## 9.5 Results of the Workshop: K7-48 Tang-e-sork

The PCM workshop for the K7-48 (Tang-e-sork) was held on June 11-14, 2001 at the secondary school in Tang-e-sork village in the basin. The participants of the workshop are shown in the Table 9-5-1. The workshop results, namely Participation Analysis (Group Categorization), Participation Analysis (Detailed Group Analysis), Problem Analysis, Objectives Analysis and Project Design Matrix (PDM) are shown in the Figure 9-5-1, 9-5-2, 9-5-3, 9-5-4, and Table 9-5-2 respectively.

Table 9-5-1 Participants List of the Workshop for K7-48

| | NAME | POSITION/OCCUPATION | ORGANISATION/VILLAGE | 6.11 | 6.12 | 6.13 | 6.14 |
|---|---|---|---|---|---|---|---|
| 1 | H. Dara | Officer of Jihad, Yasuj | Jihad, Yasuj | p | p | p | p |
| 2 | M. Dehghan | Staff of telephone office | Tang-e-sorkh village | | p | p | p |
| 3 | J. Iguchi | Expert for Participatory Planning | JICA Study Team | p | p | p | p |
| 4 | S. M. Safavi | Co-moderator | Watershed Management Deputy | p | p | p | p |
| 5 | A. Malekzadeh | Farmer and livestock keeper | Tang-e-sorkh village | p | p | p | p |
| 6 | S. Saadat | Farmer and butcher | Tang-e-sorkh village | p | p | p | p |
| 7 | S. Javidbakht | Expert | Jihad, Yasuj | p | p | p | |
| 8 | K. Khosrovani | Farmer | Tang-e-sorkh village | p | p | p | p |
| 9 | G. Ranjbar | Natural resources office | Tang-e-sorkh village | p | p | | p |
| 10 | S. Zarei | Teacher and member of shora | Tang-e-sorkh village | p | p | p | p |
| 11 | A. Hossain Pour | Teacher and farmer | Tang-e-sorkh village | p | p | p | p |
| 12 | M. Rostav | Teacher and farmer, member of shora | Tang-e-khoshak | P | p | p | p |
| 13 | M. M. Dehghan | Farmer | Tang-e-sorkh village | P | p | p | p |
| 14 | Sh. Sayfi asl | Livestock keeper, Representative of nomads | Cheshmeh chenar village. | P | p | p | p |
| 15 | F. Zarghami | Geologist | Watershed management office, Jihad, Yasuj | p | p | p | p |
| 16 | H.R. Solaymani | Co-moderator | Watershed Management Deputy | p | p | p | p |
| 17 | Bahadoran | Officer | W. M. Office, Jihad, Yasuj | p | p | p | p |
| 18 | Y. Hossainpoor | Student | Tang-e-sorkh village | p | p | p | p |
| 19 | Nastaban Moghadam | Officer | Water and soil engineering company | p | | | |
| 20 | K. Tabashir | Officer | Jihad, Yasuj | p | p | p | |
| 21 | H. A. Mohammadi | Co-moderator | Watershed Management Deputy | p | p | p | p |
| 22 | Jamshid pasyr | Officer | Propagation office, Jihad, Yasuj | | p | p | |
| 23 | N. Dehgan | Farmer | Tang-e-sorkh village | p | p | p | p |
| 24 | K. Allahi | Farmer | Tang-e-sorkh village | p | p | p | p |
| 25 | Jahan Rostami | Staff of Jihad | Propagation office, Jihad, Yasuj | | p | p | |
| 26 | E. Beheshtifard | Manager of Watershed Management Office, Yasuj | Watershed management office, Jihad, Yasuj | p | p | p | p |
| 27 | K. Zamani | Farmer | Tang-e-sorkh village | | p | | |
| 28 | A. Dehgan | Student | Tang-e-sorkh village | p | p | p | p |
| 29 | M. Afshoon | Expert | W. M. Office, Jihad, Yasuj | p | p | p | p |
| 30 | A. Latifi | Farmer and livestock keeper | Allah Abad village | p | p | p | p |
| 31 | Z. Khodarahmi | Biologist | Environment office, Yasuj | p | p | p | p |
| 32 | Ms. F. Salooni | Welfare office | Tang-e-sorkh village | p | p | p | p |
| 33 | A. Pron | Officer | Nomads office, Jihad, Yasuj | p | p | p | p |
| 34 | Ms. K. Jalilvand | Trainer | Allah Abad village | p | p | p | p |
| 35 | Ms. A. Khoob | working in house | Tang-e-sorkh village | p | p | p | p |
| 36 | Tsuneyoshi Kimura | | | | | | p |
| 37 | M. R. Jomepoor | Driver | Jihad, Yasuj | | p | p | p |
| 38 | N. Jomepoor | Student | Yasuj | | | | p |
| 39 | G. Shokohifard | Agricultural expert | JICA Study Team | | | | p |

| Beneficiaries | Negatively Affected Groups | Decision Makers | Supporting Groups | Implementing Agencies |
|---|---|---|---|---|
| Poor people | Traders | Shora members | Experts | Watershed management office, Ministry of Jihad and agriculture |
| Farmers | Livestock keepers (Permanent residents) | Representatives of beneficiaries | Officers | Contractors |
| Livestock keepers (Permanent residents) | Farmers | Natural resource office | Shora | Water system office |
| Unemployment people | Paid workers | Environment office | Forest guards | |
| Honey bee keepers | Honey bee keepers | Agricultural management office | Health office | |
| Traders | Handicraft makers | | Policemen | |
| Handicraft makers | | | Cooperatives | |
| Paid workers | | | Car owners | |
| Shop keepers | | | Young sportsmen | |
| Hunters | | | Road office | |
| Fisheries | | | Women working in houses | |
| Nomads | | | Basidge | |
| Trainees (Adults getting education for literacy) | | | | |
| Small livestock keepers | | | | |
| Women | | | | |
| Young | | | | |

Figure 9-5-1 Participation Analysis (Group Categorization) for K7-48

Group: Paid Workers

| Characteristics | Problems | Potentials |
|---|---|---|
| Mostly young | No money (no fund) | Active powers |
| They are afraid of having no job. | Low income | Actively attend to the service work |
| Searching for jobs. | No insurance | The main factor for any job |
| Help the governments. | No support for job | Suitable experience |
| | Job is not available. | Can solve problems in the villages. |
| | Less trained | |
| | No permanent job | |
| | no job | |
| | No organization for finding jobs | |
| | low facilities | |
| | They have no home. | |
| | Temporally job is problem. | |
| | No access to cities. | |

Group: Jobless People

| Characteristics | Problems | Potentials |
|---|---|---|
| They are young. | These areas have not enough jobs for them. | They are young |
| They search for job. | They are demanding for special kind of job. | There is diploma (high school). |
| Don't have income | They have not enough income. | They have enough power for working. |
| Number of them is considerable. | There is no industry. | They have talent. |
| They have not permanent job. | They can not get married. | They are creative. |
| They are single. | Intention to illegal activities | They are energetic. |
| They are depressing. | No insurance when they have not job | |
| Usually they are problematic. | | |
| They don't like to work in agriculture. | | |
| They don't have concentration. | | |

Figure 6-5-2(1) Participation Analysis (Detailed Group Analysis) for K7-48

Group: Farmers

| Characteristics | Problems | Potentials |
|---|---|---|
| Producer | Low income | Able to establish cooperatives |
| Most of residents are farmers. | no facilities | Cooperation in implementing agricultural projects |
| Land owners | less agricultural machinery | Labor power |
| Consumers | No support from officers | Experience |
| They are active. | Need more water for agriculture | Knowledge |
| They are interested in agriculture. | Not enough irrigated farmland | Producers |
| | Need more road for transportation | Handicraft production |
| | Ownership problem | |
| | Condition of roads is not good. | |
| | They don't have intensity for welfare | |
| | Minority of them does not have land. | |
| | Their land has low productivity. | |
| | Authorities do not recognize the ownership completely. | |
| | High inflation | |
| | No enough training facilities | |
| | Communication services are not enough. | |
| | There are many pests and diseases. | |
| | No agriculture insurance | |
| | They have medium knowledge. | |
| | They are petty landowners. | |
| | They have low productivity. | |
| | Need for loans | |
| | Bureaucracy | |
| | Marketing problem | |
| | They have no union for supporting the farmers. | |
| | They don't have storing facilities. | |
| | High cost of agricultural services | |

Figure 9-5-2(2) Participation Analysis (Detailed Group Analysis) for K7-48

Group: Nomads

| Characteristics | Problems | Potentials |
|---|---|---|
| They are scattered. | Not enough road | They produce meat. |
| Livestock keepers | Overgrazing | Produce dairy |
| Need to migrate | Low healthcare | They have enough energy for work. |
| Use the rangeland | Their livestock have no insurance. | Handicraft production |
| They are authorized for livestock keeping. | They have not houses. | Wool producer |
| Producers | They are scattered. STOP | |
| Consumers | No suitable security on their migration | |
| Their rangeland has traditional boundary. | They have not a suitable market for their livestock. | |
| They have farmland. | No water for their livestock | |
| Rehabilitating rangeland. | No drinking water | |
| They are cooperating in livestock keeping. | Need more forage | |
| They don't need much facility. | Low healthcare for livestock | |
| They obtain identification books for public services. | Low training | |
| They are not illiterate. | They have not enough vehicles. | |
| | Don't have communication tools. | |
| | They have not enough medicine for livestock. | |
| | Forage is expensive. | |
| | Low welfare | |
| | Pre-grazing (grazing before scheduled time) | |

Figure 9-5-2(3) Participation Analysis (Detailed Group Analysis) for K7-48

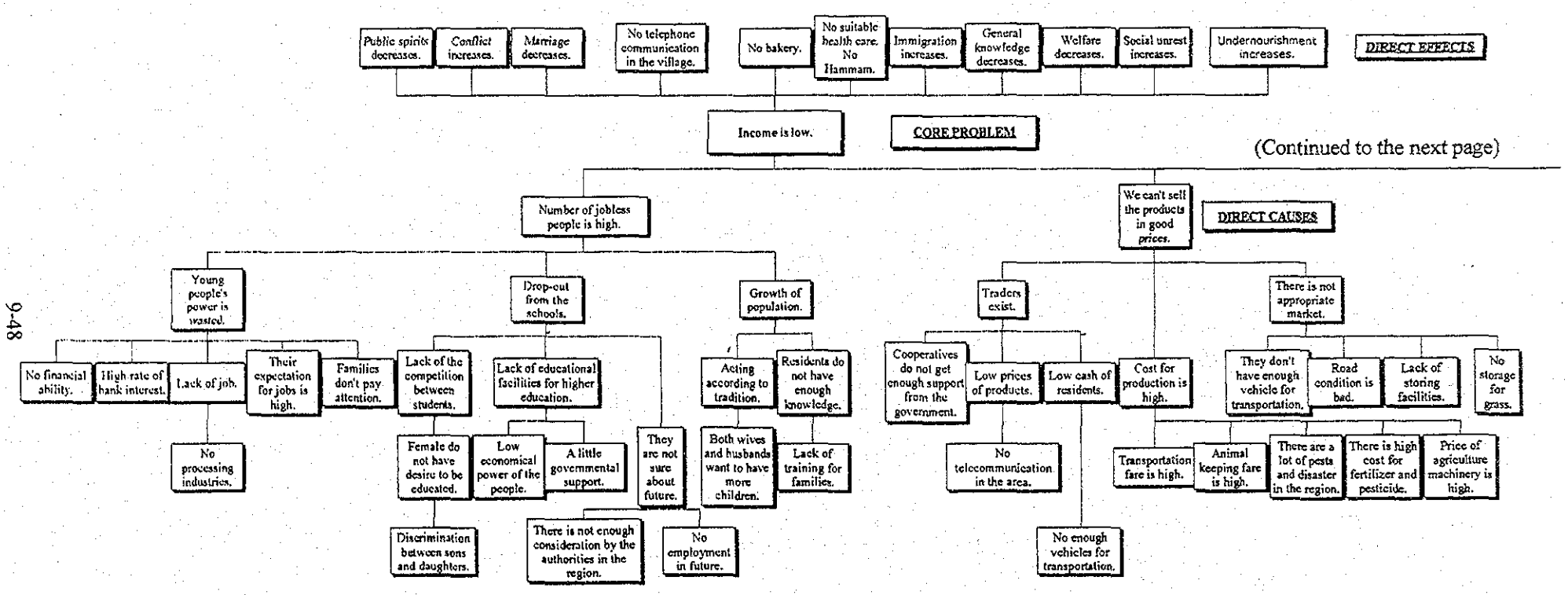


Figure 9-5-3 (1) Problem Analysis for K7-48

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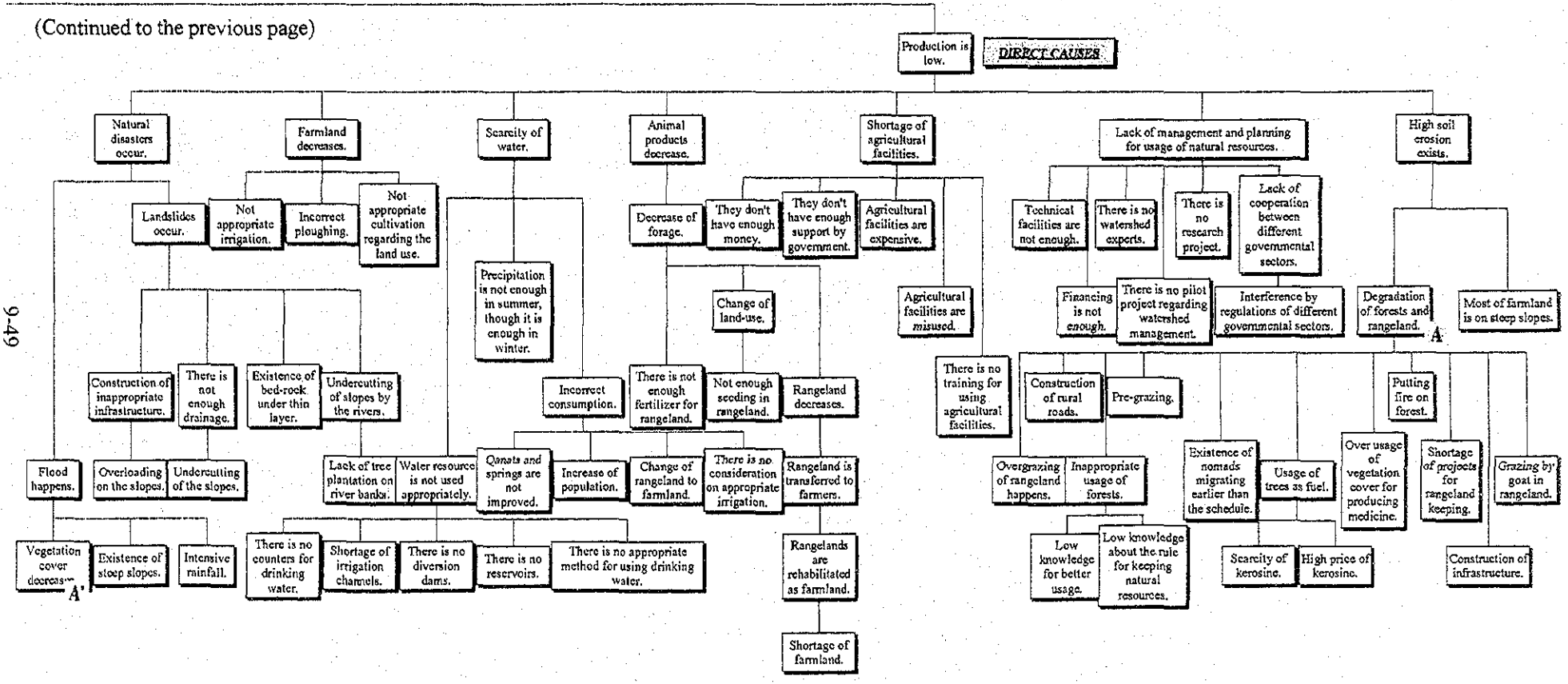


Figure 9-5-3 (2) Problem Analysis for K7-48

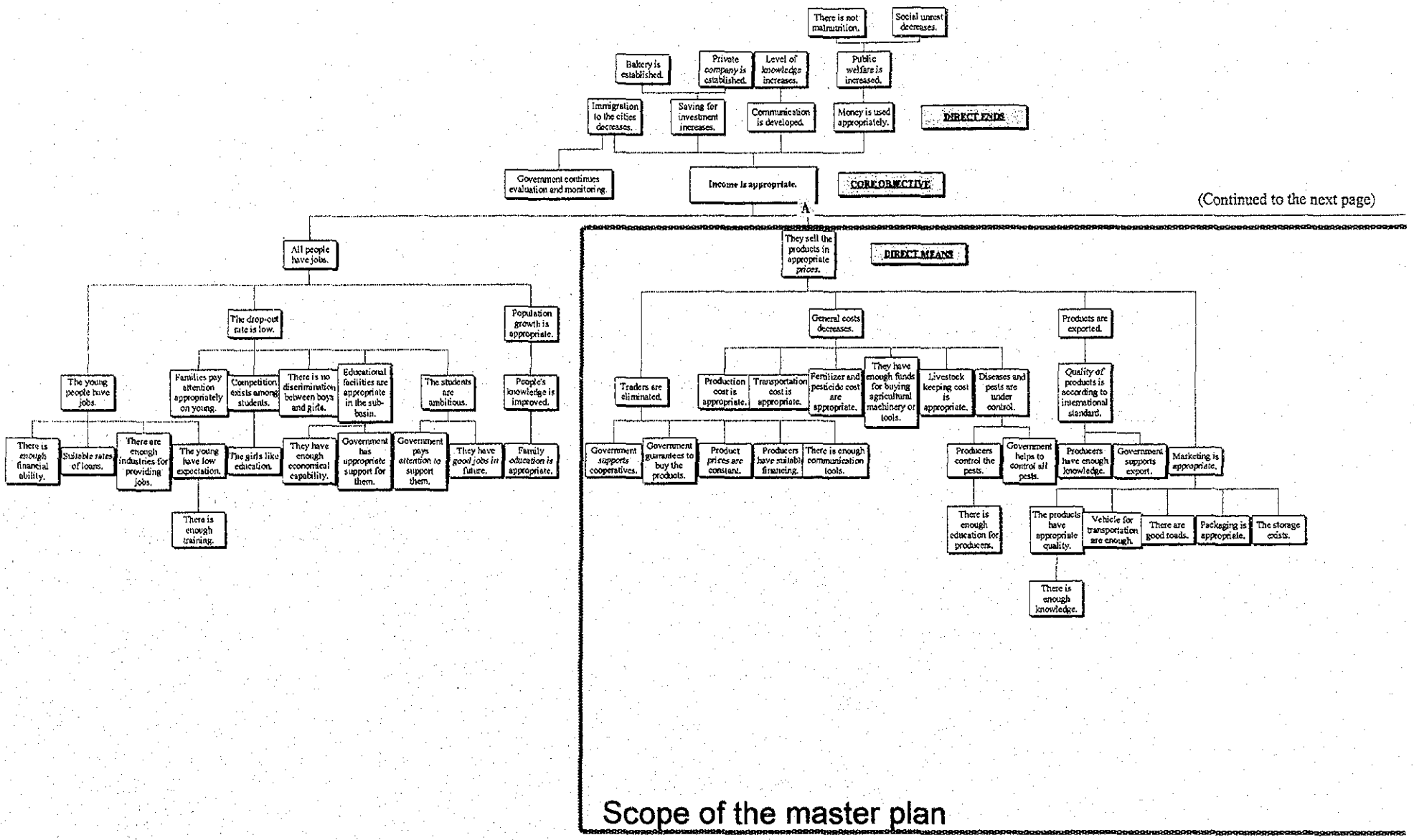


Figure 9-5-4 (1) Objective Analysis for K7-48

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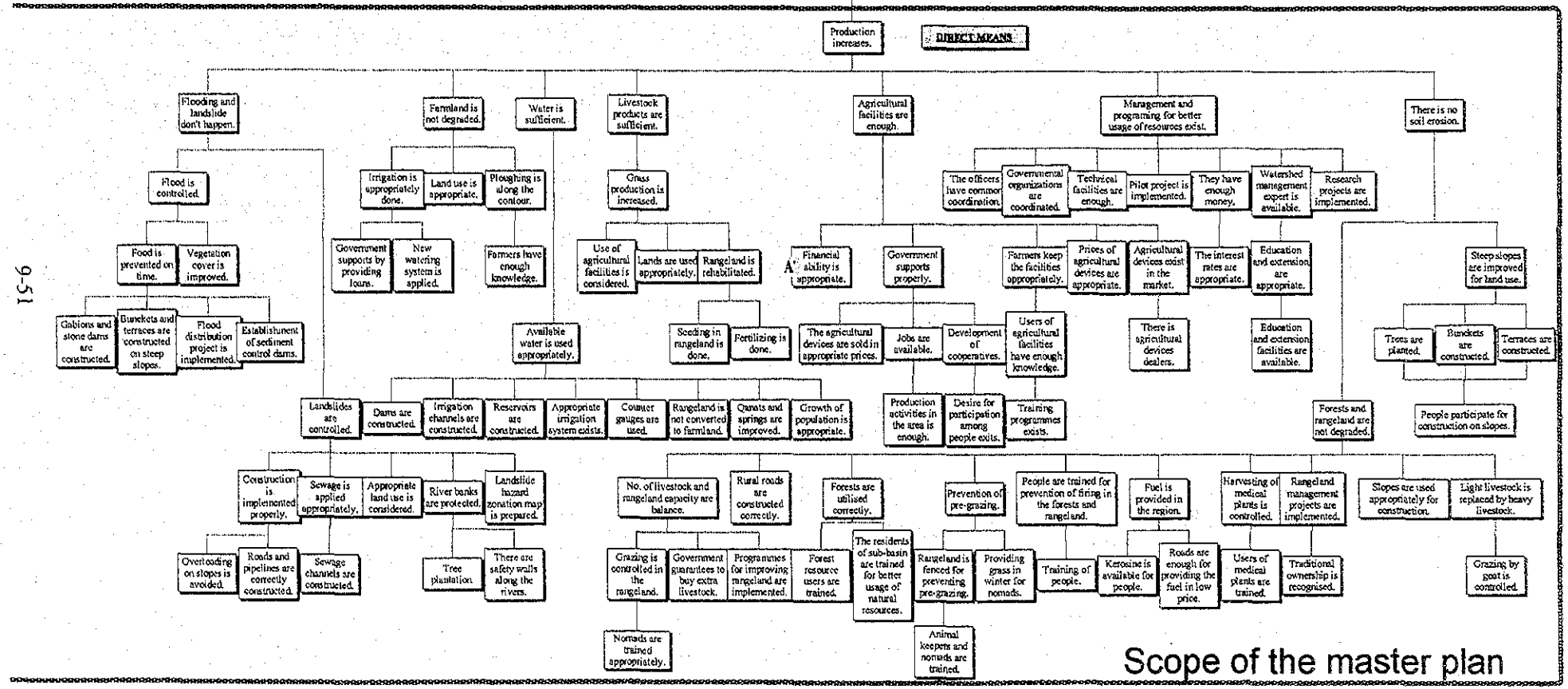


Figure 9-5-4 (2) Objective Analysis for K7-48

Table 9-5-2 Project Design Matrix (PDM) for K7-48

Project Name: Integrated Watershed Management of Tang-e-Sorkh Basin  Duration: 20 years (2002-2021)  Date: 2001/6/14

Project Area: Tang-e-Sorkh sub-basin (K7-48)  Target Group: Residents of the Tang-e-Sorkh sub-basin

| Narrative Summary | Verifiable Indicators | Means of Verification | Important Assumptions |
|---|---|---|---|
| **Overall Goal**<br>Relative welfare increases among people. | | | |
| **Project Purpose**<br>Income increases by selling all kinds of products. | | | - Immigration to the cities is reduced<br>- Government have continuous guidance on economical development of the area. |
| **Outputs**<br>1 Management and programming are appropriate.<br>2 Flooding, landslides and soil erosion are decreased.<br>3 Farmland is not degraded.<br>4 Water is appropriate.<br>5 Agricultural facilities exist.<br>6 Livestock products are appropriate.<br>7 They sell the products in good prices. | | | - Inflation is balanced. |
| **Activities**<br>1-1 Coordinate governmental sectors.<br>1-2 Coordinate different regulations.<br>1-3 Establish pilot project in the area.<br>1-4 Establish research project.<br>1-5 Evaluate the project.<br>1-6 Provide technical consulting.<br>1-7 Prepare technical facilities.<br>1-8 Establish educational facilities.<br>2-1 Residents participate to watershed management activities.<br>2-2 Recognise traditional boundaries.<br>2-3 Construct flood control dams.<br>2-4 Construct check dams.<br>2-5 Construct dikes on river banks.<br>2-6 Construct preventing wall on riversides.<br>2-7 Construct buncket on slopes.<br>2-8 Plant trees on the slopes.<br>2-9 Construct protecting walls on slopes.<br>2-10 Establish appropriate overload on a slope.<br>2-11 Construct appropriate drainage channels.<br>2-12 Establish monitoring system for roads, channels, pipelines etc.<br>2-13 Establish warning system for natural disasters.<br>2-14 Establish appropriate roads.<br>2-15 Provide grass and water for nomads in winter.<br>2-16 Establish educational centre for livestock keepers.<br>2-17 Educate forest and rangeland users for training.<br>2-18 Control goat grazing on rangeland.<br>2-19 Provide fuel.<br>2-20 Provide educational facilities for fire.<br>3-1 Train the farmers.<br>3-2 Consider the land use.<br>3-3 Plough along the contour.<br>3-4 Execute new irrigation system.<br>4-1 Prevent the conversion of rangeland to farmland.<br>4-2 Improve qanats and springs.<br>4-3 Establish reservoir dams.<br>4-4 Establish diversion dams.<br>4-5 Establish irrigation channels.<br>4-6 Establish pumping stations.<br>4-7 Establish drinking water tanks.<br>4-8 Install counter gauge.<br>4-9 Prevent over growth of population.<br>5-1 Develop cooperatives.<br>5-2 Establish buying and selling centre for agricultural facilities.<br>5-3 Provide agricultural facilities with appropriate prices.<br>5-4 Provide agricultural facilities with good quality.<br>5-5 Provide training for better usage of agricultural devices.<br>6-1 Equalise no. of livestock and capacity of rangeland.<br>6-2 Protect the rangeland by fencing.<br>6-3 Consider appropriate time for grazing.<br>6-5 Seed the rangeland.<br>6-5 Fertilise rangeland.<br>6-6 Execute systematic grazing.<br>6-7 Construct watering place.<br>6-8 Prevent entrance of heavy vehicles on rangeland.<br>6-9 Prevent issuing incorrect grazing certificate.<br>6-10 Develop grass production.<br>6-11 Develop agricultural facilities for grass production.<br>7-1 Stabilise prices of products.<br>7-2 Construct roads.<br>7-3 Establish packaging industries.<br>7-4 Establish store in the region.<br>7-5 Provide training for controlling pests and diseases.<br>7-6 Provide vehicles for transportation.<br>7-7 Guarantee purchase of the products by government.<br>7-8 Support the cooperatives by government.<br>7-9 Support export of products by government.<br>7-10 Establish telecommunication network.<br>7-11 Control diseases by government.<br>7-12 Provide training for export.<br>7-13 Provide training for increasing quality of products. | Inputs | | - Interest rate for loan is low.<br>- Related organisations support the project.<br>- The government's policy doesn't change.<br>**Preconditions**<br>- People participate to implement the project. |

## 9.6 Results of the Workshop: K8-28 Zeras

The PCM workshop for the K8-28 (Zeras) was held on June 16-19, 2001 at the technical high school in Izeh town. The participants of the workshop are shown in the Table 9-6-1. The workshop results, namely Participation Analysis (Group Categorization), Participation Analysis (Detailed Group Analysis), Problem Analysis, Objectives Analysis and Project Design Matrix (PDM) are shown in the Figure 9-6-1, 9-6-2, 9-6-3, 9-6-4, and Table 9-6-2 respectively.

Table 9-6-1(1) Participants List of the Workshop for K8-28

| | NAME | POSITION/OCCUPATION | ORGANISATION/VILLAGE | 6.16 | 6.17 | 6.18 | 6.19 |
|---|---|---|---|---|---|---|---|
| 1 | A. Baghery | Expert in training | Ministry of Jihad, Izeh | | p | | |
| 2 | M. Hassanzadeh | M.S.Holder in watershed management | Jihad provincial office. | | p | p | p |
| 3 | D. Kamimura | Expert for Socio-economic Study | JICA Study Team | | | p | p |
| 4 | S.M.Safavi | Co-moderator | Watershed Management Deputy | p | p | p | p |
| 5 | A. Ghasemi | Expert | Natural resource office, Izeh | p | p | p | p |
| 6 | M. Mokhtari | Expert in health care of buildings | Veterinary office, Izeh | p | p | p | p |
| 7 | S.F. Hossini Baraftabi | Financial expert | Rural water and sewage company in Izeh | p | p | p | p |
| 8 | H.A.Mohammadi | | | p | p | p | p |
| 9 | M.A.Keley | Expert | Provincial office, Jihad | p | | | |
| 10 | J. Iguchi | | | p | p | p | p |
| 11 | A. Ahmadi | Manager | Jihad Izeh office | p | | | |
| 12 | Kh. Jahangiri | Manager | Watershed office, Izeh | p | p | p | p |
| 13 | Ch. Awazeh | Expert in extention | Nomads affairs office, Izeh | p | p | p | |
| 14 | M. Afaridon | Manager | Extention office of Jihad, Izeh | p | | | |
| 15 | H. Mohammadi | Expert in rural development | Jihad Izeh office | p | p | p | p |
| 16 | A. Kiani | Expert in construction | Construction office of Jihad, Izeh | p | | | |
| 17 | B. Lajmurak | Expert in livestock affairs | Jihad livestock office, Izeh | p | p | p | p |
| 18 | A. Davodi | Farmer and livestock keeper | Ab sorakh village | p | p | p | p |
| 19 | J. Fadaee | Expert in watershed management | Deputy of W.M., MOJA, Tehran | p | p | p | p |
| 20 | S. Y. Mousavie | Expert in agricultural engineering | Agricultural management of Jihad, Izeh | | | p | p |
| 21 | M. H. Mahamovand | Farmer | Behoz village | | p | p | p |
| 22 | S. A. Jafari | Farmer | Sartuf village | | p | p | p |
| 23 | A. M. Jamshidi | Farmer | Zeras village | | p | p | p |
| 24 | A. Gh. Alimardi | Farmer and livestock keeper | Sebolotak village | p | p | p | p |
| 25 | Ms. F. Lajmurak | Manager, Rural women cooperative co. | Izeh string maker cooperative co. | p | | | |
| 26 | A.Raiszadeh | Manager | Natural resource office, Izeh | p | | | |
| 27 | Ms. L. Abbasi | Director of carpet producer cooperative | Carpet producer cooperatives of Izeh | p | | | |
| 28 | Ms. M. Lajmurak | Liaison officer of Emdad committee | Emdad committee of Izeh | p | | | |
| 29 | Kh. Tajgirian | Farmer and livestock keeper | Zeras village | p | p | p | p |
| 30 | A. Mahmmodvand | Farmer and livestock keeper | Behoz village | p | p | p | p |
| 31 | K. A. Bahmanpour | Farmer and livestock keeper | Zeras village | p | p | p | p |
| 32 | S. Mahmodi | Farmer and livestock keeper | Behoz village | p | p | p | p |
| 33 | M. Behbahani | Consultant | Deputy of W.M., MOJA, Tehran | p | p | | |
| 34 | M. Ghodarzi | Staff | Deputy of W.M., MOJA, Tehran | p | p | p | p |
| 35 | A. Mohammadju | Expert in civil engineering | Provincial office, Jihad | p | p | p | p |
| 36 | A. Majidy | Geologist | Provincial office, Jihad | p | p | p | p |
| 37 | S. Khadem-al-hadim. | Expert in watershed management | Provincial office, Jihad | p | p | p | p |
| 38 | N. Mirzai | Expert in watershed management | Provincial office, Jihad | p | p | | |
| 39 | R. Bayati | Expert in watershed management | Provincial office, Jihad | p | p | | |
| 40 | E. Gabari | Farmer | Bradken village | | p | p | p |

Table 9-6-1(2) Participants List of the Workshop for K8-28

| | NAME | POSITION/OCCUPATION | ORGANISATION/VILLAGE | 6.16 | 6.17 | 6.18 | 6.19 |
|---|---|---|---|---|---|---|---|
| 41 | Mirzaie | Staff | Zeras village | | | p | p |
| 42 | Ms. S.G. Zarrinkamar | Teacher of the technical school (venue of the workshop) | MOJA, Izeh office | | | p | p |
| 43 | Ms. G.Zarrinkamar | Teacher of the technical school | MOJA, Izeh office | | | p | p |
| 44 | Ms. G.Karani | Student of the technical school | | | | p | p |
| 45 | Ms. T. Nejati | Student of the technical school | | | | p | p |
| 46 | Ms. S. Mohammadi | Student of the technical school | | | | p | p |

| Beneficiaries | Negatively Affected Groups | Decision Makers | Supporting Groups | Implementing Agencies |
|---|---|---|---|---|
| Farmers | Traders | Shoras | Extensioners, MOJA | Office of documentation |
| Carpet makers | Farmers | Land owners | Local police | Natural resources office, MOJA |
| Livestock keepers (Permanent residents) | Livestock keepers | Farmers and livestock keepers | District governor | Water and electricity organisation, Ministry of power |
| Nomads immigrating outside the province. | Nomads immigrating inside the province. | Local natural resource office, MOJA | Rangeland certificate holders | MOJA |
| The farmers without land (short term residents) | Nomads immigrating outside the province. | MOJA | Bank of Agriculture | Watershed management office, MOJA |
| Nomads immigrating inside the province. | Land owners | Natural environment office | Management and programming organisation | Natural environment office |
| Fishermen | The farmers without land (short term residents) | District governor | Welfare committee | Housing foundation |
| Millers | Watershed keepers | Local justice office | Banks | Construction and rural industries, MOJA |
| Rangeland certificate holders | | | Teachers | Rural water and sewage office, MOJA |
| Shop keepers | | | Education office | Nomad affairs office, MOJA |
| Hunters | | | Local telecommunication office | Livestock affairs office, MOJA |
| Drivers | | | Health centre | |
| Local shepherds | | | Educational committee | |
| Land owners | | | Natural resources office, MOJA | |
| Traditional landowners | | | Health care providers | |
| Land users in the sub-basin | | | Health posts | |
| | | | Veterinary office | |
| | | | Foresters | |
| | | | Local extension office, MOJA | |
| | | | ID certificate office | |
| | | | People participation department, MOJA | |
| | | | Donors | |
| | | | Watershed management office, MOJA | |
| | | | Housing foundation | |
| | | | Nomad affairs office, MOJA | |
| | | | Local elders | |
| | | | JICA | |

Figure 9-6-1 Participation Analysis (Group Categorization) for K8-28

Group: Traditional Landowners in the Sub-basin

| Characteristics | Problems | Potentials | Implication for project planning |
|---|---|---|---|
| Hard working | The land have traditional boundaries. | Providing man power for project | Cooperation and providing labour for the project |
| Permanent residents | Some of them don't have registration of the land but they actually own the land. | Actively attend to the service work | Used by local authorities and local contractors |
| | There is not water for farming. | Implement project | |
| | High expense for farming activities | Good information about climate conditions | |
| | Seasonally jobless. | Recreation activities | |
| | They don't trust government. | Ability for extra activities for more income | |
| | illiterate | | |
| | Farmland is destroyed. | | |
| | Rangeland is destroyed | | |
| | No permanent water | | |
| | Land is divided into small portions | | |
| | There is not farming facilities. | | |
| | Low income | | |

Group: Carpet Makers

| Characteristics | Problems | Potentials | Related organisation |
|---|---|---|---|
| Most of them are female. | Insurance | Carpet production | Women in village |
| Providing income for their life. | Education | String production | Carpet cooperative |
| Sincerely | Loan | Colouring of wool | Extension office |
| Religious belief | Health | Making money | MOJA office |
| Simple living | Unable to sell their products | Producing carpets for their own uses | String makers cooperative |
| Hard working | Lack of facilities | Job providers | Welfare committee |
| | Lack of welfare | | Local office of commerce |
| | High prices of equipment | | Buyers |
| | Lack of shops in the area | | Traders |
| | Working in bad conditions | | Handicraft office |
| | Sickness | | District governor |
| | Low level of training | | |
| | Lack of suitable design for the carpets | | |
| | Shortage of forage | | |

Figure 9-6-2(1) Participation Analysis (Detailed Group Analysis) for K8-28

Group: Farmers (Permanent Residents)

| Characteristics | Problems | Potentials | Implication for project planning |
|---|---|---|---|
| They have land. | No dripping irrigation system | Providing manpower for project | Using the farmers as seasonal workers |
| They usually have several animals. | Destruction and erosion of farmland | Ability for extra activities | Cooperation for promoting sub-basin condition |
| Majority of people are farmers. | There is not enough fuel | Preparation of food | Cooperation for implementing the project |
| They have certificates for land ownership. | Farmers have problems on fertiliser. | Preparation of forage | Cooperation with other farmers |
| They are agricultural producers. | There is not enough forage. | Job creation | |
| They have big families. | Farmers have problems on insurance of production. | Transfer of experience to others | |
| They work so hard with low income. | Lack of mechanical equipment. | Zero-grazing | |
| Farmland is scattered. | The farmland is without irrigation. | Using scientific experience for more production | |
| They are producers of livestock products. | No appropriate place for animals. | Cooperation for executing agricultural plans. | |
| | They are following traditional agriculture. | | |
| | They get income from agriculture and livestock keeping. | | |
| | The government buys products with low prices. | | |
| | There is not mechanised farmland. | | |
| | Landslide. | | |
| | Compensation for the land going underwater by Karoon No.3 dam is low. | | |
| | Shortage of medicine for livestock | | |
| | A part of land is going underwater by Karoon No.3 dam. | | |
| | Regulation by natural resource office for farming | | |
| | Erosion in the farmland | | |
| | Flood | | |
| | No health post in some villages | | |
| | No water for drinking | | |
| | Illiteracy | | |
| | Their land is on slope. | | |
| | There are not enough schools. | | |
| | They need training for seeding. | | |
| | They are provided a little fertiliser. | | |
| | There is not appropriate road. | | |
| | No financial facilities (loans) | | |
| | No cooperation from local agricultural offices to the farmers. | | |
| | Land is not flat. | | |
| | Fertiliser is expensive in the black market. | | |
| | The boundaries between natural resources and farmland are not clear. | | |
| | No guarantee for buying products. | | |
| | There is not enough land for farming. | | |

Figure 9-6-2(2) Participation Analysis (Detailed Group Analysis) for K8-28

Group: Nomads Migrating inside the Province

| Characteristics | Problems | Potentials | Related organisation |
|---|---|---|---|
| Majority of them are livestock keepers. | Expense for medicine | Producing string from wool | Office for certificate land |
| Migrating in spring and summer | No extensioner | Producing dairy | Natural resources office |
| Self sufficient | No veterinary | Producing meat | Extensioners |
| Low expectation | Housing problems | Capable for implementing the project | Governmental offices |
| Stable against problems | No training or education | Zero-grazing | Livestock affairs office |
| They are brave. | No health care | Producing wool | Agriculture bank |
| They believe their roots. | Land tenure is not clear. | | Nomad affairs office |
| | Overgrazing | | Nomad education office |
| | Shortage of facilities | | Heath posts |
| | Not enough technical abilities | | MOJA |
| | Lack of financial abilities | | Cooperatives |
| | No credits | | Local shoras |
| | No water for livestock | | District governor |
| | Shortage of forage | | |
| | Communicable diseases | | |
| | No security | | |
| | Shortage of livestock medicine | | |
| | Shortage of water | | |
| | Shortage of road | | |
| | Lack of healthy houses for keeping animals | | |
| | Migration for six month per year | | |
| | Problems on passing through the basin | | |
| | Lack of veterinary | | |
| | Shortage of fertiliser | | |

Figure 9-6-2(3) Participation Analysis (Detailed Group Analysis) for K8-28

Group: Nomads Migrating outside the Province

| Characteristics | Problems | Potentials | Related organisation |
|---|---|---|---|
| Resistant | They have not land. | Meat and dairy production | Office for certificate land |
| Simple living | They have a little rangeland and grass. | Wool and string production | Natural Resource Office |
| Low expectation | No vaccination for livestock | | Nomad affair office |
| Access to the cheep rangeland | No health care while migrating | | Extensioners |
| Having hard life | No housing | | Cooperatives |
| Access to rich rangeland | No security on the way for migration | | Veterinary office |
| Moving long distance | No nomad's shops | | MOJA office |
| Living in tents | Lack of training facilities | | Health care office |
| Living in mountainous climate | lack of appropriate way for migration | | Education committee |
| Producers of good quality products | Exhaustion of animals | | Local police |
| | Selling products to dealers with low prices | | District governor |
| | No support from the government for selling their animals | | Local nomad shoras |
| | No certified ownership for rangeland | | |
| | No health care | | |
| | There is no medical treatment. | | |
| | Lack of support for selling their animals. | | |
| | Hard life | | |

Figure 9-6-2(4) Participation Analysis (Detailed Group Analysis) for K8-28

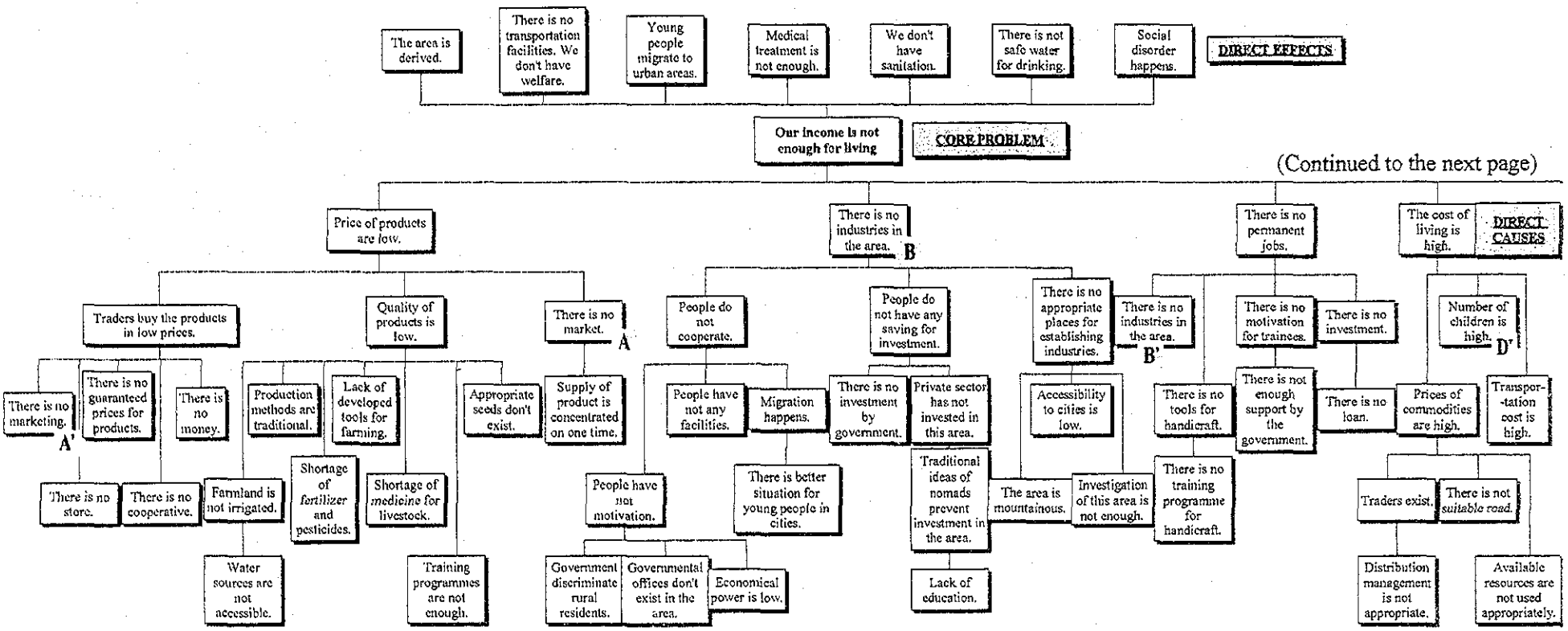


Figure 9-6-3 (1) Problem Analysis for K8-28

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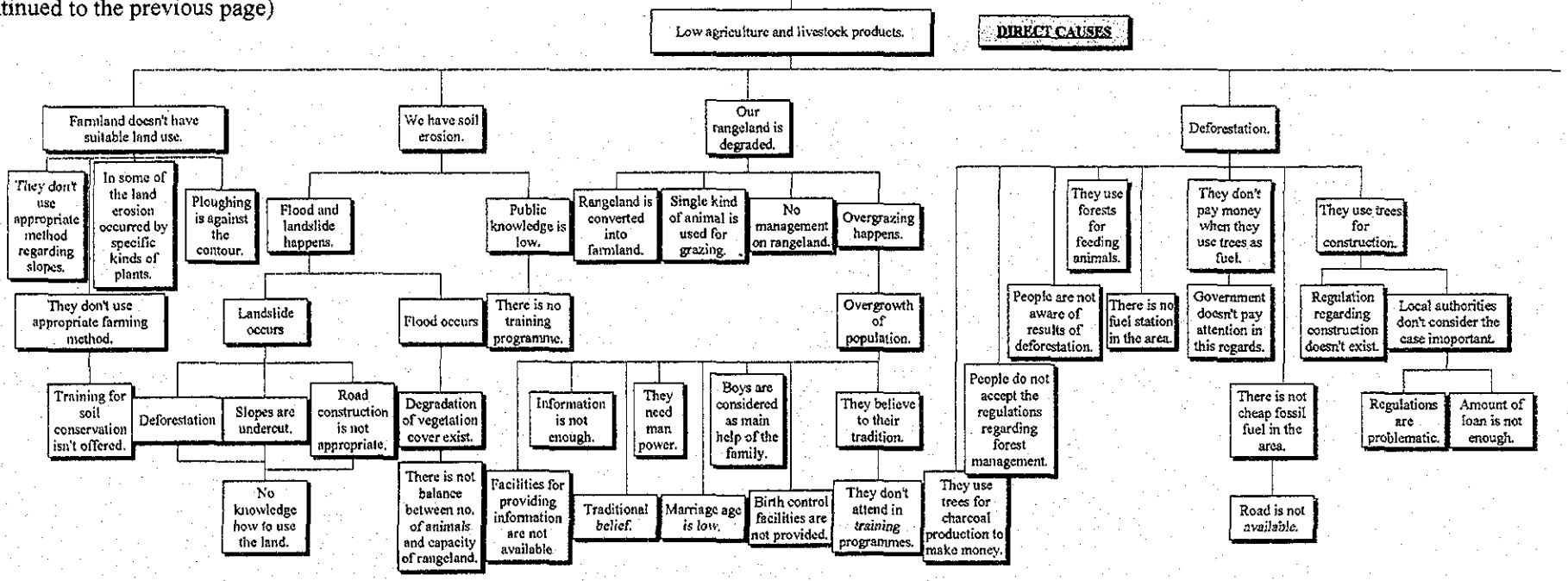


Figure 9-6-3 (2) Problem Analysis for K8-28

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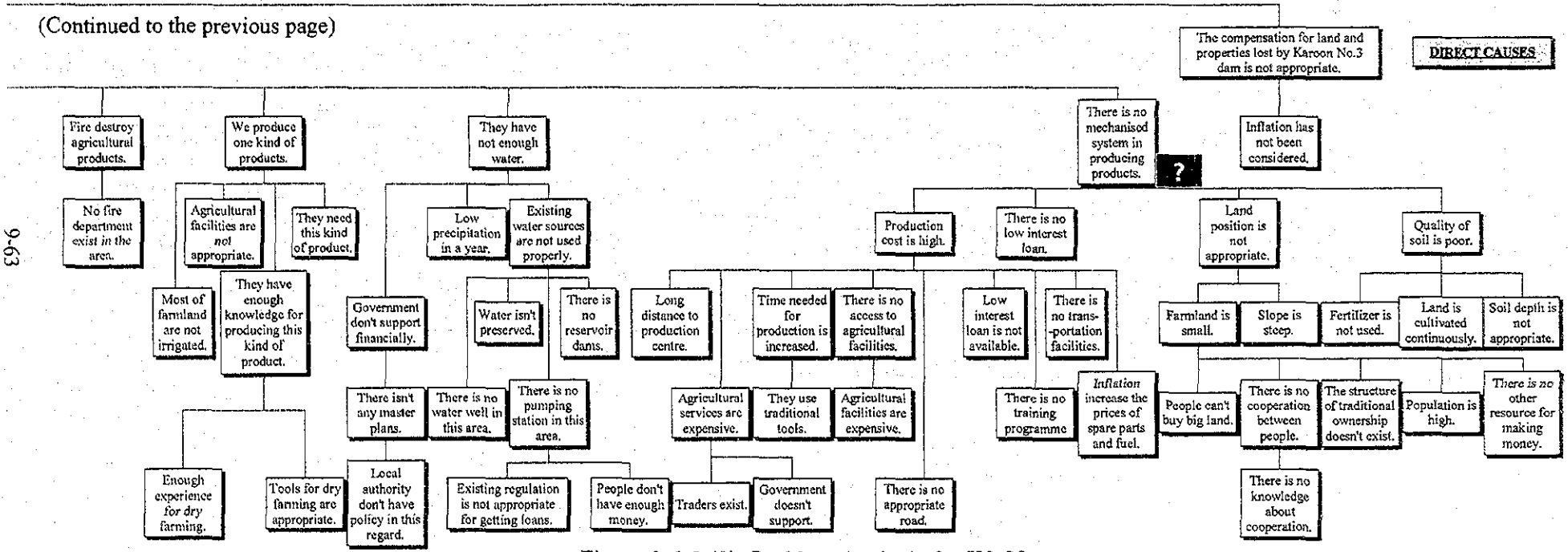


Figure 9-6-3 (3) Problem Analysis for K8-28

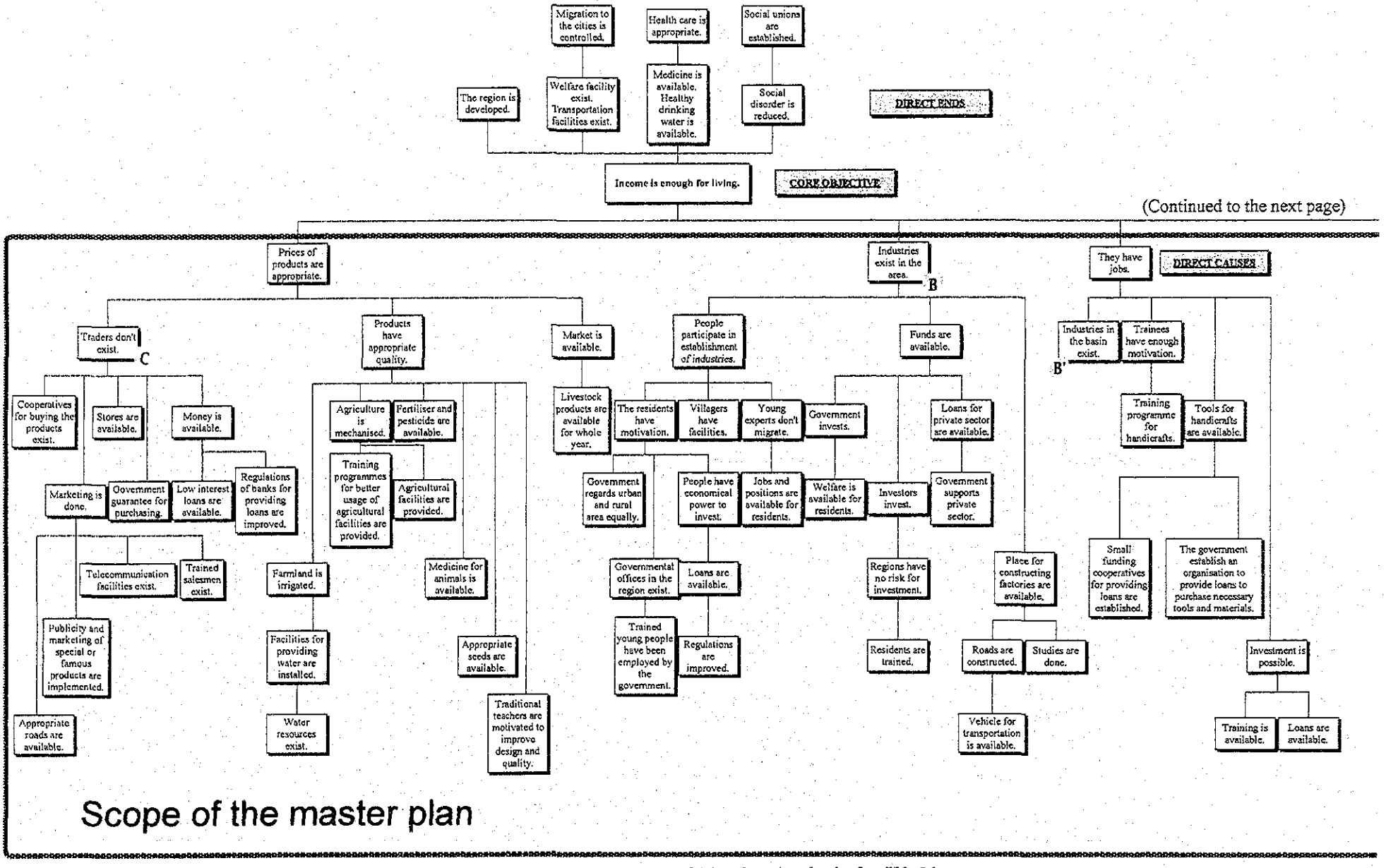


Figure 9-6-4 (1) Objective Analysis for K8-28

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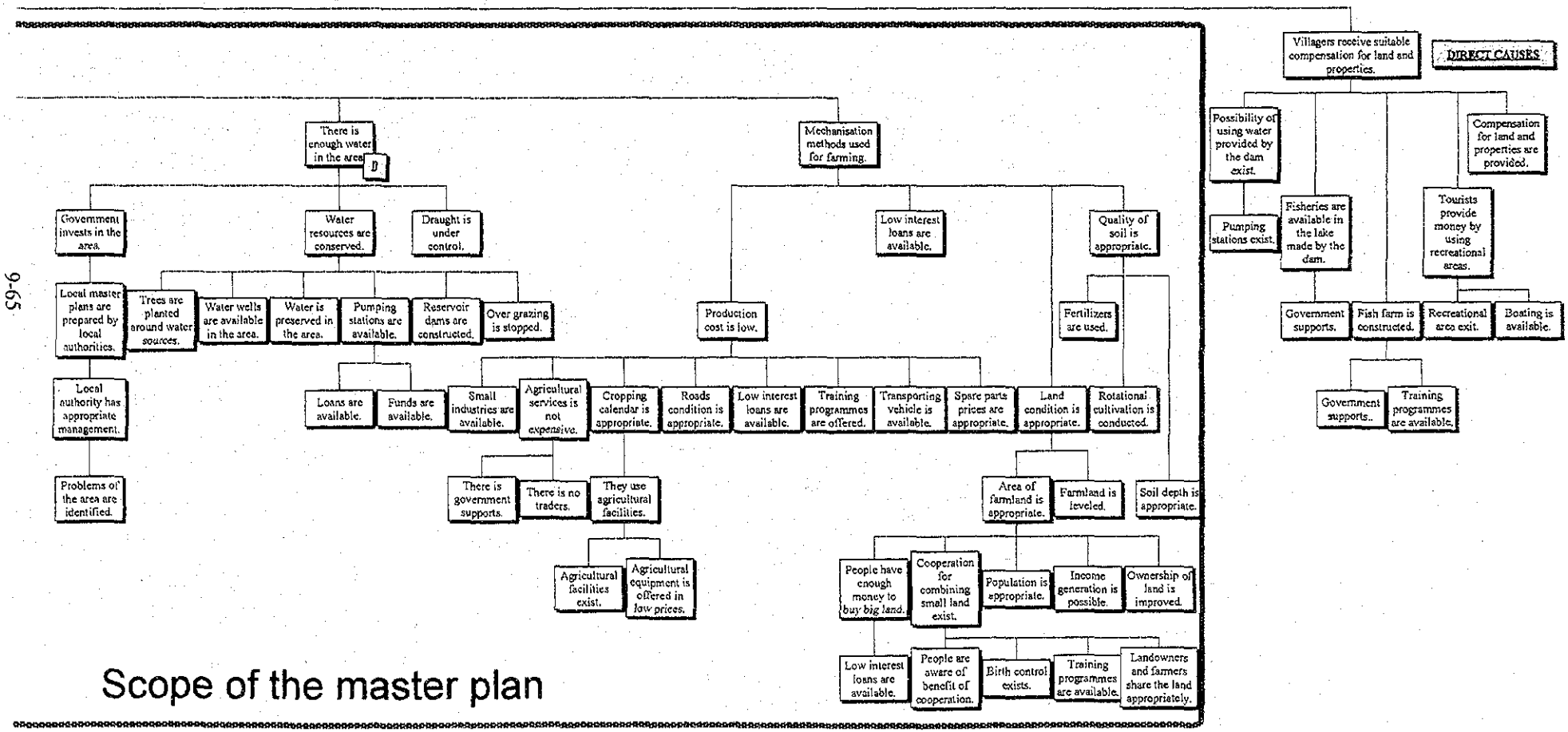


Figure 9-6-4 (2) Objective Analysis for K8-28

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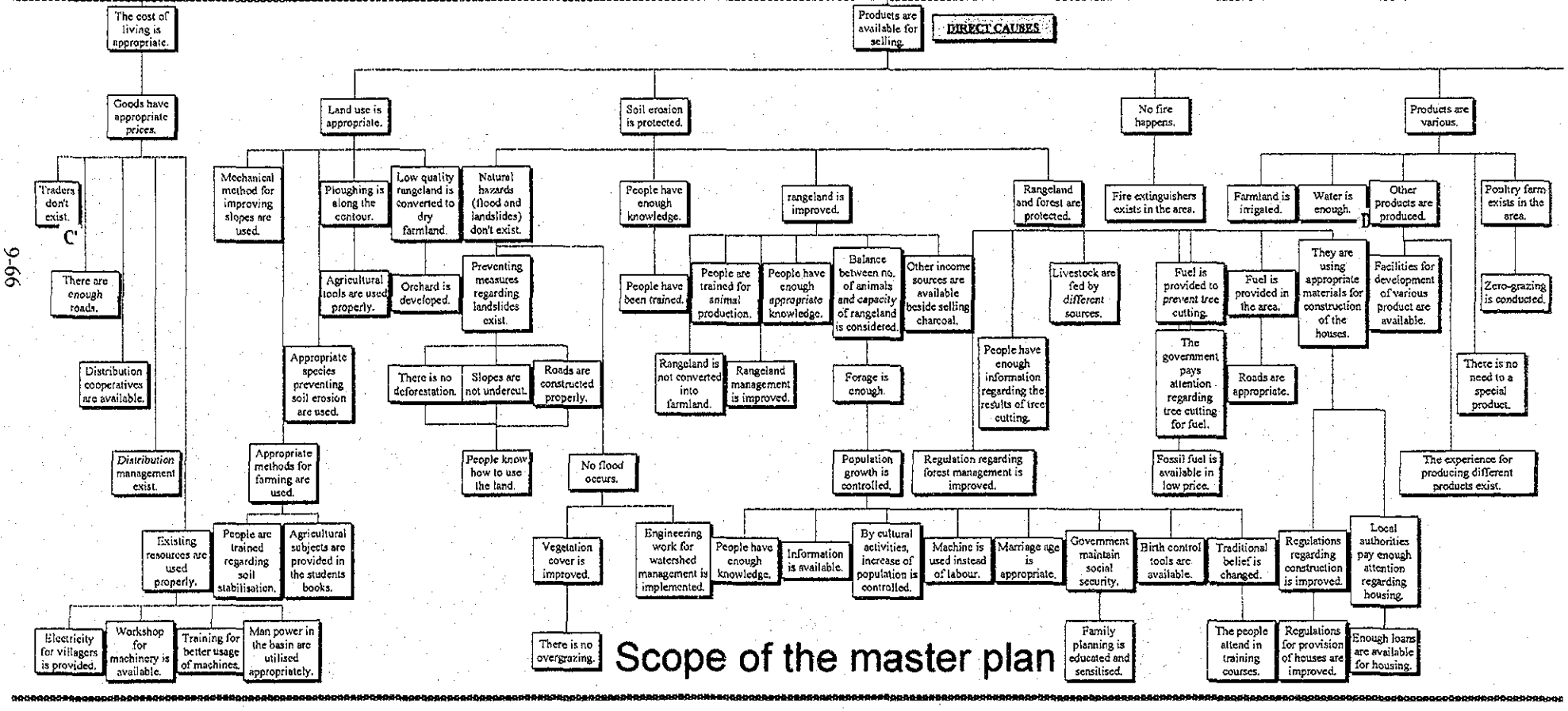


Figure 9-6-4 (3) Objective Analysis for K8-28

Table 9-6-2 Project Design Matrix (PDM) for K8-28

Project Name: Watershed masterplan of Zeras basin prepared by participation of residents Duration: 20 years (2002-2021) Date: 2001/6/19 Project Area: Zeras sub-basin (K8-28) Target Group: Farmers and nomads living in the sub-basin

| Narrative Summary | Verifiable Indicators | Means of Verification | Important Assumptions |
|---|---|---|---|
| **Overall Goal**<br>Economical, social, cultural conditions of the residents are improved. | | | |
| **Project Purpose**<br>The residents of Zeras basin have enough income for living. | | | |
| **Outputs**<br>1 Soil erosion is controlled.<br>2 Water is enough in the region.<br>3 Land use is appropriate.<br>4 Farming is mechanised.<br>5 Selling price of products is appropriate<br>6 Products are various.<br>7 Industries exist.<br>8 Crops are not destroyed by fire.<br>9 Residents have jobs.<br>10 Cost of living is appropriate. | | | - A loss of land and properties by the Karoon No.3 dam is compensated.<br>- Inflation is normal. |
| **Activities**<br>1-1 Coordinate with the Ministry of Interior to secure the area.<br>1-2 Coordinate with the Ministry of Health regarding population growth.<br>1-3 Coordinate with the Housing foundation regarding loans for construction of houses.<br>1-4 Provide training for the people.<br>1-5 Use machinery instead of manual labour.<br>1-6 Construct roads.<br>1-7 Provide fossil fuel replacing fuel wood.<br>1-8 Replace food for animals from trees.<br>1-9 Provide different resources for making money to prevent making money by producing charcoal.<br>1-10 Enforce the laws for forest management.<br>1-11 Manage over grazing.<br>1-12 Appropriately manage the rangeland.<br>1-13 Implement engineering work for watershed management.<br>2-1 Coordinate with the Ministry of Power for issuing using the water sources.<br>2-2 Construct the earth dams.<br>2-3 Split the flood water.<br>2-4 Simplify the procedures for getting loans.<br>2-5 Construct pumping stations.<br>2-6 Preserve water.<br>2-7 Implement engineering works.<br>2-8 Construct gabion dams.<br>2-9 Construct stone dams.<br>2-10 Implement biological works.<br>2-11 Prevent overgrazing.<br>3-1 Train for soil stabilisation.<br>3-2 Implement measures for soil stablisation.<br>3-3 Avoid planting specific crops promoting soil erosion.<br>3-4 Use appropriate agricultural machines.<br>3-5 Develop orchads.<br>3-6 Provide agricultural subjects in training books for students.<br>3-7 Provide compensation for the people losing lands by this management.<br>4-1 Improve land ownership.<br>4-2 Make people participate to discuss on combination of small land.<br>4-3 Combine the small land.<br>4-4 Level farmland.<br>4-5 Consider soil depth.<br>4-6 Consider a fallow period for farmland.<br>4-7 Provide tools in lower prices.<br>4-8 Provide vehicles.<br>4-9 Provide spare parts in low prices.<br>4-10 Provide jobs.<br>5-1 Construct appropriate roads.<br>5-2 Coordinate with telecommunication office.<br>5-3 Coordinate with banks.<br>5-4 Provide water.<br>5-5 Provide water supply system.<br>5-6 Provide agricultural tools.<br>5-7 Provide markets for products.<br>5-8 Provide training for changing way of farming.<br>5-9 Provide appropriate seeds.<br>5-10 Provide enough fertiliser and pesticide.<br>5-11 Provide medicine for animals.<br>5-12 Make people provide livestock products whole year.<br>5-13 Provide training for marketing.<br>5-14 Provide market in the area.<br>6-1 Convert dry farming field into irrigated field.<br>6-2 Provide enough water.<br>6-3 Consider special kinds of products.<br>6-4 Construct facilities for zero-grazing.<br>6-6 Construct poultry farm.7-1 Eliminate discrimination against rural resident by government.<br>7-2 Provide appropriate investigation.<br>7-3 Make related governmental agencies to support private sector.<br>7-4 Provide welfare for residents.<br>8-1 Establish facilities for prevent fire.<br>9-1 Establish small industries.<br>9-2 Establish founding cooperatives to support small industries.<br>9-3 Provide loans for handicrafts.<br>10-1 Provide electricity for villagers.<br>10-2 Eliminate black market.<br>10-3 Establish distributing cooperatives in the area.<br>10-4 Establish workshop for repairing agricultural machinery.<br>10-5 Provide job opportunity for jobless people. | Inputs | | - Appropriate regulation regarding house construction is enforced.<br>- Population growth is controlled.<br>- Social security is maintained by the government.<br>- New water wells are made.<br>- Telecommunication facilities are established.<br>- Bank regulations regarding loans are improved.<br>- Loans are provided.<br>- Manual labour is provided by the residents.<br>**Preconditions**<br>- Loans for housing are provided.<br>- Existing water situation does not worsen. |

## 9.7 Evaluation of the PCM Workshops

After completion of the entire PCM workshops, an evaluation meeting for the workshops was held, for identifying strength and weakness of the PCM and make suggestion for the better application of the PCM method by the Ministry in future. The meeting was held at the Research and Evaluation Department of WMD on June 30, 2001, where 4 JICA experts including the expert for Participatory Planning and 6 officers of WMD who had acted as co-moderators/ translators of the PCM workshops participated.

Based on the results of the meeting, applicability of the PCM methods to the operation of WMD and other related organizations are evaluated as follows.

### 9.7.1 Strength

(1) Participatory Approach

While the evaluation meeting, everybody admitted that one of the strongest points of the PCM workshop is its participatory approach. In the PCM workshop representatives of various concerning organizations/ groups of people participated in and they themselves were making decisions on the master plan.

At first, the participatory workshop helped the local residents to identify the problems "by themselves" and discuss "by themselves" how to solve the problems. If the residents can consider the master plan as "their own master plan" they would decide, it would be easier to get their cooperation to the implementation of the master plan.

Secondly, the participatory PCM workshop was a good opportunity for governmental officials to identify to local people's idea, and also to propagate their ideas to the people. All participants share information necessary for planning, and they can discuss each other directly. There is less possibility of redundancy and inefficiency on their communication.

Furthermore, if the participants are careful enough, workshop can also be a good opportunity to notice opinions of minorities in the society.

(2) Technology Transfer to the Officers of WMD

Another fruit of the PCM workshop is transfer of technology from the JICA expert for Participatory Planning to the officers especially those who acted as co-moderators. In the first workshops, the JICA expert was moderating the workshops, while the co-moderators translated

what he said and supported his facilitation of the workshop. Fortunately, the improvement of skills of the co-moderator to facilitate the workshop was so rapid that, in the latter workshops, the co-moderators can moderate the workshops by them selves.

In particular, Mr. Seyyed Mohammad Safavi, the only co-moderator who fully participated the entire activities concerning the PCM workshop (from the training workshop up to the evaluation meeting), has acquired skills to act as a main moderator with appropriate supervision.

(2) Others

In the evaluation meeting, they also identified some good points concerning "logically" of the PCM method. In the PCM workshop, the participants analyzed problems before discussing objectives (solutions), and the problem analysis is conducted referring "cause-effect" relationships among the problems. These relationships were then converted to "means-end" relationships that imply means to solve a specific objective. Such logical way of planning is easy to understand even for the people who don't have much expertise on the watershed management.

### 9.7.2 Weakness

As it was the first experience for WMD to apply the PCM method for actual planning on watershed management, we also identified weakness and problems on the method and its application as follows.

(1) Insufficient Participation of Local Residents

As stated above, the participatory workshop generally helped the local resident actively participate in planning process, sometimes people's 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, some officers were too active (aggressive) to insist their idea for other participants. It seemed that they believed that they know all the problems of the people and they can make most appropriate decisions on the master plan even without listening to the local residents' ideas. Such attitude completely opposes to the participatory approach.

In the first workshops number of governmental officers was more than that of residents. To make the residents more active, moderators and co-moderators made the numbers almost equal

in the latter workshops, following the original idea on composition of participants. Then residents' participation seemed more active to some extent.

(2) Facilitation (Moderation) of the Workshop

Because of too many participants, it was sometime difficult for the moderators and co-moderators to effectively facilitate the discussion. For example, we always had more than 40 participants in the workshop and sometimes it was difficult to unify discussions happening here and there. Generally, an appropriate number of participants for the PCM workshop facilitated by one fully trained moderator is 20-30.

There is still room for improvement in the time management. For some workshops we spent much time in the first stages of planning, then faced shortage of time in the latter stages.

(3) Selection of Participants

It is preferable to nominate and invite representatives of groups of people who are deeply related to the watershed management of the target area as workshop participants. However it was sometime difficult. For example, we should invite representatives of nomads to the workshop for K8-28 (Zeras), as majority of the population in the area is the nomads. However, actually we had only one representative of the nomads in the workshop for K8-28. Because they had already move to their camps in summer a few months before the workshop and it was almost impossible to contact and invite them to the workshop.

(4) Difference in Level of Understanding

It took longer time for some participants to understand purposes and methodology of the PCM method. Because some of them are illiterate and also some of them had to leave the workshop for a while as they have inevitable activities, i.e. farming activities on the time.

(5) Inefficiency

The expense we spent for the PCM workshop was too much for WMD to afford workshops for other watershed management plans. One of the its reasons is that some workshops were held unnecessarily in towns far from the pilot sub-basin, then cost for services (food, transport, etc.) was also unnecessarily increased.

Another inefficiency can be observed in decision making by WMD on timing of commencing

the workshop. After holding the Workshop in K4-1-9 (Vastegan), for 3 weeks the decision to continue the workshops were reserved by WMD. It was quite inefficient as the JICA expert for Participatory Planning wasted 3 weeks of his assignment, then he and the co-moderators faced quite hard schedule later to complete the rest of workshop in short time.

### 9.7.3 Suggestions

Based on the evaluation of the PCM workshops sated above, the following suggestions should be considered by WMD for better application of the PCM method.

(1) Suggestions for More Active Participation in the workshop

- Moderators must be careful with the governmental officers attitude interfering residents' participation.
- Active participants can be nominated as co-moderator who must be neutral.

(2) Suggestions for Better Moderation

- Time and financial for the workshop must be controlled and saved.
- MOJA must train their officer as PCM moderators.
- Number of participants must be appropriate for the number of moderators.

(3) Other Suggestions.
- Workshop should be conducted in the season when residents can participate in it.
- PCM workshop should be held at the earlier stage of planning.
- Decision makers should understand the importance and difficulties on holding the workshops.
- Before starting the workshop, necessary information must be communicated to participants in advance.

# *CHAPTER 10*

# *PLAN FORMULATION*

# CHAPTER 10 PLAN FORMULATION

## 10.1 Basic Policy of Master Plan

### 10.1.1 Overall Goal and Project Purposes

The Study area locates in the Zagros mountain range with average altitude of approx. 3,000 m. The 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. In case of heavy rainfall or rapid snow melting, many types of disasters such as debris flow and flood 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 vicious cycle is schematically shown below, and the regional society is facing the danger of collapse.

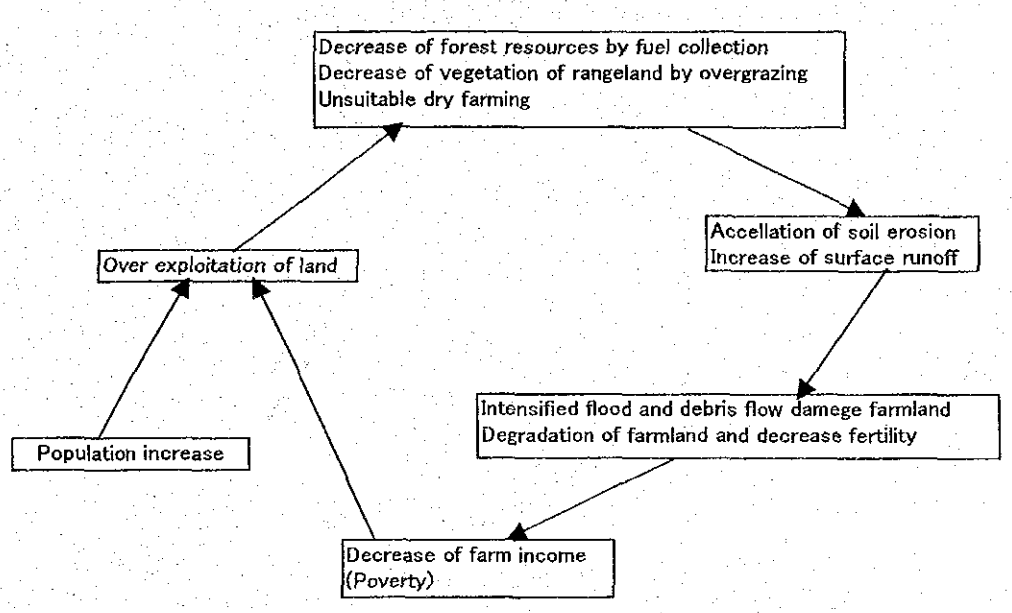


Figure 10-1-1-1 Vicious Cycle of Environment Degradation and Poverty

The existing conditions of each component of vicious cycle are as follows:

(1) *Destruction of natural environment*

-Decrease of forest resources by fuel collection

The rural survey conducted by the Study Team shows that percentage of the household still using wood for fuel are as follows;

Table 10-1-1-1 Percentage of the household still using wood for fuel Unit : %

| Study Area | Village People | | Nomad | |
|---|---|---|---|---|
| | Gas/Petrol | Wood | Gas/Petrol | Wood |
| K4-1-9 Vastegan | 92.5 | 7.5 | 23.3 | 76.7 |
| K5-19a Chaman Goli-Bazoft | 16.0 | 84.0 | 5.0 | 95.0 |
| K7-0-19-1 Sarbaz | 93.4 | 6.6 | 45.0 | 55.0 |
| K7-48 Tang Sorkh | 46.4 | 53.6 | 8.3 | 91.7 |
| K8-28 Zeras | 14.7 | 85.3 | - | - |
| Average | 52.6 | 47.4 | 20.4 | 79.6 |

As clear from the table, about half of the village household still use wood for fuel and 80 % of the nomad household use wood for fuel. Among the five (5) study areas, Chaman Goli-Bazoft and Zeras of relatively low income level have a tendency of high dependence on wood whereas the households of Vastegan and Sarbaz which have relatively high income level have changed their fuel from wood to gas/petrol. There is clear co-relation between household income and fuel conversion to gas/petrol. Total about 2,400 households depend on wood for fuel in the five study areas and the consumption of wood amounts to 7,200 tons per year on the assumption that each household consume 3 tons in a year.

-Decrease of vegetation of rangeland by overgrazing

Overgrazing sometimes give the plants too much damages to bear fruits or to sprout from the root in the next spring. In case grazing land is properly managed, carrying capacity would be 300-400 kg/ha in dry herbage while the carrying capacity in the overgrazing situation would be 150 kg/ha. The soil erosion of the overgrazing rangeland sometimes reaches 80 ton/ha/year, which might cause serious soil disaster.

-Improper practice of dry farming

If the dry farm land without contour ditch is once ploughed and exposed to heavy rainfall, severe soil erosion would occur.

(2) Increase of soil erosion and increase of direct runoff of rainfall

-Increase of soil erosion

Decrease of forest and vegetation of rangeland induce the increase of soil erosion. Dry farming in the steep land without contour ditch also causes the increase of soil erosion.

-Increase of direct runoff of rainfall

Decrease of vegetation increase the direct runoff of rainfall resulting in increase of peak discharge of rivers.

(3) Intensified flood and debris flow and degradation of farmland

-Intensified flood and debris flow

Intensified flood and debris flow occur more frequently and give damage to farmland in larger scale. The damages to agriculture are classified into two types, damage to crops in the field and damage to the farmland. The farmland damage by debris flow in Vastegan is well known and it has not yet been recovered. The damaged farmland area anticipated by 1/25 frequency flood is shown as follows;

Table 10-1-1-2 The Damaged Farmland (1/25 Frequency Flood) Unit: ha

| Sub-basin Name | Damage Area |
|---|---|
| K4-1-9 Vastegan | 285 |
| K5-19a Chaman Goli-Bazoft | 468 |
| K7-0-19-1 Sarbaz | 638 |
| K7-48 Tang Sorkh | 102 |
| K8-28 Zeras | 296 |
| Total | 1789 |

Besides the damages to crops and farmland, lost of human lives, damages to houses and damages to social infrastructure have been caused by floods and debris flows.

-Degradation of farmland and decrease of crop yield

Surface soil erosion of farmland result in the decrease of the fertility and development of gully erosion in farmland would destruct farmland and farmers would be forced to abandon the farmland in upstream area. Whereas in downstream area, farmland is sometimes abandoned because of sand and stones spread by debris flow.

(4) Decrease of farmer's income

Farm income would decrease as the agriculture production decrease because of the damages to crops and farmland. Furthermore, farmers have to bear the expense of the recovery and reconstruction of damaged farmland and irrigation facilities.

(5) Over exploitation of land

Farmers would expand reclamation of new land for dry farming without proper facilities to prevent erosion in order to keep their income level and farmers raise too many livestock more than the number within the carrying capacity, which lead to the over exploitation of land.

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

The achievement of these project purposes could be expressed in terms of following tangible indexes. Several approaches to each project purpose are considered, and each approach forms an individual project. Execution of each approach (project) will produce an effect (effects) on the project purposes. The effect must be expressed by tangible indexes.

Project Purpose-1: Mitigation of flood, debris flow and landslide damages

----Achievement Index: Scale and frequency of disaster by flood, debris flow and landslide

| **1. Approach (Project) to Mitigation of flood, debris flow and landslide damage** | |
|---|---|
| **A : Structure measures** | |
| 1-1 | **Construction of check dam :** In order to trap the sediment and reduce the riverbed gradient and stabilize the riverbed, construction of check dam is proposed. Normal size of check dams will be constructed by public work whereas small check dam to prevent expansion of gully erosion in farmland will be constructed by people's participation. |
| 1-2 | **River improvement :** Channel work and river treatment are planned in minimum extent to prevent further damages where damages were caused by the past flood. |
| 1-3 | **Relocation of houses :** Relocation of houses is planned only in Zeras where houses are located in hazardous area of debris flow and rock fall. |
| 1-4 | **Landslide protection :** Landslide protection is planned only in Sarbaz to stabilize the area of villages, roads and farmland, providing drains for snow melting water. |
| 1-5 | **Rock-fall protection :** Rock-fall protection is planned only in Chaman Goli-Bazoft along the road with hazard of rock fall. |
| **B : Non-structure measures** | |
| 1-6 | **Training for procedure of small check dam construction, and maintenance & operation of disaster prevention facility (by people's participation) :** Improve awareness of disaster prevention necessity and O/M of disaster prevention facility by villagers. |

Note : O/M = Operation & maintenance

Project purpose-2: Reduction of soil erosion and conservation of water

----Achievement Index: Sediment amount, Number and scale of gully erosion

| **2. Approach (Project) to Reduction of soil erosion and conservation of water** | |
|---|---|
| **A : Structure measures** | |
| 2-1 | **Soil erosion protection :** Soil erosion of steep farmland is protected by contour band and gully protection in Chaman Goli-Bazoft and Zeras |
| 2-2 | **Ground water monitoring & control :** Groundwater monitoring system is planed for Vastegan area where groundwater exploitation seems to exceed the safety yield. |
| **B : Non-structure measures** | |
| 2-3 | **Enlightenment for soil & water conservation activity :** Awareness of soil & water conservation necessity is improved |

Project purpose-3: Restoration/improvement of rangeland

----Achievement Index: Vegetation coverage

| 3. Approach (Project) to Restoration/improvement of vegetation | |
|---|---|
| **A : Structure measures** | |
| 3-1 | **Rangeland vegetation improvement** : Seeding and rotational use of rangeland and provision of water point for animals are planed to make the vegetation recovery. |
| 3-2 | **Orchard Terracing :** Orchard terracing is applied for the steep slope rangeland in Vastegan to prevent further soil erosion as well as production of apples. |
| 3-3 | **Forestland vegetation recovery** : Almond tree plantation is planned in the forestland with poor vegetation in Chaman Goli-Bazoft, Sarbaz, Tang Sorkh and Zeras. |
| **B : Non-structure measures** | |
| 3-4 | **Legislative measures on vegetation improvement :** Rotation use of rangeland and legislative measures such as watchman posting & authorization, etc. in order improve vegetation. |
| 3-5 | **Supply of grass seed :** Grass seed is supplied to improve rangeland vegetation. |
| 3-6 | **Allocation of vegetation production plots, and watchman posting** : By posting authorized watchman, the vegetation condition in rangeland is improved. |

Project Purpose-4 Improvement of living standard

----Achievement Index: Income, Job opportunity

| 4. Approach (Project) to Improvement of living standard | |
|---|---|
| **A : Structure measures** | |
| 4-1 | **Increase of irrigated agriculture:** By the rehabilitation of existing irrigation canal the saving water can be applied to the land now under rainfed farming. It will increase agriculture crop production. |
| 4-2 | **Fish culture promotion:** Fish culture of rainbow trout is planned in Chaman Goli-Bazoft and Sarbaz. |
| 4-3 | **Collecting and grading center of apple and vegetable:** Apple grading facilities are panned planned in Sarbaz and vegetable and apple grading facilities are planned in Tang Sorkh. |
| 4-4 | **Rural water supply improvement:** Rural water supply improvement is planned by extesion of distribution pipelines to the out-of-service area and construction of additional reservoir tanks |
| 4-5 | **Rural road improvement:** Rural road improvement is planned including paving with asphalt and construction of bridges. |
| **B : Non-structure measures** | |
| 4-6 | **Diversification to milk cow:** A number of sheep and goat is converted to milk cow in order to decrease the pressure on the rangeland and increase the job opportunity of processing milk and give profit to farmers. |

Project Purpose-5 Improvement of agricultural products/input marketing and extension of agriculture technology

----Achievement Index: Number of cooperative members, and number of attendance to extension services

| 5. Approach (Project) to Improvement of agricultural products/inputs marketing and extension of agricultural technology | |
|---|---|
| **A : Structure measures** | |
| 5-1 | **Building & facility for cooperative activity** : In order to stabilize the price of agriculture product and input and also strengthen agricultural extension service, building & facility for cooperative's activities are planned. |
| 5-2 | **Community center building** : Building for conducting enlightenment activities against natural disaster, health service promotion and improvement of living condition to women is planned. |
| ***B : Non-structure measures*** | |
| 5-3 | **Establishment of cooperative** : In order to stabilize the price of agriculture product and input and also strengthen agricultural extension service, establishment of cooperatives are planned |
| 5-4 | **Community enhancement** : Enlightenment activities against natural disaster, health service promotion and improvement of living condition to women are conducted. |

The relation of Project purpose - Approach - Effect - is shown in Table 10-1-1-3

Table 10-1-1-3 Project Purpose - Approach - Effect

| Overall Goal | Project Purpose | Indicator | Approach (Project) | Effect | Indicator |
|---|---|---|---|---|---|
| Reduction of poverty and improvement of natural environment | 1. Mitigation of flood, debris flow, and landslide damage | ・Damage caused by flood, debris flow, and landslide | *Structural Measures* | | |
| | | | 1-1.Construction of check dams | ・Sediment is reduced<br>・Riverbed gradient is reduced, and riverbed and it's banks are stabilized<br>・Damage caused by debris flow on farmland, etc. are mitigated | ・Amount of sediment<br>・Trapped sediment<br>・Scale and frequency of flood & debris flow damage |
| | | | 1-2.River treatment (Vastegan, Chaman Goli-Bazoft, Sarbaz) | ・Damage caused by flood on farmland, etc. along the river are mitigated | ・Scale and frequency of flood damage |
| | | | 1-3.Relocation of houses in hazard of debris flow & gully erosion (Zeras) | ・Damage caused by debris flow & gully erosion in hazard area are reduced | ・Scale and frequency of damage on houses, people & livestock caused by debris flow & gully erosion |
| | | | 1-4.Landslide protection (Chaman Goli-Bazoft, Sarbaz, Zeras) | ・Landslide-resistance on villages, farmland, roads, etc. is increased | ・Scale and frequency of landslide damage |
| | | | 1-5.Rock-fall protection (Chaman Goli-Bazoft) | ・Damage caused by rock-fall is reduced | ・Scale and frequency of damage on houses, people & livestock caused by rock-fall |
| | | | *Non-structural Measures* | | |
| | | | 1-6. Training for procedure of small check dam construction, and O/M of disaster prevention facility (by people's participation) | ・Awareness of disaster prevention necessity is improved<br>・O/M of disaster prevention facility will be done by villagers | ・Number of villagers participated in check dam construction and O/M of disaster prevention facility |
| | 2. Reduction of soil erosion and conservation of water | ・Soil loss amount<br>・Number and scale of gully erosion | *Structural Measures* | | |
| | | | 2-1.Contour bund (Chaman Goli-Bazoft, Sarbaz, Tangsorkh, Zeras) | ・Soil erosion in the steep slope farmland is reduced | ・Soil loss amount |
| | | | 2-2.Groundwater monitoring & control (Vastegan) | ・Ground water deposit is stabilized<br>・Equal distribution of irrigation water is attained | ・Ground water level<br>・Area of irrigated farmland |
| | | | (Check dam construction) (Chaman Goli-Bazoft, Zeras) | ・Gully erosion in the gentle slope farmland is reduced | ・Scale and frequency of gully erosion |
| | | | *Non-structural Measures* | | |
| | | | 2-3. Enlightenment for soil & water conservation activity | ・Awareness of soil & water conservation necessity is improved | ・Number of villagers participated in soil & water conservation activity |
| | 3. Restoration/ improvement of vegetation | ・Sediment amount<br>・Vegetation coverage | *Structural Measures* | | |
| | | | 3-1.Rangeland vegetation improvement (seedling, water point) | ・Carrying capacity of rangeland is increased<br>・Damage on farmland caused by soil erosion is decreased | ・Vegetation coverage<br>・Sediment amount<br>・Carrying capacity of livestock |
| | | | 3-2.Orchard terracing (Vastegan) | ・Damages on farmland caused by soil erosion are reduced<br>・Production of apples is increased (Income of farmers is increased)<br>・Job opportunity is increased in the industrial processing of apples | ・Sediment amount<br>・Apple production (Income of farmers)<br>・Job opportunity |
| | | | 3-3.Forestland vegetation recovery (almond tree plantation) (Chaman Goli-Bazoft, Tangsorkh) | | ・Forest coverage |
| | | | *Non-structural Measures* | | |
| | | | 3-4.Legislative measures on vegetation improvement<br>3-5.Supply of grass seed<br>3-6.Vegetation production plot, Watchman posting | ・Rangeland vegetation is improved and carrying capacity is increased<br>・Soil erosion is mitigated and damage to farmland is reduced | ・Number of Legislative measures<br>・Amount of seed supply<br>・Protected areas & number of watchman posted |
| | | | (Diversification to milk cow) (Vastegan, Chaman Goli-Bazoft, Sarbaz, Zeras) | ・Number of livestock in rangeland are decreased | ・Number of livestock per unit area<br>・Number of milk cow per unit area |
| | 4. Improvement of living standard | ・Income<br>・Job opportunity | *Structural Measures* | | |
| | | | 4-1.Upgrading of irrigation canal (Vastegan, Chaman Goli-Bazoft, Sarbaz) | ・Farm labors income are increased<br>・Employment opportunities are increased | ・Amount of production<br>・Job opportunity |
| | | | 4-2.Fish culture promotion (Chaman Goli-Bazoft, Sarbaz, Zeras) | ・Fishermen's income are increased<br>・Employment opportunities are increased<br>・Consumption of fish is increased, and protein source shift from goats and sheep to fish | ・Amount of production<br>・Job opportunity<br>・Amount of fish consumption |
| | | | 4-3.Collecting & grading center of apple and/or vegetable (Sarbaz, Tangsorkh) | ・Farm labors income are increased<br>・Employment opportunities are increased | ・Amount of production<br>・Job opportunity |
| | | | 4-4.Rural water supply improvement (Vastegan, Chaman Goli-Bazoft, Sarbaz, Tangsorkh) | ・Safety water is provided<br>・Water is steadily provided | ・Volume of water supply (m3/year) |
| | | | 4-5.Rural road improvement | ・Transportation cost of agricultural products are decreased<br>・Information and commodity flow are activated | ・Transportation cost<br>・Saved time by road improvement |
| | | | 4-6.Building & facility for production, processing & shipment of agricultural and milk products, and handicraft | ・Farm labors income are increased<br>・Employment opportunities are increased | ・Number of building & facility<br>・Amount of production & shipment |
| | | | (Orchard terracing) (Vastegan) | ・Income from produced orchard is increased | ・Amount of production<br>・Job opportunity |
| | | | *Non-structural Measures* | | |
| | | | 4-7.Diversification to milk cow (Vastegan, Chaman Goli-Bazoft, Sarbaz, Zeras) | ・Farmers income are increased | ・Amount of production<br>・Job opportunity |
| | 5. Improvement of agricultural products/ inputs, marketing, extension of agricultural technology, and strengthening of community activities | ・Number of cooperative member<br>・Number of attendance to extension services | *Structural Measures* | | |
| | | | 5-1.Building & facility for cooperative activity | ・Price of agricultural products are adjusted to appropriate prices<br>・Amount of dairy products and handicraft products are increased<br>・Extension services for agriculture and livestock are implemented | ・Amount of production<br>・Number of cooperative member<br>・Number of implemented extension services<br>・Number of attendance to extension services |
| | | | 5-2.Community center building | ・Enlightenment activities against natural disasters are carried out<br>・Health service are promoted<br>・Activities of improvement of living condition to women are promoted | ・Number of implemented activities<br>・Number of participants |
| | | | *Non-structural Measures* | | |
| | | | 5-3.Establishment of cooperative | ・Price of agricultural products are adjusted to appropriate prices<br>・Amount of dairy products and handicraft products are increased<br>・Extension services for agriculture and livestock are implemented | ・Amount of production<br>・Number of cooperative member<br>・Number of implemented extension services<br>・Number of attendance to extension services |
| | | | 5-4.Community enhancement | ・Enlightenment activities against natural disasters are carried out<br>・Health service are promoted<br>・Activities of improvement of living condition to women are promoted | ・Number of implemented activities<br>・Number of participants |

Note : O/M=Operation & maintenance,

### 10.1.2 Disaster Prevention Works

In order to reinforce and/or supplement the resistance to natural disaster, civil structures in various types and vegetation measures are planned appropriately. With these measures, restoration and/or improvement on the devastated terrain will be accomplished and maintained properly, and eventually flood/debris flow and soil erosion is to be lessened and/or mitigated.

There are so many places physically required to take actions immediately. However, it is not practically possible to implement disaster prevention measures for all hazardous places from the viewpoint of cost and benefit. Thus, as direct objectives, protection of villages, farmland and infrastructure such as roads and irrigation facilities is planned as disaster prevention measures. In the plan formulation, the required number of facilities is examined based on the characteristic of each master plan area, and the urgency, which is dependent on the correlation between direct objectives for protection and degree of devastation.

Check dams, one of the major disaster prevention facilities, have functions of not only storing capacity for debris but also are expected to mitigate the riverbed gradient, prevent vertical/horizontal erosion of the river course, stabilize the foot of slope, prevent the movement of unstable sediment left on the riverbed, prevent devastation of riverbed and river banks and reduce the sediment to be carried downstream. In the planning of check dams, these functions are taken into consideration based on the characteristic of each master plan area.

In the planning of check dams and river treatment, the 25-year design flood discharge is taken into consideration. The materials available at sites are planned to utilize as much as possible and the reduction of construction cost is envisaged.

River-sediment data are very few, and only suspended load data are available at the flow gauging stations in and around the master plan areas. Thus, sediment volume for check dams is estimated with reference to the specific sediment volume of the dams planned in the basin nearby. In case no dams nearby, the specific sediment volume is assumed based on the characteristics of the terrain, geological condition, and river condition.

Landslide has no direct damage on villages, however, causes damage on farmland, roads and irrigation canals. External factor of landslides in the master plan areas is saturation of surface water fed by rainfall or snowmelt, which makes the slope unstable. Therefore, the countermeasures planned here is the drainage system comprised of vertical/horizontal ditch and drop chute in order to drain surface water securely. On the other hand, the main cause of landslides along the river is riverbank erosion at

the foot of the slope. In such cases, check dams are effective in order to prevent vertical/horizontal erosion of the river course and stabilize the foot of landslide slope. In addition, countermeasures are also taken into consideration only the landslides, which cause damage on direct objectives for protection.

There is anther aspect of disaster prevention works although those measures do not act directly to disaster prevention. The erosion caused by the degradation of the watershed area becomes serious problem, which produces materials for debris flow. The countermeasure to control sedimentation is fundamentally equal to the countermeasure to control surface erosion in the watershed area. Vegetation recovery by means of controlled number of livestock and period of grazing, spreading seed of natural vegetation, control of cutting forest trees by substituting other fuel, afforestation, control of the new reclamation land and improvement of cultivation method will be examined.

Non-structural measures, such as warning and evacuation system during disaster, and training for operation and maintenance on the disaster prevention facilities are to be examined.

### 10.1.3 Community Development

Most of the inhabitants are poor and have no awareness of disaster which is caused by the degradation of basin environment through overgrazing and cutting trees. Th rural inhabitants should have economic stability to spare their resources by themselves for the facilities to prevent disasters. Some amount of capital accumulation will be necessary as only the people with economic sufficiency can afford time and mind for paying attention to environment and disaster. In this connection, many types of development for agriculture including rehabilitation of irrigation facilities and crop diversification, fish culture and rural industry promotion should be taken place so as to make the rural people economic independence.

(1) Potential for Development

The Study Areas are generally very far from cities in the mountainous area where the natural environments are deteriorated by over grazing and forest destruction. Marketing places are limited such as in and round their villages. Large marketing places are far from the areas. Access roads are not paved. Even if main roads to access roads are paved, they are heavily steep and undulated. Limited areas are near markets. Main activities in the areas are agriculture and livestock. Other is fish culture using good quality spring water. Handicrafts such as making of gilim and carpets are conducted in some areas. Land for agriculture is limited. Existing agricultural land is located in the mountainous area and lack of irrigation water. On the other hand, population in and around the areas is increasing and that of townships and cities is more rapidly increasing. It causes a increment of unemployment rate and heavy problems in the country. It is also necessary to secure the food supply.

Development potential in the areas is limited. However, production increasing for wheat, barley and feed would be expected in some areas, provided the construction of irrigation facilities at the perennial rivers. There is a possibility to be developed the first processing activities (collecting, grading, packing, distribution, etc) for agricultural products especially apple or vegetable. It is also expected to change into cow grazing and make milk and milk products, which is less affected to the environment than the present traditional livestock keeping. It is expected to increase handicraft such as making of gilim and carpet using the wool in the areas or raw materials gotten from cities. There are some places expected for fish culture utilizing springs and good water rivers. For solving over grazing fundamentally, it is necessary to reduce number of sheep and goats drastically. However, rapid reduction will cause destruction of present livestock keeping system depending on sheep and goats that has been traditionally developed and will result in social disorders. Therefore it is necessary for reducing sheep and goats to change present livestock keeping system gradually to milk processing system that makes to add values as well as restoration of vegetation in the rangeland and increase of fodder crop production such as alfalfa.

For special case, sericulture development can be considered for development. In Iran, development of sericulture is dependant in Sericulture Company of Iran. This company surveyed the whole Iran for sericulture development. Some areas in Khuzestan, Kuhgiluyeh and Chahrmahal Provinces which includes the Study Area in Karoon River basin are selected for priority 3, which is least priority in priority 1 to 3. The most popular province is a Gilan, which is distributed more than 95 % of silkworm larva. Silkworm larva distribution to Khuzestan, Kuhgiluyeh and Chaharmahal provinces are less than 0.06% respectively. Priority areas are selected by means of whether mulberry plantation can be developed or not. In 1988 data, mulberry plantation in three provinces and high priority provinces are as follows:

Table 10-1-3-1 Situation of Sericulture Plantation (year1988)

| Province | Area (ha) | Unit (tree/ha) | Number of Tree | Cocoon Production (kg) |
|---|---|---|---|---|
| Gilan | 10,903 | 3,019 | 32,919,260 | 2,008,770 |
| Zanjan/Qazvin | 210 | 250 | 52,500 | 6,600 |
| East Azarbayajan | 1,900 | 352 | 66,950 | 30,174 |
| Khuzestan | 24 | 230 | 5,500 | - |
| Kuhgiluyeh | 13 | 270 | 3,500 | - |
| Cgahrmahal | 17 | 250 | 4,250 | - |

Source : Sericulture Company of Iran

Some places in the Study Areas belong in Priority 3 area, though there is no mulberry plantation and few mulberry trees can be seen in some of the Study Areas.

On the other hand, there are different wild silkworms "YASAN" grown by some kinds of tree leaves from common silkworm grown by mulberry leaves. Major wild silkworms are "TENSAN", "CHINESE SAKUSAN", "INDIAN SAKUSAN", "MUGASAN" and "ERISAN". Consumption of

wild silkworm is 2-2.5 times of common silkworm or approximately 51.55g (3,100 cm2) of green leaves are consumed per one wild silkworm. Life expectance is 47 – 53 days. Its life is longer than that of common silkworm, it is possible to harvest cocoon at 3 – 4 times in year.
Length of string per one cocoon of "TENSAN" is 500 – 600 m, weight 0.30 – 0.35g, size 5.5 – 6.5 denier (one denier = 450m, 0.05g).

Table 10-1-3-2 Consumption of Green Leaves per One Silkworm

| Age | 1 | 2 | 3 | 4 | 5 | Total |
|---|---|---|---|---|---|---|
| Feed (g) | 0.710 | 1.563 | 4.068 | 12.922 | 52.304 | 71.566 |
| Consumption (g) | 0.239 | 0.561 | 1.859 | 8.396 | 40.496 | 51.550 |
| Rate(%) | 33.7 | 35.8 | 45.6 | 64.9 | 77.4 | 72.0 |

Source: "TENSAN" published by "SADAN HOJIN NOSANGYOSON BUNKA KYOKAI"

Table 10-1-3-3 Comparison of Silkworm

| Kinds | Cocoon weight (g) | Cocoon length (cm) | Cocoon width (cm) | String length (m) | Silk production (g) | Denier |
|---|---|---|---|---|---|---|
| Common Silkworm | 2.0 | 3.5 | 1.9 | 1,300-1,500 | 0.38 | 2.5-3.0 |
| TENSAN | 6.0 | 4.8 | 2.4 | 500-600 | 0.30-0.35 | 5.5-6.5 |
| CHINESE SAKUSAN | 8.0 | 5.0 | 2.5 | 600-700 | 0.26-0.30 | 4.8-5.1 |

Source: "TENSAN" published by "SADAN HOJIN NOSANGYOSON BUNKA KYOKAI"

String of wild silkworm is larger size and relatively flat than that of common silkworm. One silk string for cloth is made of 4 – 5 strings of cocoons. As silk cloth string of wild silkworm is larger in size and having many large or small notches in the string, it has unique appearance and touch as well as peculiar luster, it can be dealt with high price. The development for this special sericulture will be attractive. As main feed of "ERISAN" silkworm is castor oil plant, it is possible to develop this type of sericulture in the Study Areas. It is considered the good opportunity for starting the development of wild silkworm positively.

Growers can produce the cocoon to sell to string manufacturers or make silk string from cocoon by themselves in their home, therefore these activities will be able to provide good opportunity for income generation, and also to be used the unemployed labor force. As a result, employment rate would be increased. A pupa of silkworm is filled with high protein, therefore, powder of the pupa can be used for feed source of livestock and fish culture. Mulberry trees are useful for forestation to protect slope in the karoon watershed, and are also able to provide mulberry fruit, which can be sold in the regional market. Therefore, it is recommendable to study and promote the sericulture because this industry could generate quite fruitful result to regional economy, and karoon watershed.

(2) Development Policies

Land size and production are limited in the Study Areas and the areas are far from marketing places. Therefore, development policies for marketing/processing/rural industry would be considered as follows:

1) To formulate the group producing and selling as possible for increasing the efficiency. To emphasize the producers' marketing strength through the unity of producers,
2) Therefore, to establish groups and cooperatives and conduct the activities systematically and intentionally,
3) For group formulation, to select the products which are produced at present or possible to produce in the future and to choose villagers as its members who have intention to developing their activities,
4) For cooperative establishment, to establish one cooperative per village as a rule, the cooperative includes various groups. Minimum unit should be as same size as that of Iran's administration. Minimum number of households may be 40-50. In case of smaller villages than that, it is considered that groups will be able to be established by means of uniting a few small villages near around. However, it is not considered in this stage,
5) To apply the participatory development scheme for strengthening the activities by villagers and their groups, and
6) To promote the firm formulation of groups for receiving the training and education by the government and to promote the implementation.

(3) Development Plan for Marketing/Processing/Rural Industry

Analyzing the areas' conditions based on the above development potentials and policies, development plans would be designed for handicraft, training and education during the short-term (5 years), for technology transfer and primary processing during the medium (10 years) and for making milk and milk products during long-term (20 years) as follows. It is necessary to apply the participatory approach and proper training and education by the government for promoting these development plans. The promotion of these development plans should be required the further feasibility study and detailed design study.

Table 10-1-3-4 Outline of Considerable Plan

| No. | Plan | Outline | Period |
|---|---|---|---|
| 1 | Handicraft promotion | 1. Making of good quality carpet | Short term |
| 2 | Multi-purpose training facilities | 1. Crop diversification,<br>2. Plant protection,<br>3. Primary processing,<br>4. Handicraft,<br>5. Cooking, nutrition,<br>6. Health, hygiene | Short term,<br>Medium term |
| 3 | Training and education (technology transfer by the government) | 1. Crop diversification,<br>2. Plant protection,<br>3. Primary processing,<br>4. Handicraft,<br>5. Cooking, nutrition,<br>6. Health, hygiene | Short term,<br>Medium term |
| 4 | Milk production, processing<br>1. Milk products<br>2. Milk production | 1. Making of milk product (yogurt, butter, Kashk,<br>2. Milk production and sale | Medium term,<br>Long term |
| 5 | Fish culture | 1. Rainbow trout production and sale,<br>(Others: carp production and sale) | Medium term,<br>Long term |

| | | | |
|---|---|---|---|
| 6 | Fruit processing<br>1. Collecting and grading facilities<br>(Others: cooling storage facilities, Juice making or Jam making) | 1. Apple collecting and grading facilities<br>(Others: grape collecting and grading in future) | Short term,<br>Medium term,<br>Long term |
| 7 | Horticultural crops processing<br>1. Collecting and grading facilities<br>(Others: cooling storage, Juice making) | 1. Fruit vegetable crops (bitter gourd, cucumber, eggplant)<br>2. Leaf crops (cabbage, lettuce, spinach)<br>3. Root crops (potato, carrot) | Medium term,<br>Long term |

Remarks:

(i) At present, there are no development of fruit and vegetable cooling facilities around the areas. Cooling facilities in Semirom by an entrepreneur stopped constructing are found. The facilities will be required high construction cost, maintenance fee and high technology. Technology transfer to the villagers is not yet conducted. Therefore, this considerable plan should be cancelled in this stage. Home making of juice and jam is also considerable. However, as the technology transfer and experience are not yet carried out in the area, to begin with, they should be conducted in the training and education plan. Therefore, development plans for them are not considered in this stage.

(ii) For fruit processing, apple is planted in some areas at present. As grape is planted near the areas, grape production will be expected in the areas in future. At this stage, planning for processing of this crop would not be realistic before its production plan and implementation. Therefore, development plans for them are not considered in this stage.

These development plans include "Structure Measure Plans" and "Non-structure Measure Plans". These two plans cannot be divided each other. They should make up for each other for accomplishment of themselves. Structure Measure Plans include procurement of equipment and materials, establishment of facilities, etc. On the other hand, Non-structure Measure Plans include establishment of groups and cooperatives, training and education by government to said groups and cooperatives.

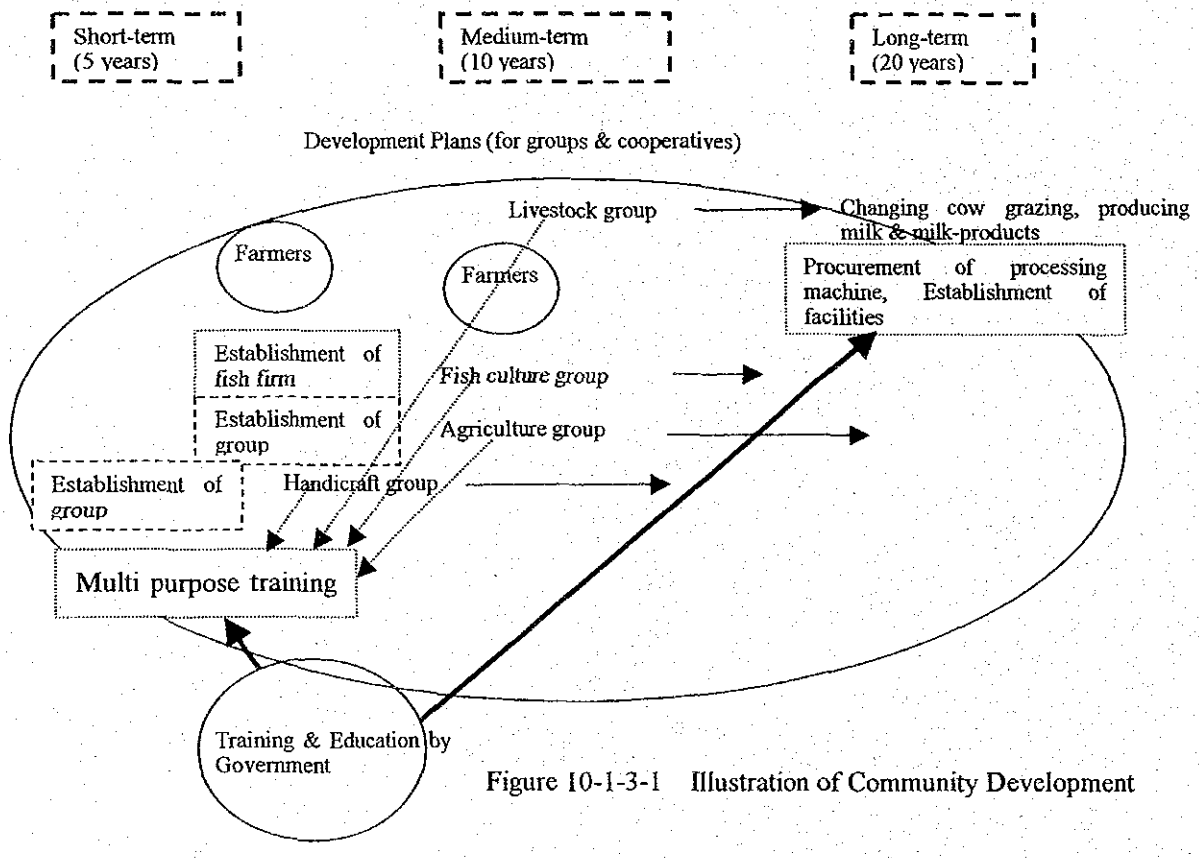


Figure 10-1-3-1 Illustration of Community Development

(4) Proposed Plans and Village Selection Criteria

Proposed plans for Marketing/Processing/Rural Industry and village selection criteria are determined by means of the followings: (1) One part of selection criteria is taken into consideration the size of village, size of field, number of livestock, development situation, accessibility to markets, etc based on the socioeconomic survey of the Study Areas, and (2) other part is taken account of proposed areas' infrastructure plans, land use plans and production plans.

Table 10-1-3-5 Proposed Plans, Selection Criteria and Name of Area (Number of Village)

| No. | Proposed Plan | Selection Criteria | Name of Area (Number of selected Village) |
|---|---|---|---|
| 1 | Establishment of groups and cooperatives for handicraft | More than 40-50 households in village, more than 20 households are active for handicraft at present. | Vastegan (4), Bazoft (1), Sarbaz (1), Zeras (4) |
| 2 | Establishment of multi-purpose training facilities | More than 50 households in village. | Vastegan (4), Bazoft (7), Sarbaz (7), Tang Sorkh (1), Zeras (3) |
| 3 | Training and education plan (by government) | (Conducting training and education to villagers using the multi-purpose training facilities.) | |
| 4 | Establishment of groups and cooperatives for milk processing facilities | Tolerable households in village at present, more than 100 heads of cow grazed. | Vastegan (4), Bazoft (5), Sarbaz (4), Zeras (2) |
| 5 | Collection and distribution facilities for milk | Tolerable households in village at present, more than 250 heads of cow grazed.<br>More than 500 heads of cow grazed near the village. | Vastegan (1), Bazoft (1), Sarbaz (1) |
| 6 | Marketing plan of fish culture products | Tolerable households in village at present, being produced by villagers.<br>Not being produced by entrepreneur. | Bazoft (1) (Rainbow trout), |
| 7 | Establishment of apple collecting and grading facilities | In case of large scale: more than 300ha apple field in village.<br>In case of small scale: more than 100ha apple field in village. | Sarbaz (Large scale), Tang Sorkh (Small scale) |
| 8 | Establishment of horticultural crops collecting and grading facilities | Good accessibility, Considerable market is near the village.<br>More than 30ha horticultural field at present. | Tang Sorkh |

Remarks : Details are referred to ANNEX K-15 Proposed Development Plans & Selection Criteria.

### 10.1.4 Public works and People's Participation

These civil works such as construction of check dams, rehabilitation of rural road and rural water supply will be implemented by public works in principle. In this case it is very important that people's participation is not for saving investment by using free labour force from people's groups, but for strengthening the people for sustainable development.

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.

People's participation will be promoted step by step in the process of project implementation. Relevant government organization, especially in the provincial levels, should assist and facilitate the enhancement of the village organization. There are three steps in the process of the project implementation to enhance function of the village organization.

First step is at the beginning of the project implementation, and the village organization will be established based on the villager's willingness to participation in the projects. All members belong to the village organization will participate in the decision making process of their organization, and participate in the activities of the organization. Through these activities, a sense of participation will be formulated.

At the time of commencement of the project, plan of operations and detail activities of the villager are already designed by the government. The village organization, therefore, just receive the planned project. It should be noted that some of the members of village organization is dubious about for the result and effect of the project. The government officers have to make close communication with the village organization and build up intimate relations with them.

Second step is at the time of monitoring of the project. In the monitoring activities, villagers grasp the problem faced in the project implementation, and discuss how overcome the problems. The results of the monitoring are put into next activities. The village organization reviews their activities and improves their original plan by themselves. Through these activities, villagers can formulate and enhance a sense of ownership for the development projects.

Third step is at the time of completion of the project. At this time, government organization will hold the workshop for project evaluation under participation by village organization. The result of the project evaluation will be put into the next project activities. The village organization will choose next activity among the projects in the master plan, or will make new project plan based on their

willingness to development. The government organization for project implementation have to support and facilitate villager' selection of next activities.

Under the above concept, the Study Team approached the rural people to discuss their needs, issues and willingness of people's participation during the field survey especially in the village survey and tried to make the information effective to formulate the community development plan.

Consequently, it is considered that these targets will be fulfilled through the combination of both; Ⅰ-Disaster Prevention Works and Ⅱ-Community Development which will be categorized into (1) Structure Measures and (2) Non-structure Measures and should be implemented through both Public Works and People's Participation

Each approach can be categorized by the matrix shown in Table 10-1-4-1 ~ 10-1-4-5.

Table 10-1-4 -1 K4-1-9 Vastegan - Outline of Master Plan

| | | | | |
|---|---|---|---|---|
| I. Disaster Prevention Work | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Check dam (Upstream of Gela Riv.) : 16 Nos. | Debris Capacity (17 yrs.), Prevention of river devastation, etc. | Training for operation & maintenance of disaster prevention facilities, Training for check dam construction procedure | Prolonging the life of disaster prevention facilities |
| | Check dam (Steep cliff) : 6 Nos. | Protection of Nasir abad, irrigation water source, fishpond and farmland (160 ha) | | |
| | Riv. Improvement : channel work (3.5km-long, w=20~30m) & River treatment (3.6 km-long, w=30~50m) | Protection of Gela Riv. L.bank - farmland : 450 ha | | |
| | | | Supply of grass seed, Soil & water conservation enlightenment activity, Legislative measures | Acceleration of vegetation improvement |
| | | | Extension and training for apple cultivation | Acceleration of Production |
| People's participation works | Check dam (Upstream of Gela Riv.) : 10 Nos. | Supplement main check dams (Debris Capacity 30,000m$^3$) | Participate training for check dam construction procedure | Acceleration of check dam construction |
| | Vegetation improvement (seedling), Vegetation production plot 4 ha, 3 watering points | Carrying capacity of rangeland 730 ha | Participate soil & water conservation enlightenment activity, 41 ha annual rotation plot, Watchman posting | Acceleration of vegetation |
| | Orchard terracing: 42 ha Irrigation facility for orchard | Reduction of soil loss : 81.5 t/ha/yr to zero, Apple production 40 t/ha/yr | Participate extension and training for cultivation of apples | Amount of production Job opportunity |
| II. Community Development | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Upgrading of Bijeh Gerd irrigation canals : L=4.0 km | Production from 10~12 ha farmland with 20 liter/s additional water | Agricultural extension promotion & training | Amount of production |
| | Community road improvement : L = 9 km | Transportation cost & time | Training for road maintenance | |
| | Rural water supply improvement: each village | Additional capacity at 2020, 176 m$^3$/day | Training for proper water use and water tariff | Reduction of water use, safety supply of water |
| | Ground water monitoring : 4 wells | Conservation of groundwater | Water conservation activity | |
| | | | Support for milk cow diversification | Carrying capacity |
| | | | Extension service of promotion & training for livestock & handicraft, Low interest loan | Amount of production |
| People's participation works | Extension of irrigated farmland | 10~12 ha | Participate agricultural extension training | Amount of production |
| | Farm road improvement: 476 km | Transportation cost & time | Participate training for maintenance | |
| | Building for collection, processing & sale of milk and its products: each village & Konark Olya | Each village: 1.0t/day/village, Konark Olya: 5t/day | Group & cooperatives for milk production & sale, Food production for milk cows, Diversification for milk cows : 750 | Additional production per cow 2,665lit |
| | Multipurpose center : each village | Promotion of group, cooperatives & community activities, Execution of governmental extension services | Group & cooperatives for handicraft & agricultural production & sale, Participate extension training | Amount of production sale & income, Community activity |
| | | | Mechanical farming | Amount of production |

Table 10-1-4-2 K5-19a Chaman Goli-Bazoft- Outline of Master Plan

| | | | | |
|---|---|---|---|---|
| I. Disaster Prevention Work | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | ・Check dam - Feriak & other Riv. : 5 Nos. -Gusale Bar & Tabarak Riv. : 19 Nos. | Debris Capacity (3 yrs.), Intake weir protection, Prevention of river devastation, etc. | Training for operation & maintenance of disaster prevention facilities, Training for check dam construction procedure | Prolonging the life of disaster prevention facilities |
| | Riv. treatment : Gusale Bar Riv. L=800m. 2-ground sill with spur dykes | Protection of village Rd.100 m, farmland 1 ha and cemetery, etc. | | |
| | Landslide Protection: 6 locations | Protection of Rd. L=6Km | | |
| | Rock fall prtection: L=100 m at Kachooz | 5 houses with 40 people & Rd. | | |
| | Gully protection : 20 gullies at Dorak | Protection of farmland | | |
| | | | Soil & water conservation enlightenment activity | Acceleration of farmland and rageland protection |
| | | | Supply of grass seed, Soil & water conservation enlightenment activity, Legislative measures | Acceleration of vegetation improvement |
| People's participation works | Check dam : 14 Nos. | Supplement main check dams (Debris Capacity 28,000m$^3$) | Participate training for check dam construction procedure | Acceleration of check dam construction |
| | Riv. treatment : R.bank of Bazoft Riv. L=500m | Protection of farmland 2.5 ha & Feriak village | Participate operation and maintenance training for disaster prevention facilities | Prolonging the life of disaster prevention facilities |
| | *Gully protection: Looserock check dam 75 Nos.* | *Farmland protection of 30 ha* | *Participate training for check dam construction procedure* | Acceleration of farmland protection |
| | Soil erosion protection: Contour bund 798 ha | Soil loss reduction : 2.31 mm/yr to 0.95 mm/yr | Participate soil & water conservation enlightenment activity, 86 ha annual rotation plot, Watchman posting, Reduction of use of fire wood | |
| | Vegetation improvement (seedling), Vegetation production plot 4 ha, 3 watering points | Carrying capacity of rangeland 1,019 ha | | Acceleration of vegetation |
| | Forestland recovery: 4 ha/year | Planting 400 almond tree/ ha | | |
| II. Community Development | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Upgrading of Gusale Bar 3-irrigation canals : L=8,4 km | Production from 45 ha farmland with 73 liter/s additional water | Agricultural extension promotion & training | Amount of production |
| | Community road improvement : L= 6 km | Transportation cost & time | Training for road maintenance | |
| | Rural water supply improvement: each village | Additional capacity at 2020, 1,682 m$^3$/day | Training for proper water use and water tariff | Reduction of water use, safety supply of water |
| | | | Support for milk cow diversification | Carrying capacity |
| | | | Extension service of promotion & training for livestock, handicraft & fish culture | Amount of production |
| | | | Low interest loan for mechanization | Amount of production |
| *People's participation works* | *Extension of irrigated farmland* | *45 ha* | *Participate agricultural extension training* | Amount of production |
| | Farm road improvement : 152 km | Transportation cost & time | Participate training for maintenance | |
| | Building for fish distribution: Ghale Tabarak | Production: 200t/year | Marketing Planning | Amount of sale |
| | Building for collection, processing & sale of milk and its products: 6 locations | 5 location : 1.0t/day/location 1 location : 5t/day | Group & cooperatives for milk production & sale, Food production for milk cows, Diversification for milk cows : 1,380 | Additional production per cow 2,665lit |
| | Multipurpose center : 7 villages | Promotion of group, cooperatives & community activities, Execution of governmental extension services | Group & cooperatives for handicraft & agricultural production & sale, Participate extension training | Amount of production sale & income, Community activity |
| | | | Mechanical farming | Amount of production |

Table 10-1-4-3 K7-0-19-1 Sarbaz- Outline of Master Plan

| I. Disaster Prevention Work | | | | |
|---|---|---|---|---|
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | ・Check dam (North basin) : 20 Nos.<br>・Check dam (South basin) : : 14 Nos. | Debris Capacity (4 yrs.), Farmland Protection, River devastation prevention | Training for operation & maintenance of disaster prevention facilities, Training for check dam construction procedure | Prolonging the life of disaster prevention facilities |
| | Landslide Protection : 9 locations | Farmland 58 ha & Rd. L = 1.1 km | | |
| | | | Soil & water conservation enlightenment activity | Acceleration of farmland and rangeland protection |
| | | | Supply of grass seed, Soil & water conservation enlightenment activity, Legislative measures | Acceleration of vegetation improvement |
| People's participation works | Check dam : 12 Nos. | Supplement main check dams (Debris Capacity 36,000m$^3$) | Participate training for check dam construction procedure | Acceleration of check dam construction |
| | River treatment : L= 5.5 km | Protection of farmland : 42 ha | Participate training for maintenance | |
| | Soil erosion protection: Contour bund 162 ha | Soil loss reduction: 2.94 mm/yr to 1.06 mm/yr | Participate soil & water conservation enlightenment activity, 173 ha annual rotation plot, Watchman posting, | Acceleration of farmland protection |
| | Vegetation improvement (seedling), Vegetation production plot 4 ha, 3 watering points | Carrying capacity of rangeland 2,524 ha | | Acceleration of vegetation |
| II. Community Development | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Upgrading of 4-irrigation canals : L=8.4 km | Farm production with 244 liter/s additional water | Agricultural extension promotion & training | Amount of production |
| | Community road improvement : L= 20 km | Transportation cost & time | Training for road maintenance | |
| | Rural water supply improvement: 11 villages | Additional capacity at 2020, 2,637 m$^3$/day | Training for proper water use and water tariff | Reduction of water use, safety supply of water |
| | | | Support for milk cow diversification | Carrying capacity |
| | | | Extension service of promotion & training for apple, livestock & handicraft | Amount of production |
| | | | Low interest loan for mechanization | Amount of production |
| People's participation works | Extension of irrigated farmland | 135 ha | Participate agricultural extension training | Amount of production |
| | Farm road improvement : 300 km | Transportation cost & time | Participate training for maintenance | |
| | Building for collection, processing & shipping of apple: 3 locations | Production: 2,400t/year | Group & cooperatives for apple production, collection, grading, shipping & sale | Amount of sale |
| | Building for collection, processing & sale of milk and its products: 5 locations | 4 location : 1.0t/day/location 1 location : 5t/day | Group & cooperatives for milk production & sale, Food production for milk cows, Diversification for milk cows : 1,219 | Additional production per cow 2,665lit |
| | Multipurpose center : 7 villages | Promotion of group, cooperatives & community activities, Execution of governmental extension services | Group & cooperatives for handicraft & agricultural production & sale, Participate extension training | Amount of production sale & income, Community activity |
| | | | Mechanical farming | Amount of production |

Table 10-1-4-4 K7-48 Tang Sorkh- Outline of Master Plan

| | | | | |
|---|---|---|---|---|
| I. Disaster Prevention Work | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | • Check dam - Tang Sorkh Riv. : 9 Nos.<br>- Boshar Riv. R.bank : 8 Nos.<br>- Boshar Riv. L. bank : 3 Nos. | Debris Capacity (12 yrs.), Farmland Protection, River devastation prevention | Training for operation & maintenance of disaster prevention facilities, Training for check dam construction procedure | Prolonging the life of disaster prevention facilities |
| | | | Soil & water conservation enlightenment activity | Acceleration of farmland and rangeland protection |
| | | | Supply of grass seed, Soil & water conservation enlightenment activity, Legislative measures | Acceleration of vegetation improvement |
| People's participation works | Check dam : 6 Nos. | Supplement main check dams (Debris Capacity 18,000m$^3$) | Participate training for check dam construction procedure | Acceleration of check dam construction |
| | *Soil erosion protection: Contour* bund 44 ha | *Soil loss reduction: 2.96* mm/yr to 1.11 mm/yr | *Participate soil & water* conservation enlightenment activity, 252 ha annual rotation plot, Watchman posting | Acceleration of farmland protection |
| | Vegetation improvement (seedling), Vegetation production plot 4 ha, 3 watering points | Carrying capacity of rangeland 756 ha | | Acceleration of vegetation |
| | Forestland recovery: 2.5 ha/year | Planting 400 almond tree/ ha | | |
| II. Community Development | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Installation of irrigation intake facility on check dam at Tange sorkh River | Farm production with 119 liter/s additional water | Agricultural extension promotion & training | Amount of production |
| | Community road improvement : L= 5 km | Transportation cost & time | Training for road maintenance | |
| | Rural water supply improvement: 7 villages | Additional capacity at 2020, 274 m$^3$/day | Training for proper water use and water tariff | Reduction of water use, safety supply of water |
| | | | Extension service of promotion & training for vegetables, apple & handicraft | Amount of production |
| | | | Low interest loan for mechanization | Amount of production |
| People's participation works | Extension of irrigated farmland | Farm production with 119 liter/s additional water | Participate agricultural extension training | Amount of production |
| | Farm road improvement : 97 km | Transportation cost & time | Participate training for maintenance | |
| | Building for collection & shipping of vegetables : Tange sorkh | Capacity : 3 t/day | Group & cooperatives for vegetables & apple production, collection, grading, shipping & sale | Amount of sale |
| | Building for collection, grading & shipping of apple: Tange sorkh | Capacity : 800 t/year | | |
| | Multipurpose center : Tange sorkh | Promotion of group, cooperatives & community activities, Execution of governmental extension services | Group & cooperatives for handicraft & agricultural production & sale, Participate extension training | Amount of production sale & income, Community activity |
| | | | Mechanical farming | Amount of production |

Table 10-1-4-5 K8-28 Zeras- Outline of Master Plan

| | | | | |
|---|---|---|---|---|
| I. Disaster Prevention Work | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Check dam : 16 Nos. | Debris Capacity (3 yrs.), Farmland Protection, River devastation prevention | Training for operation & maintenance of disaster prevention facilities, Training for check dam construction procedure | Prolonging the life of disaster prevention facilities |
| | Landslide Protection : 4 locations | Rd. L= 1.3 km | | |
| | House relocation : 2 villages | 71houses, 360people, 3,700 sheep & goat and 160 cows | | |
| | | | Soil & water conservation enlightenment activity | Acceleration of farmland and rangeland protection |
| | | | Supply of grass seed, Soil & water conservation enlightenment activity, Legislative measures | Acceleration of vegetation improvement |
| People's participation works | Check dam : 9 Nos. | Supplement main check dams (Debris Capacity 9,000m$^3$) | Participate training for check dam construction procedure | Acceleration of check dam construction |
| | Gully protection : Check dam 486 Nos. | Farmland protection of 293 ha | | Acceleration of farmland protection |
| | Soil erosion protection: Contour bund 1,724 ha | Soil loss reduction: 3.19 mm/yr to 1.08 mm/yr | Participate soil & water conservation enlightenment activity | |
| | 3 watering points | Acceleration of vegetation improvement | 336 ha annual rotation plot, Watchman posting | Acceleration of natural vegetation, Nutrition improvement for livestock |
| II. Community Development | | | | |
| Public works | (1) Structure measures | Index | (2) Non-structure measures | Index |
| | Community road improvement : L= 27 km | Transportation cost & time | Training for road maintenance | |
| | Rural water supply improvement: 15 villages | Additional capacity at 2020, 313 m$^3$/day | Training for proper water use and water tariff | Reduction of water use, safety supply of water |
| | | | Extension service of promotion & training for livestock & handicraft | Amount of production |
| People's participation works | Farm road improvement : 285 km | Transportation cost & time | Participate training for maintenance | |
| | Building for collection, processing & sale of milk and its products: 2 locations | 2 location : 2.0t/day/location | Group & cooperatives for milk production & sale | Amount of production |
| | Multipurpose center : 3 locations (Behoz, Dareh Zangi, Lir Siya Shapouri) | Promotion of group, cooperatives & community activities, Execution of governmental extension services | Group & cooperatives for handicraft & agricultural production, shipping & sale (4 locations), Participate extension training | Amount of production sale & income, Community activity |