



**Holistic Understanding for
Justified Research and Action
(HUIJRA)**

**Feasibility study to conserve chir pine (*Pinus roxburghii*)
ecosystem in Marghuzar valley of district Swat**



**Holistic Understanding for Justified Research and Action Swat
(HUIJRA)**

Near Govt. Girls Degree College, College Colony Saidu Sharif, Swat
Phone: +92 946 727759 E-mail: hujraswat@yahoo.com

Web: www.hujra.org

TABLE OF CONTENTS

1. Project No:	3
2. Project title:	3
3. Project Executant:	3
4. Project Duration (in months):	3
5. Project cost:	3
6. Project summary:	3
7. Project objectives:	5
8. Methodology used:	5
9. Results and their significance	7
9.1 Current status of chir pine ecosystem:	7
9.2 Key threats to the ecosystem:	20
9.3 Local community perception about conservation of natural resources:	24
10. Targets/objectives not achieved and reasons thereof:	27
11. Conclusions and recommendations:	27
12. Outputs: Reports, media, articles, slides, photographs etc.	30
13. Equipment status report:	30

1. Project No:

50034901

2. Project title:

Feasibility study to conserve chir pine (*Pinus roxburghii*) ecosystem in Marghuzar valley of district Swat

3. Project Executant:

3.1. Name: Shaukat Ali Sharar

3.2. Title & Organization: Executive Director Holistic
Understanding for Justified
Research and Action
(HUIRA)

3.3. Address: Opp. Govt. Girls College Saidu Sharif Swat

4. Project Duration (in months):

12 months

a) Starting date: April 2003

b) Ending date: November 2004

c) Progress report for the period: 6 months

5. Project cost:

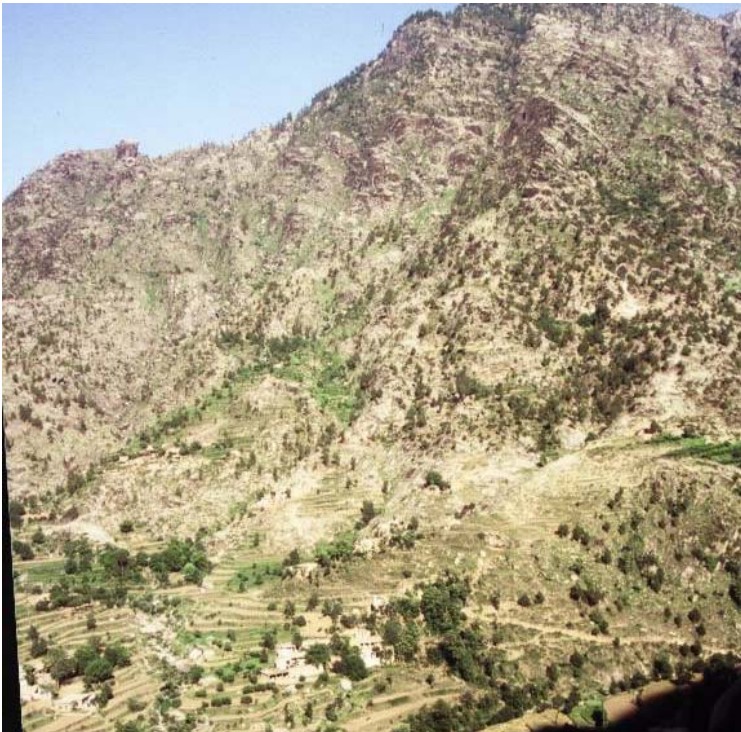
Rs. 1,39,400/- (one hundred thirty nine thousand and four hundred only)

6. Project summary:

Chir pine and scrub forests covered the mountainous valley of lower Swat until recently. These have been cut ruthlessly and now only remnant forest patches of these can be seen on sacred places like graveyards or small land holdings protected by individuals or communities. Marghuzar valley is one of the few areas still covered by chir pine. However, its cutting is reported to be alarming due to domestic and commercial needs of the local community and trade in the to meet timber demand of Mingora city respectively. To make an assessment of the current trend of these forests, know key threats and roots causes of the exploitation of these and recommended actions for conservation of the forests, the project is proposed.



An overview on the main valley of Swat from mid of Mount Elum



Here is a chance to continue with traditional practices with modern concepts but with holistic understanding

7. Project objectives:

- i. Assess the current status of the chir pine forests ecosystem in Marghuzar valley of District Swat.
- ii. Identify key threats to the ecosystem.
- iii. Know local community perception on conservation of these forests

8. Methodology used:

To assess the current situation of the forest ecosystem in Marghuzar valley, information in the following areas were collected. The method(s) adopted for collecting the information is/are given separately for each sub-heading.

a) Forests and Non Timber Forest Products (NTFPs):

Status of vegetation in Marghuzar valley varies because of difference in elevation, aspect and human use to assess the current situation of vegetation i.e. trees, shrubs, grasses and NTFPs in the valley. Systematic survey was carried out in different aspects and ranges of elevation. Transect line of 500 meter with quadrates of 5 meter radius at 50 meter interval were laid out. Vegetation under each quadrate was recorded. A total of 10 quadrates in each transect line were laid out and specified data were recorded on the format already prepared for the purpose (i.e. 10 quadrates per transect line per aspect). Detail of the data recorded is attached in annexure at the end. To further improve quality of the information, the recorded data were also compared with digital maps already prepared by the Forest Management Center (FMC) for preparation of Resource Management Plan for Swat Forest Range of Swat Forest Division where Marghuzar is one the important forest blocks. Although, the maps prepared by FMC are not upto date to provide exact status of the vegetation in the valley but consulting these maps during the process of data collection have greatly helped in knowing the change that has occurred over the course of time. Similarly other relevant information from revenue department and report written by Dr. Habib Ahmad titled "*The natural resources and human ecology of Mount Elem, District Swat*" were also to rectify the data and assess trends in vegetation.

b) Agriculture

Information about agricultural practices, irrigation, crops, farm forestry on peripheries of agricultural land and such other information pertaining to the subject were collected from field observations, revenue record and interviews with local key informants, owners and tenants.

The land tenure and temporal changes were explored through interviews with elders. Meetings with the farmer groups at different occupation zone/social groups were held to know the current status of agriculture, cropping pattern and cropping encroachment in the forests.

c) Livestock

The data of the livestock population and dynamics was obtained from various key informants in the main villages and hamlets in different ecological niches.

d) Wild life

Data on the wildlife was collected through appropriate PRA tools including meetings with elders and famous aged hunters of the past. Information was obtained to identify change in the occurrence of wildlife with the change in ecosystem. Data was also obtained from various documents already available. During the vegetation survey, various mammal species Rhesus monkey (*Mucacca mollata*) and Nokla (Civit cat) were observed. The number of wild mammals and birds are greatly reduced, obviously, because of loss of habitat mainly by the locals and also access of man to remote areas in the valley. Construction of Mandao (a temporary small house of mainly one room constructed in the upper altitudes to spend 2-3 months of summer for livestock grazing) by the Gujars and Ajars have further aggravated the situation. Such scattered temporary houses can be observed in the entire Marghuzar valley at different elevations and aspects.

e) Social System

Survey to get information on the social structure of the society in the valley were carried through appropriate PRA tools, which included interviews with the elders of different social groups and visits to main villages of the valley. Meetings with the community members, social activists, village organizations and leaders of the community were held in this connection. Information were obtained regarding family labor distribution, sources of income and dependency on forest and non-wood forest products.

Information on temporal distribution of different social groups in different ecological niches of the valley was obtained through appropriate PRA tools. Information on sections/caste as well as mutual relations and methods of livelihood were collected. Population data has been given using Census Report of 1998.

Personal observations during field visits and interviews with elders were used to indicate the current status and trends of the water resources and its usage for drinking, livestock and agriculture. The flow pattern in streams and gullies and their temporal dynamics were explored through interviews and group information, impact of changes in water availability, condition and hunting pattern of fisheries was also obtained through interview with elders and hunters to know the present situation of the water and fisheries in the valley. Information on the disease occurrence pattern and education trends were obtained from the relevant officials of the health and education departments respectively.

9. Results and their significance

Based on the methodology as explained above, the frequency of various tree, shrubs and grass/forbs were recorded for different elevation ranges for northern and southern aspects which is tabulated as under:

9.1 Current status of chir pine ecosystem:

a) Forests and Non Timber Forest Products (NTFPs):

During vegetation survey in the valley, the following vegetation were observed with their local names against each species:

Table 1: Tree species in Marghuzar valley

S. No	Tree species	Local name
1.	<i>Pinus roxburghii</i>	Nakhtar
2.	<i>Pinus wallichiana</i>	Pewuch
3.	<i>Cedrus deodara</i>	Diar/Ranzra
4.	<i>Abies pindrow</i>	Kachar
5.	<i>Picea smithiana</i>	Banrya
6.	<i>Quercus incana</i>	Bunj
7.	<i>Quercus dilatata</i>	Banjai
8.	<i>Juglens regia</i>	Ghwaz
9.	<i>Olea ferrugenea</i>	Khona
10.	<i>Platanis orientalis</i>	Chinar
11.	<i>Ficus glomerata</i>	Inzar
12.	<i>Salix spp.</i>	Wala
13.	<i>Alnus nitida</i>	Ghiray/Sharol
14.	<i>Pyrus sp.</i>	Tango
15.	<i>Ailanthus altissima</i>	Bikanra
16.	<i>Melia azadarach</i>	Shandai
17.	<i>Morus alba</i>	Toot
18.	<i>Robinia pseudoacacia</i>	Kikar
19.	<i>Populus spp</i>	Sperdad
20.	<i>Zizyphus sativa</i>	Markhanai
21.	<i>Aesculus indica</i>	Jauz
22.	<i>Pistacia integerimma</i>	Shnai
23.	<i>Acacia modesta</i>	Palosa
24.	<i>Criticus sp.</i>	Barit
25.	<i>Cedrella sp.</i>	Barabru
26.	<i>Peritopsis jacquemontiana</i>	Beranj

Table 2: Shrubs species in Marghuzar valley

S. No.	Shrubs	Local name
1.	<i>Plectranthus rugosus</i>	Sperkay
2.	<i>Indigofera gerardiana</i>	Ghureja
3.	<i>Viburnum nervosum</i>	Chamyaray
4.	<i>Dodonea viscosa</i>	Ghwaraskay
5.	<i>Cotoneaster nummularia</i>	Kharawa
6.	<i>Myrsine africana</i>	Marurang
7.	<i>Monothica buxifolia</i>	Gwargwara
8.	<i>Berberis lycium</i>	Kwaray
9.	<i>Daphne oleides</i>	Leghunay
10.	<i>Spirea canascence</i>	Krachay
11.	<i>Gymnospora royleana</i>	Sur azghay
12.	<i>Dryopteris spp.</i>	Kwanjay
13.	<i>Rubus nevous</i>	Baganra
14.	<i>Vickstromea canascence</i>	Katanr
15.	<i>Rubus fruiticosus</i>	Karwara
16.	<i>Debregeasia saeneb</i>	Ajlai
17.	<i>Cotynus cornigera</i>	Letai
18.	<i>Sarcocoea saligna</i>	Lathar
19.	<i>Salvia moorcroftiana</i>	Khardag
20.	<i>Butea minor</i>	Thalbayay

Table 3: Grasses and forbs in Marghuzar valley

S. No.	Grass/forbs	Local name
1.	<i>Cynodon dactylon</i>	Kabal
2.	<i>Origanum vulgare</i>	Shamakay
3.	<i>Cenchrus ciliaris</i>	Inganr
4.	<i>Cenchrus satigerus</i>	Pisholamay
5.	<i>Chrysopogon aucheri</i>	Berunr
6.	<i>Cymbopogon jawarancusa</i>	Sargaray
7.	<i>Artimsea scoparia</i>	Jaukay
8.	<i>Brachiaria sp.</i>	Kuray
9.	<i>Aristida adscensionis</i>	Mashkanra
10.	<i>Heteropogon contortus</i>	Surmal
11.	<i>Rumex hestatus</i>	Tarukay
12.	<i>Cyperus naveous</i>	Kwanjaka
13.	<i>Cynoglossum lanceolatum</i>	Ghishkay
14.	<i>Cannabis sativa</i>	Bang
15.	<i>Salvia moorcroftiana</i>	Khardag
16.	<i>Adiantum venostum</i>	Sumbal
17.	<i>Arisaema jacquementii</i>	Marjarai
18.	<i>Senecio chrysanthemoides</i>	Shalkhai (yellow flower)
19.	<i>Carex sp.</i>	Tarukay

20.	<i>Fragaria nubicola</i>	Tutai
22.	<i>Sorghum halpense</i>	Dadum
23.	<i>Artica dioca</i>	Jalbangai
24.	<i>Amaranthus viridus</i>	Ganhar
25.	<i>Aristida sp.</i>	Banrgaya
26.	<i>Potentella sp.</i>	Baganra
27.	<i>Themida anathera</i>	Loung
28.	<i>Bistorta amplexicaule</i>	Shakhai (red flower)
29.	<i>Verbasum thapsus</i>	Kharghwag
30.	<i>Zizyphus oxyphylla</i>	Ganderai (Ghana)

Table 4: Frequency of species for different ranges of elevations in northern aspect

ELEVATION RANGE	S. NO	SPECIES	FREQ.	ELEVATION RANGE	S. NO	SPECIES	FREQ.
1000 m to 1500 m		Trees:		1500 m to 2000 m	1	<i>Pinus wallichiana</i>	3.1
	1	<i>Quercus incana</i>	0.6		2	<i>Quercus incana</i>	2.4
	2	<i>Acacia modesta</i>	0.4		3	<i>Pinus roxburghii</i>	0.2
	3	<i>Monothica buxyfolia</i>	0.1			Shrubs:	
	4	<i>Olea ferruginea</i>	1.0		1	<i>Dryopteris sp.</i>	4.7
	5	<i>Pinus roxburghii</i>	0.6		2	<i>Viburnum nervosum</i>	2.8
		Shrubs:			3	<i>Vickstromea canascence</i>	14.7
	1	<i>Myrsine africana</i>	13.3		4	<i>Plectranthus rugosus</i>	15.2
	2	<i>Indigofera gerardiana</i>	17.9		5	<i>Cotoneaster nummularia</i>	1.6
	3	<i>Plectranthus rugosus</i>	17.4		6	<i>Berberis lycium</i>	2.9
	4	<i>Daphne oleides</i>	0.5		7	<i>Myrsine africana</i>	3.7
	5	<i>Spirea canascence</i>	9.1		8	<i>Indigofera gerardiana</i>	0.7
	6	<i>Berberis lycium</i>	2.9		9	<i>Daphne oleides</i>	0.2
	7	<i>Carissa spinarum</i>	1.6		10	<i>Rubus fruticosus</i>	0.1
		Grasses/Forbs:			11	<i>Rubus nevous</i>	0.1
	1	<i>Epluda mutica</i>	44.9			Grasses/Forbs:	
	2	<i>Cynodon dactylon</i>	1.0		1	<i>Aristida sp.</i>	8.5
	3	<i>Tapaar</i>	13.6		2	<i>Cynodon dactylon</i>	2.0
	4	<i>Origanum vulgare</i>	4.0				
	5	<i>Cenchrus ciliaris</i>	3.4				
		Trees:	FREQ.			Trees:	FREQ.
2000 m to 2500 m	1	<i>Cedrus deodara</i>	1.8	2500 m to 3000 m	1	<i>Pinus wallichiana</i>	0.9
	2	<i>Pinus wallichiana</i>	1.5		2	<i>Abies pindrow</i>	5.5
	3	<i>Quercus dilatata</i>	0.5		3	<i>Juglens regia</i>	0.2
	4	<i>Barit</i>	0.3		4	<i>Quercus dilatata</i>	0.3
	5	<i>Pinus roxburghii</i>	0.1		5	<i>Spinkai</i>	0.2
		Shrubs:			6	<i>Barit</i>	0.2
	1	<i>Plectranthus rugosus</i>	29.4			Shrubs:	
	2	<i>Indigofera gerardiana</i>	1.3		1	<i>Vickstromea canascence</i>	29.9
	3	<i>Viburnum nervosum</i>	17.1		2	<i>Berberis lycium</i>	0.6
	4	<i>Aday</i>	0.1		3	<i>Aday</i>	2.2
	5	<i>Dryopteris sp.</i>	11.3		4	<i>Dryopteris juxtapostia</i>	0.9
	6	<i>Rubus nevous</i>	0.1		5	<i>Dryopteris sp.</i>	5.0
	7	<i>Dryopteris juxtapostia</i>	0.3		6	<i>Viburnum nervosum</i>	18.2
		Grasses/Forbs:				Grasses/Forbs:	
1	<i>Aristida sp.</i>	44.2	1	<i>Bistorta amplexicaule</i>	2.3		
2	<i>Arissaema jacquemontii</i>	12	2	<i>Arissaema jacquemontii</i>	7.9		

	3	<i>Adiantum venostum</i>	14		3	<i>Adiantum venostum</i>	9.5
	4	<i>Senecio chrysanthemoides</i>	3.8		4	<i>Zizyphus oxyphylla</i>	0.4
	5	<i>Carex sp.</i>	2.5		5	<i>Artica dioca</i>	1.7
	6	<i>Fragaria nubicola</i>	10.8		6	<i>Achyranthus aspera</i>	0.5
	7	<i>Epluda mutica</i>	6		7	<i>Aristida sp.</i>	10.8
					8	<i>Fragaria nubicola</i>	8.5
					9	<i>Chrysopogon aucheri</i>	5

Table 5: Frequency of species for different ranges of elevations in southern aspect

ELEVATION RANGE	S. NO	SPECIES	FREQ.	ELEVATION RANGE	S. NO	SPECIES	FREQ.
1000 m to 1500 m	Trees:			1500 m to 2000 m	Trees:		
	1	<i>Ailanthus altissima</i>	0.8		1	<i>Pinus roxburghii</i>	4.6
	2	<i>Ficus glomerata</i>	0.1		2	<i>Ficus glomerata</i>	0.3
	3	<i>Juglens regia</i>	0.1		3	<i>Ailanthus altissima</i>	0.4
	4	<i>Olea ferruginea</i>	0.2		4	<i>Quercus incana</i>	0.9
	5	<i>Quercus incana</i>	0.7		Shrubs:		
	6	<i>Pinus roxburghii</i>	0.5		1	<i>Debregeasia saeneb</i>	0.3
	Shrubs:				2	<i>Indigofera gerardiana</i>	11.7
	1	<i>Plectranthus rugosus</i>	12.1		3	<i>Berberis lycium</i>	6.4
	2	<i>Berberis lycium</i>	1.5		4	<i>Sageretai theezans</i>	0.5
	3	<i>Rubus fruticosus</i>	1.8		5	<i>Plectranthus rugosus</i>	1.8
	4	<i>Spirea canascense</i>	0.5		6	<i>Cotoneaster nummularia</i>	0.1
	5	<i>Daphne oleides</i>	1.5		7	<i>Rubus nevous</i>	0.4
	6	<i>Sageretia theezans</i>	1.8		Grasses/Forbs:		
	7	<i>Gymnosporea royleana</i>	0.6		1	<i>Origanum vulgare</i>	12.4
	8	<i>Cotoneaster nummularia</i>	1.2		2	<i>Aristida adsensionis</i>	2.1
	9	<i>Cotynus cornigera</i>	0.4		3	<i>Cynodon dactylon (%)</i>	9.5
	10	<i>Vickstromea canescense</i>	0.1		4	<i>Aristida sp.</i>	8.1
		<i>Indigofera gerardiana</i>	4.8		5	<i>Brachiaria sp.</i>	7.6
		<i>Ilanai</i>	0.1		6	<i>Cyprus naveous</i>	3
	Grasses/forbs:				7	<i>Cenchrus satigerus</i>	7
	1	<i>Cynodon dactylon</i>			8	<i>Epluda mutica</i>	53.1
	2	<i>Artimesia scoparia</i>			9	<i>Cynoglossum lanceolatum</i>	0.1
	3	<i>Brachiaria sp</i>			10	<i>Tarkrai</i>	69
	4	<i>Tapaar</i>			11	<i>Cannabis sativa</i>	5.5
	5	<i>Epluda mutica</i>			12	<i>Cypress sp</i>	1.3
	6	<i>Cymbopogon jawarancusa</i>			13	<i>Salvia moorcroftiana</i>	0.9
7	<i>Cenchrus satigerus</i>		14	<i>Cymbopogon jawarancusa</i>	1.7		
8	<i>Origanum vulgare</i>		15	<i>Tapaar</i>	10.9		
9	<i>Aristida adsensionis</i>		16	<i>Cenchrus ciliaris</i>	3		
10	<i>Heteropogon contortus</i>						
11	<i>Cypress sp.</i>						
12	<i>Rumex hestatus</i>						

ELEVATION RANGE	S. NO	SPECIES	FREQ.	ELEVATION RANGE	S. NO	SPECIES	FREQ.
2000 m to 2500 m		Trees:		*2500 m to 3000 m		Trees:	
	1	<i>Pinus wallichiana</i>	1.2		1		
	2	<i>Quercus incana</i>	0.7		2		
		Shrubs:				Shrubs:	
	1	<i>Plectranthus rugosus</i>	20.8		1		
	2	<i>Indigofera gerardiana</i>	4.3		2		
	3	<i>Berberis lycium</i>	4.1		3		
	4	<i>Vickstromea canascence</i>	0.5		4		
	5	<i>Cotoneaster nummularia</i>	0.6		5		
	6	<i>Dryopteris sp.</i>	2.5		6		
		Grasses/Forbs:				Grasses/Forbs:	
	1	<i>Salvia moorcroftiana</i>	1.1		1		
	2	<i>Tarkrai</i>	6		2		
	3	<i>Cynodon dactylon</i>	6.7		3		
	4	<i>Aristida sp.</i>	35.2		4		
	5	<i>Sarcococca saligna</i>	2.7		5		
	6	<i>Cypress sp</i>	2		6		
	7	<i>Amaranthus viridus</i>	0.6		7		
	8	<i>Khata</i>	1.5		8		
9	<i>Arisaema jacquemontii</i>	1.1	9				

* The study area has no southern aspect in 2500-3000 m elevation range.

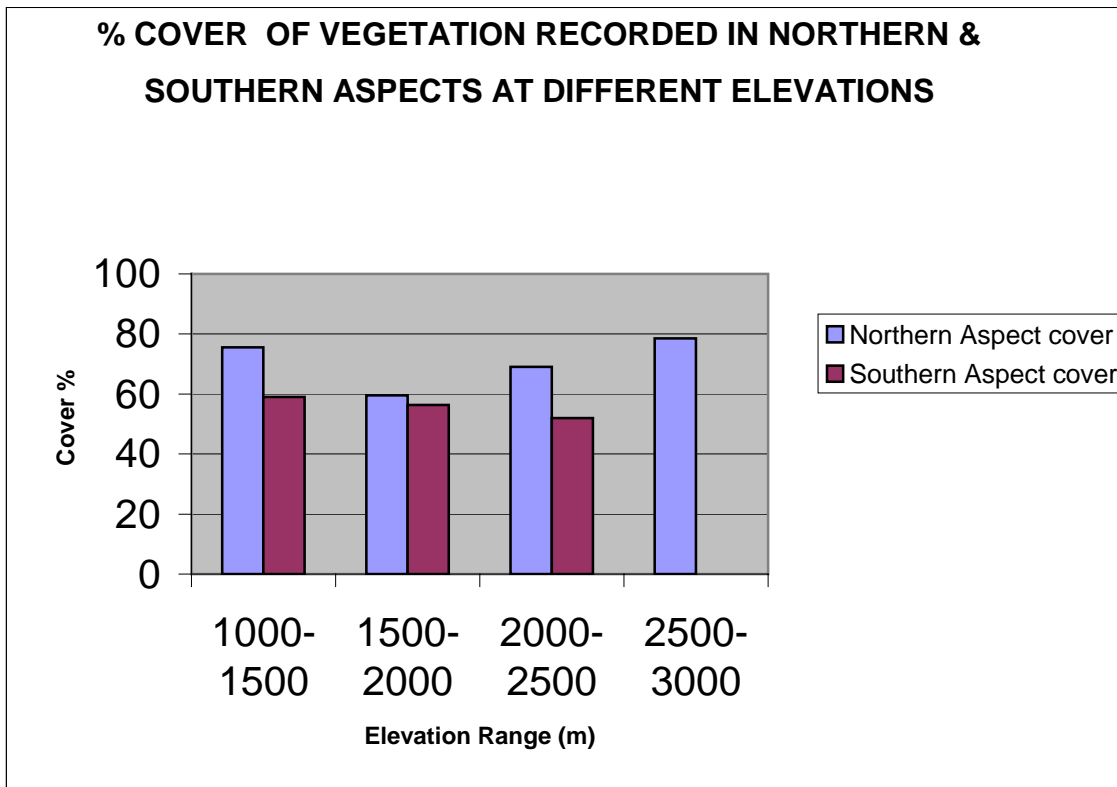
The frequency of the vegetation in the valley varies in different aspects and elevations. This variation is largely effected by the presence of human settlements, the livestock they keep, household needs, preferences for different species and the degree of exploitation by different users for domestic or commercial use. The natural distribution of vegetation, because of its ecological requirements, has to some extent, been changed largely by human interference as large number of scattered households in different ecological niches can be observed in the valley. In some areas, regeneration and sub mature to mature trees of chir, kail and oak have been protected well by the locals for their own interests while in other areas there is almost clear felling of the sites which have been occupied by grasses and shrubs in various ecological zones. In southern aspect of the valley, frequency of the grass species is high compared to northern aspect which is low.

Table 6: Percent cover recorded in quadrates on northern aspects at different elevations

Elevation (m)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Ave cover%
1000-1500	95	98	98	85	70	70	50	70	65	55	756	75.6
1500-2000	30	40	50	30	60	80	80	75	75	75	595	59.5
2000-2500	30	85	75	55	80	95	85	60	70	55	690	69.0
2500-3000	93	80	75	95	70	78	80	75	80	60	786	78.6
Ave of total												70.7

Table 7: Percent cover recorded in quadrates on southern aspects at different elevations

Elevation (m)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Ave cover%
1000-1500	80	70	50	70	5	80	58	63	54	60	590	59.0
1500-2000	5	25	70	85	80	65	58	35	65	75	563	56.3
2000-2500	55	65	80	85	15	55	60	50	40	15	520	52.0
2500-3000	Data not collected as there is no southern aspect in this range of elevation in Marghuzar valley											55.8
Ave of total												55.7



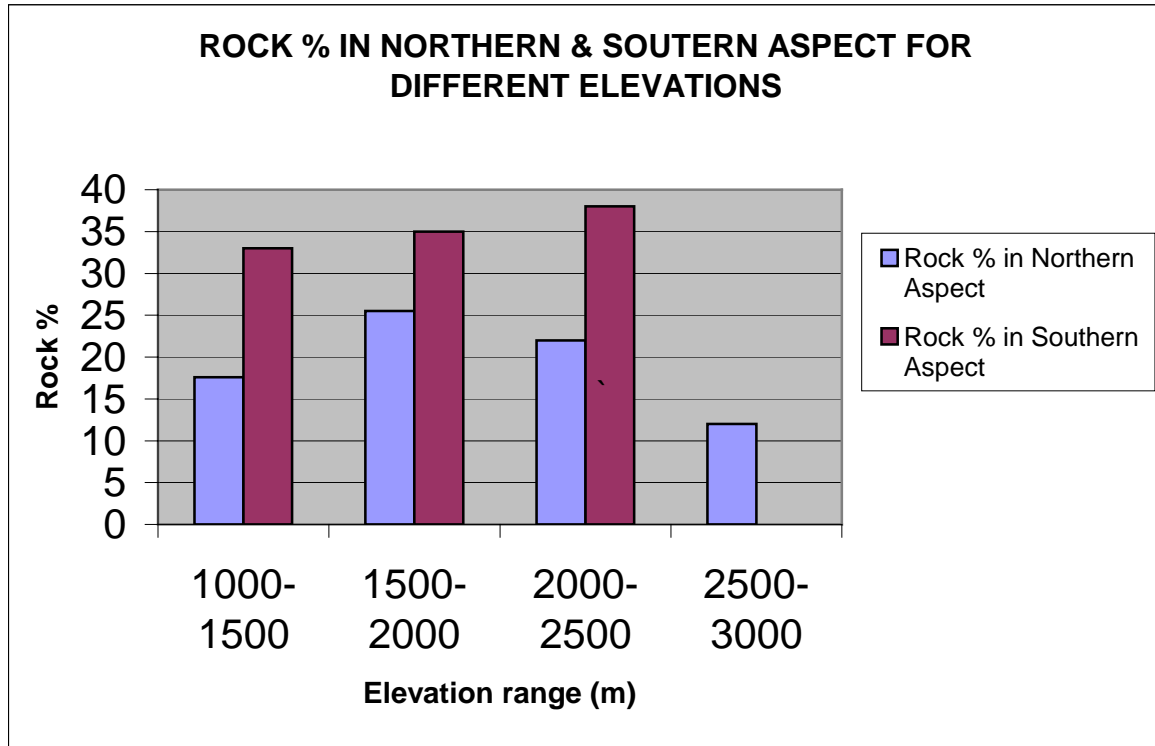
The above tables show that average cover percent on northern aspect was recorded as 70.7% compared to 55.7% on southern aspect. This cover percent include all forms of vegetation such as trees, shrubs, grasses and forbs. The average rock percent on northern and southern aspect is 19.3% and 38.0% respectively. Similarly, average bare soil percent in northern aspect is 9.55% compared to 9.07% on southern aspect. Looking to the overall situation keeping in view different vegetation type, rock and bare soil, the recorded data represents that vegetation on northern aspect is comparatively good in terms of cover percent. The presence and access of human to different aspects and elevation has greatly changed the land use pattern of the entire valley. However, in certain remote areas or areas where human influence is comparatively less have still pure patches of crops and mixed vegetation. Following table shows the difference in aggregate frequency on northern and southern aspects for different ranges of elevations in Marghuzar valley.

Table 8: Rock percent recorded in quadrates on northern aspect at different elevations

Elevation (m)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Ave cover%
1000-1500	2	2	2	10	20	20	35	20	25	40	176	17.6
1500-2000	50	40	40	50	30	15	10	5	5	10	255	25.5
2000-2500	60	10	15	30	0	5	5	30	25	40	220	22.0
2500-3000	5	15	20	5	5	20	5	5	10	30	120	12.0
Ave of total												19.3

Table 9: Rock percent recorded in quadrates on southern aspect at different elevations

Elevation (m)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Ave cover%
1000-1500	10	25	45	20	65	10	40	35	45	35	330	33.0
1500-2000	75	55	20	10	15	30	40	60	30	15	350	35
2000-2500	40	25	15	10	80	30	35	30	35	80	380	38.0
2500-3000	Data not collected as there is no southern aspect in this range of elevation in Marghuzar valley											
											Ave of total	35.33



Looking to the comparison between area covered by the rock in both aspects, it is clear that the rock percent in the northern aspect is more due to more area covered under vegetation because of more moisture content. Similarly, the presence of more households on the southern aspect could also be the reason which ultimately has pressure on various species for timber extraction, firewood collection, grass cutting and grazing.



Vegetation in the plain the slope are barrow what a phenomena after so much rehabilitation projects in the region. What the devalued system can offer.



Polices are to look through beyond timber

b) Medicinal Plants

Marghuzar is rich in medicinal plants and the importance can be imagined from the fact that still approximately 20% of population is using the indigenous herbal medicine for treatment of various diseases.

There are about 21 medicinal plants but the Local practitioner [*Tabib*] use few medicinal plants for curing practices. Due to the disruption of forest ecosystem, the medicinal plant population is decreasing at an alarming rate.

Table 10: List of Medicinal Plants

S. No	Local Name	Botanical Name	Parts used	Used for
1.	Sperkay	<i>Plectranthus rugosus</i>	Leaves	Blood coagulation
2.	Khardug	<i>Saliva moorcroftiana</i>	Leaves	Pain killer and boils
3.	Kharkhwag	<i>Verbascum thapsus</i>	Seeds	Boils
4.	Booti	<i>Ajuga bracteosa</i>	Leaves	Blood purification
5.	Banafsha	<i>Viola serpens</i>	Whole plant	Body coolness
6.	Dambara	<i>Zanthoxylum armatum</i>	Seeds	Common cold and softening of animal infected skin
7.	Karwarra	<i>Rubus fruticosus</i>	Seeds	Blood pressure
8.	Kwaray	<i>Berberis lyceum</i>	Roots	Warmness, stomach infection, strength and vitality, wounds
9.	Spero botay	<i>Daphne oleides</i>	Leaves	Stomachache and animal constipation
10.	Tarkha	<i>Coniza bunariensis</i>	Leaves	Pain killer, vaginal contraction and for gum pain
11.	Skha botay	<i>Chenopodium ambreocides</i>	Leaves	Earache
12.	Bung	<i>Canabis sativa</i>	Leaves	Pain killer
13.	Ghureja	<i>Indigofera gerardiana</i>	Roots	Stomachache and worms control
14.	Tarukay	<i>Oxalis corniculata</i>	Leaves	Digestion, removal of body Warmness and wound healing
15.	Velane	<i>Mentha longifolia</i>	Whole plant	Stomachache
16.	Zanglee botay	<i>Coniza Canadensis</i>	Leaves	Scabies
17.	Sharsham	<i>Brassica compestris</i>	Roots	Male sexual tonic
18.	Mamaikh	<i>Phoenia emodii</i>	Roots	Backache
19.	Marjarai	<i>Arissaema jacquementii</i>	Roots	Joint pain, sexual tonic
20.	Sra zela	<i>Geranium sp</i>	Rhizomes	blood purification
21.	Markhanrai	<i>Zizyphus sativa</i>	Leaves	Sugar
22.	Shnai	<i>Pistacia integerimma</i>	Bark	Hepatitis
23.	Nakhtar	<i>Pinus roxburghii</i>	Needles/leaves	Inflammation (Iaramay)

Agriculture:

In late sixties, at the time of merger of Swat state with Pakistan the total households were 478 with a total population of 3800 people in Marghuzar valley. During the last 32 years the number

of households has grown to 2480 (520% increase) with a total population of 22613 people (600% increase). The recorded increase in agriculture land is less than 1%, however in real situation including protected forest encroachment may be more than 20%. During state time the per household land availability was 8.2 hectares, while currently only 1.7 hectares cultivable land is available.

According to Revenue and census department, the area and population in Marghuzar valley is as under:

Table No 11: Population and land use data in Marghuzar valley

S.No	Name of Main village	Population	No. of HH	Cultivable land	Total area
1	Spal Bandai	2554	288	516.4	961.80
2	Kukrai/Chithor	3222	344	564.4	2638.18
3	Marghuzar	5490	599	1082.4	4773.85
4	Sher Athraf	1494	168	618.3	2126.00
5	Islampur	9853	1081	1388.2	4147.85
	Total	22613	2480	4169.7	14647.68

The above table shows the land classification and ownership boundaries of individual villages as compared with the population and number of household. The decreasing availability of land per household is converting cropping from primary to secondary activity.

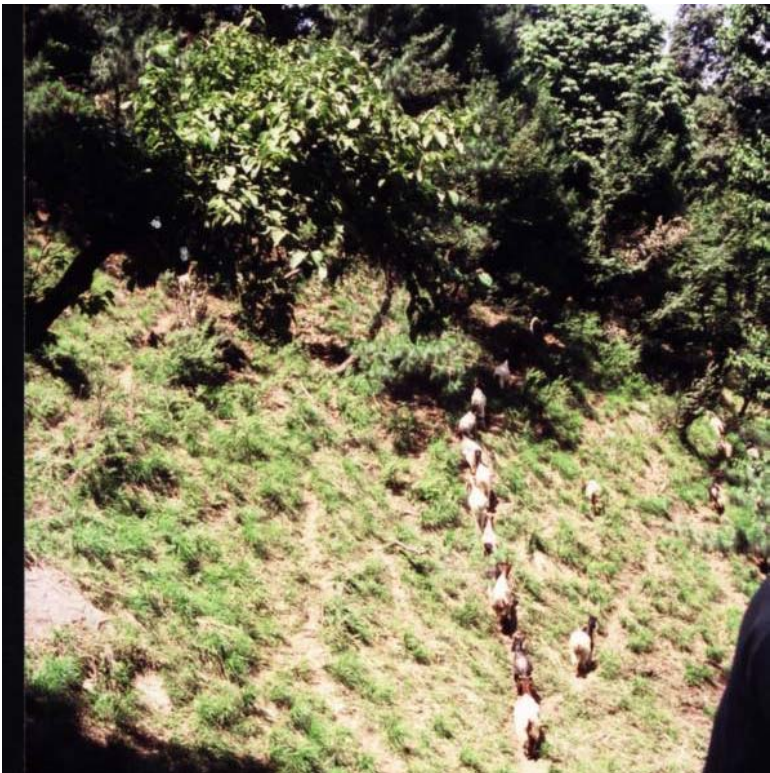
The remittances from abroad and mega cities followed by non-farm earning opportunities in the service sector are currently forming the base for family subsistence. In general production has replaced the grain production and the denuding forest has compelled the population to grow fuel trees on the field boundaries. It thus seems that the trees are shifted from hillside to valley bottom.

Generally semi traditional agricultural practices are adopted which have kept agriculture below subsistence level. As the valley has no vast plain land, mechanization of agriculture is not adopted, cropping system is mainly mono-seasonal but in some areas double cropping is practiced. Multiple cropping patterns and inter-cropping is not visible. In the upper limits, which is Barani (rain-fed) area, maize is the main crop, while in the lower valley wheat and onion are cropped in double cropping system. Rice is grown in some areas where possible. Soil fertility is degraded due to the little input of farmyard and green organic matter and the irrational use of fertilizers. Agriculture is mainly extensive and integrated, traditionally, with livestock and horticulture. Cow, buffaloes, sheep and goat are reared, only for domestic need. Apple, apricot, pears and plum are the main trees, which are traditionally grown. There is no apiculture or sericulture activities in the valley.

In nut-shell, due to the worst conditions of natural resources, mismanagement and worst conservation, the valley is unable to meet the basic food requirement of its population



Where there is protection but for how long keeping in view the present institutional arrangements



The diversity on the other side of the valley is at stake

c) Livestock:

Livestock occurred almost in every household in the valley, which include cows, buffaloes, goats and sheep. People mainly keep cow in the upper reaches with few goats or sheep, while in the main villages buffalo is the main livestock along with cow. It is astonishing that few households in the upper reaches are also keeping buffaloes. According to the information collected in the field from various key informants in the main villages and hamlets, data on livestock in Marghuzar valley is given in the following table.

Table No. 12 Livestock population in Marghuzar valley

S. #	Village/Moza	Livestock Population				
		Cattle	Buffaloes	Goat/Sheep	Others	Total
1.	Spal Bandai	225	235	157	30	647
2.	Kukrai/Chithor	370	214	500	75	1159
3.	Marghuzar	580	350	1200	250	2380
4.	Sher Athraf	130	45	700	70	945
5.	Islampur	530	270	980	420	2200
	Total	1835	1114	3537	845	7331

d) Wildlife:

The sub-tropical scrub forests scrub, chir pine forests and moist temperate forests habitats in Marghuzar valley were populated by several wildlife species until the recent past. The Grey goral, black bear, common leopard, wolf, Rhesus monkey were key mammalian fauna, while monal and koklas pheasants, grey, black and chakur partridges were key bird fauna in the valley. However recent information and observation in the valley suggests remnant population of a group of Rhesus monkeys, and occasional presence of monal pheasant. The common monkey inhabited in Jogiano Sar is threatened from the continuous illicit felling and also by the local people who catch them for sale. Koklas still inhabits some of the left over forest patches, while chakur partridges are found on exposed rocky terrains. Several bird species including black partridges, Griffon vultures, Eurasian kestrel, black drongo, red vented and white cheeked bulbuls, several species of warblers, long tailed minivets, rose finches and other small song birds are found here.

According to the Resource Management Plan for Swat Forest Range of Swat Forest Division, the status of wildlife in Marghuzar Planning Unit is as under:

Table 14: Category wise status of mammals and birds in Marghuzar valley

Category			Category			
Mammals	No	Status	Birds	No	Status	Remarks
Rhesus monkey	170	Common	Monal pheasant	76	Endangered	Nil
Black bear	5	Endangered	Koklas pheasant	46	Common	Nil
Goral	6	Threatened	Chakor	300	Common	The population of chakor in Marghuzar is sheared with Najigram.

According to a report by Habib Ahmad, 2000¹, the wild life in the valley was as under:

Table 15: Wildlife in Marghuzar valley

S.No	Scientific name	Common Name	Local Name
1	<i>Acridotheres fuscus</i>	Common myana	Karo
2	<i>Alectoris chkar</i>	Chakor	Zarka
3	<i>Corvus splendens</i>	House crow	Qargha
4	<i>Francolinus francolinus</i>	Black partridge	Taro
5	<i>Lanius schach</i>	Bay backed shrike	Teghak
6	<i>Passer domesticus</i>	House sparrow	Chanchanra
7	<i>Pycnonotus cafer</i>	Red Vented bulbul	Balbala
8	<i>Pycnonotus leucogenys</i>	White cheeded bulbul	Balbala
9	<i>Streptopelia decaocto</i>	Collared dove	Korkorai
10	<i>Turdoides caudatus</i>	Common babbler	Sourea
11	<i>Upopa epops</i>	Hoopoe	Mula Chargak
12	<i>Francolinnus pondicerianus</i>	Grey partridge	Tanzarae

Since then, no significant change has occurred in the status of the birds in the valley.

Table 16: Current status of wild life in Marghuzar valley

S. No	Common Name	Local Name	Status
1	Wild sheep (goral)	Saranai ghada	Extinct
2	Porcupine	Shkoonr	Common
3	Common leopard	Manzaray	Extinct
4	Black bear	Yagh	Rarely seen
5	Jackal	Gedarh	Fair
6	Wolf	Sharmakh	Rare
7	Hare	Soya	Fair
8	Rhesus monkey	Shado	Fair
9	Fox	Loombara	Rare

e) Social System

Two broader categories of the inhabitants can be classified as those residing in the valley bottom and those residing on hill slopes. In the valley bottom main village are sporadically scattered. The residents of the main villages include Miangan, (the main land owner), the artisans (carpenter, potters, weavers and black smith) and occasionally buffaloes rearing Gujars.

The Gujars are the subsequent hillside residents in the suburbs of the main villages. They apart from rearing livestock also lease the lands belonging to Miangan. In a few areas in the vicinity of Islampur, there are 30-40 families of Kohistani tenants residing mainly in Salim Khan Banda and Tor Kamar. The Gujars mainly depend on livestock and sale of milk and may bring wheat and rice straw from down the Swat valley for winter-feeding of their livestock. Gujars are dominant population group surpassing slightly the population of Miangan in the valley.

Sheikhan are the residents of the forest area. They mainly depend on forest and sale of timber and firewood. They keep cattle, goats and sheep. They are the primary forest exploiters. After the

¹ The natural resources and human ecology of Mount Elum of District Swat, WWF-Pakistan

exhaustion of the natural forests, only the forest trees in the vicinity of their residences are still prevailing and regeneration is taking place in areas protected and possessed by Sheikhan families. During the state time, 30-40 nomadic sheep and goat flocks used to spend their winter in the valley, but due to cropping encroachment to grazing land and protection of tree grazing lands for hay harvesting limited land is available and now while proceeding for winter pasturing to Buner. The tenants including Gujars, Shekhan and Kohistani are mostly facilitated by the ex-royal family to settle in the area, when they were in possession of most of the land in the valley and they needed tenants and watchers to guard them.

The Shaikhan, Kohistanis and Gujars have equal social status and can be termed exterior tenants traditional subordinate groups to Miangan, while the artisans are the traditional subordinates groups residing inside the main village. All the subordinate groups do inter marriages however the Miangan considering themselves socially superior refrain to establish marital relation with subordinate group in general.

9.2 Key threats to the ecosystem:

Following are the key threats to the ecosystem of the valley, which are basically outcome of the field data collection, various meetings with locals/key informants and personal observations in different ecological niches.

a) Unemployment and dependency on natural forests:

During discussions with various key informants, individual and groups of farmers, tenants and owners in different hamlets and main villages, it was found and observed that unemployment is the major threat that has compelled the inhabitants of the valley to cut forests for sustaining their livelihoods. There is no source other than the available natural forests that can supplement their livelihood. The locals residing in the foothills and mainly in the hamlets bring a head load of firewood to Marghuzar, which is a main market; in return they buy daily commodities from shopkeepers. This is a routine work for them to sustain their livelihoods and can be observed in the eastern (Islampur) and western (Marghuzar) sub watersheds of the valley. Similarly, timber is also brought to Marghuzar market, which is further transported illegally to Mingora city. Burgeoning population is one of the main reasons compelling the locals to cut these forests to sustain their livelihood, as there is no source than the existing forests.

b) Land tenure:

Land tenure is considered as one of the important impediment behind persistent degrading natural resources. After merger of Swat state with Pakistan, there emerged issue of land tenure and resource ownership. Unfortunately the issue was not settled properly at that time which resulted in ruthless cutting of forests of Marghuzar valley. Deforestation of chir pine forests and loss of allied biodiversity is the major issue since then. Court cases are under trial between members of ex Walis of Swat state and Miangan of Spal Bandai and amongst various locals residing in the valley for grant of ownership right. In this situation of gaining ownership right, the resources are ruthlessly being used without any check and control system on part of the community.

c) *Deforestation and timber smuggling:*

Deforestation of forest areas for domestic and commercial use is one of the main reasons since 1969, since merger of the ex Swat state with Pakistan. During that time, each day hundreds of logs were daily shifted to Marghuzar market. This number gradually reduced and during late nineties, 40-50 logs of size 8"x12"x6" were daily shifted to the market. At present about 5-10 logs are transported daily and are kept in secret storehouses for onward transportation to Mingora. Timber from adjacent Buner district through various routes were also transported in the past. The main focus of timber harvesting by such elements is now those areas having few patches in upper reaches of Jogiano Sar (Ilem peak), Tor Kamar and Ranzro Sar. Thousands of stumps of deodar, kail and fir can be observed in these areas. The deforested areas have been occupied by various shrub species mainly by Sperkay (*Plectranthus rugosus*), Ghwareja (*Indigofera gerardiana*) and Lathir (*Dryopteris sp.*).

d) *Free grazing:*

During vegetation survey and data collection from various key informants and livestock owners in various hamlets and at different altitudes and aspects, it was found and observed that free grazing of goat, sheep and cow in the natural forests is a common practice, which has slowed down growth of young regeneration of Chir and Kail. Among the cattle, goat is considered a dangerous animal that browses young shoots of conifer species. The locals residing in the valley mainly keep goats among the livestock. Hundreds of such browsed young plants can be observed in different parts of the valley. There is no regulation for grazing pastures on the higher altitudes and thus has resulted in failure and slow growth of regeneration.

e) *Exotic species planted in the area:*

In the valley of Marghuzar, ex Environmental Rehabilitation Project (ERP) planted Eucalyptus (Lachi) and Rubinia (Kikar) in the area of Islampur as per following detail:

Table 12: ERP Project Plantation in Islampur

Year	Area (acres)
1996-1997	459
1997-1989	500
1989-1999	205
Total	1164

This trend of planting exotic species is against the ecological requirements of the area and must be discouraged. Trees like Rubinia, Poplar, Ailanthus and Melia should be encourage in the peripheries of the agricultural field to meet the local fuel wood requirements thereby reducing pressure on the natural forests.

f) *Lack of participatory NRM approach by forest department:*

The Forest Department is inclined towards traditional policing role, which has resulted in loss of forest cover. Participation to great extent ensures confidence among various stakeholders in protection and controlled use of natural resources and give sense of sharing of responsibilities and ownership of the resource, which ultimately leads toward sustainability in utilization of the natural resources.

g) *Lack of awareness raising and no development initiatives:*

During various discussions with individual farmers, tenants and group of farmers it was found that awareness is lacking among the local community with the fact that since they are the main stakeholders of the area and can be affectees or beneficiaries of the degradation or rehabilitation of all the available natural resources in the area. Therefore, they should realize and take into consideration the controlled use of the resources for their sustainable livelihood. Being one the prime stakeholders dealing these forests, the Forest Department under the current scenario where restructuring have been done and institutional reforms introduced, should act and play due role to give momentum to the participatory natural resource management. Marghuzar valley being unfortunate in the sense that no developmental projects with NRM related interventions have ever undertaken. This may also be considered as one of the reasons for lacking awareness among the community in conservation of the natural resources in the valley.

h) *Encroachment in Protected Forests:*

Access of man to each and every nook and corner of the valley has greatly changed the land use pattern of the valley. The pure patches of chir, kail, oak and mixed crop at various ecological zones have been changed and now giving a picture of sparse vegetation occupied by various shrubs. Conversion of forestland into agricultural fields and construction of houses on such land is the major issue for the forest department to coup with. Since implementation work on demarcation of forest areas (Protected Forests) in the valley is in progress, therefore, during interview with various key informants and with those residing in the forest areas, it was revealed that 25-30 percent of the locals have made encroachment in the forest areas either by construction of houses or conversion of forest land into terraced agriculture field or both. They are living in these forests for the last 3-4 decades and some of them are living even more than this. These people keep large number of livestock and enjoying grass cutting, grazing and cutting forests for firewood and timber. Those people who have occupied and entered into the forestland are now facing an uncertain situation about future of their houses they have constructed and the land they have brought under terraced agriculture. Various encroachment cases are under trial in the local courts and decisions in this regard are awaited.

i) *Insufficient number of field staff of the Forest and Wildlife Departments:*

During vegetation survey of the valley, it was found that there is only one Forester and two Forest Guards for 18 compartments in Marghuzar Forest Block to look after its protection and management. These compartments are covering an area of 3229 hectares and have difficult terrain condition, which consist of

moderate to steep slopes and have scattered households on different elevations and aspects. It is therefore, extremely difficult for a single person to look after more than 1000 hectare of forests in a mountain environment. Further the staff is not local of the Marghuzar valley which further aggravates the situation.

j) *Lacking implementation on the prescriptions made under Resource Management Plan:*

The prescriptions and recommendations as mentioned in the resource management plan for Swat Forest Range of which Marghuzar is one of the main (forest) block has not been fully implemented. As for instance, the Marghuzar valley (Marghuzar Forest Block) comprises of 18 compartments which starts from compartment 1 near Kukrai on the west of Marghuzar khwar and ends on compartment 18 near Islampur on the east of the Marghuzar khwar. According to Resource Management Plan for Swat Forest Range of Swat Forest Division, detail of various compartments that fall in different working circles is as under:

Table 13: Compartment under different working circles

Compt. No.	Area (ha)	Working Circle
1	135	Community-Use Working Circle
2	146	Conservation Working Circle
3	189	-do-
4	136	Conservation Working Circle
5	219	Tourism Working Circle
6	246	-do-
7	190	Conservation Working Circle
8	293	-do-
9	220	Community-Use Working Circle
10	125	-do-
11	178	Tourism Working Circle
12	251	-do-
13	206	Community-Use Working Circle
14	167	-do-
15	152	-do-
16	155	-do-
17	93	-do-
18	128	Conservation Working Circle
Total	3229	

There are six compartments that fall in conservation working circle and accordingly preservation works like afforestation, check damming, protection of regeneration etc. has to take place, but no such interventions have made in these compartments except 70 acres recent plantation (March-April, 2004) which has been done in compartment No. 5 and 6 only. Similarly compartments falls under tourism working circle needs to be developed for promotion of tourism but no such activities seems to have been conducted in these compartments.

j) *Non filling of compartment history files:*

Compartment history file is an important tool of forest management which provide all details of compartment and keep the incharge forester updated about the situation of the forests. Like for instance, the history file provide general information about the compartment such as its area, crop composition and condition, boundaries, slopes, aspects and altitudes. Beside these, it also provides important information about rights and concessions, give detail about felling, thinning and other miscellaneous yields. Moreover, it presents social profile and any damage such as forest fire or detail of area burnt/damaged due to fire etc. In short, compartment history file is an important tool which provide to forester detailed overview of natural resources of the forests in particular and its social profile in general. In light of that, various management options can be suggested and actions taken according to the circumstances and issues/problems can be brought into notice of the high ups of the department.

It is amazing that beside an obligation for the incharge field staff to keep record and update the history files, not a single compartment history file has so far been made updated. That is why there has always been encroachment where the locals have either converted the forestland into agriculture or constructed houses or both. Above all there is no record of hundreds of acres clear cut and latter burnt below the Jugiono Sar in 2001. The burnt area with trees is still there without any attention and entries in the compartment history files. If such a large damage went unnoticed, then who would have cared about smaller damages.

9.3 Local community perception about conservation of natural resources:

Meetings were held with communities/social groups, directly related to the forestland and with the Union Council, Islampur to institutionalize the process and to know the collective perception of the community and its representatives about protection and conservation of available natural resources.

Meeting with District Nazim, Forest Department, Union Council's Nazim, Naib-Nazim and Counselors were held to know the perception of relevant institutions in this connection. PRA was held in different villages of the valley to know the local community perception about the conservation of the ecosystem, keeping in view their dependency on the resource base.

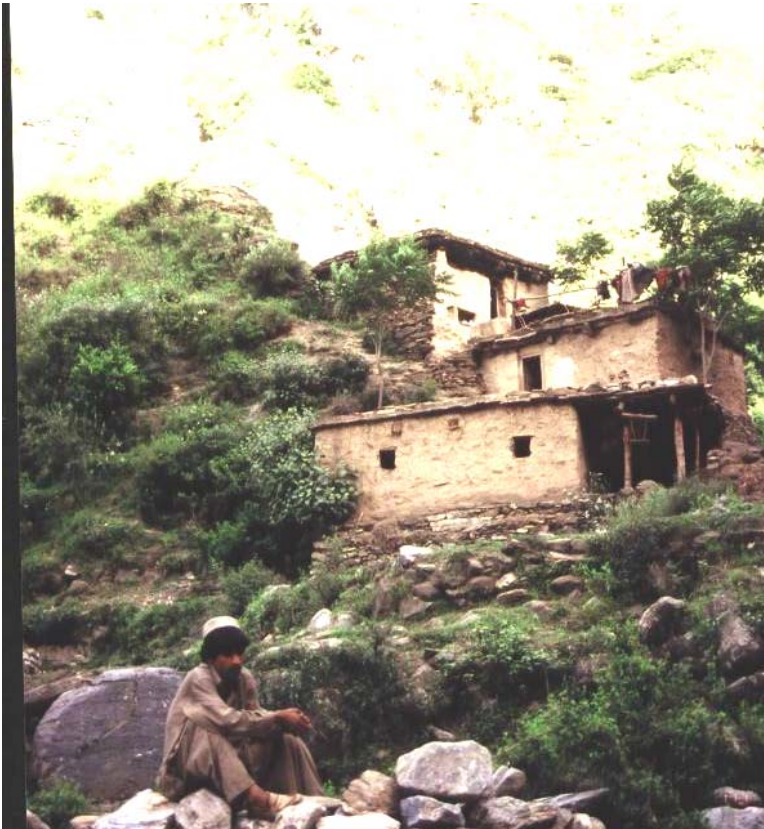
As a result of various meetings with the locals in different ecological niches during data collection and vegetation survey, following are the perceptions of the locals about conservation and protection of natural resource in the valley.

- i) Almost every inhabitant have realized that natural resources of Marghuzar valley are degrading and will diminish in the near future, if this pace of deforestation continues. But beside this they are of the view that there is no source of income other than the available forests, which for majority of the locals serve as the only source for sustaining their livelihoods.

- ii) According to perception of the local community, once a tree is cut either under proper marking as prescribed in the working plan or illegally by some one, role of the department is then over in that very area because there is no tree at all now. The locals think that role of field staff of the department is restricted to lodging reports about damages to forested areas from encroachment for agricultural fields and construction of houses.
- iii) Informal interview with the locals residing in the main villages and inhabitants of the hamlets suggested that these forests could be improved if government provide job opportunities to the locals and initiate developmental project that should focus on poverty alleviation and provide some alternate arrangements to divert the pressure on forests. The proposed project in context of conservation of natural resources and rehabilitation of the area should include plantation on blank areas, protection of natural regeneration and establishment of fruit and forest nurseries. Few of the households in the hamlets also demanded that provision of electricity would also reduce pressure on forests.
- iv) The locals residing in the foothills in particular and those residing in the hamlets and upper reaches in general have demanded for supply of fast growing trees to plant them in blank areas surrounding their houses and in peripheries of their agricultural fields and such other blank areas. As according to them this can greatly supplement their firewood requirements and will reduce pressure on natural forests and will also save their time as the firewood requirement can be met from near their houses.
- v) It was also revealed by some of the locals that staff of forest department is not dutiful and are not visiting forests to check the damages and control the situation.
- vi) During discussions with various people, it was pointed out that provision of training in apiculture, livestock, agriculture and nursery raising will not only improve skills in these fields but will also provide job opportunities to the locals which will result in reducing pressure on these forests.
- vii) It is encouraging that regeneration and sub mature to mature trees of chir and kail are growing around habitations where locals have protected these for meeting their firewood and timber requirements. Despite the fact that the locals residing in various parts of the valley are not the owners or royalty holders of these forests but they know that protection of such regeneration and trees will be used by them in future. This trend can be observed in various parts of the valley.



Mother of future but need clean and healthy environment for their off springs in harmony with nature.



Rural Habitat - Natural Resources Management with human use is the beauty in appropriate manner through participation of all visible.

10. Targets/objectives not achieved and reasons thereof:

GIS mapping (Being too expensive)

11. Conclusions and recommendations:

Based on the findings of the project, it is imperative to develop a participatory forest conservation program for the Marghuzar Valley, wherein all key stakeholders have an effective and equal say. To be able get to implementation of some participatory action plan and joint forest management, the HUIJA recommends the following to be addressed on priority basis:

1. Consultative process:

Since there are various social and technical issues related to natural resources of the valley, therefore to achieve the overall objectives of sustainable participatory natural resource management, the process require continuous interactions with all stakeholders which include the local community, Forests, Wildlife and Livestock departments, local government, local NGOs etc.

2. Settlement and resolution of land disputes:

Land tenure and ownership disputes have played key role in deforestation of the valley. There is need for resolving existing conflicts over the subject. This is key to designing any conservation or development program. This may require legislation in the provincial assembly.

3. Land use planning and Zoning:

In the past, there has been no regard for any land use patterns. The local community brought land under the use according to their needs, wish and desire. This played a havoc to the ecosystem, as ultimately agriculture and settlements extended to forested areas, henceforth, resulting in mass scale deforestation. There is a need to develop a land use plan that also delineates various land use zones. Without well-defined land use planning and zoning in the area, any NRM related efforts in the valley would face potential threats of conversion to other land uses than forested cover.

4. Tourism promotion and development:

Marghuzar being located near to the urban center, is easily accessible. Therefore, thousands of tourists from Swat, other cities of Pakistan and even abroad visit the valley. However, the only exposed spot in the Valley is the White Palace Hotel and its environs. There is potential for hiking, trekking and mountaineering in addition to sight seeing, and enjoying mild summers. The valley needs exposure and accessibility to its remote areas. It is recommended highly to promote the tourism potential of the valley through brochures, posters, and articles.

5. Energy plantation:

Because of the burgeoning population pressure on the existing natural forests for firewood and timber extraction, there is need to raise awareness among the locals for establishing energy plantations on marginal and sub marginal lands so that local requirement is met from within the local area.

6. Skill development in alternate income generation:

Capacity building of local community in various income generation activities would help divert pressure on natural forests. This would require attention by doing the following interventions:

- *Fruits and fuel wood from pastoral land*
- *Apiculture, sericulture and kitchen gardening etc.*
- *Forests and fruit nursery raising techniques*
- *Value addition to various products for catching high price*
- *Micro enterprise development etc.*

7. *Capacity building of the local government system:*

Capacity building of local representatives in farm forestry practices, environmental awareness and participatory/joint forest management need to be provided. This would not only make them aware about the existing degradation and its ill consequences but would prove helpful in participatory/joint forest management and would also realize their role in sustainable natural resource management and conservation.

8. *Fuel efficient technology (energy stoves):*

The existing natural forests serve as a main source for firewood consumption, therefore there is need to provide energy conservation stoves to the local community. It would be better to demonstrate such stoves to the females of the valley so that awareness and relish for its adoption is developed.

9. *Livestock husbandry and grazing management:*

Livestock being the main source of income for subsistence livelihoods for majority of the locals in Marghuzar valley. Fodder requirements for these livestock from the available grazing lands and pastures in various sub valleys play important role. The existing free grazing system needs regulation by involvement of local community so that there remained sustainability in provision of palatable grass species and also ecology of the valley is not disturbed.

10. *Health and hygiene development:*

The local communities being living illusive and remote have little exposure to needs for living hygienic and keeping healthy environment. There is a need to raise awareness of the local community on it. The local community suffers from various diseases, including lungs and breathing disorders resulting in cough and ultimately tuberculosis. A clean household environment may be an answer to it that could be achieved through small changes in their lifestyle. To be able make this change; there is need for awareness raising and demonstration of model.

11. *Promotion of joint/participatory forest and wildlife management:*

The Forest Department has been restructured and institutional reforms introduced. Legal coverage has been given for joint forest management and participatory land use planning. There is need to ensure real participation of the local community in planning and implementation of interventions for promotion and development of forests and wildlife in the valley.

12. *Awareness raising:*

As there is lacking awareness amongst the local community for natural resource management, so need is to help them realize importance of sustainable and control use of the existing natural resources of the valley.



There is a lot to improve to explore exploratory colures of exploration for modified.



The landscape offers a lot for tourism. Strict frameworks are no more valid.

12. Outputs: Reports, media, articles, slides, photographs etc.

All slides, photographs are available with HUIRA.

13. Equipment status report:

GPS purchased under the project is available. In addition the camping equipment procured for the use of the project is also available with HUIRA.