

## 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)

Project	Target Year				
	2000	2005	2010	2015	2020
1 Construction of check dam		■	■		
2 River improvement		■	■	■	
3 Rangeland vegetation improvement		■	■		
4 Orchard terracing		■	■		
5 Groundwater monitoring		■	■	■	■
6 Increase of irrigated agriculture		■	■	■	■
7 Diversification to milk cow		■	■		
8 Rural water supply improvement		■	■	■	■
9 Rural road improvement		■			
10 Establishment of cooperative		■	■	■	■
11 Community enhancement		■	■	■	■

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

Project	Target Year				
	2000	2005	2010	2015	2020
1 Construction of check dam		■	■		
2 River treatment				■	
3 Landslide protection and rock-fall protection		■			
4 Soil erosion protection		■	■	■	
5 Rangeland vegetation improvement		■	■		
6 Forestland vegetation recovery		■	■		
7 Increase of irrigated agriculture		■	■	■	■
8 Fish culture promotion		■	■		
9 Diversification to milk cow		■	■		
10 Rural water supply improvement		■	■	■	■
11 Rural road improvement		■	■		
12 Establishment of cooperative		■	■	■	■
13 Community enhancement		■	■	■	■

Table 11-1-3 Implementation Schedule (K-7-0-19-1 Sarbaz)

Project	Target Year				
	2000	2005	2010	2015	2020
1 Construction of check dam		■	■		
2 River treatment				■	
3 Landslide protection		■	■		
4 Soil erosion protection		■	■		
5 Rangeland vegetation improvement (seedling, water point)		■	■		
6 Increase of irrigated agriculture		■	■	■	■
7 Collecting and grading center of apple		■	■		
8 Diversification to milk cow		■	■		
9 Rural water supply improvement		■	■	■	■
10 Rural road improvement		■	■		
11 Establishment of cooperative		■	■	■	■
12 Community enhancement		■	■	■	■

**Table 11-1-4 Implementation Schedule (K-7-48 Tang Sorkh)**

Project	Target Year				
	2000	2005	2010	2015	2020
1 Construction of check dam		██████████	██████████		
2 Soil erosion protection		██████████	██████████		
3 Rangeland vegetation improvement		██████████	██████████		
4 Forestland vegetation recovery		██████████	██████████		
5 Increase of irrigated agriculture		██████████	██████████	██████████	██████████
6 Collecting and grading center of apple and vegetable		██████████			
7 Rural water supply improvement		██████████	██████████	██████████	██████████
8 Rural road improvement		██████████			
9 Establishment of cooperative		██████████	██████████	██████████	██████████
10 Community enhancement		██████████	██████████	██████████	██████████

**Table 11-1-5 Implementation Schedule (K-8-28 Zeras)**

Project	Target Year				
	2000	2005	2010	2015	2020
1 Construction of check dam		██████████	██████████		
2 Relocation of houses		██████████	██████████		
3 Landslide protection		██████████			
4 Soil erosion protection		██████████	██████████	██████████	██████████
5 Rangeland vegetation improvement		██████████	██████████	██████████	
6 Milk processing and Marketing		██████████			
7 Rural water supply improvement		██████████	██████████	██████████	██████████
8 Rural road improvement		██████████			
9 Establishment of cooperative		██████████	██████████	██████████	██████████
10 Community enhancement		██████████	██████████	██████████	██████████

### 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

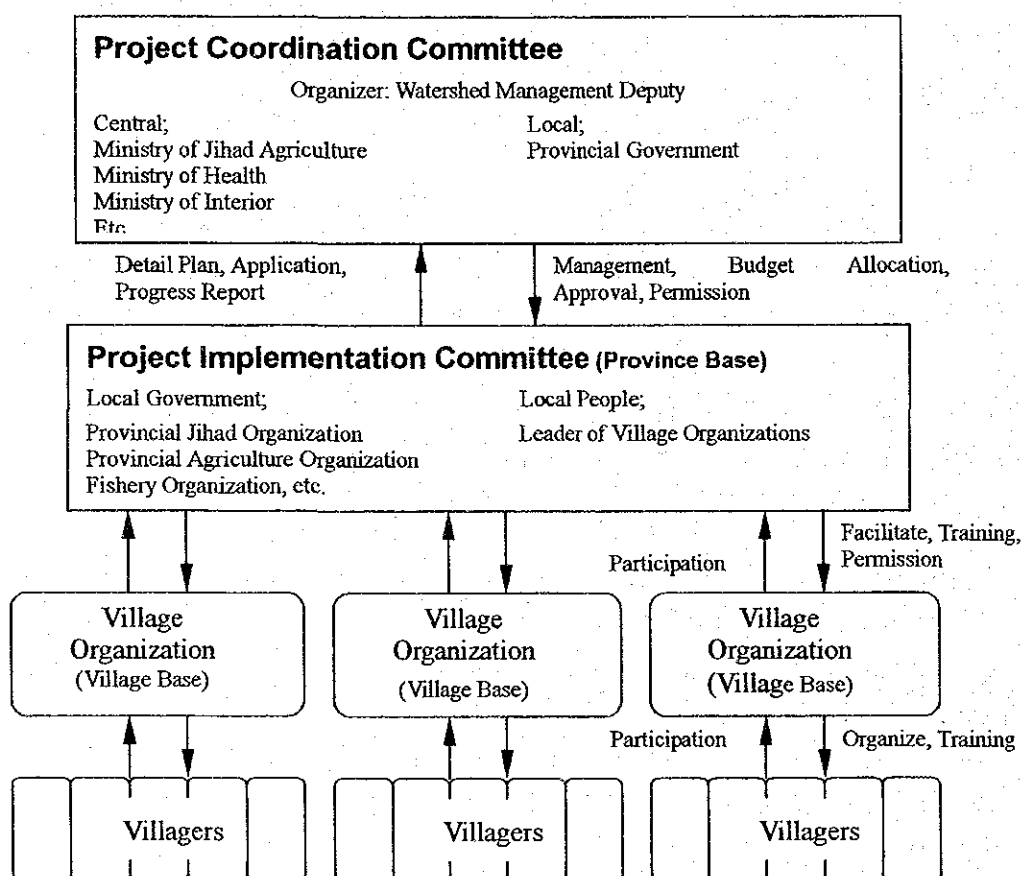


Figure 11-1-1 Proposed Organization of the Project Implementation

### 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.

Organizational structure of operation and maintenance is as follows.

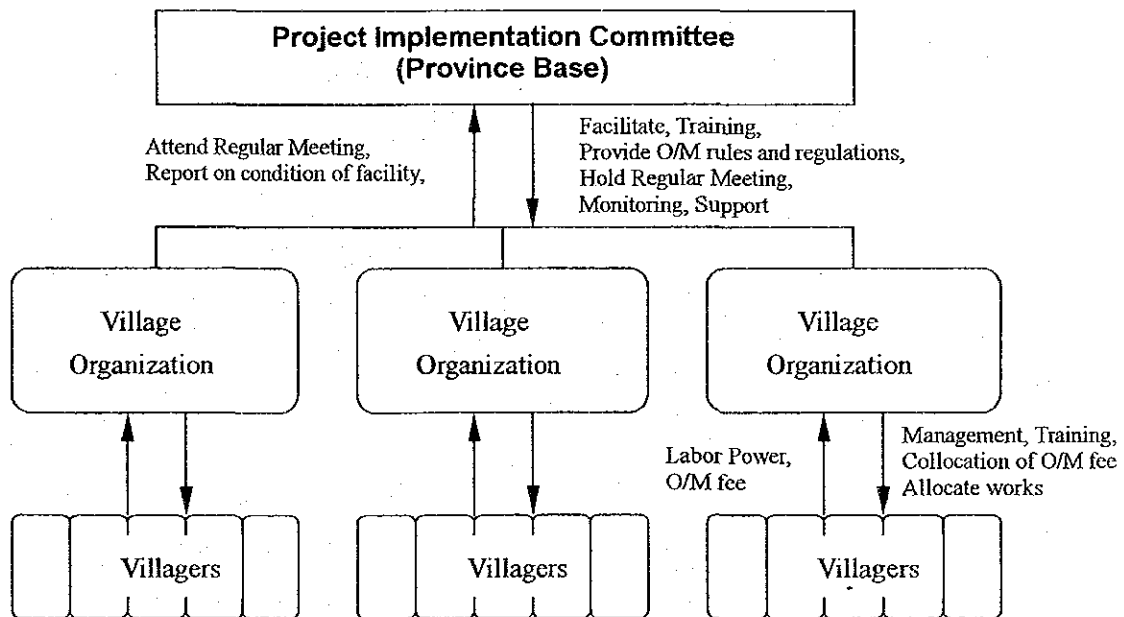


Figure 11-2-1 Proposed Organization of Operation and Maintenance



### 11.2.2 Operation and Maintenance Cost

The operation and maintenance cost for the proposed projects is 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 treatment	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

## 12 PROJECT COST ESTIMATION

### 12.1 Method of Cost Estimation

Cost of proposed projects is estimated by using unit prices that provided by Study and Evaluation Department, Water shed Management Office, Ministry of Jihad Agriculture.

Project cost will be composed of construction base cost, preparatory works and civil works, and administration const, engineering cost, and other related costs for the facilities constructed by the proposed project.

### 12.2 Project Cost of Master Plan Areas

Table 12-2-1 Project Cost : Vastegan

Project	Cost (1000Rls.)
1. Construction of check dam	3,426,000
2. River treatment	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

Table 12-2-2 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

Table 12-2-3 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	—
<b>Total</b>	<b>25,383,000</b>

Table 12-2-4 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	—
<b>Total</b>	<b>5,468,200</b>

Table 12-2-5 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	—
<b>Total</b>	<b>14,218,200</b>

## 13 PROJECT EVALUATION

### 13.1 Methodology

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.

### 13.2 Project Benefit

#### (1) Expected direct and indirect benefit from the project implementation

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

**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 Riverbed gradient is reduced, and riverbed and it's banks are stabilized	Villager's living condition is stabilized Agricultural production is stabilized
River treatment (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 Damages on farmland caused by soil erosion are decreased	Environmental condition of Karoon watershed is improved
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
Increase of irrigated agriculture	Orchard production is increased 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 Employment opportunity is increased	Consumption of fish is increased, and protein source shift from goats and sheep to fish
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 Time required for villager's movement is decreased	Information and commodity flow are activated
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 Extension services for agriculture and livestock are implemented	Price of agricultural products are adjusted to appropriate prices Agricultural and Livestock production is increased
Community enhancement	Villager's participation in project implementation is promoted Enlightenment activities against natural disasters are carried out Health service are promoted Activities to improve villager's living conditions are promoted	Utility life of the facilities is extended Villager's capability against disasters is increased Villager's living environment is improved

Remarks:  Tangible effect/ benefit

(2) Estimation of the project benefit

Followings are estimated project benefits in each Master Plan Area.

**Table 13-2-2 Project Benefit : Vastegan**

Project	Project Benefit (1000RIs.)	
	Financial Benefit	Economic Benefit
1. Construction of check dam	—	158,970
2. River treatment	—	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
<b>Total</b>	<b>5,118,065</b>	<b>5,650,263</b>

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

Project	Project Benefit (1000RIs.)	
	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
<b>Total</b>	<b>8,288,338</b>	<b>9,076,564</b>

**Table 13-2-4 Project Benefit : Sarbaz**

Project	Project Benefit (1000RIs.)	
	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
<b>Total</b>	<b>17,785,241</b>	<b>18,472,753</b>

**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
<b>Total</b>	<b>1,720,220</b>	<b>1,666,320</b>

**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
<b>Total</b>	<b>2,401,710</b>	<b>3,849,760</b>

### 13.3 Financial Evaluation

#### (1) 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 at the rate of 12% applied in the financial analysis.

##### c) Pricing Basis

All costs and benefits in this analysis have been expressed on a constant 2000/01-price basis.

#### (2) 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.



**Table 13-3-1 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%

**Table 13-3-2 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%

**Table 13-3-3 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%

**Table 13-3-4 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

**Table 13-3-5 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%

(3) 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) Basic Evaluation Criteria

#### 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.

#### b) Shadow Exchange Rate (SER)

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.

### (2) Economic Cost

The economic costs of the construction works are converted from financial prices by applying standard conversion factors.

### (3) 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.

**Table 13-4-1 Results of Economic Analysis : Vastegan**

Project	NPV	B/C	EIRR
1. Construction of check dam	-1,280,354	0.42	1.9%
2. River treatment	-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%

Table 13-4-2 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%

Table 13-4-3 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%

Table 13-4-4 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%

Table 13-4-5 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%

#### (4) 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
- 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.

### 13.6 Environmental Assessment

The Initial Environmental Examination (IEE) was conducted in five master plan areas to determine the environmental soundness of projects proposed for these areas. Impacts of the proposed projects on the following environmental components were considered:

- Physical/biological: soil, water, fauna/flora
- Social/economical: increase in income, employment opportunity
- Cultural: historical remains and cultural assets.

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

- No plan for residential resettlement
- No plan for involuntary resettlement
- No conflict among communities
- No loss of job opportunity
- No income disparity
- No impairment of cultural assets or historical remains.

During construction period the proposed projects might induce some minor negative impacts on environment of these areas. But they will bring-about many beneficial impacts such as increase in crop production, improvement in livestock sector and enhancement of marketing system. Implementation of the projects is important for promoting living stand of people and conservation of the environment.

## 14 CONCLUSION AND RECOMMENDATION

### 14.1 Conclusion

#### 14.1.1 Vicious Cycle

The study area has been degraded by decrease of the vegetation and the forest area due to overgrazing and cutting trees for fuels and reclamation for increase of the new cultivation area and subsequent soil erosion. In case of heavy rainfall or rapid snow melting, many types of disasters such as flood, debris flow and landslide are anticipated. The area is suffering from a vicious cycle of natural-social environment: "Decrease of farm income (Poverty) - Further exploitation of land - Degradation of natural environment - Natural disasters and damage to farmland - decrease of productivity of land --Decrease of farm income (Poverty)". The regional society is facing the danger of collapse.

#### 14.1.2 Selection of Master Plan Study Area

Based on the Phase I Inventory Study, five master plan study areas were selected in taking into consideration of the scale and damage of the past natural disasters and development potentials. The number of master plan study areas were also taken into consideration and two (2) study areas were selected in Chaharmahal va Bakhtiyari and each one (1) in Kohgiluyeh va Boyerahamad, Esfahan and Khuzestan respectively. The selected master plan study areas are as follows;

Table 14-1-1 The Selected Master Plan Areas

Name	No.	Area (km <sup>2</sup> )	Province
1. Vastegan	K4-1-9	67.0	Chaharmahal
2. Chaman Goli-Bazoft	K5-19-a	113.1	Chaharmahal
3. Sarbaz	K7-0-19-1	154.5	Esfahan
4. Tang Sorkh	K7-48	65.4	Kohkilouyeh
5. Zeras	K8-28	63.7	Khuzestan

#### 14.1.3 Overall Goal and Project Purpose

The overall goal of the master plan is to break through the above vicious cycle at two nodes of the "Degradation of natural environment" and "Decrease of farm income. In order to realize the overall

goal, following five project purposes are proposed.

- (1) Mitigation of flood, debris flow and landslide damages
- (2) Control of soil erosion and conservation of water
- (3) Restoration and improvement of rangeland vegetation
- (4) Improvement of living standard
- (5) Improvement of agriculture product/input marketing and agriculture extension

Above project purposes could be categorized into three (3) major project components.

- (1) Disaster prevention work (mitigation of flood, debris flow and landslide)
- (2) Natural environment recovery (soil erosion control and vegetation restoration)
- (3) Rural and economic development (improvement of living condition and increase of agricultural product)

#### 14.1.4 Project Evaluation

Economic evaluation has been carried out for each project. Overall benefit cost ratios (B/C) at the interest of 12 % and economic internal rate of return (EIRR) are as follows;

Table 14-1-2 Results of Project Evaluation

Area	B/C	EIRR
1. Vastegan	1.22	23.5
2. Chaman Goli-Bazoft	1.19	24.1
3. Sarbaz	1.56	49.7
4. Tang Sorkh	1.51	31.0
5. Zeras	1.30	18.4

The projects are sound in engineering aspect and recommendable from economic point of view.

#### 14.1.5 People's Participation

To achieve community development under people's initiative, an intensive approach to the village with technical information for plan formulation will be needed, and organizing and strengthening user's committees will trigger community development activities and reduction of vulnerability, then finally achieve a successful disaster prevention and community development project.

It is vitally important to select the farmers group and/or organization, who have strong willingness for development and are positive to pay for their share of project cost. Emphasis should be placed on the "Participatory" planning and implementation for the success of sustainable and positive development. The promotion of the better farmer's participatory organization is also important to get the official subsidies to the project and to receive the governmental training and education.

## **14.2 Recommendation**

### **14.2.1 Government Function**

Project planning in each province is the responsibility of the corresponding Provincial Jihad Organization and the Study and Evaluation Department (SED) of WMD only check and evaluate the plan. Major work of the SED is to collect and analyze those data of floods and landslides and etc. and it seems that the staffing and capability of SED for project planning are insufficient. SED should have the initiative and responsibility of project planning of the large scale projects and the projects extending to large area of more than one province. Staffing and capacity of SED inclined to engineering aspect and ordinary economic and financial evaluation of the project such as Net Present Value (NPV), Benefit Cost Ratio (B/C) Economic Internal Rate of Return (EIRR) have not conducted until now. SED should master these tools and apply them for project planning and evaluation.

The participatory workshop generally helped the local residents actively participate in the planning process. However, number of the governmental officers was sometimes more than that of the residents people's and active participation was interfered by the governmental officers' attitude. Even though the officers of all levels of administration (local, provincial and central) are essential components of the workshop participants, some officers were too active (aggressive) to insist their ideas. They acted as if they knew all the problems of the residents and they could make most appropriate decisions on the master plan even without listening to the local residents. Such attitude completely opposes to the participatory approach. The attitude of government officials should be moderate not so as to interfere the participation of the resident people.

### **14.2.2 Legislation Measure for Over-grazing**

Wide-spread and chronic over-grazing situation is prevailing in the study area, which is the main cause of degradation of natural vegetation. This is a country-wide problem and the Department of Livestock recognized the problems seriously. The Study Team proposed the project of vegetation recovery of rangeland and the project of production increase of alfalfa for livestock feed. However, the projects would not solve the over-grazing situation totally. For the fundamental solution of this problem, control of the livestock head is inevitable. National level legislation measures would be required for provincial level regulation of control of livestock head. Substantial allocation of head of livestock to individual farmers would be entrusted to Shola based on the regulation of the province.

### **14.2.3 Experimental Pilot Project**

The Study Team recommends prompt implementation of the projects. Disaster prevention work



including mitigation of flood, debris flow and landslide and natural environmental recovery including soil erosion control and vegetation restoration are very urgent. However, projects proposed in the master plan are integrated and have many components and some project such as soil erosion control and vegetation recovery have less implementation experience. Experimental pilot project would be recommended in a selected area among the five (5) master plan study areas. The Study Team would like to recommend Vastegan as a pilot project area because of many components of project and accessibility and expected propagation effect, which will enable easy project monitoring, extension and propagation.

#### (1) Purpose of the Pilot Project

The purpose of this pilot project is to give a sample of participatory implementation of watershed management projects which would be a kindling and propagate to other projects in the Master Plan area with target of poverty alleviation and improvement of natural environment. Realization of poverty alleviation means that “people can live without debts” and “ people need not go to cities or abroad for getting job”. The selection criteria of pilot project are as follows;

- to give direct effect on improving natural environment
- to have project scale of easy implementation in short term
- to give the chance of many villager participation
- to give profit to participants
- to be certain in success with the similar natured past sample
- to have a probability of propagation

In due consideration of the above condition, the project of orchard terrace for soil erosion protection is recommended.

#### (2) Selection of the Project Site

Vastegan area is located in about 80 km south of the province capital Sharekord and it can be approached from Sharekord within one hour drive. Access to the site and communication with local people would be easy for the provincial officials concerned. It would also help other local people visit the site, which contribute to exhibition effect and propagation effect. It is very favourable that the some local people in Vastegan area already have experience of construction of orchard terrace and they are now in an initial stage of getting fruits of apples.

#### (3) The Project

The orchard terrace for soil erosion protection is selected for the pilot project because of the following reasons;

- The project can be initiated in a small scale with rather small amount of budget.
- Farmers can get direct profit through their ownership of orchard terrace.
- The project will give quick yield of soil erosion control and apple fruit production.

The project will contribute both to natural environment improvement and to poverty alleviation of local people. The operation and maintenance and farming would be easy because the project site is located near by the Vastegan village. Many provincial officials and local people can visit the site easily, exhibition effect of which will help to promote similar nature scheme.

#### (4) Contents of the Project

##### a) Purpose of the Project

The project aims at reduction of poverty and improvement of natural environment. With reference to the PCM Workshop held at Vastegan, the two major issues; low buying motivation (living standard) and youth's migration to cities are raised. Therefore, reduction of poverty implies to stimulate people's buying motivation and to improve living standard. In addition, youth's migration to cities will be reduced and then the local community will be revived. On the other hand, improvement of natural environment implies to reduce the damage on farmland and to secure income by decreasing natural disaster, and finally to provide people safe and peace life.

##### b) Effects of the Project

- To reduce soil loss of about 8t/ha/year (5 mm/year) to almost negligible and to stabilize and maintain the productivity in the hilly rangeland, where the land suffers from severe soil erosion due to deterioration of vegetation by over grazing

- To create annual income of about 6,000,000 Rial for each family, which is equivalent to 60% of present income, by converting lower productive rangeland to apple orchard with productivity of 40t/ha.

By the increase of the income, the peoples can attain better living condition and moreover, the surplus, a part of the increase income can be spent for further investment of development, which would create upward spiral in the regional society. In addition, the reduction of youth's migration to cities and the revival of the local community will be attained by showing the way to earn stable income through the Project when they participate actively.

##### c) Components of the Project

Area: 15ha

Facilities:

Diversion Weir:	1 masonry weir
Irrigation Canal:	L = 2,800m (Conveyance Canal = 1,300m, Main Canal = 1,500m) Concrete Canal (B 0.20m x H 0.20m)
Orchard Terrace:	15ha

Project Cost: 488,486,000 Rial

Facility	Breakdown of the Project Cost (rial)			
	Total Cost	Adm. Cost	Labor Cost	Material Cost
Water Source (Diversion Weir, Canal)	264,507,000	35,496,000	31,352,000	197,659,000
Orchard Terrace (including apple nursery)	223,979,000	10,666,000	171,628,000	41,685,000
Total	488,486,000	46,162,000	202,980,000	239,344,000
Composition	100%	9%	42%	49%

O/M Cost: 27,202,000 Rial/year

Facility and Farming	Breakdown of O/M Cost (rial/year)			
	O/M Cost	Adm. Cost	Labor Cost	Material Cost
Water Source (Diversion Weir, Canal)	2,849,000	191,000	1,011,000	1,647,000
Orchard Terrace	1,778,000	0	1,430,000	348,000
Farming Cost	22,575,000	0	9,375,000	13,200,000
Total	27,202,000	191,000	11,816,000	15,195,000
Composition	100%	1%	43%	56%

Participants: 75 families (0.2ha/family) participating among 600 families in 4 villages.

Trees per family: 80 trees (1tree/25m<sup>2</sup>x2,000m<sup>2</sup>=80 trees)

Benefit of the Project: 32,800,000 Rial/ha x 15ha = 492,000,000 Rial

492,000,000 Rial/75 families = 6,560,000 Rial/family/year

=60% of Present Income (Present Income: 10,300,000 Rial/family/year)

Economic Evaluation: B/C= 4.59 IRR= 43.4%

Carrying Capacity: In view of 50 % increase of the average income, 30 new families can be accommodated

##### (5) Share of the Cost

###### a) Share of the Project Cost

Since this Pilot Project aims to preservation of natural environment and increase of income for farmers, it contributes to improvement of natural environment as well as to increase of income directly to farmers. Therefore, the project will be proceeded with a cost share of beneficial farmers. It will make farmers to have ownership of the project. Project cost is composed of administrative cost, labor cost and material cost, of which labor cost shares 40%. Beneficial farmers are, therefore, requested to share 40% of the project cost by means of labor work or cash payment. Remaining 60% is requested to the Government or NGO or the International Aid Agencies.

###### i) Share of the Farmers

In case labor cost of 202,980,000 Rial is shared by 75 farmers, one farmer shares about 2,706,000Rial, equivalent to 27% of annual income of a family in Vastegan Since construction work of the project is composed of simple easy works such as manual earthwork, it is recommended to request farmers to contribute by labor work. In the case of labor work, share cost is equivalent to 3.6 months. (unskilled labor :750,000 Rial/month) It is, therefore, recommended to make options for farmers to choose ①payment, ②labor work or ③ combination, in order to increase participatory selections for farmers.

ii Remaining Share other than Farmers

Remaining share is requested to the Government or NGO or the International Aid Agencies. Since it is composed of administrative cost and material cost, it should be in the form of fund. It is, therefore, very important to make deep understanding of donors on effects of the project.

b) Share of the O/M Cost

O/M cost is composed of O/M and repair cost of the water source facility, repair cost of the orchard terrace and farming cost of apples. Other costs than water source facility, which is a common facility, has to be born by individual farmers. From an aspect of general case of this scale, O/M and repair of water source facility are conducted by farmers themselves orchard

(6) Implementation of the Project

a) Establishment of Project Coordination Committee

In order to implementing the Pilot Project, Project Coordination Committee (PCC) should be established, which composes of members from central Watershed Management Office, Ministry of Jihad-Agriculture as a central force and funding agencies, NGOs, Forestry Office as well as provincial Watershed Management Office who will be a executing agencies. PCC will conduct a budget acquisition for the project and coordinate the central level competence. PCC will carry out, at the beginning stage of the project, the explanation of the background, purpose, implementation schedule for the Pilot Project, holding the originators' meeting at the project site and supporting the establishment of beneficiaries' group

b) Opening of originator's meeting

The Project Coordination Committee (PCC) will hold the originator's meeting with provincial related organizations, whose participants should be inhabitants in the related villages who have rights to enter the project site. Address of the Project participation should be carried out to all related village inhabitants through the Village Islamic Councils or Shora.

c) Establishment of beneficiaries' group

In order to sustaining the Project, it is important that the inhabitants would participate the project and they would have ownership. Beneficiaries' group of the inhabitants who show the willingness in the originator' meeting should be established. At the time of establishment, it is efficient that PCC will act as a facilitator and Shora members will participate as coordinator for supporting and advising on the establishment of group's organization and operation rules.

The group basically operates under the participation of inhabitants. At the time of reviewing of the activities' plan, monitoring plan and reviewing the project at the interim stage, workshop type meeting, which makes flank and free circumstance, is useful to obtain the various participant opinions. On the other hand, important decisions for group's organization and operating rules, should be made by the

opinions of the general meeting consisting of whole members.

d) Establishment of Project Implementation Committee (PIC)

The Project Implementation Committee (PIC) should be established, consisted of Provincial Jihad-Agriculture as a central force and representatives (5 –6 persons) of beneficiaries' group. PIC will be entrusted with missions; the system construction that inhabitants can participate the Project from the planning stage and implementing stage up to operating and maintaining stage as well as supporting the beneficiaries' group on the technical aspect. PIC also entrust the works such as site survey or composition of implementation drawing to the local survey companies and transfer the technology to them. This system can promote the survey and designing abilities of the local companies and extend the project to near areas.

(7) Implementation of the Project

a) Construction Work

Main construction works of the project are for small canal and orchard terrace. These works are easy for construction. However, selection and decision of the canal route and definition of the beneficial project boundary are essential and important from an engineering viewpoint. Survey works of the canal route and the boundary will be entrusted to the local survey company by PIC. The route of canal and the boundary of the project will be confirmed by the beneficial group. Preparation of construction documents will be also entrusted to the local survey company.

Since almost construction works will be conducted by labor work of the beneficial group who are unskilled in construction work, it is difficult to supervise the works even for simple earth and concrete works. PIC should recruit jobless capable men by administrative fee and transfer technology to them on supervision of construction work in order to accelerate the implementation of the project.

b) Allocation of the Land

Developed land of 15 ha will be allocated to 75 farmers with a land of 0.2 ha for each farmer. The land is irrigated by distribution ditches of 100 m length in average aligned at 30m interval through outlets of the main irrigation canal

c) Apple Cultivation

Although cultivation technology of apples is popularized among farmers in the large growing districts, its technology is not yet extended to the slopes where the development is not yet extended. It is, therefore, required for farmers to acquire necessary technology for apple cultivation. Extension Department of General Provincial Agricultural Bureau should be responsible on its extension. PIC should support farmers to visit the large growing districts in order to make them able to learn by themselves. Since apples are sold generally through brokers to market, farmers should also learn negotiation technique with brokers.

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