CHAPTER 4

FIRST PCM WORKSHOP

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4.1 Objectives of the 1st PCM Workshop

The 1st Project Cycle Management (PCM) workshop for the Study was held on April 16-26, 2000 in the office No.14 of the Watershed Management Deputy, Ministry of Jihad-e-Sazandegi (MOJ), and its tasks were smoothly completed. The record of daily programs of the workshop is shown in Figure 4-1-1. Participants of the workshop consisted of 17 members from the, 8 members of the JICA Study Team and 3 members from other related organizations. Table 4-1-1 is a list of the participants.

The objective of the workshop was to review and thrash out the implementation plan of the study. The detailed tasks of the workshops and concerning activities are summarized in Table 4-1-2.

4.2 Outline and Outcome of the 1st PCM Workshop

As results of the participatory planning of the PCM method, participants reached consensus on problems and objectives targeted by the Study and a plan for the study.

Figure 4-2-1 shows process and result of the "Participation Analysis", which is to identify the groups likely to be affected by the Study, and to select the "Target Group" among them. As the figure shows, the rural residents of Karoon river basin were selected as the "Target Group" of the Study.

Figure 4-2-2 shows a result of the "Problem Analysis" which represents the *causes* and *effects* of existing problems identified in the project area (the Karoon river basin). Then Figure 4-2-3 shows a result of the "Objectives Analysis" which identifies the desirable situation that would be attained once problems have been solved, and clarifying the *means-end* relationship required to attain such conditions.

Figure 4-2-4 shows a result of the "Project Selection." According to the PCM method, participants of the workshop select a specific project strategy from project components based on the information obtained in the former Objective Analysis process. However, the framework of the JICA Study has already decided to certain extent between MOJ and JICA by signing the Scope of Works and the inception report. Thus the participants could not select a project strategy out of the framework. Then the participants just identified the objectives in the Objective Tree that are covered by the JICA Study.

Table 4-2-1 shows the Project Design Matrix (PDM) of the Study that shows the logical inter-relationship among the components of the study project, such as the objectives, *Activities*, and *Inputs*. The PDM is to be utilized for implementation and evaluation of the study project.

4.3 Other Results of the 1st PCM Workshop

After completing the above-mentioned participatory planning of the PCM method, the participants also discussed on some details of implementation of the study.

The participants reached a consensus on the method to select five sub-basins, for that integrated watershed management master plans shall be prepared in the study. The method is to select one most problematic sub-basin in the sense of each of the five criteria below:-

- sub-basin which faces economical under-development and lack of job opportunity.
- Sub-basin which faces actual damage by disasters.
- Sub-basin which faces high population growth.
- Sub-basin which potentially has a risk of disaster.
- *Sub-basin which potentially has capacity for development.*

The participants also reached a consensus on the groups whose representatives should be invited to the 2nd workshop for designing master plans of 5 pilot sub-basins. The proposed list of participants for the workshop is mentioned later.

The participants also discussed at the workshop to decide items of data which should be included in the inventory. However, they could not reach the conclusion, because the discussion needs much time for technical consideration.

All the above-mentioned results have no contradiction with the scope of works or the inception report formerly signed by MOJ and the JICA Study Team.

4.4 Preparation of the 2nd Workshop

The Japanese expert in charge of the participatory planning visited to Shar-e-kord and the Karoon basin twice and made necessary arrangement for the 2nd workshop as follows.

4.4.1 Plans of the 2nd Workshop

The JICA Study Team plans to hold the 2nd PCM workshop to design master plans for watershed management of 5 pilot sub-basins. The workshop shall take at least 35 clear days, because one workshop which takes 7 days respectively is needed for each pilot sub-basins. The workshops would be held in and around the study area (the Karoon basin), rather than in Teheran. The number of participants each workshop shall be 20 to 30.

4.4.2 Identification of the Participants of the Workshop

As mentioned above, in the 1st workshop the participants identified who should be invited for the 2nd workshop. The Table 4-4-1 is the participants list drafted based on the results of the 1st workshop. There still is a room for improvement of the proposed idea.

4.4.3 Assignment of "Translator-cum-participants"

The biggest problem expected in the 2nd workshop is a "Language Barrier" between participants who can not speak English and other participants, as more than half of the participants would not be able to communicate in English.

To ease the problem, it would be recommended to invite 3 or 4 "translator-cum-participants" for each workshop. The participants, who actively participated to the discussion in the 1st workshop, are competent as the translator-cum-participants.

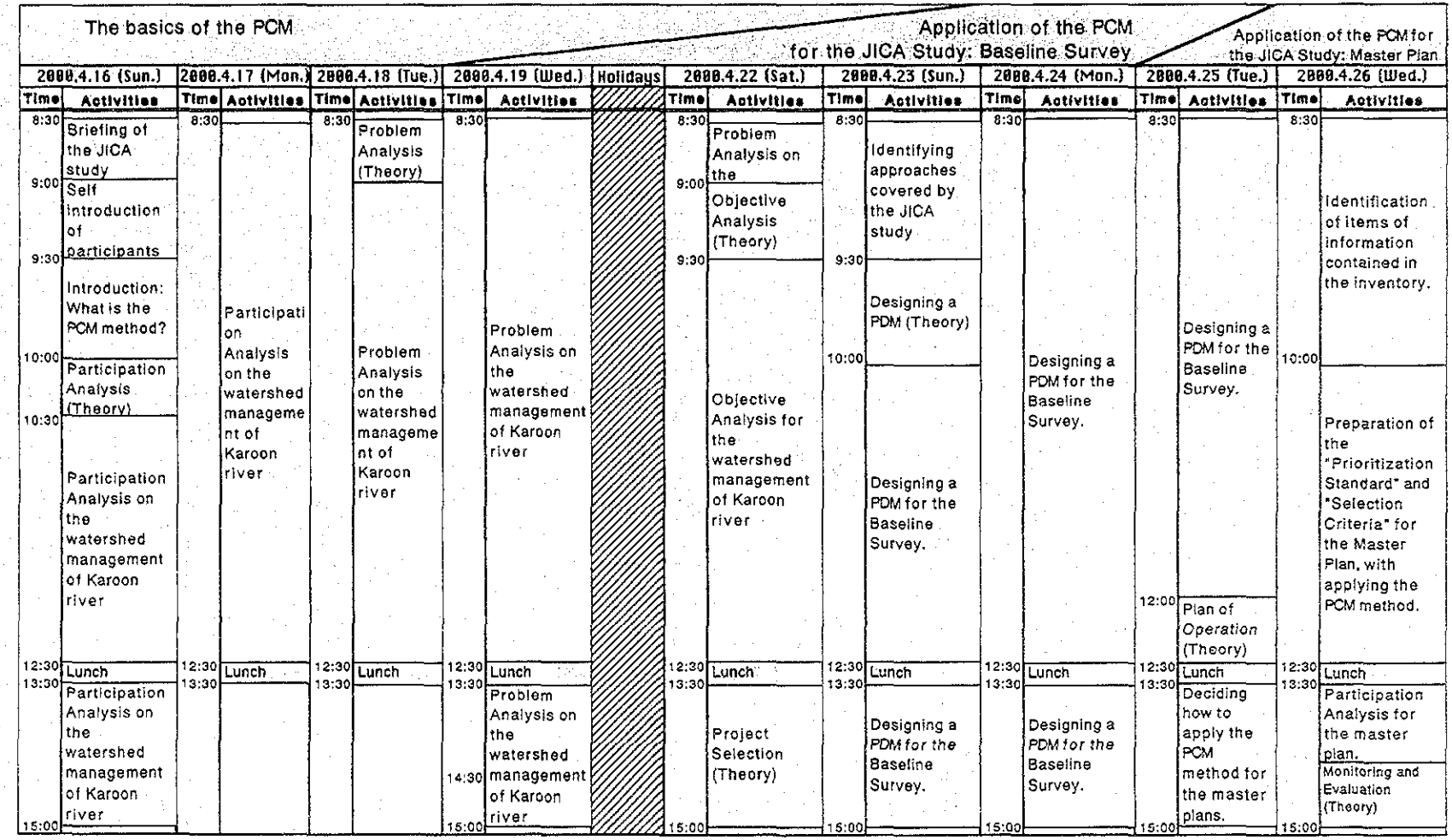

Figure 4-1-1 Record of Daily Program of the 1st PCM Workshop

Table 4-1-1 Participants of the 1st PCM Workshop

No.	Name	Organization	Specialty
1	Mr. Amir Maleki Bigdeli	Flood Group, Study and Evaluation, Watershed Management Deputy, MOJ	Irrigation expert (Hydrology)
2	Mr. Alireza Golbabaei	Karkheh Dam Office, MOJ	Hydrologist
3	Mr. Babak Ebrahimi	Karoon Watershed Management Office, Watershed Management Deputy, MOJ	Hydrology
4	Mr. Ebrahim Hosseini	Study and Evaluation, Watershed Management Deputy, MOJ	Spatial Analysis
5	Mr. F. Behboodi	Watershed Management Deputy, MOJ	Soil
6	Mr. Farhad Razavi-salim	Watershed Management Deputy, MOJ	Evaluation Land
7	Mr. H. Saadat	Watershed Management Deputy, MOJ	Watershed Management
8	Mr. Hady Mirkiaiy	Watershed Management Deputy, MOJ	Irrigation and Watershed Management
9	Mr. Hossain-ali Mohamadi	Watershed Management, Mazandaram Provincial Office, MOJ	Watershed Management
10	Mr. Khazaie Mandour	MOJ	Watershed Management
11	Mr. Mohammad Aghighi	Watershed Management Deputy, MOJ	Watershed Management Engineering
12	Mr. Mohsen Urumieh	Study and Evaluation, Watershed Management Deputy, MOJ	GIS expert in watershed Management
13	Mr. Mostafa Noori	Watershed Management Deputy, MOJ	Biologist
14	Mr. Rahmati	Study and Evaluation, Watershed Management Deputy, MOJ	Erosion and Sediment
15	Mr. Sarlak Avaz	Study and Evaluation, Watershed Management Deputy, MOJ	Hydrologist
16	Dr. Seyyed Ahmad Heydarian	Watershed Management Deputy, MOJ	Soil and Water. Project Manager.
17	Mr. Seyyed Mohammad Safavi	Watershed Management Deputy, MOJ	Geomorphology and Arial Photo Interpretation
18	Mr. Mehrdad Barkhordar	River Bureau, Ministry of Energy	River Engineering and Flood control
19	Dr. Yaghoub Nouruzi-banis	Soil Conservation and watershed management Research Center	Water Resource Engineering
20	Mr. Ziaeddin Almassi	Hable Rud National Project	Environmental Planning and Management
21	Mr. Awadh Kishor Sah	JICA Study Team	Remote Sensing and GIS
22	Mr. Hironori Takahashi	JICA Study Team	Water Resources, Rural Development
23	Dr. Jiro Iguchi	JICA Study Team	Project Management, Environmental Management
24	Mr. Jiro Namura	JICA Study Team	Land Use Planning (Agriculture, Forestry, Livestock)
25	Mr. Jiro Yabe	JICA Study Team	Hydrology and Water Use
26	Ms. Maryam Zare	JICA Study Team	Sedimentology
27	Mr. Seiichi Yamakawa	JICA Study Team	Disaster Prevention Planning
28	Mr. Tsuneyoshi Kimura	JICA Study Team	Engineering Geologist

Table 4-1-2(1) Detailed Tasks of the 1st PCM Workshop

Tasks	Description in the Inception Report	Outputs	Activities
0. Preparation of the workshops.	N/A	Necessary arrangement is made to start the workshops for the following tasks.	0-1. The Study Team drafts the tasks, expected outputs and activities needed for the tasks, and schedule of the workshops (This document). 0-2. Based on the draft, the Study Team and the Iranian counterpart personnel determines the schedule and participants of the workshops. 0-3. The Study Team and the Iranian counterpart personnel make necessary arrangement (place, facilities, documents etc.) needed for the workshops.
a. Review of Plan of Operation of the Study.	The Study aims to prevent natural disasters and preserve natural resources and environment in the watershed of Karoon river. The scale and type of development in the area are to be decided with people's participation as an adequate size to be managed by people. Thus, the contents of inventory must include requirement from local people, and the results of analysis are to be arranged in a way understandable by the local people.	PDM of the study is prepared, basically following the plan the Study Team prepared.	-1. The Study Team prepare a draft PDM of the study based on the present study plan. a-2. At the workshop, method to design a PDM is explained to the participants. a-3. At the workshop, the participants design a PDM of the study plan based on the problem analysis and the needed information identified through the task (b). The PDM must be consistent with the draft prepared through a-1.
b. Decision of Items of Inventory.	For the formulation of watershed management plan, the function of the basin is to be analyzed and divided into several sub-functions. With extraction of attributes and factors on such sub-functions, the property of sub-basin is to be given and clarified. Generally, these attributes of the terrain of basin are composed of soil, topography, slope of land, vegetation, vegetation cover, land use, and precipitation, and they are generally arranged in following form. Important functions related to aquifer recharge are soil, vegetation, land slope, catchment area, geology, land use, topography, coverage area of pond/lake/swamp/river and climate characteristics, particularly precipitation.	List of items of the inventory is prepared.	b-1. At the workshop, the Problem Analysis of the PCM method is explained to the participants. b-2. At the workshop, the participants apply the Problem Analysis to the problems concerning natural disasters and preservation of natural resources that the Study Area is generally facing. As a result of the analysis the "Problem Tree" is prepared. b-3. At the workshop, the participants identify cards without sufficient information. b-4. At the workshop, the participants list necessary information and items of data providing such information.
c. Examination of Methodology of Prioritization.	Upon above items arranged in inventory and rating to be evaluated, appropriate weight of evaluation points are to be given, and the "Prioritization Standard" is to be formulated on the selection of the sub-basins to be studied.	The "Prioritization Standard" for the Master Plan Study Area is prepared.	c-1. At the workshop, the criteria of project selection of the PCM method is explained to the participants. c-2. At the workshop, the participants determine the "Prioritization Standard," with refering to the criteria above and the items of the inventory determined through the task(b).

Table 4-1-2(2) Detailed Tasks of the 1st PCM Workshop

Tasks	Description in the Inception Report	Outputs	Activities
d. Establishment of Selection Criteria for Master Plan Study Area.	Based on "Prioritization Standard" examined above, development priority is to be given on respective sub-basin. Thus, the selection criteria on "Master Plan Study Area" is to be established. Especially in the study Area, factors on land use, development process of land, and soil erosion are important on the selection of "Master Plan Study Area."	The Selection Criteria for the Master Plan Study Area is prepared.	d-1. At the workshop, the participants decide how to divide the Study area into sub-basins. d-2. At the workshop, the participants decide criteria to select "Master Plan Study Area" from the sub-basins, based on the "Prioritization Standard."
e. Examination of Consistency of the Plan, Monitoring and Feed-back.	"Disaster Prevention" is considered to be a degree of achieving watershed management and preservation, and the cause and result of disaster have close relationship each other. Respective plan is to be downsized into an appropriate scale capable to be controlled by local society or people. With sizable plans, the effectiveness for "Disaster Prevention" is to be attained in whole the basin terrain of the "Master Plan."	The participants of the workshop understands how to design a master plan with considering the size of the master plan, relationship between several factors causing the disaster etc.	e-1. At the workshop, methods to apply the PCM method to the master plan in the Phase II of the study is explained to the participants.
f. Formulation of Basic Policy for Master Plan.	"Disaster Prevention" is generally promoted by obtaining the resistance against unexpected disaster with view of both natural and social environments. In the bottom of such fragility against disaster, the population issue as well as poverty issue is always laid on, and extruding these issues will promote the plan for "Disaster Prevention." A plan to be formulated in the Study has sustainability of raising the productivity in the basin and improving the living standard of local people. The framework of "Basic Policy for Master Plan" is to be formulated involving this process.	A PDM of a plan applicable for the sub-basins in general is prepared as the framework.	f-1. At the workshop, the participants design a PDM of a master plan which is generally applicable to the sub-basins, based on the problem analysis and the needed information identified through the task (b).

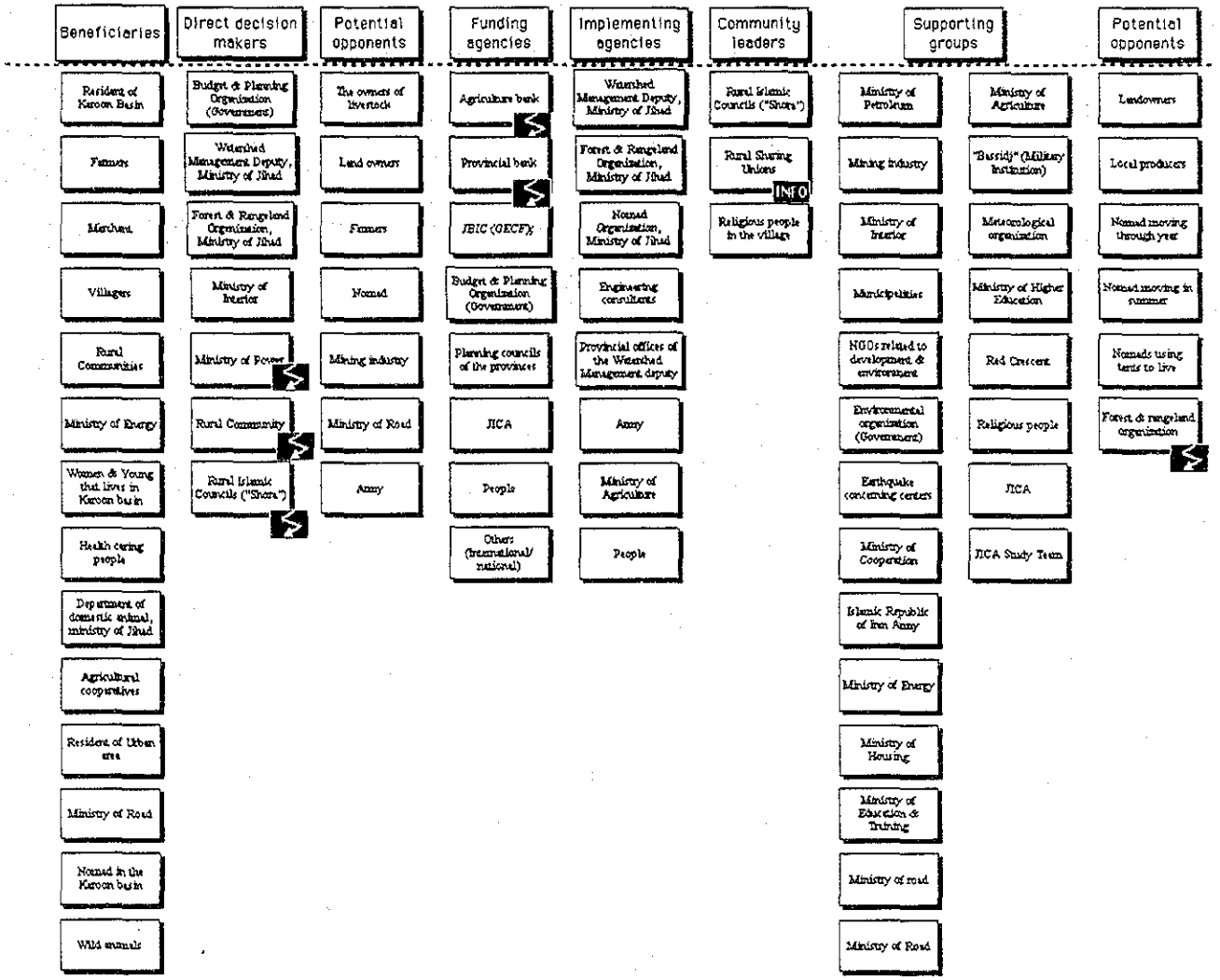

Figure 4-2-1(1) Result of Participation Analysis (Group Categolization)

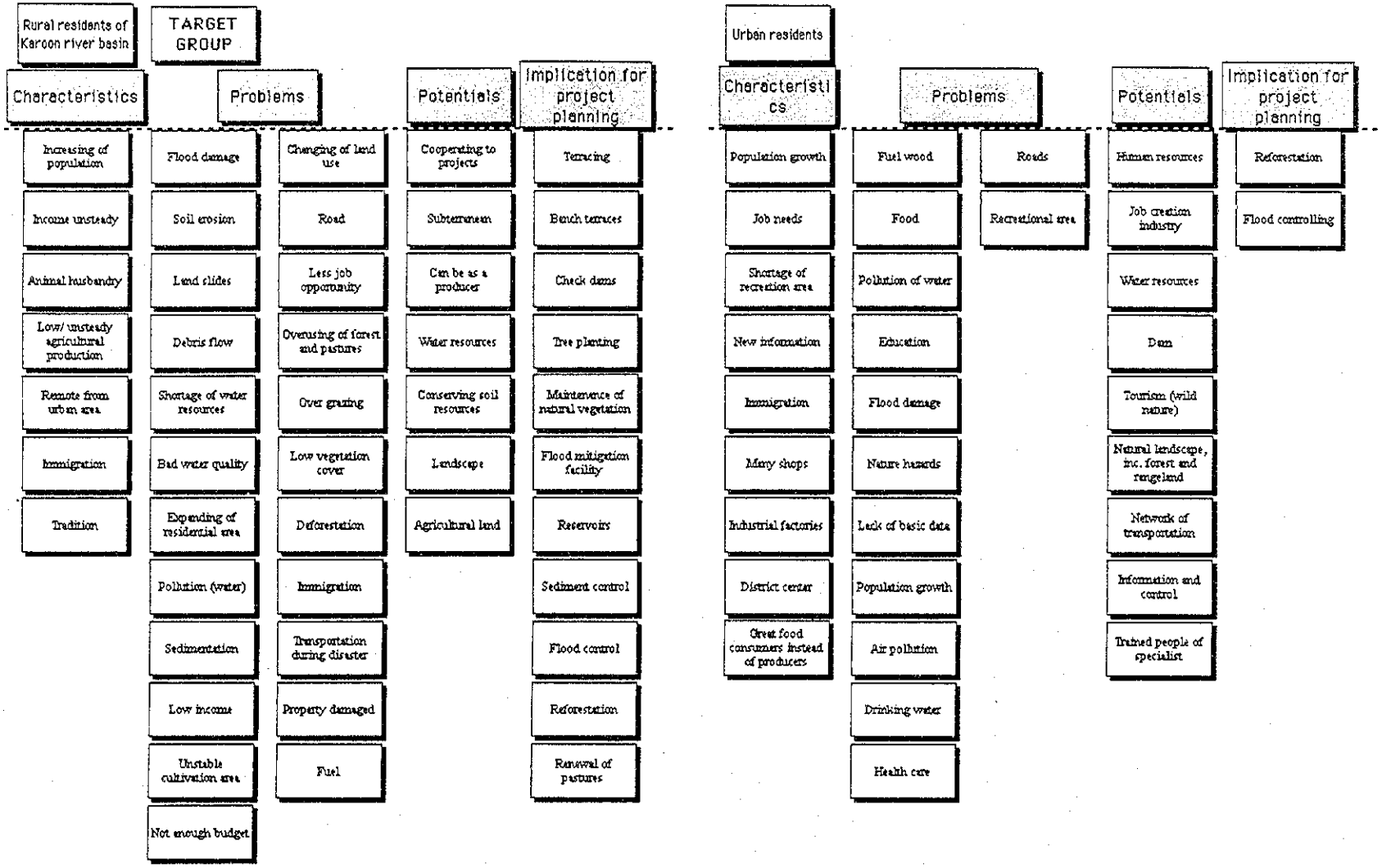

Figure 4-2-1(2) Result of Participation Analysis (Detailed Group Analysis 1)

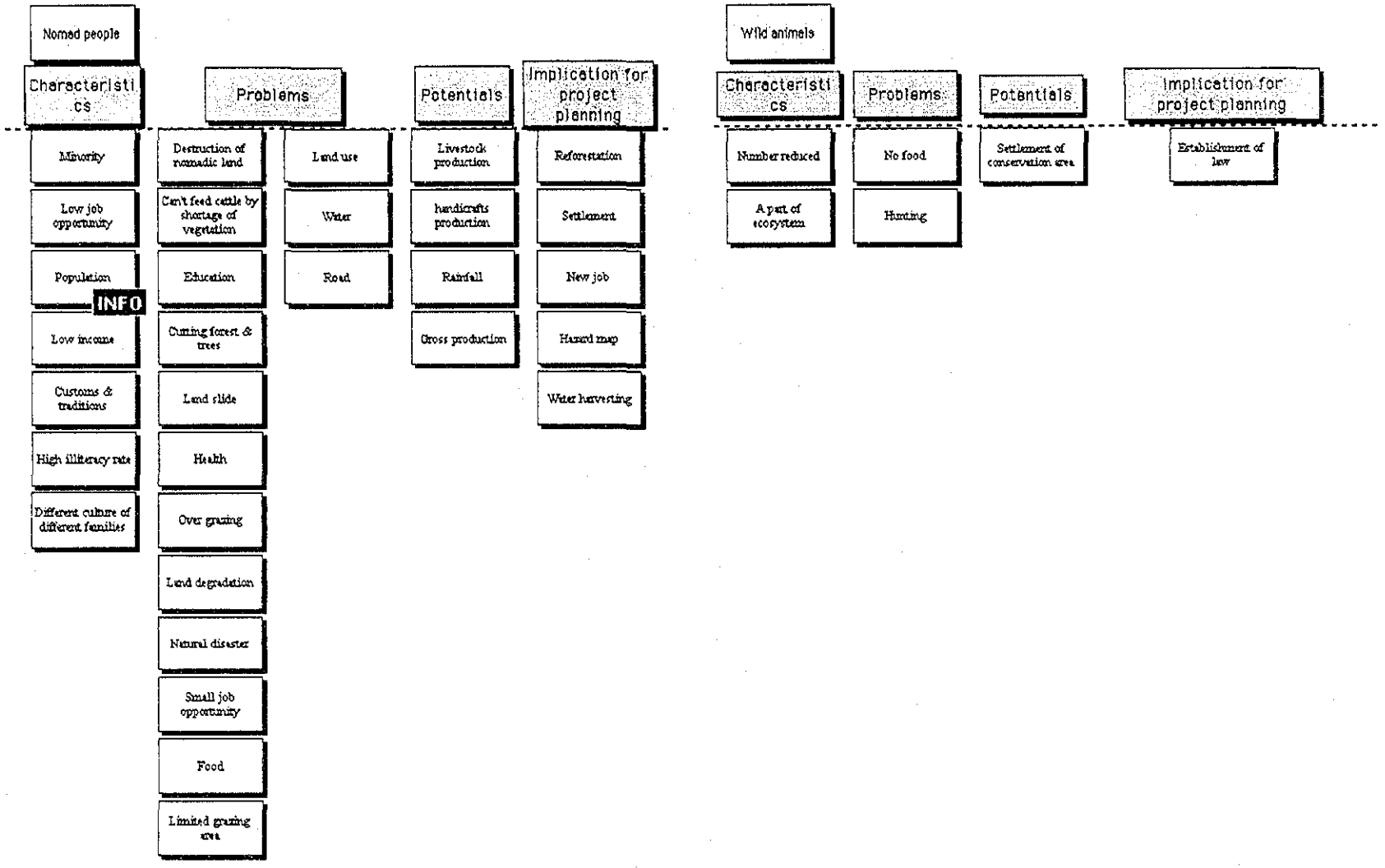

Figure 4-2-1(3) Result of Participation Analysis (Detailed Group Analysis 2)

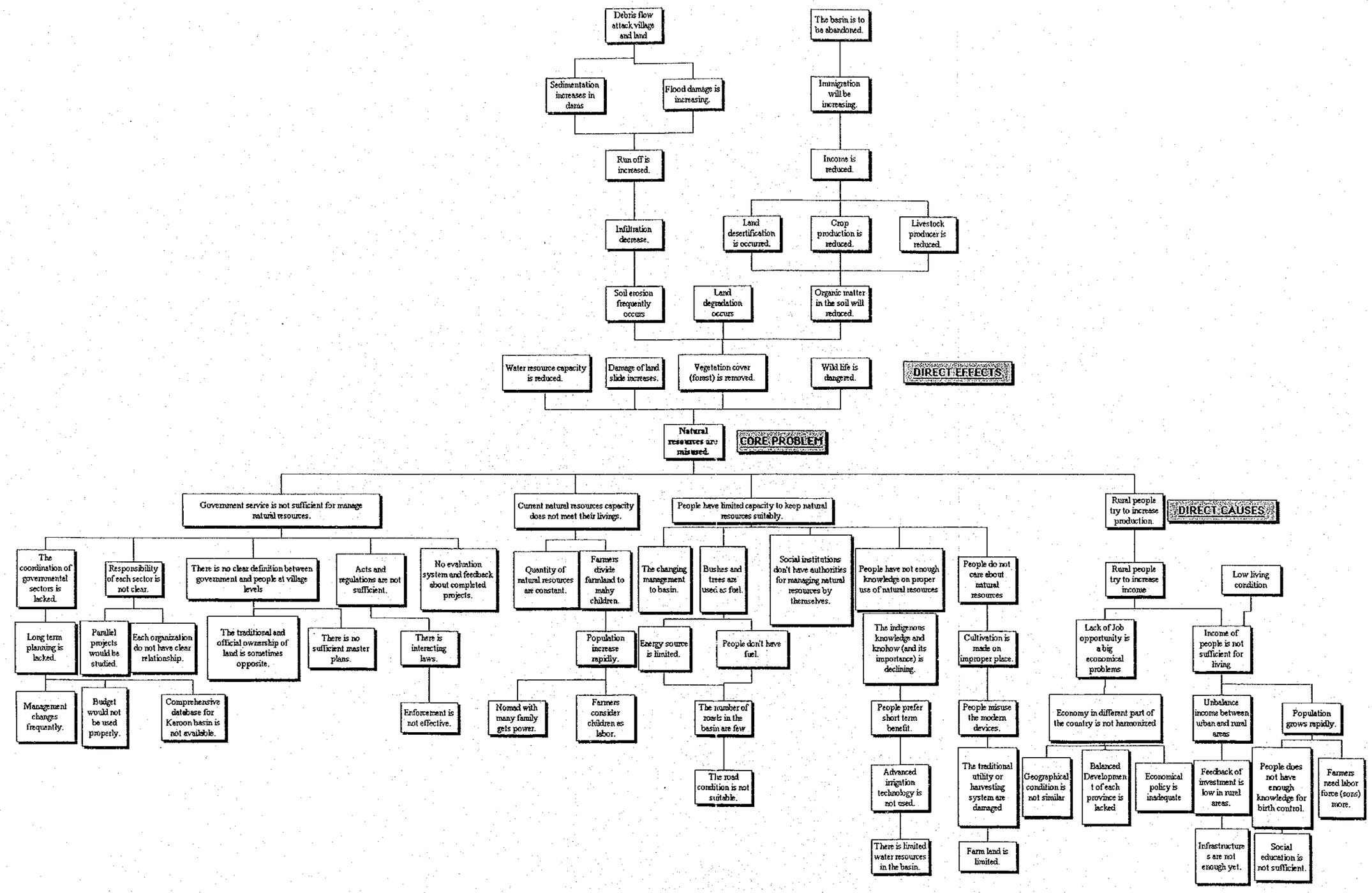

Figure 4-2-2 Result of Problem Analysis (Problem Tree)

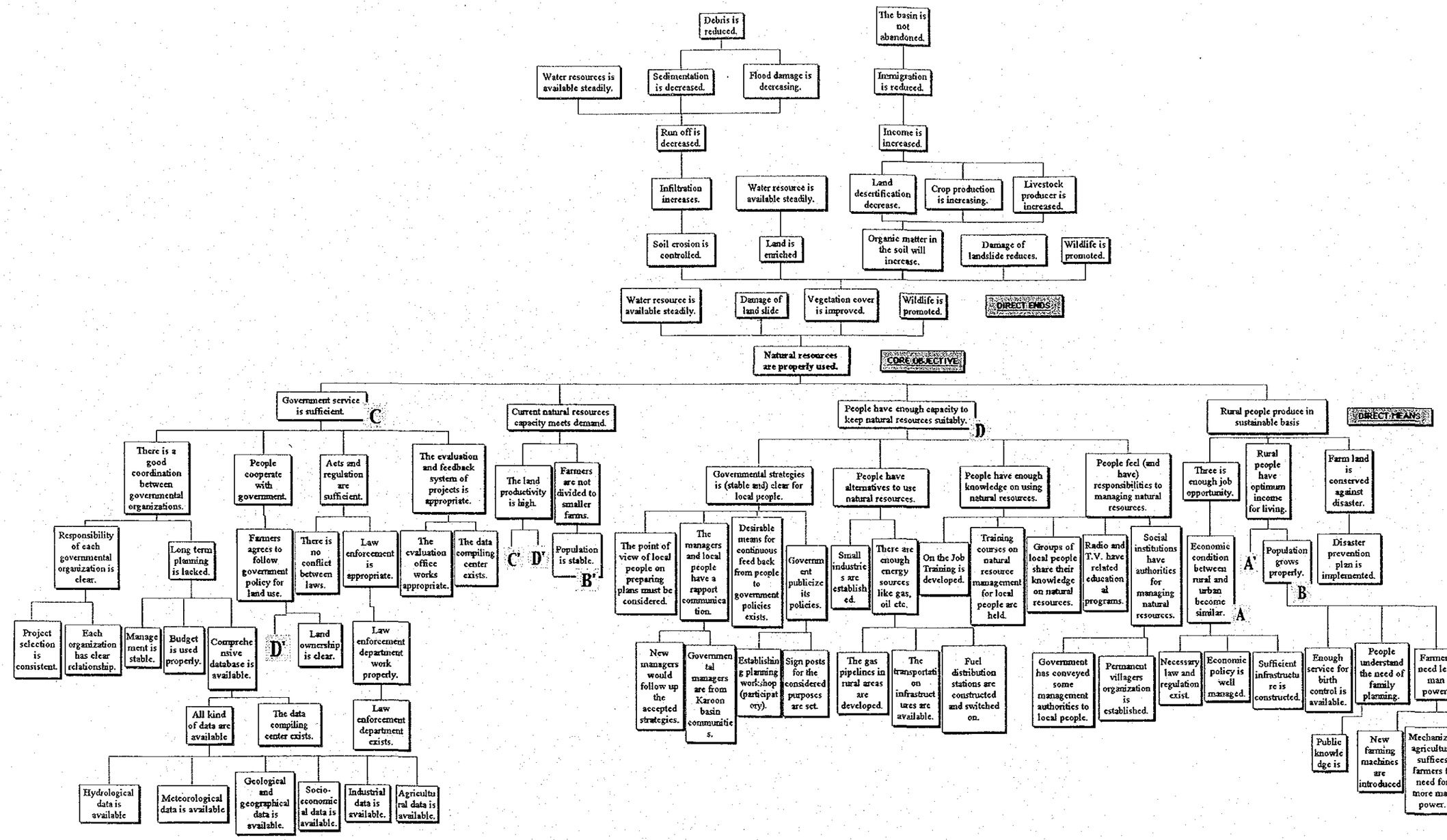

Figure 4-2-3 Result of Objective Analysis (Objectives Tree)

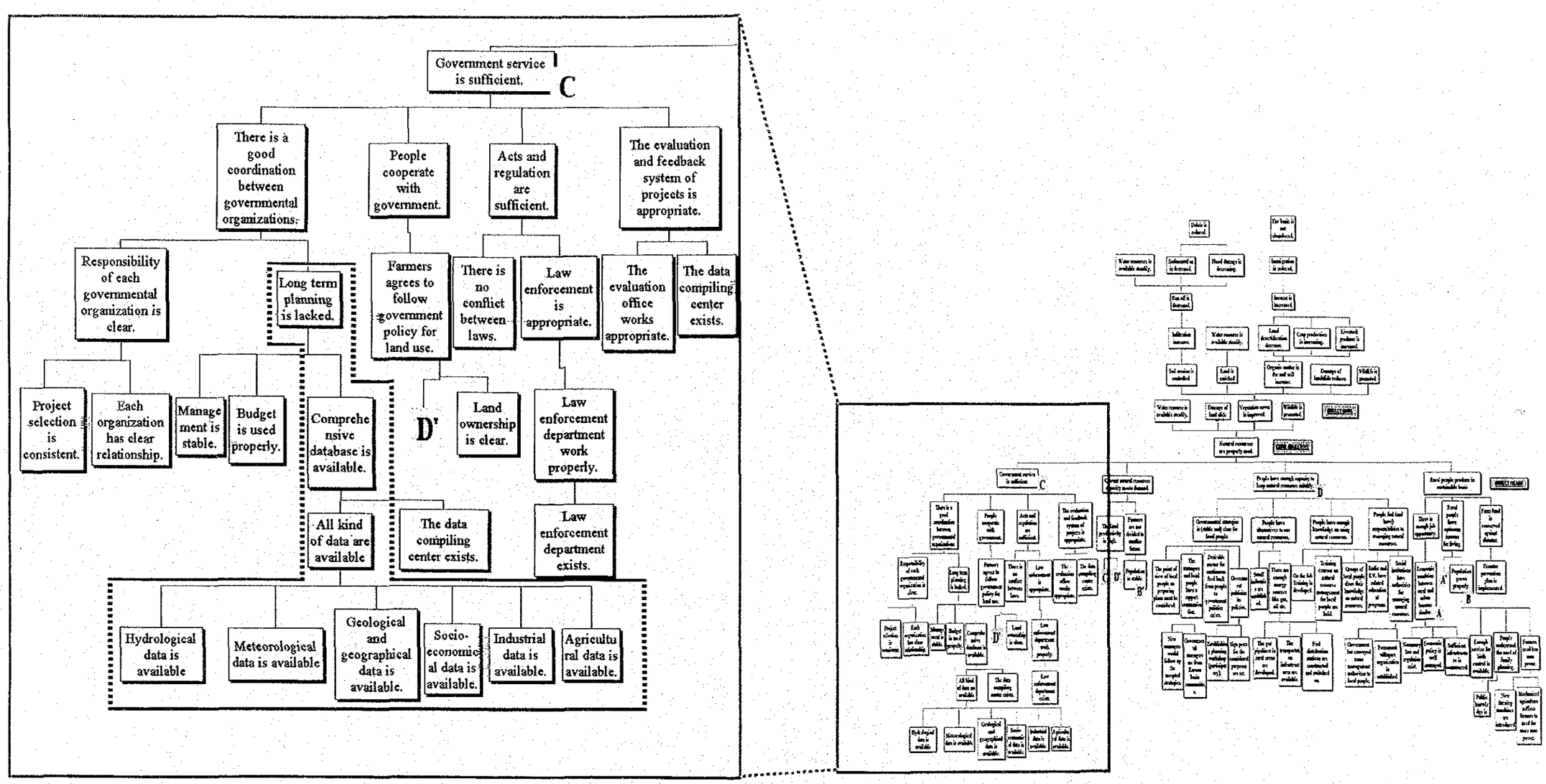

Figure 4-2-4 Result of Project Selection

Table 4-2-1 Project Design Matrix (PDM)

Project name: The Study on Watershed Management Plan for Karoon River in the Islamic Republic of Iran | Duration: February 1, 2000 to Oct 31, 2001
Project area: Upper Karoon Basin (Karoon Dam No 1) | Target group: Rural Residents of Karoon Basin | Date: April 25, 2000

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal - Social and Economic Conditions of rural people in the Karoon basin and other river basins are improved.	1. Human Development Index (HDI) of the residents in the Karoon basin and other river basins increases by the year 2030. 2. Damage by natural disasters in the Karoon basin and other river basin is reduced by the year 2030.		
Overall Goal -Social and Economic Conditions of rural people in the selected 5 sub-basins are improved.	1. Human Development Index (HDI) [1] of the residents in the selected 5 sub-basins increases by the year 2013. 2. Damage by natural disasters in the selected 5 sub-basins is reduced by the year 2008.	1-1. Records of the income of people at the Central Bank of Iran. 1-2. Records of social aspects and population at the Plan and Budget organization (especially the Iranian Statistical Center). 2-1. Records of natural disasters at the Natural Disaster Reduction Committee, the Ministry of Interior. 2-2. Records and reports about flood at the Water Resources Center (TAMAB), the Ministry of Energy.	-Evaluation of the implementation of the master plans is conducted. -The Iranian government calibrate the models for other sub-basins.
Project Purpose Integrated watershed management plans for selected 5 sub-basins are prepared.	-Technical committees of directly related organizations (the Ministry of Jihad-e-Sazandegi, the Planning and Budget Organization, etc.) approve the master plans for 5 sub-basins by October 31, 2001 on feasibility, viability and methodology of the plans.	1. Final report of the study project. 2. The agreements of related organizations on the approvals.	-The master plans are properly implemented.
Outputs 1. Common understanding on the project among the JICA Study Team, Iranian counterpart and related organizations is achieved. 2. Data necessary for inventory are collected. 3. Inventories essential for watershed management planning for all sub-basins of the Karoon basin are prepared. 4. sub-basins for master plans are selected. 5. Necessary programs are integrated for watershed management of each sub-basin.	1. Progress report is submitted periodically. 3. Interim report containing the inventories will be submitted by January, 2001. 4. Interim report including the selected 5 sub-basins for master plans will be submitted by January, 2001. 5. Final report containing master plans will be submitted by 31 October, 2001.	1~5. The reports. 1~5. Project records of the submittal of the reports.	
Activities 1-1. Hold PCM workshop. 1-2. Transfer the PCM method for planning. 1-3. Review the plan of the study project with Iranian counterpart and related organizations. 2-1. Collect available reports. 2-2. Collect remote sensing data. 2-3. Collect physical data. 2-4. Collect present land use data. 2-5. Collect socio-economic data. 2-6. Collect the data related to the natural disaster. 3-1. Divide the Karoon basin into sub-basins. 3-2. Evaluate and analyze all collected data. 3-3. Compile the data into GIS system.	4-1. Define the selection criteria. 4-2. Analyze the collected data. 4-3. Identify the needs and problems of all sub-basins. 4-4. Select 5 sub-basins. 5-1. Hold participatory workshops. 5-2. Conduct participation analysis. 5-3. Identify the issues in the sub-basins. 5-4. Consider countermeasures for each issues. 5-5. Examine the applicability of the counter measures. 5-6. Select the project components. 5-7. Conduct impact assessment. 5-8. Design the master plans for each sub-basins. 5-9. Prepare implementation plans.	Inputs **Iranian side** -4 permanents counterparts. -Temporary counterparts when necessity arises. -Office space with equipment. -Transportation in the field. -Provision of relevant data and information. **Japanese side** -Equipment and devices. -Study team members.	-Protocol of technical assistance between Japan and Iran continues. -Data holders are cooperate with the project. **Precondition** -Rural people cooperate with the study.

[1] Availability of data needed to calculate HDI in the selected sub-basins has not been confirmed.

Table 4-4-1 Expected Participants for the 2nd Workshop

Group1: Rural people

Member of "Shoura" of each villages in the sub-basin

Representative(s) of the villagers farming in village(s)

Representative(s) of the people grazing in the sub-basin

Representative(s) of Land owners of village(s) in the sub-basin.

Representative(s) of elder people in the sub-basin ((Reserved, because of duplication with "Shoura").

Representative(s) of Women in the sub-basin ((Reserved, because of some difficulties to invite them).

Group2: Representative of Organizations under the Ministry of Jihad-e-sazandegi

Representative of the Tehran office of the evaluation and study department, WMD, MOJ.

Representative of the Karoon watershed management office, WMD, MOJ.

Representative of the Provincial extension offices WMD, MOJ.

Representative of the Provincial office of Nomad organization MOJ.

Representative of the Provincial office of Construction MOJ.

Representative of the Provincial office of Livestock MOJ.

Representative of the Provincial office of Promotion, MOJ.

Representative of the Provincial office of forest and range land organization, MOJ.

Representative of the Provincial office of Soil, Water, livestock and forestry research center, MOJ.

Representative of the Provincial office of Planning deputy, MOJ.

Group3: Other governmental agency

Representative of the Provincial office of the Ministry of Interior.

Representative of the Provincial office of the Ministry of Agriculture.

Representative of the Provincial office of the Ministry of Budget.

Representative of the Provincial office of the Environmental Organization.

Representative of the Provincial office of the Water Deputy, the Ministry of Energy.

Provincial governments

Group4: Others

Members of the JICA Study Team.

local consultants (Reserved, because of uncertainty).

NGOs (Reserved, because of uncertainty).

Professors from the universities nearby (Reserved, because of difficulties to select the professors)

CHAPTER 5

SUB-BASIN INVENTORY

CHAPTER 5 SUB-BASIN INVENTORY

5.1 Division into Sub-basins

The Study area, upstream of Shahid Abbaspor Dam, consists of eight main river basins from K 1 to K 8 and is divided into small sub-basins in order to formulate the inventory.

The division of the Study area is generally made taking into consideration of topographical conditions such as watershed boundary and river courses, inhabitant areas and the size of the areas, based on topographic maps of 1: 50,000.

Sub-basins are originally set at 10 to 50 km^2, however, the size of sub-basins becomes rather large because inhabitant areas are scattered in the Study area and uniformity of sub-basins such as living and social conditions is taken into account.

The 455 sub-basins are finally identified and the results of division are summarized as follows;

Table 5-1-1 The Results of Division into Sub-basins

Basin code	River name	Area (km^2)	No. of sub-basin	Average sub-basin area (km^2)
K 1	Behesht abad	3,920.2	63	62.2
K 2	Ab. Kurang	1,223.7	21	58.3
K 3	Middle Karoon	2,509.1	47	53.4
K 4	Vanak	3,214.8	40	80.4
K 5	Bazoft	2,174.7	41	53.0
K 6	R. Lordegan	1,474.0	20	73.7
K 7	Khersan	9,021.6	164	55.0
K 8	Karoon	3,273.6	59	55.5
Total		26,811.8	455	58.9

Note; Revision is made on sub-basins and the total area revised becomes; 26,811.7 km^2

5.2 Components of Inventory

Study Area has been divided into 455 sub-basins with an average area size of 59 km^2, for which the inventory describing natural, social and economic features has been prepared. The items such as land use, vegetation, land capability, protected area, for which data and information were given in the form of maps (polygon data) were converted to numeric quantity in full use of GIS. Such inventory items as landslides, flood damage and geological features, which require the past records and data, and also photo-interpretation were manually prepared. Inventory items are summarized in Table 5-2-1.

5.3 Data Arrangement for GIS

The GIS data preparation for this Study was carried out by acquiring the various kinds of required data then organizing all in ARC/INFO data format by integrating them in a common coordinate system. Data were acquired by field survey, SPOT (Panchromatic) satellite imageries, interpretation of aerial photos, existing data such as topographic and others. Following activities were employed for this:

- Interpretation of Aerial Photos
- Analysis of SPOT Satellite Imageries.
- Collection of Existing Data.
- Preparation of Skeleton (Background) Data for Maps.
- Preparation of Thematic Data for Maps.
- GIS Data Analysis.
- Output of Maps.

5.3.1 Interpretation of Aerial Photos

The aerial photographs of ranging from 1991 to 1999 (scale 1:40,000), covering the whole study area were acquired from National Cartographic Center (NCC). These photos were interpreted for landslide and other features.

5.3.2 Analysis of SPOT Satellite Imageries

SPOT satellite imageries covering the whole Karoon watershed area were used in this Study. Applying necessary enhancement to original SPOT data, three kinds of images were printed at approximate scale of 1:100,000 which were used for GCPs collection and interpretation purpose. Considering the steep slopes in the study area, to achieve more spatial accuracy, Digital Elevation Model (DEM) generated from contour data was employed to ortho-rectify the SPOT images. The ortho-rectified image data was used to transfer the thematic information so delineated on the aerial photographs.

5.3.3 Collection of Existing Data

Basically the collected existing data were those required for background and thematic maps. These include relatively wide varieties of exiting data, both in form of digital and paper maps as listed below:

(1) Topographic (1:50,000) maps
(2) Topographic (1:25,000) digital as well as paper maps

(3) Administration data
(4) Land use data: maps (scale ranging from 1:100,000 to 1:250,000) and digital form
(5) Vegetation data: maps(scale ranging from 1:50,000 to 1:250,000) and digital form
(6) Land capability map (scale 1:250,000)
(7) Erosion sensibility data: maps (scale ranging from 100,000 to 1:250,000) and digital form
(8) Meteorological station data
(9) Gauging station data
(10) Dam location data
(11) Flood location data
(12) Protected area data and others.

5.3.4 Preparation Skeleton (Background) Data for Maps

Skeleton data, capable of using as background for thematic map like vegetation and so on, was delineated with the following basic features:

a) Main and Sub-basin boundary; altogether 8 main and 455 sub-basins (Figure 5-3-1)
b) Roads
c) Major rivers
d) Administration boundaries
e) Location of cities
f) Lake/Reservoir

5.3.5 Preparation of Thematic Data for Maps

By combining the interpretation as well as the existing map information, the following thematic layers were produced:

a) Vegetation
b) Land Use
c) Erosion sensibility (erodibility)
d) Land Capability
e) Land slide
f) Meteorological station data
g) Gauging station location
h) Dam location
i) Flood location
j) Protected areas

5.3.6 GIS Data Analysis

In order to facilitate an accurate overlay of two or more GIS data together, all the GIS data so received from different source with different coordinate (projection) systems were converted to the common system.

In this study, the basic unit of area calculation being at sub-basin, sub-basin data was overlaid with different thematic GIS data such as administration boundaries, vegetation, land use, land slide, land capability and others in order to find out the aerial extent of various classes within a particular sub-basin.

5.3.7 Output of Maps

Based on the above common coordinate system, the index map for 1:100,000 scaled maps were prepared (Figure 5-3-2). Using this index map, all the background data were overlaid first so that on its top, any one of the thematic layer could be overlaid titling the map of that thematic (subject). The included thematic maps are land slide, vegetation, land use, land capability, erosion sensibility and so on.

Table 5-2-1 (1) Inventory Items

Inventory Category	Inventory Items	Classification
1. Land Capability	1) Mountainous lands	Weighted Land Capability by Geographical Categories and Land Capability Index
	2) Hilly lands	
	3) Plateau and upper terraces	
	4) Piedmont plains	
	5) Elluvial fans	
	6) Lowlands	
	7) Gravelly colluvial fans	
	8) Gravelly river fans	
	9) Complexes	
	10) Land capability index	
2. Soil and Water Conservation Facility	1) Debris Barrages	
	2) Slope Stabilization	
	3) Contour Bands	
	4) Water Ways	
	5) Sediment Traps	
	6) Revegetation	
	7) Afforestation	
	8) Contour Tillage	
3. Erosion Class	1) Trace	9 classes by Erosion Amount
	2) Trace-Low	
	3) Low	
	4) Low-Fair	
	5) Fair	
	6) Fair-High	
	7) High	
	8) High-Severe	
	9) Severe	
4. Socio Economic Condition	1) Population	Population by rural and urban
	2) Households	Households by rural and urban
	3) EAP	Age 10 and over
	4) Unemployment Rate	Jobless
	5) Income Level	Agriculture & livestock income
5. Agriculture and Livestock	1) Agricultural Land	Irrigated land, Non-irrigated land
	2) Orchard	Irrigated land, Non-irrigated land
	3) Livestock	Sheep, Goats, Cows, Horses, etc.
6. Natural Vegetation and Environmental Reserve	1) Vegetation	Code, Area, Condition, Trend
	2) Carrying Capacity	Capacity for grazing
	3) Protected Area	Area
	4) National Park	Area
	5) Wetland	Area
	6) Genetic Reserve	Area
	7) National Nature Monument	Location

Table 5-2-1 (2) Inventory Items

(continued)

Inventory Category	Inventory Items	Classification
7. General Information	1) Name of Province	
	2) Name of Township	
	3) Name of Villages	
	4) Name of Drained Tributary	
	5) Locating Coordination	
	6) Related 1:50,000 map	
	7) Catchment Area	
8. Meteorology and Hydrology	1) Mean Annual Rainfall (mm)	
	2) Mean Maximum Daily Rainfall	
	3) Mean Temperature	Max., Min.,Average
	4) Annual Evaporation	
9. Water Use	1) Annual Rainfall (MCM)	
	2) Annual Runoff (MCM)	
	3) Annual Runoff Depth (mm)	
	4) Mean Maximum Runoff	
	5) Annual Runoff Ratio	
	6) Water Use for Irrigation	
	7) Water Use for Domestic Water	
10. Flood Damage	1) Date, Cause, Location	
	2) Previous Big Floods	
	3) Total Damage	
	4) Damage of Human Beings	
	5) Damage of Livestock	
	6) Damage of Agriculture	
	7) Damage of Houses	
	8) Damage of Infrastructure	road, canat, well, bridge, spring, etc.
11. Landslide	1) Town, District, Village	
	2) Location Coordination	
	3) Date of Movement	
	4) Kind of Movement	
	5) Area	
	6) Main Cause	
	7) Lithology of Mass Movement	
	8) Damage	
	9) Classification of Risk	
12. Geological Feature and Geology	1) Elevation	Max. Min.
	2) Mountain area	
	3) Hilly area	
	4) River side terrace	
	5) Alluvial flat plain	
	6) Large scale fan	
	7) Special geological features	
13. Land Use	1) Irrigated farmland	Area by Land Use Category
	2) Non irrigated (dry) farmland	
	3) Forest	
	4) Forest with inter-cropping	
	5) Rock	
	6) Others	

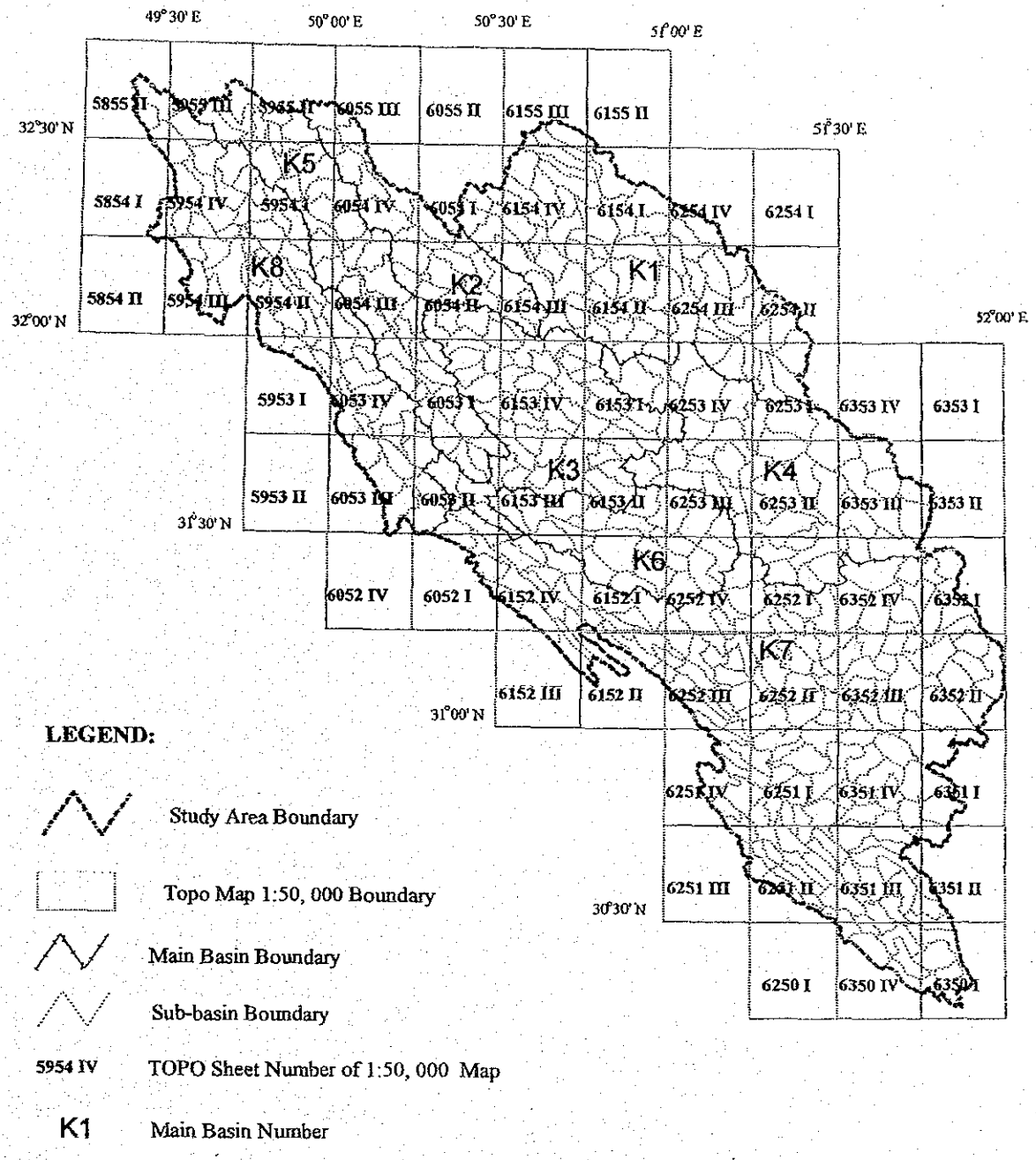

Figure 5-3-1 Map Showing Main and Sub-basins in the Study Area

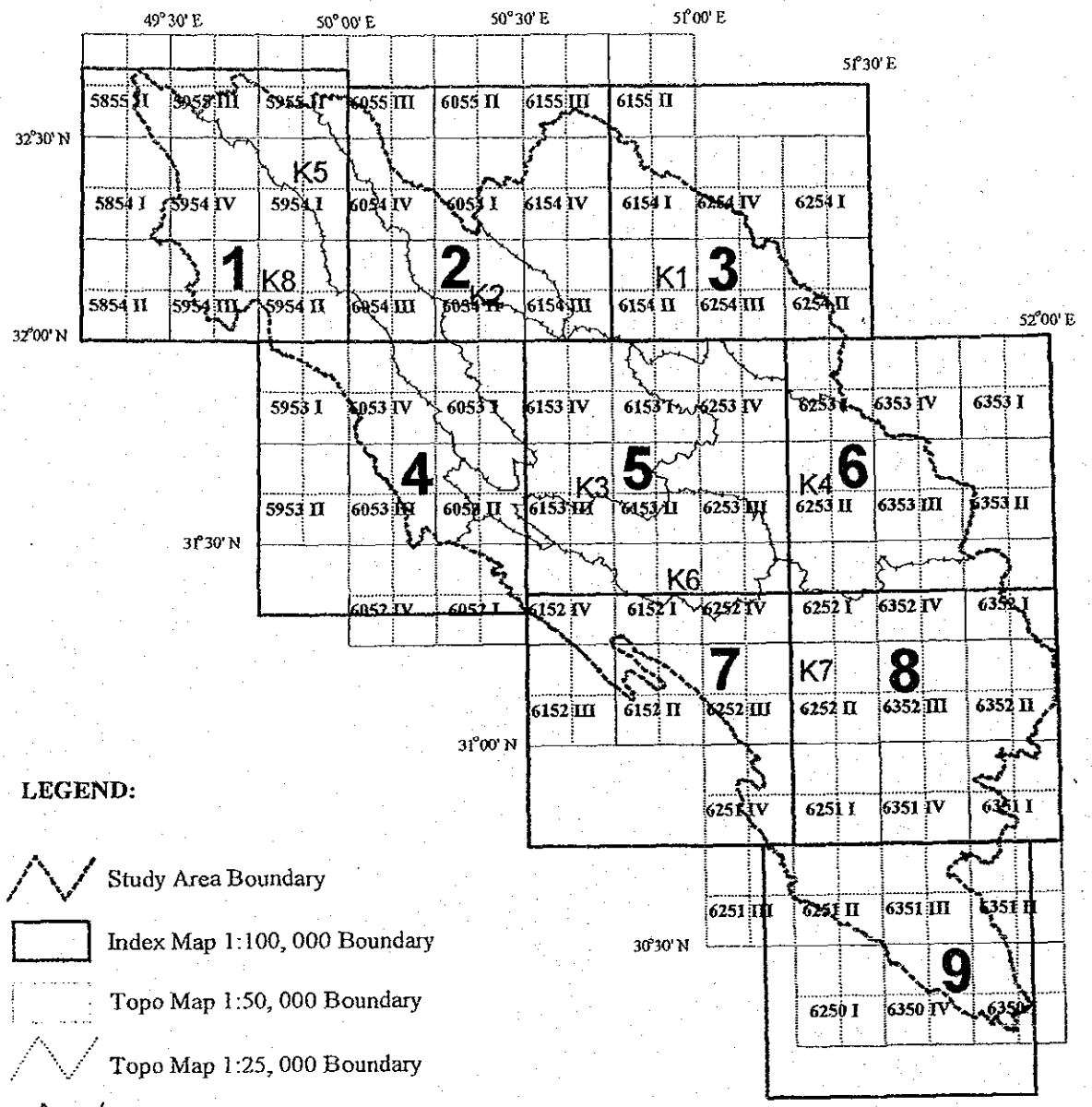

Figure 5-3-2 Index Map Sheet (1:100,000) Covering Whole Study Area
for the Watershed Management Plan for Karoon River Project

CHAPTER 6

SELECTION OF MASTER PLAN STUDY AREAS

CHAPTER 6 SELECTION OF MASTER PLAN STUDY AREAS

6.1 Selection Criteria

There are many aspects to be considered for the selection criteria for candidate sub-basins, however, the following items are taken into consideration;

(1) Selection of Natural-disaster Area

Master plan areas are to be selected from the sub-basins where the certain scale of natural disaster hit and sizable damage occurred in recent years.

* Here, the disaster is confined to flood including debris flow, and landslides only.
* Flood including debris flow occurred in the latest 10 years and landslides occurred within 50 years are to be evaluated.

(2) Evaluation of Disaster Damage

Sub-basins where the certain scale of disaster hit and sizable damage occurred are to be selected, however, the following rule has been made for the evaluation of disaster damage.

a) Flood (including debris flow) Damage

It is rather difficult to evaluate the flood/debris flow damage in sub-basins, as the type of information obtained is not homogeneous and insufficient. However, in order to evaluate flood/debris flow damage with quantitative manner, the following rule is made as shown in Table 6-1-1.

b) Landslide Damage

The landslide damage is also evaluated based on the extent of landslide areas accumulated in respective sub-basin, as shown in Table 6-1-2. In the Master Plan Areas, at least one sub-basin where severe landslide occurred should be selected.

Table 6-1-2 Rules for Evaluation (Landslide Area)

Order of Evaluation	Total landslide area per sub-basin (ha)
5	100.1~200.0
4	50.1~100.0
3	30.1~50.0
2	5.1~30.0
1	0~5.0

Table 6-1-1 Rules for Evaluation (Flood and Debris Flow Damage)

Order of Evaluation	Extent of disaster	Type of damage for evaluation
5	Severe	*Flood/debris flow in recent years + following 3 items Agriculture damage is more than 10 ha., Infra/ damage- more than 3 types including houses, Flood area / more than 2 village (location)
4	Very high	*Flood/debris flow in recent years, *Agriculture damage is more than 10 ha., + one out of the following 3 items Infra/ damage- more than 2 types including houses, Flood area / more than 2 village (locations) Damage for human
3	High	*Flood/debris flow in recent years + one out of the following 4 items Agriculture damage is less than 10 ha (10~0), Infra/ damage- more than 2 types including houses, Flood area / more than 2 village (locations), Livestock Damage
2	Fair	*Flood/debris flow in recent years
1	Low	Flood/debris flow

(3) Number of Candidate Sites for Each Province

Each of the four provinces in the Study area, except Fars Province, should have one sub-basin, and one of the four provinces (possibly Chahar Mahal va Bakhteyari Province) have two sub-basins and select five sub-basins altogether.

(4) Evaluation for Soil Erosion

Soil erosion is important item and is to be evaluated after flood and landslide. In the soil erosion inventory, the extent of erosion is classified 9 stages and only the upper three stages (7 to 9) are to be evaluated. The extent of erosion is shown in the ratio (percentage) of eroded area to the sub-basin area, and the following rule is made for evaluation.

Table 6-1-3 Rules of Evaluation (Soil Erosion)

Order	Extent of erosion (7~9 stage)
5	More than 61 %
4	41 ~ 60 %
3	21 ~ 40 %
2	1 ~ 20 %
1	Less than 1%

(5) Necessity of Structural or Non-structural Countermeasures

Sub-basin where people are still living is the minimum requirement and, in addition to this, the following conditions are required;

* Remedial works from previous disaster are not completed,
* Immediate countermeasures are necessary judging from the present situation,
* Structural or non-structural countermeasures for disaster prevention can be considered, and the residents can control and manage these countermeasures.

There is no inventory on this item, therefore, based on the field reconnaissance and interview from provincial officials and the residents, the following rule for evaluation is made.

Table 6-1-4 Rules of Evaluation (Necessity of Countermeasures)

Order	Extent of Necessity
5	Very High
4	Relatively High
3	High
2	Identified
1	Low

(6) Possibility of Development

Sub-basins, which have sufficient water resources for development, are to be selected.

There is no inventory on this item, therefore, based on the field reconnaissance and interview from provincial officials and the residents, the following rule for evaluation is made.

Table 6-1-5 Rules for Evaluation (Possibility of Development)

Order	Availability for Water Resource
5	Abundant water resource is available easily
4	Water resource is available easily
3	Water resource is available
2	Water resource is insufficient & new source is required
1	New water source is required

(7) Land Capability

Land capability is also examined from the viewpoint of topography and soil conditions in connection with the land use.

Referring to the land capability inventory, the total land capability index is generally in proportion to the size of the sub-basin. In order to evaluate the land capability, the ratio of land capability index over sub-basin area is worked out and classified as follows.

Table 6-1-6 Rules for Evaluation (Land Capability)

Order	Ratio of land capability index over sub-basin area
5	More than 1.3
4	1.2
3	1.1
2	1.0
1	Less than 1.0

(8) Accessibility and Propagation

The minimum requirement for sub-basins should be accessible by road, and the following conditions are reviewed in order to evaluate the effects of propagation.

* Sub-basins located at the appropriate distance from provincial capital or district center (for example, Semiroum to Esfahan Province and Izeh to Khuzestan Province)
* Sub-basins located near the main road
* Sub-basins where the road condition is good
* Sub-basins where similar disaster areas are located at surrounding area
*Sub-basins where the residents strongly request to the provincial office for remedial work

There is no inventory on this item, therefore, based on the conditions abovementioned, the following rule is made.

Table 6-1-7 Rules for Evaluation (Accessibility and Propagation)

Condition	Point	Condition	Point
Relatively close to either provincial capital or regional center	1	Rather far from either provincial capital or regional center	0
Close to the main road	1	Far from the main road	0
Access to the site is good	1	Access to the site is poor	0
Similar disaster areas are located nearby	1	Similar disaster areas are not located	0
Request for remedial work from the residents	1	Either no request or uncertain	0

6.2 *Selection of Master Plan Areas*

(1) Selection of Natural-disaster Areas

Natural-disaster areas were selected from the flood (including Debris flow) damage and landslide inventories.

(2) Evaluation on Flood (including debris flow) Damage and Landslides

Landslide damage is also shown in the inventory, however, the remarks do not cover all the records and some records are not clarified. Thus, this inventory item is not sufficient enough to evaluate all the basins and to be used reference only. On the other hand, the items of landslide area and classification of risk cover all the records and these two items are used for evaluation of landslides. The indices for evaluation of landslides are as follows;

- Total landslide area in each sub-basin
- Rate of total landslide area per sub- basin
- Total figures multiplied landslide area by classification of risk (risk index)

Based on the selection criteria, evaluation on flood (including debris flow) damage and landslides has been made as shown in Tables 6-2-1 and 6-2-2.

(3) Sorting of Sub-basins and Selection from Each Province

Sub-basins with flood (including debris flow) damage or landslides listed in Tables 6-2-1 and 6-2-2 are sorted out into respective provinces and the results are shown in Tables 6-2-3 and 6-2-4. Then, the selection of Master Plan Areas is conducted for each province as follows.

a) Chaharmahal va Bakhteyari Province

The natural disaster areas in Chaharmahal va Bakhteyari Province are shown in Table 6-2-3. There are 73 disaster areas in the Province, which consists of 52-flood damage area, 32-landslide areas and 11-duplicated areas. The detail is as follows;

Table 6-2-5 Results of Evaluation (1) : Chaharmahal va Bakhteyari Province

Order	Number of disaster sub-basin	
	Flood/debris flow	Landslide
5	2	1
4	3	1
3	15	2
2	8	8
1	19	20

Sub-basins with the order of more than "4"on flood/debris flow damage and landslides are selected for further evaluation with other criteria, and the result is shown in the following table;

Table 6-2-6 Results of Evaluation (2) : Chahalmahal va Bakhteyari Province

Sub-basin	Disaster		Ero-Sion	Necessity of Counter-measures	Develop-ment Possibili-ty	Land Capa-bility	Access/Propagation					Total	Order
	Flood/ debris flow	Land-slide					*1*	*2*	*3*	*4*	*5*		
K2-1	5	1	5	2	2	3	1	1	1	1	1	23	4
K 3-1-14a	-	5	2	1	1	2	0	0	1	1	1	14	7
K 3-1-16	4	-	1	5	5	5	1	1	1	1	1	25	2
K 3-3-2e	-	4	5	3	2	5	1	1	1	1	1	24	3
K4-1-9	4	-	4	5	5	5	1	1	1	1	1	28	1
K7-0-3	4	-	2	3	3	5	0	0	0	1	0	18	5
K7-0-5	5	1	1	4	3	2	0	0	0	1	0	17	6

As for the sub-basin of K3-1-14a, the village "Chelo", where huge landslides occurred and the village itself had already abandoned, belongs to this basin, so that the Necessity of countermeasures and the Development possibility are evaluated low marks.

b) Esfahan Province

The natural disaster areas in Esfahan Province are shown in Table 6-2-4. There are 17 disaster areas in the Province, which consists of 14-flood damage area, 8-landslide areas and 5-duplicated areas. The detail is as follows.

Table 6-2-7 Results of Evaluation (1) : Esfahan Province

Order	Number of disaster sub-basin	
	Flood/debris flow	Landslide
5	0	2
4	2	0
3	1	0
2	10	2
1	1	4

Sub-basins with the order of more than "4"on flood/debris flow damage and landslides are selected for further evaluation with other criteria, and the result is shown in the following table;

Table 6-2-8 Results of Evaluation (2) : Esfahan Province

Sub-basin	Disaster		Ero-	Necessity	Develop-	Land	Access/Propagation					Total	Order
	Flood/ debris flow	Land- slide	Sion	of Counter- measures	ment Possibili-t y	Capa- bility	1	2	3	4	5		
K7-0-10-1	4	-	1	3	2	5	0	0	0	1	0	16	4
K7-0-18	4	2	1	3	2	5	1	0	1	1	1	21	3
K7-0-19-1	2	5	2	5	4	5	1	0	1	1	1	27	1
K7-0-24	2	5	3	5	4	5	0	0	1	0	1	26	2

There are two sub-basins having the evaluation on landslide of "5". The sub-basin of K7-0-19-1 is located close to the district center, Bideh, whereas, that of K7-0-24, located on the border of the basin boundary of the Study area, is rather far from the center.

c) Kohkilouyeh va Boyer Province

The natural disaster areas in Kohkilouyeh va Boyer Province are shown in Table 6-2-4. There are 8 disaster areas in the Province, which consists of 3-flood damage area, 5-landslide areas. The detail is as follows.

Table 6-2-9 Results of Evaluation (1) : Kohkilouyeh va Boyer Province

Order	Number of disaster sub-basin	
	Flood/debris flow	Landslide
5	0	0
4	0	2
3	1	0
2	0	3
1	2	0

Sub-basins with the order of more than "3"on flood/debris flow damage and landslides are selected for further evaluation with other criteria, and the result is shown in the following table;

Table 6-2-10 Results of Evaluation (2) : Kohkilouyeh va Boyer Province

Sub-basin	Disaster		Ero-	Necessity	Develop-	Land	Access/Propagation					Total	Order
	Flood/ debris flow	Land- slide	Sion	of Counter- measures	ment Possibili-t y	Capa- bility	1	2	3	4	5		
K7-48	3	-	3	5	5	4	1	1	1	1	1	25	1
K7-30	-	4	2	5	2	1	0	0	1	0	1	16	2
K7-37-5a	-	4	2	3	2	2	0	0	1	1	0	15	3

There are two sub-basins having the evaluation on landslide of "4". The both sub-basins are located rather far from the Provincial capital, Yasuj.

d) Khuzestan Province

The natural disaster areas in Khuzestan Province are shown in Table 6-2-4. There are 13 disaster areas in the Province, which consists of 3-flood damage area, 12-landslide areas and 2-duplicated areas. The detail is as follows.

Table 6-2-11 Results of Evaluation (1) Khuzestan Province

Order	Number of disaster sub-basin	
	Flood/debris flow	Landslide
5	0	0
4	0	0
3	1	1
2	3	4
1	0	7

Sub-basins with the order of more than "2"on flood/debris flow damage and landslides are selected for further evaluation with other criteria, and the result is shown in the following table;

Table 6-2-12 Results of Evaluation (2) : Khuzestan Province

Sub-basin	Disaster		Ero-sion	Necessity of Counter-measures	Develop-ment Possibili-ty	Land Capa-bility	Access/Propagation					Total	Order
	Flood/ debris flow	Land-slide					*1*	*2*	*3*	*4*	*5*		
K8-13b	3	-	1	1	5	1	0	0	1	1	1	13	5
K8-25-1b	2	2	4	3	2	3	1	1	1	1	1	21	2
K8-28	2	1	4	5	3	5	0	0	1	1	1	23	1
K3-0b	-	2	2	3	3	5	1	1	1	1	0	19	3
K8-22	-	2	1	3	3	1	1	1	1	1	0	14	4
K8-27	-	2	2	3	3	1	0	0	0	0	0	11	7
K8-29	-	3	2	3	3	1	0	0	0	0	0	12	6

As for the flood/debris flow damage, there is only one sub-basin (K8-13b) having higher order of evaluation "3" among the selected sub-basins, however, the villages in this sub-basin are generally developed on the flood plain of the Karoon River. On the upstream of this sub-basin, Karoon No.3 Dam is now under construction and the flood damage will be reduced to a great

extent after the completion of dam. Thus, the Necessity of countermeasures is evaluated low marks.

On the other hand, as for the landslide, there is only one sub-basin (K8-29) having higher order of evaluation "3" among the selected sub-basins, however, this sub-basin is not accessible by road. Thus, the access/propagation effects are evaluated with zero.

e) *Selected Master Plan Areas from Respective Provinces*

Master plan areas (sub-basins) are selected from respective provinces, 2 from Chahar Mahal va Bakhteyari, 3 from Esfahan, Kohkilouyeh va Boyer, and Khuzestan. The sub-basin for landslide is selected from Esfahan Province, K7-0-19-1, and altogether, five sub-basins are selected and tabulated as follows;

Table 6-2-13 Results of Evaluation : Total

Province	Sub-basin	Disaster		Ero-sion	Necessity of Counter-measures	Develop-ment Possibili-ty	Land Capa-bility	Access/Propagation					Total
		Flood/ debris flow	Land-slide					*1*	*2*	*3*	*4*	*5*	
Chaharma-hal	K3-1-16	4	-	1	5	5	5	1	1	1	1	1	25
	K4-1-9	4	-	4	5	5	5	1	1	1	1	1	28
Esfahan	K7-0-19-1	2	5	2	5	4	5	1	0	1	1	1	27
Kohkilouyeh	K7-48	3	-	3	5	5	4	1	1	1	1	1	25
Khuzestan	K8-28	2	1	4	5	3	5	0	0	1	1	1	23

6.3 Selected Master Plan Study Areas

According to the criteria and the procedure described in the previous sections, five sub-basins shown in the following table were selected.

Table 6-3-1 Selected Master Plan Study Area (Results of Evaluation)

Name	No.	Area(km^2)	Province
1. Aziz abad	K3-1-16	52.5	Chaharmahal
2. Vastegan	K4-1-9	67.0	Chaharmahal
3. Kolbeluk	K7-0-19-1	63.1	Esfahan
4. Tang Sorkh	K7-48	65.4	Kohkilouyeh
5. Zeras	K8-28	63.7	Khuzestan

The Study Team proposed to take up the above 5 sub-basin as the master plan study area in the Interim Report. However, WMD insisted to take up Chaman Goli-Bazoft instead of Aziz abad in the discussion on Interim Report, because Chaman Goli-Bazoft has already been designated as strategic growth point. This area is remote, and it takes more than 4 hours by car from Shahr-e-kord. It is considered that implementation of the project in this area would have less propagation effects. In due

consideration of the situation, development potentiality and willingness of the inhabitants, the Study Team accepted the proposal of WMD to take up Chaman Goli-Bazoft as master plan study area.

WMD requested the Study Team to extend the area of Kolbeluk and to include the adjacent area of south. They also requested to change the name from Kolbeluk to Sarbaz. The Study Team accepted these request.

Finally WMD and the Study Team agreed to undertake the master plan study on 5 areas listed in the following table.

Table 6-3-2 Selected Master Plan Study Area (Final)

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

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (1/2-1)

Sub-basin	Flood/Debris Flow			Previous	Damage for Human			Livestock Damage			Agricultural		Houses Damage(no)		
	Cause	Date of occurance	No. of floods	flood (years)	Killed	Lost	Injured	Chick	Cow	Sheep	Damage (ha) Farm	Garden	70~ %	30-70 %	0-30 %
K 1 (Main river ; Ab. Behesht Abad)															
K 1-1	Flood														
K 1-1-3	Flood														
K 1-1-4	Flood														
K 1-1-5	Flood														
K 1-1-7	Flood														
K 1-2-3b	Flood														
K 1-2-5g	Flood														
K 1-2-5j	Flood														
K 1-2-5k	Flood														
K 1-2-5m	Flood														
K 1-2-6a	Flood	96-8/31													
K 1-2-6b	Flood	96-8/31													
K 1-2-6c	Flood	96-8/31													
K 1-2-6d	F/D.Flow														
K 1-2-6f	Flood														
K 1-2-6i	Flood														
K 1-2-6m	Flood														
K 1-3	F/D.Flow														
K 1-4-1	Flood														
K 2 (Main river ; Ab. Kurang)															
K2-1	F/D.Flow, O/F, HNR	98-3/29	1	70							4.5	0.3			10
	F/D.Flow	95-4/24									21.0				
		96-4/24									21.0				
	F/D.Flow	97-5/31									6.0				
K 3 (Main river ; Karoon)															
K 3-1-7	D.Flow	95-1/23													
		95-3/5									2.0				
K 3-1-9	M-Flood, T-D.Flow, O/F	98-3/29	1	80							4.0		5		
	Small F.	5ys ago													
	Flood, O/F	98-3/29	1	80											
K 3-1-11	M-Flood, T-D.Flow, O/F	98-3/30	1	80							5.0				
K 3-1-13	M-Flood, T-D.Flow	98													
K 3-1-16	M-Flood, T-D.Flow, O/F, HNR, Intake d.	98-5/13	1	80							10.0				2
	Small F.														
K 3-2-2	D.Flow, O/F	98-3/29	1	70							1.0				
	D.Flow, O/F	98-3/29	1	70							2.0				
K 3-2-3	M-Flood, T-D.Flow, O/F.	98-3/29	1	70							4.0				
K 3-2-4	M-Flood, T-D.Flow, O/F.	98-3/29	1	70											

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (1/2-2)

Sub-basin	Flood/Debris Flow			Previous	Damage for Human			Livestock Damage			Agricultural		Houses Damage(no)		
	Cause	Date of occurance	No. of floods	flood (years)	Killed	Lost	Injured	Chick	Cow	Sheep	Damage (ha) Farm	Garden	70~ %	30-70 %	0-30 %
K 3-2-4	Small F.	1y ago													
	M-Flood, T-D.Flow, O/F.	98-3/29	1	70					3	10	0.5				
	M-Flood, T-D.Flow, O/F.	98-3/29	1	70							0.7				25
	M-Flood, T-D.Flow, O/F.	98-3/29	1	70											
	M-Flood, T-D.Flow, O/F.	98-3/29	1	70											
	Flood	18ys ago													
K 3-2-5	D.Flow	98													
K 3-3-2a	M-Flood, T-D.Flow	98													
K 3-4-1	Flood	98													
K 3-4-2	F/D.Flow	98													
K 3-5	F/D.Flow, O/F	98-3/29	1	70						150	0.3			3	
	Small F.	1y ago													
K 3-6	F/D.Flow, O/F	98-3/29	1	70							15.0			1	1
	Small F.														
K 4 (Main river : Ab. Vanak)															
K4-1-4	Flood	98													
K4-1-6	M-Flood, T-D.Flow														
K4-1-7	F/D.Flow														
K4-1-8	F/D.Flow	98									20.0				
K4-1-8a	Flood														
K4-1-9	D.Flow D.Flow	98									80.0				
K4-1-11	F/D.Flow F/D.Flow F/D.Flow	98													
K4-1-12	F/D.Flow														
K 5 (Main river ; Bazoft)															
K5-20	F/D.Flow, O/F	97-9/19	1	100											
	F/D.Flow, Sedi.	97-9/19	1	60											
	F/D.Flow, O/F	97-9/19	1	60											
	F/D.Flow, O/F, HNR, Sedi.	97-9/19	1	100											
K5-21	F/D.Flow, Sedi., Tr.	97-9/19	1	60											
	F/D.Flow, O/F, HNR	97-9/19	1	60											
	F/D.Flow, O/F, HNR	97-9/19	1	60											

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (1/2-3)

Sub-basin	Flood/Debris Flow			Previous	Damage for Human			Livestock Damage			Agricultural		Houses Damage(no)		
	Cause	Date of occurance	No. of floods	flood (years)	Killed	Lost	Injured	Chick	Cow	Sheep	Damage (ha) Farm	Garden	70~ %	30-70 %	0-30 %
K5-21	F/D.Flow, O/F, HNR	97-9/19	1	50											
K5-23	F/D.Flow	98-5/13			5	3							2		10
K 6 (Main river ; Lordegan)															
K6-1-6	Flood														
K6-2	Flood, O/F														
K6-4-1	F/D.Flow	95-3/5									8.0				
K 7 (Main river ; Khersan)															
K7-0-3	F/D.Flow	98-3/29, 5/13	2	40					3	13	10.0		4	10	
K7-0-5	F/D.Flow	98-3/29, 5/13	2	70					1	30	0.3				3
	F/D.Flow	98-3/29, 5/13	2	70						50	20.0				
	F/D.Flow	98-3/29, 5/13	2	70							3.0		5		
	F/D.Flow	98-3/29, 5/13	2	70					1		4.0	4.0			4
	Small F.	7ys ago													
K7-0-10-1	M-Flood, T-D.Flow	98-3/29									21.0	12.0			3
K7-0-10-2	Flood	98-3/29													
K7-0-10-6j	Flood	98-3/29									6.0				
K7-0-10-6k	Flood	98-3/29													
K7-0-10-9	F/D.Flow														
K7-0-18	F/D.Flow	98-3/29									20.0	10.0			
K7-0-19-1	F/D.Flow	98-3/29													
K7-0-19-2	D.Flow	98-3/29													
K7-0-20a	F/D.Flow	98-3/29													
K7-0-20b	D.Flow	98-3/29													
K7-0-21	F/D.Flow	98-3/29													
K7-0-22	F/D.Flow	98-3/29													
K7-0-23	F/D.Flow	98-3/29													
K7-0-24	F/D.Flow	98-3/29													
K7-1	M-Flood, T-D.Flow														
K7-2	M-Flood, T-D.Flow														
K7-42-1	M-Flood, T-D.Flow														
K7-43	M-Flood, T-D.Flow														
K7-48	F/D.Flow, Sediment														
K 8 (Main river : Karoon)															
K8-13b	M-Flood, T-D.Flow	98-4/28	1	-	1				20	400					
K8-25-1b	F/D.Flow														
K8-28	M-Flood, T-D.Flow														

Note : O/F = Over flow, D.Flow = Debris Flow, F/D.Flow = either flood or debris flow, M-Flood = Main river/Flood, T- D.Flow = Tributary/Debris Flow, 96-8/31= 1996, August 31(Date of occurance), HNR = House near river, Small F. = Small Flood, Intake d = Intake dam, Sedi. = Sediment, Tr. = Tree, Tri. = Tributary, Chick = Chicken

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (2/2-1)

Sub-basin	Roads (km)			Infrastructure							Total damage (Mil.R)	Remarks	Evaluation
	Paved	Gravel	Vil.	Ganat	Well	Canal	Bridge	Spring	Others	Study			
K 1 (Main river ; Ab. Behesht Abad)													
K 1-1									FP, P. house				1
K 1-1-3													1
K 1-1-4													1
K 1-1-5													1
K 1-1-7													1
K 1-2-3b													1
K 1-2-5g													1
K 1-2-5j													1
K 1-2-5k													1
K 1-2-5m													1
K 1-2-6a													2
K 1-2-6b													2
K 1-2-6c													2
K 1-2-6d													1
K 1-2-6f													1
K 1-2-6i													1
K 1-2-6m													1
K 1-3													1
K 1-4-1													1
K 2 (Main river ; Ab. Kurang)													
K2-1						1.00		1		A	31.8		5
											12.0		
											1.0		
			0.0										
K 3 (Main river ; Karoon)													
K 3-1-7													3
											15.0		
K 3-1-9						0.20			3 elec. line	N	254.6		3
										N			
K 3-1-11									7pumps	N	150.0	Doorak-anari (old name)	3
K 3-1-13									P. tools				2
K 3-1-16			3.0			1.00			Fish p.	N	229.0		4
											no		
K 3-2-2							1			A	10.7		3
				1						A	21.7	Incl. Ghaeedan	
K 3-2-3			0.2				1			A	73.8	Incl. Malek shir	3
K 3-2-4							1			A			3

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (2/2-2)

Sub-basin	Roads (km)			Infrastructure							Total damage (Mil.R)	Remarks	Evaluation
	Paved	Gravel	Vil.	Ganat	Well	Canal	Bridge	Spring	Others	Study			
										A	11.4		
							1			A	99.5		
							1			A			
										A			
K 3-2-5							5	1	W. pipe				3
K 3-3-2a													2
K 3-4-1									F P.				2
K 3-4-2							1						2
K 3-5				2		0.08	1		3 elec. line	N	61.0		3
K 3-6										N	31.2		3
K 4 (Main river: Ab. Vanak)													
K4-1-4						2							2
K4-1-6													1
K4-1-7													1
K4-1-8													3
K4-1-8a													1
K4-1-9					10		10						4
K4-1-11				1 1									3
K4-1-12													1
K 5 (Main river ; Bazoft)													
K5-20										A			3
										N			
										N			
										N			
K5-21										N			3
										N			
										N			

Table 6-2-1 Evaluation of Flood & Debris Flow Damage (2/2-3)

Sub-basin	Roads (km)			Infrastructure							Total damage (Mil.R)	Remarks	Evaluation
	Paved	Gravel	Vil.	Ganat	Well	Canal	Bridge	Spring	Others	Study			
K5-21										N			
K5-23											600.0	Incl. Dorak sofla	3
K 6 (Main river ; Lordegan)													
K6-1-6													1
K6-2													1
K6-4-1											41.0	rdarreh chenar ; incl.	3
K 7 (Main river ; Khersan)													
K7-0-3								1		N	123.1		4
K7-0-5										N	6.6		5
								1		N	31.0		
										N	53.0		
										N	18.9		
K7-0-10-1				1		5	15						4
K7-0-10-2													2
K7-0-10-6j						3	1					Hann dam / 98	3
K7-0-10-6k													2
K7-0-10-9													1
K7-0-18				2		20	10						4
K7-0-19-1													2
K7-0-19-2													2
K7-0-20a													2
K7-0-20b													2
K7-0-21													2
K7-0-22													2
K7-0-23													2
K7-0-24													2
K7-1													1
K7-2													1
K7-42-1													1
K7-43													1
K7-48													3
K 8 (Main river : Karoon)													
K8-13b	20.0						3				4,152.0	Karoon No.3 Dam ; Under Construction	3
K8-25-1b													2
K8-28													2

Note: Vil. = Village

Table 6-2-2 (1/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of Risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evafu-ation	Area (10^3ha)	%	Index	Grade	Each	Total
K1-1	1800001	1991	Rotational	15	39	38	5.0	13.5	2	4.6	0.3	B	4	2.0	50.0
	1800002	1991	Potential Slides	15	38	49	1.5	-				B	4	0.6	
	1800003	1991	Rotational /Flow	15	49	38	7.0	-				B	4	2.8	
	1800004	1993	Rotational	49	38	55	1.7	-				B	4	0.7	
	1800005	1993	Rotational	15	49	38	13.2	-				B	4	5.3	
	1800006	1993	Rotational	49	38	3	6.0	-				B	4	2.4	
	1800007	1993	Rotational /Flow	15	39	18	10.2	-				B	4	4.1	
	1800008	1993	Rotational/ Flow	38	49	18	7.0	-				A	6	4.2	
	1800190	1993	Topple+ Transitional	6	2	3	28.8	-				B	4	11.5	
	1800191	1993	Rotational	15	38	48	1.3	-				C<B	3	0.4	
	1800192	1993	Rotational	15	38	48	2.7	-				C<B	3	0.8	
	1800194	1993	Rotational	15	38	39	0.6	-				C<B	3	0.2	
	1800195	1993	Rotational +Flow	15	38	39	1.5	-				C<B	3	0.4	
	1800196	1993	Rotational	6	48	38	1.4	-				C<B	3	0.4	
	1800197	1993	Rotational	15	38	39	1.1	-				C<B	3	0.3	
	1800198	1993	Rotational	15	38	39	20.0	-				C<B	3	6.0	
	1800199	1993	Rotational	15	38	39	26.4	-				C<B	3	7.9	
K1-1-2	1800082	1994	Rotational	26	15	49	0.8	0.4	1	5.6	0.0	C<B	3	0.2	1.6
	1800083	1996	Rotational	15	49	48	3.5	-				B	4	1.4	
K1-2-1	1800189	1993	Rotational	15	38	39	21.6	2.2	1	3.8	0.1	C<B	3	6.5	6.5
K2-1	1800074	1995	Rotational	15	49	48	3.0	1.4	1	5.4	0.0	B	4	1.2	4.9
	1800077	1996	Rotational	6	48	38	0.6	-				C<B	3	0.2	
	1800078	1995	Rotational	6	48	38	0.3	-				C<B	3	0.1	
	1800079	1996	Flow	6	48	38	0.5	-				C<B	3	0.1	
	1800080	1996	Flow	6	48	38	0.2	-				C<B	3	0.0	
	1800081	1995	Rotational	15	49	48	0.5	-				C<B	3	0.1	
	1800151	1994	Rotational	6	38	48	1.2	-				C<B	3	0.4	
	1800152	1994	Rotational	6	38	48	1.4	-				C<B	3	0.4	
	1800153	1994	Rotational	6	38	48	4.4	-				B	4	1.8	
	1800154	1994	Rotational	6	38	48	0.8	-				C<B	3	0.2	
	1800193	1993	Rotational	15	38	48	1.1	-				C<B	3	0.3	
K2-3	1800075	1995	Lateral	15	49	48	12.5	3.1	1	9.5	0.0	B	4	5.0	12.2
	1800076	1995	Lateral	6	48	38	18.0	-				B	4	7.2	
K2-5-1a	1800052	1996	Lateral Spread	6	39	38	5.7	39.0	3	8.6	0.5	B	4	2.3	147.1
	1800053	1996	Rotational	48	38	39	12.0	-				B	4	4.8	
	1800055	1996	Rotational	6	38	48	50.0	-				C<B	3	15.0	
	1800056	1996	Topple+ Rotational	15	48	49	1.8	-				B	4	0.7	
	1800057	1996	Rotational	15	38	48	24.0	-				C<B	3	7.2	
	1800058	1994	Rotational	15	28	48	0.5	-				B	4	0.2	
	1800059	1994	Rotational	15	38	48	1.2	-				B	4	0.5	
	1800060	1996	Rotational	15	38	48	0.2	-				B	4	0.1	
	1800061	1994	Lateral Spread	15	28	48	2.0	-				B	4	0.8	
	1800062	1994	Rotational	15	28	48	0.6	-				C<B	3	0.2	
	1800063	1994	Rotational	15	6	38	45.0	-				A	6	27.0	
	1800101	1994	Soily	15	3	18	44.0	-				B	4	17.6	
	1800102	1993	Flow/ Rotational	6	38	48	18.0	-				B	4	7.2	
	1800103	1994	Rotational	26	6	38	3.6	-				B	4	1.4	
	1800104	1994	Rotational	26	6	38	2.2	-				B	4	0.9	
	1800105	1994	Rotational	6	38	48	0.2	-				C<B	3	0.0	
	1800106	1994	Rotational	6	38	49	0.7	-				B	4	0.3	
	1800107	1994	Rotational	6	26	38	2.5	-				C<B	3	0.8	
	1800108	1994	Flow/ Rotational	6	38	48	21.2	-				C<B	3	6.4	
	1800110	1993	Rotational	6	38	48	110.5	-				C<B	3	33.2	
	1800111	1993	Rotational	6	38	48	11.4	-				C<B	3	3.4	
	1800112	1994	Flow/ Lateral	15	48	38	0.4	-				C<B	3	0.1	
	1800113	1995	Rotational	15	39	48	2.4	-				C<B	33	7.9	
	1800114	1996	Lateral S./Rotational	15	39	38	2.1	-				C<B	3	0.6	
	1800115	1995	Rotational	15	38	48	6.0	-				C<B	3	1.8	

Table 6-2-2 (2/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K2-5-1a	1800116	1995	Rotational	22	6	38	20.4	-				C<B	3	6.1	
	1800117	1995	Fall/ Lateral S.	48	15	38	0.4	-				B	4	0.2	
	1800118	1993	Fall/Rotational	15	48	41	0.5	-				C<B	3	0.1	
	1800119	1996	Rotational	6	26	38	0.5	-				B	4	0.2	
	1800120	1972	Flow/ Rotational	48	38	39	0.2	-				C<B	3	0.1	
	1800121	1994	Rotational	38	48	39	0.4	-				C<B	3	0.1	
K2-6	1800051	1996	Rotational/	15	39	38	4.0	1.2	1	3.7	0.0	B	4	1.6	3.9
	1800054	1996	Rotational	15	38	48	7.8	-				C<B	3	2.3	
K3-0a	2000053	New	Fall	15	4	40	22.0	2.2	1	7.4	0.0	C<B	3	6.6	6.6
K3-0b	2000034	New	Potential Slides	15	34	4	22.5	13.7	2	7.2	0.2	C	1	2.3	19.6
	2000035	New	Potential Slides	55	34	6	0.2	-				C	1	0.0	
	2000036	New	Transitional/ Flow	6	34	55	0.1	-				C	1	0.0	
	2000037	New	Transitional/	6	34	55	0.8	-				C	1	0.1	
	2000038	New	Potential Slides	6	34	55	0.1	-				C	1	0.0	
	2000039	New	Potential Slides	6	34	55	0.5	-				C	1	0.0	
	2000040	New	Transitional/	6	34	55	1.1	-				C	1	0.1	
	2000041	New	Potential Slides	6	34	55	0.7	-				C	1	0.1	
	2000042	New	Fall	4	15	40	10.0	-				C<B	3	3.0	
	2000043	New	Fall	4	15	40	5.0	-				C<B	3	1.5	
	2000044	New	Fall	4	15	40	10.8	-				C<B	3	3.2	
	2000045	New	Transitional/ Flow	6	34	19	17.5	-				C	1	1.8	
	2000046	New	Transitional/ Flow	6	34	19	3.6	-				C<B	3	1.1	
	2000047	New	Fall	4	15	40	32.5	-				C	1	3.3	
	2000048	New	Transitional/Topple	4	15	40	2.8	-				C	1	0.3	
	2000049	New	Rotational	4	15	40	4.2	-				C	1	0.4	
	2000050	New	Transitional/ Flow	6	34	19	3.2	-				C	1	0.3	
	2000051	New	Transitional/ Fall	4	15	40	5.0	-				C	1	0.5	
	2000052	New	Transitional/ Fall	4	15	40	16.7	-				C	1	1.7	
K3-1-1	1800183	1993	Rotational	15	38	48	1.1	0.3	1	4.9	0.0	C<B	3	0.3	0.8
	1800184	1993	Rotational	15	48	38	1.1	-				C<B	3	0.3	
	1800188	1993	Rotational	15	38	48	0.4	-				C<B	3	0.1	
K3-1-13	1800158	1992	Lateral	38	39	48	32.5	8.9	2	4.1	0.2	B	4	13.0	30.0
	1800155	1992	Rotational	15	48	38	0.3	-				C<B	3	0.1	
	1800157	1992	Rotational	15	38	48	9.4	-				C<B	3	2.8	
	1800156	1992	Rotational	15	48	38	3.7	-				C<B	3	1.1	
	1800159	1992	Transferred face	15	39	38	36.0	-				C<B	3	10.8	
	1800091	1993	Flow	6	49	38	7.2	-				C<B	3	2.2	
K3-1-14a	1800049	1993s	Flow+ Rotational	38	49	18	38.0	199.6	5	4.6	4.4	B	4	15.2	1,187.7
	1800092	1993	Flow	6	49	38	8.4	-				C<B	3	2.5	
	1800050	1993s	Flow+ Rotational	6	38	49	1,950.0	-				A	6	1,170.0	
K 3-2-3	1800175	1990	Rotational/Lateral S.	38	48	39	19.2	18.4	2	4.9	0.4	C<B	3	5.8	55.3
	1800174	1990	Rotational	38	39	48	1.1	-				C<B	3	0.3	
	1800169	1991	Rotational	38	39	48	1.8	-				C<B	3	0.5	
	1800168	1991	Rotational	6	38	39	1.3	-				C<B	3	0.4	
	1800161	1983	Rotational	38	48	39	2.8	-				C<B	3	0.8	
	1800170	1991	Lateral	15	38	39	33.6	-				C<B	3	10.1	
	1800160	1983	Rotational +Flow	6	48	38	84.5	-				C<B	3	25.4	
	1800166	1983	Rotational/ Flow	38	39	48	3.8	-				C<B	3	1.1	
	1800164	1983	Flow	38	48	39	0.3	-				C<B	3	0.1	
	1800162	1983	Rotational	6	38	39	5.0	-				C<B	3	1.5	
	1800167	1983	Flow	6	38	39	12.2	-				C<B	3	3.6	
	1800163	1983	Flow	38	39	48	3.3	-				C<B	3	1.0	
	1800165	1983	Rotational	38	39	48	15.8	-				C<B	3	4.7	
K3-2-4	1800124	1993	Flow/ Rotational	15	38	55	2.4	2.8	1	4.5	0.1	C<B	3	0.7	8.9
	1800125	1993	Rotational	15	38	55	8.5	-				C<B	3	2.6	
	1800126	1993	Lateral S./ Rotational	15	38	39	6.0	-				C<B	3	1.8	
	1800127	1993	Lateral S./Rotational	15	38	39	2.5	-				B	4	1.0	
	1800128	1993	Fall/Lateral S.	15	38	39	2.5	-				B	4	1.0	

Table 6-2-2 (3/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K3-2-4	1800129	1993	Rotational	15	38	55	0.5	-				C<B	3	0.1	
	1800132	1993	Rotational	6	38	55	1.2	-				C<B	3	0.4	
	1800130	1993	Rotational	15	48	38	0.4	-				C<B	3	0.1	
	1800131	1993	Flow	15	48	38	4.0	-				C<B	3	1.2	
K3-2-5	1800136	1993	Rotational	15	6	38	9.9	5.0	1	4.3	0.1	C<B	3	3.0	16.5
	1800135	1993	Rotational	15	38	39	10.2	-				B	4	4.1	
	1800134	1993	Rotational	38	39	55	5.3	-				B	4	2.1	
	1800133	1993	Fall/Rotational	15	48	42	20.0	-				C<B	3	6.0	
	1800173	1992	Rotational	15	38	48	0.8	-				C<B	3	0.2	
	1800172	1992	Rotational	15	38	48	0.3	-				C<B	3	0.1	
	1800171	1992	Rotational	15	38	48	0.3	-				C<B	3	0.1	
	1800122	1993	Rotational	6	38	48	0.9	-				C<B	3	0.3	
	1800123	1993	Rotational	15	38	48	2.4	-				C<B	3	0.7	
K3-2-6	1800143	1993	Rotational	15	38	39	2.7	7.5	2	3.4	0.2	C<B	3	0.8	28.8
	1800144	1993	Rotational	6	38	39	0.1	-				C<B	3	0.0	
	1800145	1993	Rotational	15	38	48	3.5	-				C<B	3	1.1	
	1800146	1993	Rotational	15	38	39	11.0	-				C<B	3	3.3	
	1800149	1993	Rotational	6	38	39	0.5	-				C<B	3	0.1	
	1800147	1992	Rotational	15	38	39	0.9	-				C<B	3	0.3	
	1800148	1993	Rotational	15	38	39	17.0	-				C<B	3	5.1	
	1800150	1993	Rotational	15	38	39	2.6	-				C<B	3	0.8	
	1800139	1993	Lateral	15	38	48	19.5	-				A	6	11.7	
	1800140	1993	Rotational	6	38	39	0.3	-				C<B	3	0.1	
	1800141	1993	Rotational	15	38	39	3.4	-				C<B	3	1.0	
	1800142	1992	Rotational	6	38	55	4.0	-				B	4	1.6	
	1800137	1993	Rotational	6	38	48	2.1	-				C<B	3	0.6	
	1800138	1992	Rotational	15	38	39	7.5	-				C<B	3	2.3	
K3-2-7	1800176	1992	Rotational	15	38	39	7.0	13.2	2	6.0	0.2	C<B	3	2.1	39.6
	1800177	1992	Rotational	15	38	39	0.8	-				C<B	3	0.2	
	1800178	1992	Rotational	15	38	39	5.3	-				C<B	3	1.6	
	1800179	1992	Rotational	15	48	38	2.5	-				C<B	3	0.7	
	1800180	1993	Lateral	15	38	39	110.0	-				C<B	3	33.0	
	1800181	1993	Rotational/ Fall	15	38	39	6.4	-				C<B	3	1.9	
K3-3-1	1800097	New	Rotational	6	49	38	3.2	3.2	1	4.3	0.1	C<B	3	0.9	6.9
	1800090	1993	Flow	6	49	38	2.6	-				B	4	1.0	
	1800095	1993	Rotational	6	49	38	1.8	-				C<B	3	0.5	
	1800093	1993	Rotational	6	49	38	3.2	-				C<B	3	1.0	
	1800094	1993	Rotational	6	49	38	4.6	-				C<B	3	1.4	
	1800100	1993	Rotational	6	49	38	0.6	-				B	4	0.2	
	1800096	1993	Flow	6	49	38	1.0	-				C<B	3	0.3	
	1800020	1995	Rotational	6	49	38	1.9	-				B	4	0.7	
	1800044	1995	Transitional/ Flow	39	49	38	11.1	-				B		0.0	
	1800043	1995	Rotational	2	49	38	1.9	-				B	4	0.8	
K3-3-2a	1800047	1978	Rotational/ Flow	15	49	39	36.0	15.5	2	6.0	0.3	B	4	14.4	64.1
	1800048	1978	Rotational/ Flow	49	38	39	60.0	-				B	4	24.0	
	1800012	1991	Rotational	15	49	38	3.8	-				B	4	1.5	
	1800013	1991	Rotational	15	49	38	9.6	-				C<B	3	2.9	
	1800011	1991	Rotational	15	49	38	9.5	-				B	4	3.8	
	1800010	1991	Rotational	15	49	38	14.5	-				A	6	8.7	
	1800009	1991	Rotational	15	49	38	22.0	-				B	4	8.8	
K3-3-2b	1800038	1993	Rotational	15	49	38	3.5	0.8	1	4.9	0.0	B	4	1.4	3.3
	1800040	1993s	Lateral	15	49	38	3.3	-				B	4	1.3	
	1800036	New	Rotational	15	49	38	1.4	-				B	4	0.6	
K3-3-2e	1800016	1988	Rotational	6	49	38	14.3	68.0	4	3.3	2.0	A	6	8.6	302.4
	1800018	New	Lateral	6	49	38	190.0	-				B	4	76.0	
	1800015	New	Rotational	38	49	30	175.0	-				A	6	105.0	
	1800017	1988	Rotational	6	38	30	5.0	-				B	4	2.0	
	1800014	New	Rotational	38	49	30	180.0	-				B	4	72.0	

Table 6-2-2 (4/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K3-3-2e	1800027	1991w	Rotational/ Flow	15	6	49	45.0	-				C<B	3	13.5	
	1800028	1991w	Rotational/ Flow	15	49	6	40.7	-				C<B	3	12.2	
	1800030	1991	Rotational	15	49	38	6.0	-				A	6	3.6	
	1800029	1991	Lateral	15	49	38	10.5	-				B	4	4.2	
	1800031	New	Rotational	6	49	38	3.3	-				B	4	1.3	
	1800032	1991	Rotational	6	49	38	3.0	-				B	4	1.2	
	1800033	*1991*	*Rotational*	*15*	*49*	*38*	*7.0*	-				*B*	*4*	*2.8*	
K3-3-2g	1800039	1993s	Fall/Rotational	15	38	49	14.0	2.7	1	6.6	0.0	C<B	3	4.2	9.2
	1800034	1995s	Rotational	15	38	49	4.0	-				B	4	1.6	
	1800035	1995s	Rotational	15	38	49	4.8	-				B	4	1.9	
	1800037	New	Fall+ Rotational	49	38	15	3.7	-				B	4	1.5	
K3-3-3a	1800099	New	Flow	6	49	38	2.6	1.1	1	5.3	0.0	C	1	0.3	3.5
	1800021	1986	Rotational	49	38	6	0.2	-				B	4	0.1	
	1800022	1989	Rotational	6	39	38	8.0	-				B	4	3.2	
K3-3-3b	1800019	New	Lateral	6	38	49	222.0	22.2	2	5.8	0.4	B	4	88.8	88.8
K3-4-1	1800041	1993s	Transitional/ Flow	38	27		1.7	0.2	1	5.0	0.0	B	4	0.7	0.7
K4-1-4	1800071	1993	Rotational	49	38	48	5.6	6.8	2	6.3	0.1	B	4	2.2	21.1
	1800072	1992	Rotational	6	49	48	62.7	-				C<B	3	18.8	
K4-1-7	1800067	1994	Rotational	9	10	13	0.4	0.0	1	5.2	0.0	A	6	0.3	0.3
K4-3-1	1800069	1986	Rotational	6	38	9	2.3	0.4	1	7.3	0.0	B	4	0.9	1.4
	1800073	1993	Rotational	6	38	48	1.7	-				C<B	3	0.5	0.5
K4-3-2	1800066	1993	Rotational	6	38	49	0.9	0.1	1	7.2	0.0	B	4	0.4	0.4
K4-4-2b	1400008	New	Fall+Topple	15	34	9	6.5	0.7	1	9.5	0.0	C<B	3	2.0	2.0
K5-1	1800185	1993	Rotational	15	38	48	1.1	0.6	1	3.6	0.0	C<B	3	0.3	1.7
	1800186	1993	Rotational	15	38	39	0.7	-				C<B	3	0.2	
	1800187	1993	Rotational/Fall	15	48	38	3.9	-				C<B	3	1.2	
K5-3	1800182	1993	Rotational	15	48	38	0.4	0.0	1	4.7	0.0	C<B	3	0.1	0.1
K5-5	2000087	New	Potential Slides	49	56	55	5.7	37.9	3	7.1	0.5	C	1	0.6	100.2
	2000007	New	Rotational/ Flow	49	34	19	30.0	-				C	1	3.0	
	2000005	New	Rotational	49	34	19	1.5	-				C	1	0.2	
	2000004	New	Rotational/ Flow	49	34	19	18.0	-				C	1	1.8	
	2000002	New	Rotational/ Flow	34	49	55	311.5	-				C<B	3	93.5	
	2000086	New	Potential Slides	56	49	34	5.2	-				C	1	0.5	
	2000003	New	Rotational	49	34	55	2.8	-				C	1	0.3	
	2000001	New	Rotational	6	49	34	4.2	-				C	1	0.4	
K6-4-4	1800065	1993	Flow+ Rotational	6	48	38	6.1	0.6	1	7.2	0.0	B	4	2.4	2.4
K7-0-5	1800064	1993	Flow+ Rotational	15	28	55	2.9	0.3	1	3.4	0.0	A<B	5	1.5	1.5
K7-0-10-9	1400002	New	Rotational	15	18	38	4.4	0.4	1	12.4	0.0	B	4	1.8	1.8
K7-0-12	1400003	New	Rotational/ Flow	15	34	26	4.7	0.5	1	4.0	0.0	C	1	0.5	0.5
K7-0-17	1400011	New	Rotational	6	40	49	59.7	18.1	2	6.9	0.3	C	1	6.0	40.7
	1400020	New	Rotational	6	41	19	39.8	-				C<B	3	11.9	
	1400013	New	Rotational	6	41	19	3.8	-				C<B	3	1.1	
	1400010	New	Rotational	38	49		8.5	-				C	1	0.8	
	1400018	New	Rotational	6	49	41	61.3	-				C<B	3	18.4	
	1400019	New	Rotational	41	19	49	8.0	-				C<B	3	2.4	
K7-0-18	1400021	New	Rotational	6	41	19	53.4	5.3	2	7.5	0.1	C<B	3	16.0	16.0
K7-0-19-1	1400033	New	Rotational	6	34	41	7.0	157.4	5	6.3	2.5	C	1	0.7	602.2
	1400034	New	Rotational	6	15	19	2.0	-				C	1	0.2	
	1400023	New	Lateral	14	6	34	174.1	-				B	4	69.6	
	1400035	New	Lateral	34	41		157.1	-				B	4	62.8	
	1400039	New	Flow	6	34	41	2.4	-				C<B	3	0.7	
	1400040	New	Flow	6	34	38	5.5	-				B	4	2.2	
	1400043	New	Rotational	34	41		31.4	-				C	1	3.1	
	1400038	New	Rotational	34	49	18	59.7	-				B	4	23.9	
	1400044	New	Rotational/ Flow	9	34	41	78.5	-				B	4	31.4	
	1400042	New	Rotational	6	34	41	14.7	-				C<B	3	4.4	
	1400041	New	Rotational/ Flow	34	49	18	196.4	-				B	4	78.5	
	1400045	New	Lateral	49	34	41	785.4	-				B	4	314.2	

Table 6-2-2 (5/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K7-0-19-1	1400036	New	Rotational	14	41		45.6	-				C	1	4.6	
	1400037	New	Rotational	14	34	49	14.7	-				B	4	5.9	
K7-0-21	1400047	New	Rotational	34	49	18	5.8	0.8	1	11.7	0.0	C	1	0.6	0.8
	1400048	New	Flow	34	49	18	2.6	-				C	1	0.3	
K7-0-24	1400025	New	Flow	49	14	41	3.1	103.7	5	8.2	1.3	C	1	0.3	407.5
	1400028	New	Rotational	48	14	41	10.5	-				C<B	3	3.1	
	1400057	New	Potential Slides	41	49	34	12.0	-				C	1	1.2	
	1400053	New	Rotational/ Flow	9	18	34	4.4	-				B	4	1.8	
	1400054	New	Flow	49	18	34	3.4	-				C	1	0.3	
	1400056	New	Rotational/ Flow	41	34	49	3.7	-				B<C	2	0.7	
	1400051	New	Lateral	34	41	14	994.8	-				B	4	397.9	
	1400055	New	Rotational/ Flow	41	34	49	5.1	-				B	4	2.1	
K7-30	3000040	1992	Lateral	49	27	38	22.5	55.0	4	4.9	1.1	C<B	3	6.8	213.4
	3000028	1993s	Rotational	27	55	49	0.8	-				C	1	0.1	
	3000041	1991w	Rotational	55	49	27	4.6	-				A<B		0.0	
	3000045	1993	Rotational	55	49	38	2.8	-				C	1	0.3	
	3000044	1992	Rotational	55	49	27	9.5	-				C<B	3	2.9	
	3000030	1993s	Rotational	27	49	55	1.0	-				C<B	3	0.3	
	3000042	1993	Rotational	49	38	39	4.0	-				A<B	5	2.0	
	3000039	1993s	Rotational	55	27	49	4.7	-				A<B	5	2.4	
	3000046	New	Lateral	55	27	49	23.0	-				C<B	3	6.9	
	3000038	1992	Lateral	55	18	38	12.0	-				C<B	3	3.6	
	3000043	New	Lateral	55	27	49	0.0	-				B	4	0.0	
	3000017	1992s	Rotational	49	55	39	1.2	-				C	1	0.1	
	3000029	1993s	Rotational	27	49	55	6.0	-				C<B	3	1.8	
	3000022	1994	Rotational	55	49	38	2.2	-				A<B	5	1.1	
	3000019	New	Rotational	49	38	39	2.8	-				A<B	5	1.4	
	3000018	1992s	Rotational	49	55	38	2.0	-				A<B	4	0.8	
	3000020	1991w	Rotational	55	49	38	2.5	-				C	1	0.3	
	3000021	1992s	Rotational	55	49	39	0.2	-				C	1	0.0	
	3000031	New	Rotational	15	55	49	4.0	-				C	1	0.4	
	3000026	New	Lateral	6	55	38	5.4	-				B	4	2.2	
	3000142	1991w	Rotational	49	15	50	0.8	-				C	1	0.1	
	3000025	1993w	Rotational	6	9	49	0.3	-				A<B	5	0.1	
	3000024	New	Lateral	9	55	49	15.0	-				B	4	6.0	
	3000113	1991w	Rotational				1.0	-				C	1	0.1	
	3000047	1991w	Rotational	15	49	50	0.4	-				C	1	0.0	
	3000048	1991w	Rotational	49	24	38	1.4	-				C	1	0.1	
	3000143	New	Lateral	49	55	50	75.0	-				B	4	30.0	
	3000032	New	Rotational	55	49	27	9.0	-				A<B	5	4.5	
	3000114	New	Lateral	49	50	24	50.0	-				A<B	5	25.0	
	3000112	New	Lateral	49	50	24	35.0	-				A<B	5	17.5	
	3000144	1991w	Rotational	49	15	50	0.9	-				B	4	0.4	
	3000145	1991w	Rotational	49	15	50	0.3	-				A<B	5	0.2	
	3000111	1991w	Rotational	49	50	56	3.0	-				A<B	5	1.5	
	3000050	1991w	Rotational	27	55	38	20.6	-				C<B	3	6.2	
	3000149	1991w	Rotational/ Flow	49	6	9	0.4	-				B	4	0.2	
	3000150	1991w	Rotational/ Flow	49	6	9	0.8	-				B	4	0.3	
	3000148	1991w	Rotational	49	6	9	1.0	-				B	4	0.4	
	3000147	1991w	Rotational	49	15	9	3.1	-				B	4	1.2	
	3000146	1991w	Rotational	49	15	9	0.3	-				B	4	0.1	
	3000049	1993s	Rotational	27	38	9	0.7	-				A<B	5	0.4	
	3000159	1991w	Rotational/ Flow	49	50	38	0.6	-				A<B	5	0.3	
	3000158	1991w	Rotational	6	49	9	0.3	-				B	4	0.1	
	3000033	1993	Rotational	15	55	49	0.9	-				C<B	3	0.3	
	3000034	New	Lateral	55	49	38	8.1	-				C<B	3	2.4	
	3000035	New	Lateral	55	49	27	20.0	-				B	4	8.0	
	3000015	New	Rotational	49	18	38	4.5	-				B	4	1.8	

Table 6-2-2 (6/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K7-30	3000016	New	Rotational	49	18	38	3.6	-				C<B	3	1.1	
	3000036	New	Lateral	55	49	27	4.5	-				C<B	3	1.4	
	3000027	1992s	Rotational	15	55	49	4.4	-				C<B	3	1.3	
	3000125	New	Rotational	49	15	50	1.1	-				C<B	3	0.3	
	3000124	New	Rotational	49	15	50	2.7	-				A<B	5	1.4	
	3000023	1992s	Rotational	15	49	55	10.4	-				A	6	6.2	
	3000126	New	Rotational	49	50	55	3.3	-				A<B	5	1.7	
	3000037	1992	Rotational	15	49	38	2.4	-				C	1	0.2	
	3000155	1991w	Rotational	49	9	50	4.0	-				B	4	1.6	
	3000156	New	Rotational	49	9	50	5.0	-				B	4	2.0	
	3000131	New	Rotational	49	15	50	3.4	-				A<B	5	1.7	
	3000129	1991w	PotentialSlides	15	49	20	0.4	-				C	1	0.0	
	3000127	1991w	Rotational	49	19	50	4.8	-				A<B	5	2.4	
	3000128	New	Rotational	49	19	50	10.7	-				A<B	5	5.4	
	3000130	New	Lateral	49	15	50	2.6	-				B	4	1.0	
	3000008	1981w	Rotational	55	54	39	3.3	-				A<B	5	1.7	
	3000151	New	Rotational	49	15	50	3.2	-				B	4	1.3	
	3000007	1993	Rotational	55	39	38	2.5	-				A<B	5	1.3	
	3000006	1374s	Rotational	55	38	39	1.1	-				A<B	5	0.6	
	3000133	New	Lateral	49	15	50	7.2	-				A<B	5	3.6	
	3000134	New	Rotational	49	15	50	7.3	-				C	1	0.7	
	3000005	New	Flow	49	38	39	2.2	-				C	1	0.2	
	3000135	New	PotentialSlides	49	15	50	0.6	-				C	1	0.1	
	3000136	1991w	Flow	49	15	50	0.8	-				C	1	0.1	
	3000137	1991w	PotentialSlides	49	15	50	0.4	-				B	4	0.2	
	3000132	1993	Lateral	49	50	55	6.5	-				A<B	5	3.3	
	3000003	1993w	Flow	49	38	50	1.5	-				A	6	0.9	
	3000004	1990w	Rotational	49	38	39	0.2	-				C	1	0.0	
	3000153	New	Rotational	49	9	50	6.0	-				A<B	5	3.0	
	3000002	1980	Rotational	49	38	39	4.5	-				C	1	0.5	
	3000001	1971	Rotational	49	38	39	4.5	-				C	1	0.5	
	3000141	1991w	Rotational	49	15	50	0.5	-				A<B	5	0.2	
	3000009	1993s	Lateral	55	9	27	9.5	-				A<B	5	4.8	
	3000138	New	Lateral	49	15	50	10.5	-				A<B	5	5.3	
	3000139	New	Rotational	49	50	21	11.0	-				B	4	4.4	
	3000013	1993	Rotational	49	55	39	0.9	-				C	1	0.1	
	3000140	New	Rotational	49	50	19	4.2	-				A<B	5	2.1	
	3000010	1993	Rotational	55	39	38	0.6	-				C	1	0.1	
	3000011	1990w	Rotational	55	38	39	8.4	-				C	1	0.8	
	3000014	1993	Rotational	55	49	50	25.0	-				B	4	10.0	
	3000012	1994	Rotational	55	27	49	0.0	-				A<B	5	0.0	
K7-37-3	3000066	1993	Lateral	9	19	38	9.6	11.7	2	3.0	0.4	B	4	3.8	48.6
	3000067	1993	Rotational	9	19	38	3.2	-				A<B	5	1.6	
	3000068	1993	Rotational	9	19	38	0.7	-				A<B	5	0.4	
	3000065	1993	Lateral	9	38	39	11.0	-				B	4	4.4	
	3000080	New	Rotational	6	9	19	31.7	-				B	4	12.7	
	3000063	New	Lateral	9	19	38	36.1	-				B	4	14.4	
	3000062	1993	Rotational	9	38	39	3.0	-				A<B	5	1.5	
	3000077	New	Wedging	9	27	50	2.1	-				C<B	3	0.6	
	3000076	1993	Rotational	9	27	50	1.0	-				C	1	0.1	
	3000074	New	Lateral	9	27	50	14.9	-				A<B	5	7.4	
	3000075	New	Rotational	9	27	50	3.1	-				A<B	5	1.6	
K7-37-5a	3000061	New	Lateral	9	38	39	2.4	53.5	4	2.2	2.5	B	4	1.0	214.5
	3000060	New	Lateral	9	27	38	9.5	-				B	4	3.8	
	3000059	New	Lateral	9	50	38	19.5	-				B	4	7.8	
	3000057	1993	Zone (Unmapable)	9	18	27	9.8	-				B	4	3.9	
	3000056	New	Lateral	9	19	20	346.5	-				B	4	138.6	
	3000055	1993	Flow	9	50	38	3.6	-				A<B	5	1.8	

Table 6-2-2 (7/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K7-37-5a	3000054	New	Lateral	6	9	19	135.0	-				B	4	54.0	
	3000053	New	Lateral	6	9	19	7.0	-				B	4	2.8	
	3000051	New	Fall	6	9	19	2.1	-				B	4	0.8	
K7-37-6a	3000093	1993	Potential Slides	6	9	19	1.4	20.5	2	2.3	0.9	B	4	0.6	86.0
	3000092	1992	Lateral	6	9	50	46.5	-				B	4	18.6	
	3000086	New	Potential Slides	9	50	19	50.0	-				A<B	5	25.0	
	3000087	New	Lateral	9	50	19	55.0	-				B	4	22.0	
	3000090	1993	Rotational	6	9	38	0.7	-				C	1	0.1	
	3000091	1993	Rotational	6	9	50	2.6	-				C	1	0.3	
	3000089	New	Flow	9	50	38	0.7	-				C	1	0.1	
	3000085	New	Rotational	9	50	38	0.9	-				C	1	0.1	
	3000088	New	Rotational	9	19	20	40.5	-				B	4	16.2	
	3000084	1993	Rotational	9	50	38	2.8	-				A<B	5	1.4	
	3000083	1993	Rotational	9	50	38	2.9	-				A<B	5	1.5	
	3000082	1993	Potential Slides	9	18	50	0.6	-				C<B	3	0.2	
	3000081	1993	Rotational	9	18	50	0.2	-				A<B	5	0.1	
K7-37-7a	3000078	New	Lateral	9	19	20	46.4	6.0	2	4.7	0.1	B	4	18.6	25.5
	3000079	1993	Potential Slides	9	19	50	13.9	-				A<B	5	6.9	
K8-21	2000008	New	Rotational/Fall	49	47	15	30.0	3.7	1	8.0	0.0	B	4	12.0	12.7
	2000009	New	Potential Slides	15	49	47	2.5	-				C	1	0.3	
	2000022	New	Potential Slides	15	49	55	4.0	-				C	1	0.4	
	2000014	New	Fall	15	19	49	0.3	-				C	1	0.0	
K8-22	2000023	New	Fall/ Transitional	15	49	55	4.0	9.7	2	1.9	0.5	C	1	0.4	11.5
	2000024	New	Fall/ Transitional	15	49	55	9.0	-				C	1	0.9	
	2000025	New	Potential Slides	15	49	55	0.5	-				C	1	0.1	
	2000026	New	Potential Slides	15	49	55	4.8	-				C	1	0.5	
	2000027	New	Potential Slides	15	49	55	3.0	-				C	1	0.3	
	2000028	New	Potential Slides	15	49	55	1.1	-				C	1	0.1	
	2000029	New	Potential Slides	15	49	55	0.6	-				C	1	0.1	
	2000030	New	Potential Slides	15	49	55	1.8	-				C	1	0.2	
	2000031	New	Transitional/ Flow	15	4	49	6.0	-				B	4	2.4	
	2000054	New	Potential Slides	15	42	55	2.1	-				C	1	0.2	
	2000055	New	Potential Slides	15	42	55	0.8	-				C	1	0.1	
	2000056	New	Potential Slides	15	42	55	2.4	-				C	1	0.2	
	2000057	New	Potential Slides	15	42	55	0.3	-				C	1	0.0	
	2000058	New	Potential Slides	15	42	55	0.5	-				C	1	0.0	
	2000060	New	Fall/ Transitional	15	2	5	60.0	-				C	1	6.0	
K8-23	2000059	New	Potential Slides	6	49	34	0.3	0.0	1	7.3	0.0	C	1	0.0	0.0
K8-24	2000062	New	Potential Slides	15	42	55	0.0	0.0	1	6.5	0.0	C	1	0.0	0.0
K8-25-1a	2000032	New	Transitional/ Fall	15	19	4	27.0	2.7	1	3.7	0.1	C	1	2.7	2.7
	2000150	New	Potential Slides	15	55	49	0.4	-				C	1	0.0	
K8-25-1b	2000085	New	Potential Slides	55	47	34	12.0	22.2	2	7.4	0.3	C	1	1.2	22.2
	2000149	New	Rotational +Flow	49	55	2	208.0	-				C	1	20.8	
	2000033	New	Transitional/Rotatio-nal	15	34	3	2.4	-				C	1	0.2	
K8-26	2000151	New	Potential Slides	6	15	55	1.2	4.8	1	6.2	0.1	C	1	0.1	4.8
	2000152	New	Potential Slides	15	49	19	0.2	-				C	1	0.0	
	2000153	New	Potential Slides	15	49	19	0.9	-				C	1	0.1	
	2000154	1998w	Transitional +Flow	6	49	55	0.7	-				C	1	0.1	
	2000155	1998w	Potential Slides	6	49	55	2.8	-				C	1	0.3	
	2000156	New	Potential Slides	15	49	19	42.0	-				C	1	4.2	
K8-27	2000066	New	Fall/ Transitional	15	19	40	1.5	14.2	2	7.4	0.2	C	1	0.2	81.7
	2000067	New	Potential Slides	15	19	40	5.3	-				C	1	0.5	
	2000068	New	Fall/ Transitional	15	3	40	135.0	-				A	6	81.0	
K8-28	2000070	New	PotentialSlides	6	55	34	7.8	3.7	1	6.4	0.1	B	4	3.1	15.0
	2000069	New	Transitional/ Fall	6	55	49	24.0	-				B	4	9.6	
	2000081	New	PotentialSlides	6	55	47	5.6	-				B	4	2.2	
K8-29	2000071	New	Transitional/ Fall	6	1	28	14.0	30.6	3	7.5	0.4	B	4	5.6	121.8

Table 6-2-2 (8/8) Evaluation of Landslides

Basin No.	Data No.	Date of Move-ment	Kind of movement	Main cause			Landslide area			Sub-Basin	Rate of LS Area	Classification of risk		Area Risk Index	
				1	2	3	Each (10^3m^2)	Sum (ha)	Evalu-ation	Area (10^3ha)	%	Evalu-ation	Grade	Each	Total
K8-29	2000073	New	PotentialSlides	6	55	40	0.1	-				C	1	0.0	
	2000074	New	Transitional/ Fall	15	55	40	10.0	-				B	4	4.0	
	2000075	1991s	Rotational/	49	55	34	280.0	-				B	4	112.0	
	2000076	New	PotentialSlides	55	28	34	0.2	-				B	4	0.1	
	2000077	New	PotentialSlides	28	55	47	1.4	-				C	1	0.1	

Table 6-2-3 (1/2) Evaluation of Flood/Debris Flow Damage & Landslides for Chaharmahal va Bakhteyari Province

Basin No.	Town / Village	Flood/ Debris flow	Landslide				Extent of Erosion	L. Capability		Mountain area (%)	Popu-lation	Basin area (km^2)
			Evalu-ation	Area (ha)	Rate (%)	Risk Index		Total	Index			
K2-1	Karim abad, Kaj	5	1	1.4	0.0	4.9	75.7%	57	1.1	74.2	2,305	53.5
K 3-1-9	Darehe yaas, Darehe beed, Madan	3					0.0%	74	1.0	91.1	1,211	73.7
K 3-1-16	Aziz abad balla & paien	4					0.0%	69	1.3	85.4	515	52.2
K 3-2-4	Malek shir, Chole-dan, Sarqal-eh, Sanna-zeh, Ghaeedan, Kaheedan	3	1	2.8	0.1	8.9	48.8%	45	1.0	99.5	968	45.0
K 3-2-5	Sarkhun	3	1	5.0	0.1	16.5	0.0%	43	1.0	99.6	888	42.9
K 3-5	No turki	3					0.0%	38	1.0	100.0	527	37.8
K 3-6	Gerdepineh, Abass abad, Cheshmeh solinan, Rupineh	3					0.4%	85	1.4	64.1	634	62.7
K4-1-8	Moorchegan, Bijgerd, Godarkabk	3					6.4%	243	2.2	69.2	1,247	110.6
K4-1-9	Vastegan, Nasir abad	4					49.5%	117	1.7	59.9	756	67.0
K7-0-5	Gendab, Bizhgan, Sefidar, Dam-ab	5	1	0.3	0.0	1.5	0.0%	34	1.0	100.0	1,363	34.2
K 3-1-7	Buger	3					0.0%	87	1.0	87.2	2,492	87.0
K 3-1-11	Sharak-gadid doorak	3					0.0%	55	1.0	100.0	948	55.1
K4-1-11	Gandoman, Hosein-abad, Kotak Senajan, Maamureh, Chermineh	3					15.5%	650	4.5	28.4	6,787	143.4
K4-1-12	Boldaji	1					7.1%	249	3.6	43.3	11,490	69.4
K5-20	Nazi, Mahmod sham, Sange namak, Damshat, Mian dadan	3					68.7%	74	1.0	98.0	545	71.9
K5-21	Hosain abad, Tarom, Roobat kooh, Telord, Tarom, Roobat-kooh, Mahmood-abad, Damshat, Miyan dohan oliya	3					81.8%	64	1.5	94.5	180	43.3
K5-23	Alagi oliya, Dorak sofla	3					66.3%	69	1.0	100.0	289	69.2
K6-4-1	Lordegan, Piran, Tal maroun, Deh no, Moorjezmoie	3					10.6%	318	2.4	58.6	24,994	130.7
K7-0-3	Shahnadjaf, Peruz, Bogh kaj	4					20.0%	162	1.4	100.0	4,319	115.4
K 1-2-6a	Shamsh abad	2					0.0%	165	2.7	72.8	3,077	62.2
K 1-2-6b	-	2					47.0%	282	5.6	68.2	2,586	50.0
K 1-2-6c	Taghanak, Bahram abad	2					0.0%	416	4.9	12.3	21,601	84.9
K 3-1-13	Gel sefid, Rahim abad, Takhteh chub	2	2	8.9	0.2	30.0	0.0%	41	1.0	100.0	704	40.9
K 3-2-2	Kanamee, Shiassi	3					10.2%	64	1.0	100.0	1,373	63.5
K 3-2-3	Deh-kohneh, Varzard, Emam zadeh jafar, Deh no, Kanami	3	2	18.4	0.4	55.3	9.7%	49	1.0	92.7	1,054	48.9
K 3-3-2a	Damab, Deh no (pain, bala)	2	2	15.5	0.3	64.1	49.2%	60	1.0	70.9	605	60.4
K 3-4-1	Chelo, Deh Kohneh, Haftpiran	2	1	0.2	0.0	0.7	36.6%	50	1.0	88.5	1,749	49.8
K 3-4-2	Davazdah enam, Sar char	2					0.0%	63	1.0	88.6	1,364	62.7
K4-1-4	Shams abad	2	2	6.8	0.1	21.1	0.0%	63	1.0	96.6	1,823	62.6
K 1-1	Beheshet abad	1	2	13.5	0.3	50.0	47.9%	46	1.0	89.0	3,033	46.0
K 1-1-3	Chelicheh, Chegha hest	1					37.1%	396	6.4	49.1	4,835	61.7
K 1-1-4	Gusheh, Deh cheshmeh, Gajoun	1					38.8%	187	2.0	82.2	6,216	91.8
K 1-1-5	Farsan, Babahydar	1					37.5%	178	2.4	67.3	35,106	74.8
K 1-1-7	Isa abad, Fill abad	1					44.6%	153	2.1	80.4	4,072	72.4
K 1-2-3b	Shelamzar, Jafar abad	1					11.7%	210	4.6	41.1	2,717	45.5
K 1-2-5g	-	1					0.0%	128	1.8	48.2	1,025	71.4
K 1-2-5j	Borujen, Atagaleh	1					0.0%	168	3.0	51.2	43,655	55.8

Table 6-2-3 (2/2) Evaluation of Flood /Debris Flow Damage & Landslides for Chaharmahal va Bakhteyari Province

Basin No.	Town / Village	Flood/ Debris flow	Landslide				Extent of Erosion	L. Capability		Mountain area (%)	Popu-lation	Basin area (km^2)
			Evalu-ation	Area (ha)	Rate (%)	Risk Index		Total	Index			
K 1-2-5k	Borujen, Naghaneh	1					0.0%	263	3.6	17.8	977	72.0
K 1-2-5m	Borujen	1					0.0%	325	3.8	0.0	1,227	86.6
K 1-2-6d	Farrokhshahr, Mazraeh digak miani	1					0.0%	184	2.8	45.5	28,164	66.3
K 1-2-6f	-	1					0.0%	80	1.1	58.9	1,904	72.9
K 1-2-6i	Shahre kord, Eshgaftak	1					0.0%	477	6.7	15.2	102,466	71.2
K 1-2-6m	Hafshejan, Sirak	1					45.4%	198	4.2	10.7	2,314	47.6
K 1-3	Juneqan	1					48.4%	341	4.4	63.0	20,070	77.1
K 1-4-1	Pardenjan, Keren	1					32.9%	85	3.2	47.9	1,958	26.4
K4-1-6	Cheshime ali	1					0.0%	49	0.9		610	55.9
K4-1-7	Lah-daraze,Tagargab, Godarkabk	1	1	0.0	0.0	0.3	29.4%	114	2.2		583	51.7
K4-1-8a	Emamoeys, Hyder abad	1					5.7%	304	3.3		897	93.3
K6-1-6	Shirani, Toutang, Tang kalureh, Darakeh, Zarin derakht, Totang, Jan nesa	1					3.1%	105	1.8		2,761	56.9
K6-2	Monj	1					0.0%	66	1.0		2,918	66.5
K7-1	Deh no, Deh barez, Shevar, Jocall	1					0.0%	68	1.0		1,600	67.6
K7-2	Suhrab, Alishir, Chalderaz, Shoar, Mil shoa, Sarchour, Dareh tangi, Mil sha, Shouar	1					99.2%	82	1.2		1,548	70.2
K 1-1-2	Asad abad		1	0.4	0.0	1.6	30.9%	98	1.7	81.7	4,335	56.3
K 1-2-1	Salm, Balagholi		1	2.2	0.1	6.5	41.6%	142	3.7	60.8	2,370	38.4
K2-3	Rostam abad, Dehow nadeh, Shekar abad, Aliku		1	3.1	0.0	12.2	59.3%	168	1.8	65.9	4,190	95.3
K2-5-1a	Afsar abad, Dezdak, Godan, Dozdak balla & paien, Sayf abad, Darab, Godar, Bahman abad		3	39.0	0.5	147.1	50.5%	90	1.0	77.0	801	86.3
K2-6	Dashtak		1	1.2	0.0	3.9	48.5%	58	1.6	78.9	1,535	36.9
K 3-1-1	Dareh shur		1	0.3	0.0	0.8	0.2%	52	1.1	100.0	797	49.1
K 3-1-14a	Kavand		5	199.6	4.4	1,187.7	18.1%	46	1.0	95.5	791	45.6
K 3-2-6	Gandomkar		2	7.5	0.2	28.8	0.0%	34	1.0	89.6	717	33.5
K 3-2-7	-		2	13.2	0.2	39.6	0.0%	60	1.0	92.4	1,264	59.8
K 3-3-1	Duporan, Bag-giran, Gautoot, Rigak		1	3.2	0.1	6.9	71.1%	43	1.0	100.0	939	43.1
K 3-3-2b	Ralem abad, Parkhor, Zolm abad, Joghdan		1	0.8	0.0	3.3	18.4%	49	1.0	88.4	412	49.3
K 3-3-2e	Naghan, Marik, Kerdan		4	68.0	2.0	302.4	96.0%	66	2.0	41.4	264	33.2
K 3-3-2g	Jehraz, Gashed, Parkhur, Chahartaq		1	2.7	0.0	9.2	4.9%	66	1.0	77.3	719	65.7
K 3-3-3a	Ardal		1	1.1	0.0	3.5	29.3%	132	2.5	69.3	2,267	53.1
K 3-3-3b	Cheshmeh sulegan		2	22.2	0.4	88.8	33.0%	101	1.7	84.3	6,056	58.1
K4-3-1	Durahan, Gerdebisheh, Deh kheda		1	0.4	0.0	1.4	23.8%	72	1.0	90.0	839	72.5
K4-3-2	Deh tout, Cheshimeh abdal, Deh bagh, Godar goosh angulki		1	0.1	0.0	0.4	24.4%	99	1.4	79.0	811	71.8
K5-1	Teriz, Barge anjir, Kabuci, Jaroye balla & paien, Kabotarankerm tabe balla & paien		1	0.6	0.0	1.7	10.6%	49	1.4	100.0	532	36.2
K5-3	Shalil (bala, paien)		1	0.0	0.0	0.1	17.2%	50	1.1	100.0	702	47.2
K5-5	Mur varid		3	37.9	0.5	100.2	45.5%	71	1.0	100.0	1,875	71.3
K6-4-4	Gorg ala, Deh no gudarz		1	0.6	0.0	2.4	36.4%	233	3.2	73.1	2,532	71.9

Table 6-2-4 (1/2) Evaluation of Flood /Debris Flow Damage & Landslides for Esfahan, Kohkiluyeh &Khuzestan Provinces

Basin No.	Town / Village	Flood/ Debris flow	Landslide				Extent of Erosion	L. Capability		Mountain area (%)	Popu-lation	Basin area (km^2)
			Evalu-ation	Area (ha)	Rate (%)	Risk Index		Total	Index			
Esfahan												
K7-0-10-1	Rud abad	4					0.0%	43	3.0	0.0	698	14.3
K7-0-18	Barand balla & paien	4	2	5.3	0.1	16.0	0.0%	222	3.0	57.1	830	74.7
K7-0-10-6j	-	3					0.0%	252	4.8	23.1	279	52.2
K7-0-10-2	Tang khasheg	2					0.0%	137	2.1	74.9	513	65.5
K7-0-10-6k	Shafi abad	2					0.0%	304	4.5	35.5	383	68.1
K7-0-19-1	Gardaneh bizhan, Doregan, Kal balko	2	5	157.4	2.5	602.2	16.1%	122	1.9	88.4	698	63.1
K7-0-19-2	-	2					20.2%	51	1.0	100.0	585	51.2
K7-0-20a	Cheshmeh khonyar, Ganjegan, Dorahan, Deh bozurg, Safdar abad, Lurkash, Kahangan	2					4.4%	197	2.7	86.1	805	72.8
K7-0-20b	Dangzeli, Noghl	2					6.5%	91	1.6	100.0	999	57.1
K7-0-21	Bazargah, Amir abad, Rahiz, Shahid, Kahardan, Valad khani	2	1	0.8	0.0	0.8	3.9%	454	3.9	68.7	1,308	117.1
K7-0-22	Dareh burgoli, Por rouz	2					0.8%	82	1.5	91.1	574	54.0
K7-0-23	Dareh narmak	2					25.7%	49	1.0	100.0	571	48.9
K7-0-24	-	2	5	103.7	1.3	407.5	33.8%	133	1.6	89.3	966	81.5
K7-0-10-9	Samirum, Jozar, Tapeh shahidan	1	1	0.4	0.0	1.8	42.1%	431	3.5	50.7	300	124.4
K4-4-2b	Ghalaeh gohadam		1	0.7	0.0	2.0	0.0%	206	2.2	81.2	769	94.8
K7-0-12	Nayed ali		1	0.5	0.0	0.5	30.0%	85	2.1	16.2	561	39.7
K7-0-17	-		2	18.1	0.3	40.7	31.9%	100	1.4	95.8	896	69.4
Khokhilya												
K7-48	Tange surkh, Deh toli, Cheshmeh chenar	3					33.2%	77	1.2	87.6	1,490	65.4
K7-42-1	Yasuj faramarzi, Emam zadeh shahzadeh farajollah	1					0.4%	133	1.9	65.1	82,348	70.4
K7-43	Deh no, Mahmoud abad, Masoum abad	1					13.2%	34	1.0	98.3	7,993	34.2
K7-30	Cheh yel, Gariveh, Sar chal, Gardan talbaladoon, Dora, Chat, Samandi, Ghanat		4	55.0	1.1	213.4	6.3%	45	0.9	97.6	1,720	48.9
K7-37-3	Deli kho, Chitu, Dareh khani, Deh bozorg, Parshekoft		2	11.7	0.4	48.6	14.9%	37	1.2	95.3	864	30.0
K7-37-5a	Taleh boz, Dareh khani		4	53.5	2.5	214.5	16.3%	22	1.0	100.0	621	21.5
K7-37-6a	-		2	20.5	0.9	86.0	13.9%	23	1.0	87.2	519	23.2
K7-37-7a	Chaleh siseh		2	6.0	0.1	25.5	31.6%	23	0.5	100.0	989	47.3
Khuzestan												
K8-13b	Susan, Ceraya, Deh no, Ab zalu, Deh boz, Deh kohneh, Gilan, Malviran, Abezaloo, Sorya, Emamzadeh danial, Soryya	3					0.7%	21	0.4	79.8	1,462	48.0
K8-25-1b	Dehdez, Lebbid, Ghaleh sard, Sarmasjed, Ghaleh balla sard	2	2	22.2	0.3	22.2	46.6%	79	1.1	75.7	2,883	73.7
K8-28	Zeras, Shakhaz, Dareh zang, Morzi, Gerdlidan, Sarguf, Dehno	2	1	3.7	0.1	15.0	57.9%	133	2.1	97.1	1,990	63.7
K3-0a	Cheteh, Lirali		1	2.2	0.0	6.6	0.0%	74	1.0	94.0	2,110	74.2
K3-0b	Murzam, Deh kohneh		2	13.7	0.2	19.6	1.4%	91	1.3	86.0	2,751	72.3
K8-21	Badaumza, Chahr deh		1	3.7	0.0	12.7	0.0%	100	1.3	100.0	1,415	79.9
K8-22	Bar parch, Zir khu shalu		2	11.7	0.6	13.5	0.1%	19	1.0	95.4	282	19.3
K8-23	Rekat shalu, Sebri		1	0.0	0.0	0.0	13.1%	31	0.4	95.7	1,068	73.0

Table 6-2-4 (2/2) Evaluation of Flood /Debris Flow Damage & Landslides for Esfahan, Kohkilouyeh &Khuzestan Provinces

Basin No.	Town / Village	Flood/ Debris flow	Landslide				Extent of Erosion	L. Capability		Mountain area (%)	Popu-lation	Basin area (km²)
			Evalu-ation	Area (ha)	Rate (%)	Risk Index		Total	Index			
K8-24	Baju shalu, Abe gonjeshki, Bonyab, Jalali		1	0.0	0.0	0.0	0.0%	55	0.8	90.7	953	65.1
K8-25-1a	Shalu		1	2.7	0.1	2.7	30.1%	48	1.3	88.2	672	37.0
K8-26	Darch, Shalu, etc		1	4.8	0.1	4.8	65.1%	77	1.3	93.7	1,765	61.5
K8-27	Mohamad, Poshte asiavand, Noshivand		2	14.2	0.2	81.7	6.2%	28	0.4	90.1	155	73.8
K8-29	Darb gharibi, Dehrudjeld, Jalali, Jir ahmad		3	30.6	0.4	121.8	4.3%	17	0.2	91.7	2,324	74.8