consciousness of Residents	* Consciousness on better living condition is spreading rupidly. especially on the fields of health and education needs.	* Although electricity is 100 % supplied, other public services are felt not enough compared to the urbanized area.	* Very much positive impacts can be expected during and after the implementation of the projects.	* Feeling of "the Government is caring us" is important.
2. Health and Higiene		1. Increased use of Agrochemicals	* Agrochemicals are not much widely used in the area.	* Some farmers may couple irrigation water with agrochemicals to get more production.	* Expansion of irrigantion network together with introduction of modern cultivating system may increase the volume and extent of agrochemicals.	* Pollusion-related education and information dissemination is needed.
		2. Outbreak of Endemic Diseases	* At present no endemic diseases is observed.	-	* Relation of irrigation water and water-borne endemic diseases should be connsidered.	* A long-term monitoring system is needed.
		3. Spreading of Infectious Diseases	* At present, no water-borne infectious diseases is observed.	* With expansion of irrigation network, water-borne infectious disease may spread.	* Expansion of irrigation system/network and its operation and maintainance should be conducted with sanitary point of view in mind.	* -ditto-
		4. Residual Toxicity of Agrochemicals	* There is virtually no information existing concerning the issue.	* There could be some chance of occurrence of the issue especially in downstream areas.	* Thie scale of the issue depends on the kind of agrochemicals/materia and volume/extent of usage. * Information dissemination/education measures should be taken in implementing the projects.	* -ditto-
		5. Increase of Domestic and Human Wastes	* Not much increase of wastes is expected other than the case of petro-chemical packages.	* Increase of those domestic wastes which are difficult to process is a nation-wide problem.	* A small scale garbage collection and processing system should be considered.	
		6. Improvement in Health and Higiene System	* Existing system is not enough to cope with the health-care needs of residents.	* Mainly due to the remoteness of the area from urban facilities, together with sporadic nature of settlements, it has been difficult to establish and implement health-care system in the area.	* Implementation of the projects may bring about better health-care system and information and access on the issue.	
3. Historic Remains, Cultural Assets and Natural Grand View, etc.		1. Impairment of Historic Remains and Cultural Assets	* No evidence of historic remains and cultural assets in the area.	-	-	
		2. Loss of Natural Grand-View	* This area is abundant in natural grand-view same as surrounding areas.	-	* Not much loss of natural grand-view is expected in the area.	
		3. Impact on Buried Resources	* No evidence of buried resources and/or assets	-	-	
		4. Impact on Intangible Cultural Properties	* No intangible cultural property is observed.	-	-	
4. Special Considerations/ Circumstances			* No special considerations/circumstances compared with surrounding areas is observed.	-	-	

Table 13-5-2 Initial Social Environmental Evaluation Matrix - Chaman-Goli Bazoft Area -1/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(1) Residents' Lives	1. Planned Resettlement	* No plan in this Project.	* Once flood occurs, farmland is buried by sediment and road network including a bridge is destroyed. * Impact of natural disaster is so significant to maintain their daily lives that planned resettlement may be considered in the near future.	* The projects will improve living conditoins especially by preventing damages from floods, thus stabilizing present conditions of residential area. * The projects here has no plan for resettlement of residents.	
		2. Involuntary Resettlement	* No plan in this Project.	* If a severe flood occurs, not only farmland but also residential area may be damaged and residents may be forced to involuntary resettling.	* Same as above mentioned, there will be not necessity for involuntary resettlement by the implementation of the project.	
		3. Substantial Changes in	* Not much change is expected.	-	* Not much changes in the way of life is expected as the projects and development brought about by them are of small scale.	
		4. Conflicts among Communities and People	* Not expected	* Not only the over-grazing issue but also the difference of the Way of Lives between Villagers and Nomads is the causes of conflicts among them.	* In this case both Villagers and Nomads are beneficiaries of the projects and existing conflicts (if any) can be mitigated.	
		5. Impact on Native People, Minority Groups and Nomads	* At present 29.8 % of the total population is Nomads. * However, most of them are transferring within the area and not to be considered as complete outsiders.	* Nomadic People are loosely bonded with wider concept of clans and/or tribes and their relationships and/or motivation with the (range)land may slightly different from those of Villagers.	* There is no reason to expect conflict among Villagers and Nomads by the implementation of the projects. * Both of them are beneficiaries of the project and their relationship will be improved, rather.	* A positive impacts can be expected by the present project.
		6. Sensitization and Enlightenment	* With the development of medias and diffusion of education, both residents well associated with the present social condition. * They are well aware of their present conditions and desiring to improve the social environment.	* Lack or shortage of means/access to sensitization and actual action to obtain them.	* Present projects will bring about better impacts both on accessess and motivation formation for this isuue.	* Promotion of mobilizatio of residents in the implementation of projects is recommended.
	(2) Demographic Issues	1. Popluation Increase	* Average annual growth rate of population during 1966/2001 indicates rather high level of 3.02 %.. * However, it is stabilizing to 2.48 %/annum during 1986/2001.	* Rather high population growth is performed in the area during the several decades notwithstanding rapid urbanization tendency of the country which indicate much nore higher natural increase rate.	* Sudden or significant population increase by the implementation of the project is not expected as they are limited to small scale activities.	
		2. Drastic Change in Population Composition	* Because of urbanization of most economically active age-groups, population composition of these age-groups are decreasing. It means that only children and higher-aged people are left behind.	* Urbanization tendency seems to be stabilized in recent years. However, it will revive again when a better chance of access to information and social services are provided.	* There will be not much impact on the existing population composition by this project as it is limited to small scale development activities.	
		3. Family Planning Issues	* After the Islamic Revolution, family planning activities are checked and both the Villagers and Nomads are reluctant to participate.	* Ther will be less chance of agricultural occupation in the near future in a limited available land with many children. * It will bring about smaller size of landholding and less productivity of unit land.	* As above mentioned, this project is limited to small scale improvement and not much impact on this issue is expected.	
	(3) Economic Activities of the Residents	1. Changes in Bases of Economic Activities	* This area's economic activity is basically based on agriculture and livestock production. * There is no reason to expect this existing condition to change in the near future.	* There is no other way to seek for another field of economic activities if people is to live within the area.	* As the project aims solely to protect the existing economic activities against natural disaster, no change in the bases of it by the implementation of it. generation.	* Positive impact on maintainance of present activities
		2. Occupational Changes and Unemployment	* As the nature of the area, not much occupational change is observed. * Presently, unemployment ratio of the area is less than 2 % which is a very good performance compared with other Master Plan Areas.	* People should have to emmigrate outside the area if one is to find out another type of occupation.	* There will be not much occupational changes bring about by the implementation of the project. * Rather, residents ell get more confidence in their occupation/job with protection against natural disaster.	
		3. Increase in Income Disparities	* Significant income disparity is not observed. * In nominal income, Nomads are getting comparatively higher income than Villagers.	* Price control of agricultural crops is checking farmers' incentive to improve and increase their products thus checking better income generation. * Nomads who have nominally better income should have to spend much more to obtain foodcrops.	* Not much impact on income disparity is expected as the project covers all the residents.	* Factors other than the implementation of the project is much larger in considering this issue.
		4. Changes in Income Structure	* Not much tendency is observed	* Not much changes is expected	* Not much impact on income structure is expected by the implementation of the project.	

Table 13-5-2 Initial Social Environmental Evaluation Matrix - Chaman-Goli Bazoft Area -2/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(4) Institution and Custom	1. Adjustment and regulation of Water/Fishing Rights	* Not required.	* There will be no need of adjustments and/or establishment of new regulations.	* Existing institutional and customary system can cope with the implementation of projects.	
		2. Changes in Social and Institutional Structure	* Not expected	* Not required	* Existing institutional and customary system can cope with the implementation of projects.	
		3. Changes in Existing Institutions and Customs	* Not required	* Not required	* Much better adaptation and utilization of exiting institutinal and customary procedures can be expected by the implementation of the project.	* With better provision of administrative and public services.
		4. Changes in Consciousness of Residents	* Consciousness on better living condition is spreading rapidly, especially on the fields of health and education needs.	* Although electricity is 100 % supplied, other public services are felt not enough compared to the urbanized area.	* Very much positive impacts can be expected during and after the implementation of the projects.	* Feeling of "the Government is caring us" is important.
2. Health and Higiene		1. Increased use of Agrochemicals	* Agrochemicals are not much widely used in the area.	* Some farmers may couple irrigation water with agrochemicals to get more production.	* Expansion of irrigantion network together with introduction of modern cultivating system may increase the volume and extent of agrochemicals.	* Pollusion-related education and information dissemination is needed.
		2. Outbreak of Endemic Diseases	* At present no endemic diseases is observed.	-	* Relation of irrigation water and water-borne endemic diseases should be considered.	* A long-term monitoring system is needed.
		3. Spreading of Infectious Diseases	* At present, no water-borne infectious diseases is observed.	* With expansion of irrigation network, water-borne infectious disease may spread.	* Expansion of irrigation system/network and its operation and maintsinance should be conducted with sanitary point of view in mind.	* -ditto-
		4. Residual Toxicity of Agrochemicals	* There is virtually no information existing concerning the issue.	* There could be some chance of occurrence of the issue especially in downstream areas.	* The scale of the issue depends on the kind of agrochemicals/material and volume/extent of usage. * Information dissemination/education measures should be taken in implementing the project.	* -ditto-
		5. Increase of Domestic and Human Wastes	* Not much increase of wastes is expected other than the case of petro-chemical packages.	* Increase of those domestic wastes which are difficult to process is a nation-wide problem.	* A small scale garbage collection and processing system should be considered.	
		6. Improvement in Health and Higiene System	* Existing system is not enough to cope with the health-care needs of residents.	* Mainly due to the remoteness of the area from urban facilities, together with sporadic nature of settlements, it has been difficult to establish and implement health-care system in the area.	* Implementation of the projects may bring about better health-care system and information and access on the issue.	
3. Historic Remains, Cultural Assets and Natural Grand View, etc.		1. Impairment of Historic Remains and Cultural Assets	* No evidence of historic remains and cultural assets in the area.	-	* Not expected by the implementation of the project.	
		2. Loss of Natural Grand-View	* This area is abundant in natural grand-view same as surrounding areas.	-	* Not much loss of natural grand-view is expected in the area.	
		3. Impact on Buried Resources	* No evidence of buried resources and/or assets	-	-	
		4. Impact on Intangible Cultural Properties	* No intangible cultural property is observed.	-	-	
4. Special Considerations/ Circumstances			* No special considerations/circumstances compared with surrounding areas is observed.	-	-	

Table 13-5-3 Initial Social Environmental Evaluation Matrix - Sarbaz Area -1/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(1) Residents' Lives	1. Planned Resettlement	* No plan in this Project. * At present, the area suffers from very large scale of landslides at the foot of Dena Mountain Ranges and flood from Marbor River. * However, notwithstanding those natural disasters and damages thereof, there is no intention of planned resettlement.	* Once flood occurs, farmland is buried by sediment and road network including a bridge is destroyed. * Impact of natural disaster is so significant to maintain their daily lives that planned resettlement may be considered in the near future.	* The projects will improve living conditoins especially by preventing damages from floods, thus stabilizing present conditions of residential area. * The projects here has no plan for resettlement of residents.	
		2. Involuntary Resettlement	* No plan in this Project.	* If a severe flood occurs, not only farmland but also residential area may be damaged and residents may be forced to involuntary resettling.	* Same as above mentioned, there will be not necessity for involuntary resettlement by the implementation of the projects.	
		3. Substantial Changes in	* Not much change is expected.	-	* Not much changes in the way of life is expected as the projects and development brought about by them are of small scale.	
		4. Conflicts among Communities and People	* Not expected	* Not only the over-grazing issue but also the difference of the Way of Lives between Villagers and Nomads is the causes of conflicts among them.	* In this case both Villagers and Nomads are beneficiaries of the projects and existing conflicts (if any) can be mitigated.	
		5. Impact on Native People, Minority Groups and Nomads	* At present 53.7 % of the total population is Nomads. * However, most of them are transferring within the area and not to be considered as complete outsiders.	* Nomadic People are loosely bonded with wider concept of clans and/or tribes and their relationships and/or motivation with the (range)land may slightly different from those of Villagers.	* There is no reason to expect conflict among Villagers and Nomads by the implementation of the projects. * Both of them are beneficiaries of the project and their relationship will be improved, rather.	* A positive impacts can be expected by the present project.
		6. Sensitization and Enlightenment	* With the development of medias and diffusion of education, both residents well associated with the present social condition. * They are well aware of their present conditions and desiring to improve the social environment.	* Lack or shortage of means/access to sensitization and actual action to obtain them.	* Present projects will bring about better impacts both on accessess and motivation formation for this isuue.	* Promotion of mobilizatio of residents in the implementation of projects is recommended.
	(2) Demographic Issues	1. Popluation Increase	* Average annual growth rate of population during 1966/2001 indicates rather high level of 3.70 %.. * It is maintaing still high 3.21 %/annum during 1986/2001.	* Rather high population growth is performed in the area during the several decades notwithstanding rapid urbanization tendency of the country which indicate much nore higher natural increase rate.	* Sudden or significant population increase by the implementation of the project is not expected as they are limited to small scale activities.	
		2. Drastic Change in Population Composition	* Because of urbanization of most economically active age-groups, population composition of these age-groups are decreasing. It means that only children and higher-aged people are left behind.	* Urbanization tendency seems to be stabilized in recent years. However, it will revive again when a better chance of access to information and social services are provided.	* There will be not much impact on the existing population composition by this project as it is limited to small scale development activities.	
		3. Family Planning Issues	* After the Islamic Revolution, family planning activities are checked and both the Villagers and Nomads are reluctant to participate.	* Ther will be less chance of agricultural occupation in the near future in a limited available land with many children. * It will bring about smaller size of landholding and less productivity of unit land.	* As above mentioned, this project is limited to small scale improvement and not much impact on this issue is expected.	
	(3) Economic Activities of the Residents	1. Changes in Bases of Economic Activities	* This area's economic activity is basically based on agriculture and livestock production. * There is no reason to expect this existing condition to change in the near future.	* There is no other way to seek for another field of economic activities if people is to live within the area.	* As the project aims solely to protect the existing economic activities against natural disaster, no change in the bases of it by the implementation of it. generation.	* Positive impact on maintainance of present activities
		2. Occupational Changes and Unemployment	* As the nature of the area, not much occupational change is observed. * Presently, unemployment ratio of the area is less than 2 % which is a very good performance compared with other Master Plan Areas.	* People should have to emmigrate outside the area if one is to find out another type of occupation.	* There will be not much occupational changes bring about by the implementation of the project. * Rather, residents ell get more confidence in their occupation/job with protection against natural disaster.	
		3. Increase in Income Disparities	* Significant income disparity is not observed. * In nominal income, Nomads are getting comparatively higher income than Villagers.	* Price control of agricultural crops is checking farmers' incentive to improve and increase their products thus checking better income generation. * Nomads who have nominally better income should have to spend much more to obtain foodcrops.	* Not much impact on income disparity is expected as the project covers all the residents.	* Factors other than the implementation of the project is much larger in considering this issue.
		4. Changes in Income Structure	* Not much tendency is observed	* Not much changes is expected	* Not much impact on income structure is expected by the implementation of the project.	

Table 13-5-3 Initial Social Environmental Evaluation Matrix - Sarbaz Area -2/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(4) Institution and Custom	1. Adjustment and regulation of Water/Fishing Rights	* Not required.	* There will be no need of adjustments and/or estabishment of new regulations.	* Existing institutional and customary system can cope with the implementation of projects.	
		2. Changes in Social and Institutional Structure	* Not expected	* Not required	* Existing institutional and customary system can cope with the implementation of projects.	
		3. Changes in Existing Institutions and Customs	* Not required	* Not required	* Much better adaptation and utilization of exiting institutinal and customary procedures can be expected by the implementation of the project.	* With better provision of administrative and public services.
		4. Changes in Consciousness of Residents	* Consciousness on better living condition is spreading rapidly, especially on the fields of health and education needs.	* Although electricity is 100 % supplied, other public services are felt not enough compared to the urbanized area.	* Very much positive impacts can be expected during and after the implementation of the projects.	* Feeling of "the Government is caring us" is important.
2. Health and Higiene		1. Increased use of Agrochemicals	* Agrochemicals are not much widely used in the area.	* Some farmers may couple irrigation water with agrochemicals to get more production.	* Expansion of irrigantion network together with introduction of modern cultivating system may increase the volume and extent of agrochemicals.	* Pollusion-related education and information dissemination is needed.
		2. Outbreak of Endemic Diseases	* At present no endemic diseases is observed.	-	* Relation of irrigation water and water-borne endemic diseases should be considered.	* A long-term monitoring system is needed.
		3. Spreading of Infectious Diseases	* At present, no water-borne infectious diseases is observed.	* With expansion of irrigation network, water-borne infectious disease may spread.	* Expansion of irrigation system/network and its operation and maintainance should be conducted with sanitary point of view in mind.	* -ditto-
		4. Residual Toxicity of Agrochemicals	* There is virtually no information existing concerning the issue.	* There could be some chance of occurrence of the issue especially in downstream areas.	* The scale of the issue depends on the kind of agrochemicals/materia and volume/extent of usage. * Information dissemination/education measures should be taken in implementing the project.	* -ditto-
		5. Increase of Domestic and Human Wastes	* Not much increase of wastes is expected other than the case of petro-chemical packages.	* Increase of those domestic wastes which are difficult to process is a nation-wide problem.	* A small scale garbage collection and processing system should be considered.	
		6. Improvement in Health and Higiene System	* Existing system is not enough to cope with the health-care needs of residents.	* Mainly due to the remoteness of the area from urban facilities, together with sporadic nature of settlements, it has been difficult to establish and implement health-care system in the area.	* Implementation of the projects may bring about better health-care system and information and access on the issue.	
3. Historic Remains, Cultural Assets and Natural Grand View, etc.		1. Impairment of Historic Remains and Cultural Assets	* No evidence of historic remains and cultural assets in the area.	-	* Not expected by the implementation of the project.	
		2. Loss of Natural Grand-View	* This area is abundant in natural grand-view same as surrounding areas.	-	* Not much loss of natural grand-view is expected in the area.	
		3. Impact on Buried Resources	* No evidence of buried resources and/or assets	-	-	
		4. Impact on Intangible Cultural Properties	* No intangible cultural property is observed.	-	-	
4. Special Considerations/ Circumstances			* No special considerations/circumstances compared with surrounding areas is observed.	-	-	

Table 13-5-4 Initial Social Environmental Evaluation Matrix - Tanghe Sorkh Area -1/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(1) Residents' Lives	1. Planned Resettlement	* No plan in this Project. * As the area situated catchment area of Beshar river with seriously erosive mart formation. This causes huge sediment into river, the rise of river-bed unstable river course, erosion of river bank and limited area of farmland along the river, and floodings.	* Once flood occurs, farmland is buried by sediment and debris which needs many years of efforts for removing and recovering.	* Even if a severe flood occurs, there will be not much necessity for planned resettlement for the part of Villagers. * In case of Nomads, not much consideration is needed for the issue of resettlement because of the nature of their lives. However, if the Government to promote "settling" of them, measures for motivating them to do so will be needed.	* By the present projects for prevention of natural disaster, there will be less chances of planned resettlement in this area.
		2. Involuntary Resettlement	* Very few needs/necessities of involuntary resettlement here.	* If a severe flood occurs, not only farmland but also residential area may be damaged.	* Same as above mentioned, there will be not much necessity for involuntary resettlement here.	* -ditto-
		3. Substantial Changes in the Way of Lives	* If there is no damage from flood and debris flow thereof, a good income can be obtained from apple production * However, available land for apple is very much limited preventing further development of it.	* However, natural disasters from time to time prevent a steady development of income generation.	* With the projects for prevention of natural disasters, there will be better chances of tightening community bonds. * The effects of present projects will positively promote better relationships between Villagers and Nomads. * A positive improvement of the Way of Life can be expected.	* There will be not much changes in both the Way of Lives of Villaers and Nomads.
		4. Conflicts among Communities and People	* Over-grazing and soil-erosion thereof may be the cause of conflict between Villagers and Nomads. * However, most of Nomads are already half-settled within the area that there seemed not much conflicts come to surface.	* Not only the over-grazing issue but also the difference of the Way of Lives between Villagers and Nomads is the causes of conflicts among them.	* Not much conflicts are observed even now and not expected to become more evident.	
		5. Impact on Native People, Minority Groups and Nomads	* At present, 38.1% of total popuation is Nomads. * However, most of them are transferring within the area and not to be considered as complete outsiders.	* Nomadic People are loosely bonded with wider concept of clans and/or tribes and their relationships and/or motivation with the (range)land may slightly different from those of Villagers.	* At present and in the near future, there will be not much adverse effects and/or impacts on the Nomadic People is expected.	* A positive impacts can be expected by the present project.
		6. Sensitization and Enlightenment	* With the development of medias and diffusion of education, both residents well associated with the present social condition. * They are well aware of their present conditions and desiring to improve the social environment.	* Lack or shortage of means/access to sensitization and actual action to obtain them.	* Present projects will bring about better impacts both on accssess and motivation formation for this isuue.	* Promotion of mobilizatio of residents in the implementation of projects is recommended.
	(2) Demographic Issues	1. Population Increase	* Average annual growth rate of population during 1966/2001 indicates 0.41 % that is far below the national average. * It still is very low rate of only 0.85 %/annum during 1986/2001 due to a large exodus from rural area to urbanized areas.	* Urbanization of population is a common problem. * Shortage of social information and services is the major reason which cannot be coped with the area alone.	* Not much sound increase of population is expected even if the present projects are implemented.	* National level countermeasures will be needed.
		2. Drastic Change in Population Composition	* Because of urbanization of most economically active age-groups, population composition of these age-groups are decreasing. It means that only children and higher-aged people are left behind.	* Urbanization tendency seems to be stabilized in recent years. However, it will revive again when a better chance of access to information and social services are provided.	* With the better income brought about by the implementation of projects, present tendency of social-decrease of the most economically active age-groups may be mitigated.	* -ditto-
		3. Family Planning Issues	* After the Islamic Revolution, family planning activities are checked and both the Villagers and Nomads are reluctant to participate.	* Ther will be less chance of agricultural occupation in the near future in a limited available land with many children. * It will bring about smaller size of landholding and less productivity of unit land.	* As this issue is having traditional and religional origin that the present projects will not give much impacts even if they include mobilization and sentisization of residents.	* -ditto-
	(3) Economic Activities of the Residents	1. Changes in Bases of Economic Activities	* This area's economic activity is basically based on apple and livestock production and getting relatively higher income from those sources.	* There is no other way to seek for another field of economic activities if people is to live within the area. * However, available land for apple production is limited for further development of production.	* There will be not much changes in the bases of economic activities. * However, the present projects will enhance much more stabilized present economic activities both in their daily lives and income generation.	* Positive impact on maintainance of present activities
		2. Occupational Changes and Unemployment	* As the nature of the area, not much occupational change is observed. * Presently, unemployment ratio of the area is very high 10.8 % which is the most severe performance compared with other Master Plan Areas.	* People should have to emmigrate outside the area if one is to find out another type of occupation. * Because of limited area for expansion of apple production, unemployment rate cannot be improved drastically.	* There will be not much occupational changes in the near future. * However, as amentioned in the above, urbanization of the most economical active age-groups may bring about less productivity in the present structure of occupation. * Unemployment condition will maintain present sound level as there is not much change in the occupational structure expected.	
		3. Increase in Income Disparities	* Significant income disparity is not observed. * In nominal income, Nomads are getting comparatively higher income than Villagers.	* Price control of agricultural crops is checking farmers' incentive to improve and increase their products thus checking better income generation. * Nomads who have nominally better income should have to spend much more to obtain foodcrops.	* Not much impact on income disparity is expected even if the project is implemented.	
		4. Changes in Income Structure	* Not much tendency is observed	* Not much changes is expected	* Not much impact on income structure is expected.	

Table 13-5-4 Initial Social Environmental Evaluation Matrix - Tanghe Sorkh Area -2/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(4) Institution and Custom	1. Adjustment and regulation of Water/Fishing Rights	* Not required.	* There will be no need of adjustments and/or establishment of new regulations.	* Existing institutional and customary system can cope with the implementation of projects.	
		2. Changes in Social and Institutional Structure	* Not expected	* Not required	* Existing institutional and customary system can cope with the implementation of projects.	
		3. Changes in Existing Institutions and Customs	* Not required	* Not required	* Much better adaptation and utilization of exiting institutinal and customary procedures can be expected.	* With better provision of administrative and public services.
		4. Changes in Consciousness of Residents	* Consciousness on better living condition is spreading rapidly, especially on the fields of health and education needs.	* Although electricity is 100 % supplied, other public services are felt not enough compared to the urbanized area.	* Very much positive impacts can be expected during and after the implementation of the projects.	* Feeling of "the Government is caring us" is important.
2. Health and Higiene		1. Increased use of Agrochemicals	* Agrochemicals are not much widely used in the area.	* Some farmers may couple irrigation water with agrochemicals to get more production.	* Expansion of irrigantion network together with introduction of modern cultivating system may increase the volume and extent of agrochemicals.	* Pollusion-related education and information dissemination is needed.
		2. Outbreak of Endemic Diseases	* At present no endemic diseases is observed.	-	* Relation of irrigation water and water-borne endemic diseases should be connsidered.	* A long-term monitoring system is needed.
		3. Spreading of Infectious Diseases	* At present, no water-borne infectious diseases is observed.	* With expansion of irrigation network, water-borne infectious disease may spread.	* Expansion of irrigation system/network and its operation and maintainance should be conducted with sanitary point of view in mind.	* -ditto-
		4. Residual Toxicity of Agrochemicals	* There is virtually no information existing concerning the issue.	* There could be some chance of occurrence of the issue especially in downstream areas.	* Thie scale of the issue depends on the kind of agrochemicals/materia and volume/extent of usage. * Information dissemination/education measures should be taken in implementing the projects.	* -ditto-
		5. Increase of Domestic and Human Wastes	* Not much increase of wastes is expected other than the case of petro-chemical packages.	* Increase of those domestic wastes which are difficult to process is a nation-wide problem.	* A small scale garbage collection and processing system should be considered.	
		6. Improvement in Health and Higiene System	* Existing system is not enough to cope with the health-care needs of residents.	* Mainly due to the remoteness of the area from urban facilities, together with sporadic nature of setlements, it has been difficult to establish and implement health-care system in the area.	* Implementation of the projects may bring about better health-care system and information and access on the issue.	
3. Historic Remains, Cultural Assets and Natural Grand View, etc.		1. Impairment of Historic Remains and Cultural Assets	* No evidence of historic remains and cultural assets in the area.	-	-	
		2. Loss of Natural Grand-View	* This area is abundant in natural grand-view same as surrounding areas.	-	* Not much loss of natural grand-view is expected in the area.	
		3. Impact on Buried Resources	* No evidence of buried resources and/or assets	-	-	
		4. Impact on Intangible Cultural Properties	* No intangible cultural property is observed.	-	-	
4. Special Considerations/ Circumstances			* No special considerations/circumstances compared with surrounding areas is observed.	-	-	

Table 13-5-5 Initial Social Environmental Evaluation Matrix - Zeras Area -1/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(1) Residents' Lives	1. Planned Resettlement	* No plan in this Project. * Grazing and dry farming in the forest area have caused serious soil erosion in the area.	* Once flood occurs, farmland is buried by sediment and debris which needs many years of efforts for removing and recovering. * During these years, fodder production may decrease. It will cause overgarazing problems both for Villagers and Nomads.	* Even if a severe flood occurs, there will be not much necessity for planned resettlement for the part of Villagers as most communiti are already removed from one place to another.	* By the present projects for prevention of natural disaster, there will be less chances of planned resettlement in this area.
		2. Involuntary Resettlement	* Very few needs/necessities of involuntary resettlement here.	* If a severe flood occurs, not only farmland but also residential area may be damaged. However, the issue may be limited for "reconstruction" and not for "resettlement"	* Same as above mentioned, there will be not much necessity for involuntary resettlement here.	* -ditto-
		3. Substantial Changes in the Way of Life	* Even if there is no damage from flood and debris flow thereof, not much income can be obtained from small scale crops and livestock production.	* However, natural disasters from time to time prevent a steady development of income generation and lead to over-grazing issue which causes heavy stress on the forests.	* With the projects for prevention of natural disasters, there will be better chances of tightening community bonds. * A positive improvement of the Way of Life can be expected.	* There will be not much changes in both the Way of Lives of Villaers and Nomads.
		4. Conflicts among Communities and People	* Over-grazing and soil-erosion thereof may be the cause of conflict among newly settled Villagers	-	* Not much conflicts are observed even now and not expected to become more evident by the implementation of the project.	
		5. Impact on Native People, Minority Groups and Nomads	* At present, total popuation is Villagers and there is no Nomads. * However, most of them are settled ex-Nomads.	-	* At present and in the near future, there will be not much adverse effects and/or impacts on the residents.	
		6. Sensitization and Enlightenment	* With the development of medias and diffusion of education, residents are well associated with the present social condition. * They are well aware of their present conditions and desiring to improve the social environment.	* Lack or shortage of means/access to sensitization and actual action to obtain them.	* Present projects will bring about better impacts both on accessess and motivation formation for this isuue.	* Promotion of mobilizatio of residents in the implementation of projects is recommended.
	(2) Demographic Issues	1. Popluation Increase	* Average annual growth rate of population during 1966/2001 indicates the lowest rate of 0.05 % that is far below the average figur * Furthermore, it dropped to only 0.01 %/annum during 1986/ 2001 due to a large exodus from rural area to urbanized areas.	* Urbanization of population is a common problem. * Shortage of social information and services is the major reason which cannot be coped with the area alone.	* Not much sound increase of population is expected even if the presnt project is implemented.	* National level countermeasures will be needed.
		2. Drastic Change in Population Composition	* Because of urbanization of most economically active age-groups, population composition of these age-groups are decreasing. It means that only children and higher-aged people are left behind.	* Urbanization tendency seems to be very much severe during 1966/2001.	* Even With the better income brought about by the implementation of projects, present tendency of social-decrease of the most economically active age-groups may not be improved.	* -ditto-
		3. Family Planning Issues	* After the Islamic Revolution, family planning activities are checked and both the Villagers and Nomads are reluctant to participate.	* Ther will be less chance of agricultural occupation in the near future in a limited available land with many children. * It will bring about smaller size of landholding and less productivity of unit land.	* As this issue is having traditional and religional origin that the present projects will not give much impacts even if they include mobilization and sentisization of residents.	* -ditto-
	(3) Economic Activities of the Residents	1. Changes in Bases of Economic Activities	* This area's economic activity is basically based on livestock and to some part dry farming of which productivity is rather low.	* There is no other way to seek for another field of economic activities if people is to live within the area.	* There will be not much changes in the bases of economic activities.	
		2. Occupational Changes and Unemployment	* As the nature of the area, not much occupational change is observed. * Presently, unemployment ratio of the area is very high 12.0 % which is rthe worst of all the Master Plan Areas.	* People should have to emmigrate outside the area if one is to find out another type of occupation.	* There will be not much occupational changes in the near future. * However, as amentioned in the above, urbanization of the most economical active age-groups may bring about less productivity in the present structure of occupation. * Unemployment condition will maintain present worst level as there is not much change in the occupational structure expected.	
		3. Increase in Income Disparities	* Significant income disparity is already observed. * As the major income source is livestock production, this income disparity may be caused by the numbers of livestock kept by individual households(families).	* Agricultural crops here is, in most part, for self-consumption and livestock production is the sole source of income.	* Sometimes development activities calls for a widening of income disparity. Here, it is anticipated such effects as the benefit of project is first received by those who have vested rights.	* Means for equal-sharing of project benefits should be considered.
		4. Changes in Income Structure	* Not much tendency is observed	* Not much changes is expected	* Not much impact on income structure is expected.	

Table 13-5-5 Initial Social Environmental Evaluation Matrix - Zeras Area -2/2-

			Present Conditions	Issues and Problems	Initial Evaluation	Remarks
1. Social Life	(4) Institution and Custom	1. Adjustment and regulation of Water/Fishing Rights	* Not required.	* There will be no need of adjustments and/or establishment of new regulations.	* Existing institutional and customary system can cope with the implementation of projects.	
		2. Changes in Social and Institutional Structure	* Not expected	* Not required	* Existing institutional and customary system can cope with the implementation of projects.	
		3. Changes in Existing Institutions and Customs	* Not required	* Not required	* Much better adaptation and utilization of exiting institutinal and customary procedures can be expected.	* With better provision of administrative and public services.
		4. Changes in Consciousness of Residents	* Consciousness on better living condition is spreading rapidly, especially on the fields of health and education needs.	* Although electricity is 100 % supplied, other public services are felt not enough compared to the urbanized area. * This area is the remotest from nearby urban facilities.	* A positive impacts can be expected during and after the implementation of the projects.	* Feeling of "the Government is caring us" is important.
2. Health and Higiene		1. Increased use of Agrochemicals	* Agrochemicals are not much widely used in the area.	* Some farmers may couple irrigation water with agrochemicals to get more production.	* Expansion of irrigantion network together with introduction of modern cultivating system may increase the volume and extent of agrochemicals.	* Pollusion-related education and information diasemination is needed.
		2. Outbreak of Endemic Diseases	* At present no endemic diseases is observed.	-	* Relation of irrigation water and water-borne endemic diseases should be connsidered.	* A long-term monitoring system is needed.
		3. Spreading of Infectious Diseases	* At present, no water-borne infectious diseases is observed.	* With expansion of irrigation network, water-borne infectious disease may spread.	* Expansion of irrigation system/network and its operation and maintainance should be conducted with sanitary point of view in mind.	* -ditto-
		4. Residual Toxicity of Agrochemicals	* There is virtually no information existing concerning the issue.	* There could be some chance of occurrence of the issue especially in downstream areas.	* Thie scale of the issue depends on the kind of agrochemicals/materia and volume/extent of usage. * Information dissemination/education measures should be taken in implementing the projects.	* -ditto-
		5. Increase of Domestic and Human Wastes	* Not much increase of wastes is expected other than the case of petro-chemical packages.	* Increase of those domestic wastes which are difficult to process is a nation-wide problem.	* A small scale garbage collection and processing system should be considered.	
		6. Improvement in Health and Higiene System	* Existing system is not enough to cope with the health-care needs of residents.	* Mainly due to the remoteness of the area from urban facilities, together with sporadic nature of settlements, it has been difficult to establish and implement health-care system in the area.	* Implementation of the projects may bring about better health-care system and information and access on the issue.	
3. Historic Remains, Cultural Assets and Natural Grand View, etc.		1. Impairment of Historic Remains and Cultural Assets	* No evidence of historic remains and cultural assets in the area.	-	-	
		2. Loss of Natural Grand-View	* This area is abundant in natural grand-view same as surrounding areas.	-	* Not much loss of natural grand-view is expected in the area.	
		3. Impact on Buried Resources	* No evidence of buried resources and/or assets	-	-	
		4. Impact on Intangible Cultural Properties	* No intangible cultural property is observed.	-	-	
4. Special Considerations/ Circumstances			* No special considerations/circumstances compared with surroundin areas is observed.	-	-	

13.6 Environmental Assessment

13.6.1 Objectives and Components

Initial Environmental Examination (IEE) is the first appraisal for identifying the possibility of environmental impacts by the project carried out on the basis of readily available but limited information. IEE is the initial step of the Environmental Impact Assessment (EIA) and is carried out with accuracy sufficient to determine whether or not subsequent steps of the EIA will be required.

The Initial Environmental Examination was conducted in five Master Plan Areas to determine the environmental soundness of projects proposed for these areas; and to fulfill the standard of international developmental studies. The examination was based on Guidelines of Japan International Cooperation Agency (JICA), Environmental Code of Iran, and the relevant international norms. JICA Checklist for Proving Environmental Impact being the working document. The examination was focused on predicted impacts of the proposed projects on environmental components such as:

- Physical: soil, land, water
- Biological: fauna, flora
- Socio-economic: increase in productivity and income, employment opportunity
- Institution and custom related issues: adjustment of laws and regulation, institutional changes
- Cultural: buried historical remains, cultural assets
- Others: air pollution, changes in air and water temperature.

13.6.2 Procedures

For accomplishing the IEE task several steps were taken. Prior to field survey, authorities in Department of the Environment (DOE) and other relevant organizations were approached for making technical discussion and collecting materials and documents relating to environmental issues. Writings and information about the projects proposed for the master plan areas were received from JICA teammates. Contents of JICA Checklist were explained to counterparts to have their comments and guidance on execution of IEE. Then the expert and counterpart with necessary materials (checklist) and tools (binoculars) left Tehran for the master plan areas. In each area, at first the importance and objectives of IEE were clarified to local authorities/experts to receive their view point and support for smooth conduction of IEE. Thence the actual field survey was started. In the field, site of each proposed project was examined from various aspects to predict its environmental impacts. For example by seeing sediment and debris in farms at foothill, construction of check dam on upper part of waterway (gully) was justified. Complain of farmers about low productivity of dry farming,

and complain of nomads regarding shortage of feed for their livestock indicated that all the inhabitants would be benefited from an irrigation project. So such projects insert no adverse effect on local community, rather improve their life quality. In this manner all environmental parameters of the area were evaluated and the checklist was completed accordingly. For close observation of natural environment some aids such as binoculars were used. It took about 3 days to complete the environmental survey in each master plan area, June 6, to July 30, 2001 being the survey period. The final versions of completed checklists were inserted in the Field Report (2) and submitted to Iranian side on August 2001.

13.6.3 Outputs of Initial Environmental Examination

Main outputs of the IEE are the completed checklists for five mater plan areas, based on which the results and preliminary conclusions were made. These checklists are presented in ANNEX G of this report. In checklist the negative Significant Environmental Impacts (SEI) are ranked as A, B, C, D, and explained as- A: the subject SEI is unquestionably induced by the project. B: the subject SEI is likely to be induced by the project. C: the SEI is not fully known. D: there is no possibility that the subject SEI is likely to be induced by the project. Based on materials and documents of the proposed projects and careful observation of projects sites, the expert evaluated the environmental impacts and decided their ranks. An IEE output with D rank indicates that the proposed project is environment-friendly and can go ahead.

Of IEE outputs some are common to projects of all of five master plan areas. These are hereby given:

(1) No plan for residential settlement
(2) No plan for involuntary resettlement
(3) No conflict among communities
(4) No loss of job opportunity
(5) No income disparity
(6) No need of establishment of any new law or regulation
(7) No impairment of buried historical remains or cultural assets
(8) No acceleration in rate of soil erosion and soil salinization phenomena
(9) No deterioration in soil fertility or land quality

13.6.4 Results and Discussions

Based on the initial assessment through field investigation, analysis of documents of the proposed projects, review of environmental related writings, and experience of previous similar works, some

results were drawn, which are discussed here. In general, the proposed projects for the five master plan areas induced no major negative impacts on the environment. Minor negative environmental impacts that could be induced by structural measures of the proposed projects are discussed here. If the introduced irrigation water is not properly managed and efficiently utilized, it may cause spread of water born diseases, acceleration of soil salinization/alkalinization phenomena, and deterioration of soil fertility by leaching the soil nutrients to lower layers. Availability of irrigation water may accelerate the conversion of forest and rangeland to cultivated lands, limiting population and diversity of natural vegetation. With provision of irrigation water, crop production would increase; if the produced are not properly handled they may become available to agricultural pests such as rat, leading to pest infestation. Control of soil erosion through biological works, including the introduction of fast growing exotic plants is one of components of the proposed projects; this may cause changes in natural vegetation and appearance of new plant pathogens in the area. Construction of check dams on waterways (gullies) for disaster prevention or other purposes; would disturb the creatures transiting in these waterways. Even these are minor negative impacts, and watershed management works are known to be environment-friendly and so design to counter deterioration of physical/biological environment, the project is advised to pay careful attention to all environmental aspects from the first step.

13.6.5 Preliminary Conclusions

It is predicted that some minor negative impacts are induced on the environment by the proposed projects. But these impacts are avoidable, and reversible (if occurred) through a package of precautions, countermeasures, proper management of development activities and sound *operation/maintenance works*.

On the other hand, the beneficial impacts of the proposed projects are clustered on increased crop production, increased land valuation, increased land efficiency, improvement in livestock sector, and enhancement of agro-processing and marketing systems. In addition to these regional benefits, the projects are expected to contribute to national economy and overall development of the country.