A COMPARATIVE STUDY OF HAZARA FOREST COMMUNITIES IN PAKISTAN: A SYSTEM DYNAMICS APPROACH

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RESEARCH QUESTION AND OBJECTIVE

- How qualitative variables would be incorporated to identify the forest management strength and weaknesses.
- To describe the current management trends of forest resources at community’s level and to incorporate the preferences of the community to identify the main obstacles in forest management and major drivers of deforestation.
- To suggest some area specific policy guidelines for effective collaborative forest management.
What is going on in managing forest resources?

Factors Contributing to growth

Factors affecting growth

Better Forest Management

Poor Forest Management

Forest decline
The communities have high level of awareness and knowledge of deforestation but lack directional forest management practices.
Khyber Pakhtunkhwa (KP) formerly known as North West Frontier Province (NWFP), Area of KP 74521 km$^2$ (9.36% of the country)

Population 27.167 m (14.74% of the country’s population) with 2.82% population growth rate, third largest province of Pakistan by the size of both population and economy. It comprises 10.5% of Pakistan's economy.

Forest cover in KP is estimated at 20.3 percent – higher than the national average of 5 percent and even far higher than the Millennium Development Goal of 6%.

Range resources cover more than 45.1% of the total area of the country. Rangelands and pastures constitute about 48 percent of the land area in the province.
Protected areas cover 12.38 percent of the land area of KP.

Hazara is one of the seven divisions of the province and has 26 districts.

District Abbottabad has 10\textsuperscript{th} position with respect to area and population wise its ranking is 7\textsuperscript{th} in the province. Mansehra has 5\textsuperscript{th} in area and 4\textsuperscript{th} in population wise ranking of the province.

The annual rate of deforestation 27,000 ha.

National Conservation Strategy (1992) reported deforestation of 7,000 to 9,000 ha per annum resulting in annual decline of 0.2\% forest cover in the 1980s.

FAO reported deforestation of 39,000 ha per year in the 1990s in Pakistan (FAO, 2009).
FOREST AREAS IN PAKISTAN (M. HA)

Forest area of Pakistan (m ha)

- KP
- Punjab
- Sindh
- Baluchistan
- Gilgit/Baltistan
- AJK
- FATA/FR
- Islamabad
- Total

Forest area (m ha)
FOREST AREAS (% OF LAND AREA)

Forest area as % of the Land area

% of land area

Kp, Punjab, Sindh, Baluchistan, Gilgit/Baltistan, AJK, FATA/FR, Islamabad, Total

% of Land area
Hazara Division forests are 55% of the provincial forests.
WOOD CONSUMPTION, POPULATION GROWTH AND LAND USE IN THE STUDY AREA (2010-11)

- Per capita wood consumption in Pak. .285 m³
- Per capita wood consumption KPK 0.35 m³
- Population of District Abbottabad 1.2 m and population growth rate 1.82 %
- Population of District Mansehra 1.56 m and population growth rate 2.4%

- Total Forest area KPK 1.508 m ha. (20.3% of its land area)
- Forest area Dis. Abbot 0.067173 m ha. (37 % of its land area)
- Forest area Dis. Mans. 0.149454 m ha. (36% of its land area)
- Agri. area of Dis. Abbot 0.023419 m ha. (13 % of its land area)
- Agri. area of Dis. Mans. 0.061145 m ha. (14.8 % of its land area)
- Built up area Dis. Abbot 0.002991 m ha. (1.7 % of its land area)
- Built up area Dis. Mans. 0.001676 m ha. (0.4 % of its land area)
Participatory forest management projects have been implemented since 1980s

- The Forestry Sector Project (FSP) in Pakistan by Asian Development Bank in 1996- played a pioneering role for participatory forest management in the area.
Retrieve information from their real life practices.

Incorporates their choices and preferences.

A sample of 200 families living in two districts of Khyber Pakhtunkhwa Province, a forest rich area of the country has taken on random basis, living within the range of 0-10 Km from the forests.
Model architecture is developed by two sets of models;

Model A
a) Wood consumption and
b) Land use in the study area

Model B
Qualitative variables identified by the community.

Effectiveness Test, the results of model B are compiled and data points are taken as; for positive role “Yes” with value “1” and for no progress “NO” with value “0” is incorporated. For a medium progress the value 0.5 is assigned.

The validity of the model
PART A - MODEL A - LAND USE

Growth rate in agri Man
Growth rate in agri Abot
Change in ag land
Ag land
Change in ag land
Growth rate in Forest Man
Growth rate in Forest Abot
Change in Forest land
Forest land
Change in Forest land
Space available?
Other land class
Change in Other land class
Growth rate in range Man
Growth rate in range Abot
Change in Range land
Range land
Change in Range land
Built up
Growth rate in Built up Man
Growth rate in Built up Abot
Change in Built up
Built up
Forest area is growing.
Agriculture area is not expanding at higher rate because most of the people depend on other sources of income.
Built up area is increasing in the study area.

There is no control on the expansion of built up area.
Rangeland area is more than 48% of the land area of the province and it is growing further.
The rate of growth in wood consumption in District Abbottabad is more than the other district. Overall wood consumption in the province is increasing because of shortage in fuel wood substitutes.
MODEL
PART B
COMMUNITY’S FOREST MANAGEMENT PRACTICES
Institutions are weak, their role is becoming further weakened.
Overall, factors contributing to better management are not improving.

Management weakness is higher than strength showing poor forest management.
VALIDITY OF THE MODEL

- The studies conducted in the same area from 2000 to 2012, have been selected.
- The common variables have been selected for comparison.
- The Likert Scale taken from different studies has been made uniform for comparison. In some studies likert scale 0-5 represents from low effect to high but in another study it goes up from 0-5 showing “very difficult” to “Normal”.
HIGH PERCENTAGE SHOWS HIGH LEVEL OF USE.
Model Validity

Role of Institutions

Scale showing role from low to high level

- Local community’s role
- Forest Department role
- NGOs role
- Local Jirga’s role
- Institutional Access
- Trust for NGOs
- Trust for FD

- Units from Literature
- Units from Models
EFFECTIVENESS TEST FOR FOREST MANAGEMENT PRACTICES IN THE STUDY AREA
EFFECTIVENESS TEST FOR FOREST MANAGEMENT PRACTICES IN THE STUDY AREA

Graph showing Overall Progress of the Community Based Model

Scores

-4 -3 -2 -1 0 1 2 3

Current Practice Missing Information Information Reliability Total progress

Model Variables
EFFECTIVENESS TEST FOR FOREST MANAGEMENT PRACTICES IN THE STUDY AREA

Shahbaz, Ali and Suleri (2011) also mentioned that the perceived usefulness of the forest project for forest management in the area is low; environmental usefulness is very low, socio-cultural usefulness is low and economic usefulness is average.
Results

- Institutions are weak in playing effective role in forest management. Permit system to cut trees from forest is exercised by very small number of people.
- Wood growth in the area is lower than wood use. However wood is used as fuel wood and for construction of houses- not for selling in the market. People are relying on income other than forest resources.
- Wood consumption is increasing because of non-availability of affordable fuel wood substitutes.
- Role and trust for Forest Department, and NGOs in the area is low as compare to community institute. Forest resources are heavily exploited in the hands of timber criminals, who are, according to community the political elite, government officials and local influential people.
RESULTS

- There is no land use policy; land conversion is going on. However the conversion is checked by some social elements; land as joint property, ownership of farmlands and cultivated land.
- Model is proved valid in the light of studies conducted in the same area, however the structure of forest management is not effective as shown in the effectiveness criteria presented by the present research- supported by other studies.
System dynamic modeling is a powerful tool to accommodate and simulate qualitative variables in environmental management.

Participatory forest management is an effective tool to address forest management issues. However the role and responsibilities of forest department and communities are not properly defined in Pakistan.

There is lack of directional forest management resulting in ad hoc based practices by forest community

The Forest Department should act as facilitator not competitor with the community.