A Comparative Study of Hazara Forest Communities in Pakistan: A System Dynamics Approach

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Pakistan
Provincial Map
United Nations Pakistan
Department of Safety & Security
Tajikistan
China
India
Iran
Afghanistan
IAK
KP
Gilgit-Balistan
Federal Capital
PAK
FATA
Punjab
Sindh
Balochistan
Chitral
Ghizar
Hunza-Nagar
Gilgit
Diamir
Skardu
Ghanche
Astore
Neelum
Bajaur Agency
Mohmand Agency
Peshawar
Mardan
Swabi
Haripur
Abbottabad
Muzaffarabad
Khyber Agency
Kurram Agency
Hangu
Kohat
Attock
Rawalpindi
Mirpur
Chakwal
Jhelum
Gujrat
North Waziristan Agency
Bannu
Karak
Mianwali
FR Tank
Lakki Marwat
South Waziristan Agency
Tank
Khushab
Sargodha
Mandi Bahauddin
Sialkot
Gujranwala
Narowal
Hafizabad
Sheikhupura
Lahore
Nankana Sahib
Kasur
Okara
Sahiwal
Pakpattan
Vehari
Multan
Lodhran
Bahawalnagar
Bahawalpur
Rahim Yar Khan
Rajanpur
Dera Ghazi Khan
Layyah
Muzaffargarh
Khanewal
Jhang
Toba Tek Singh
Faisalabad
Chinniot
Bhakkar
Dera Ismail Khan
Zhob
Qilla Saifullah
Musa Khel
Sherani
Qilla Abdullah
Pishin
Ziarat
Loralai
Hamai
Quetta
Barkhan
Mastung
Sibi
Kohlu
Nushki
Kalat
Kachi
Dera Bugti
Chaghi
Kharan
Nasirabad
Jhal Magsi
Jaffarabad
Jacobabad
Kashmore
Shikarpur
Ghotki
Washuk
Qambar & Shahdad Kot
Larkana
Sukkur
Khuzdar
Naushero Feroze
Dadu
Khairpur
Panjgur
S.Benazirabad
Awaran
Sanghar
Kech
Lasbela
Jamshoro
Matiari
Tando Allah Yar
Umer Kot
Gwadar
Hyderabad
Mirpur Khas
Karachi
Tando Muhammad Khan
Badin
Tharparkar
Thatta
130 65 0 130 260 390 520
Kilometers
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Legend
Provinces
Balochistan
FATA
Federal Capital
Gilgit-Balistan
KP
PAK
Punjab
Sindh
Districts
Asia
Sea

CONTENTS

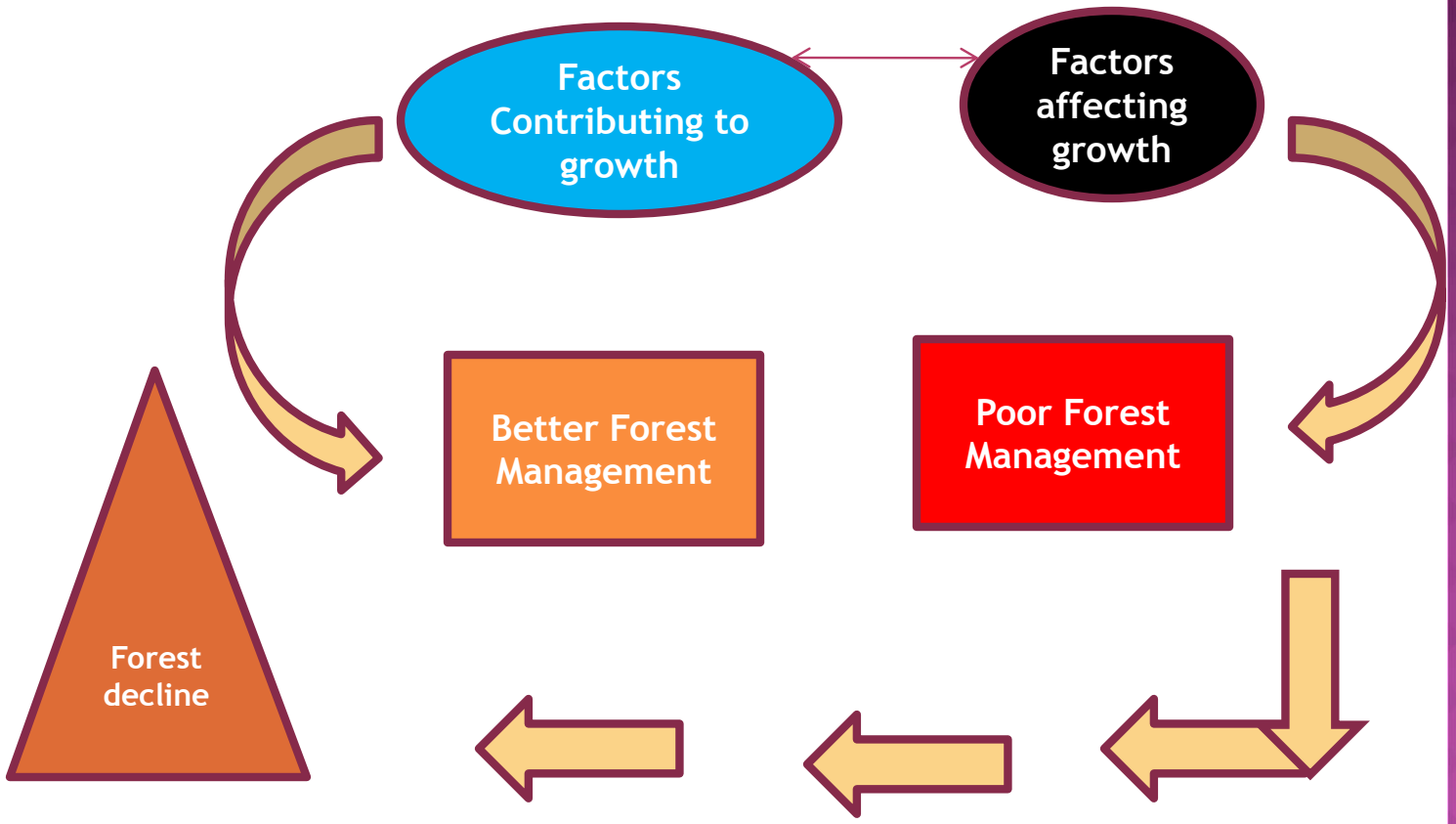
- Research Question and Objectives
- Hypotheses
- Methodology
- Causal Loop Diagram
- Models
- Model Validation
- Model Effectiveness
- Results and Conclusion

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.

FOREST MANAGEMENT BY COMMUNITY

What is going on in managing forest resources?



HYPOTHESES

- The communities have high level of awareness and knowledge of deforestation but lack directional forest management practices.

METHODOLOGY

STUDY AREA

- 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.

METHODOLOGY

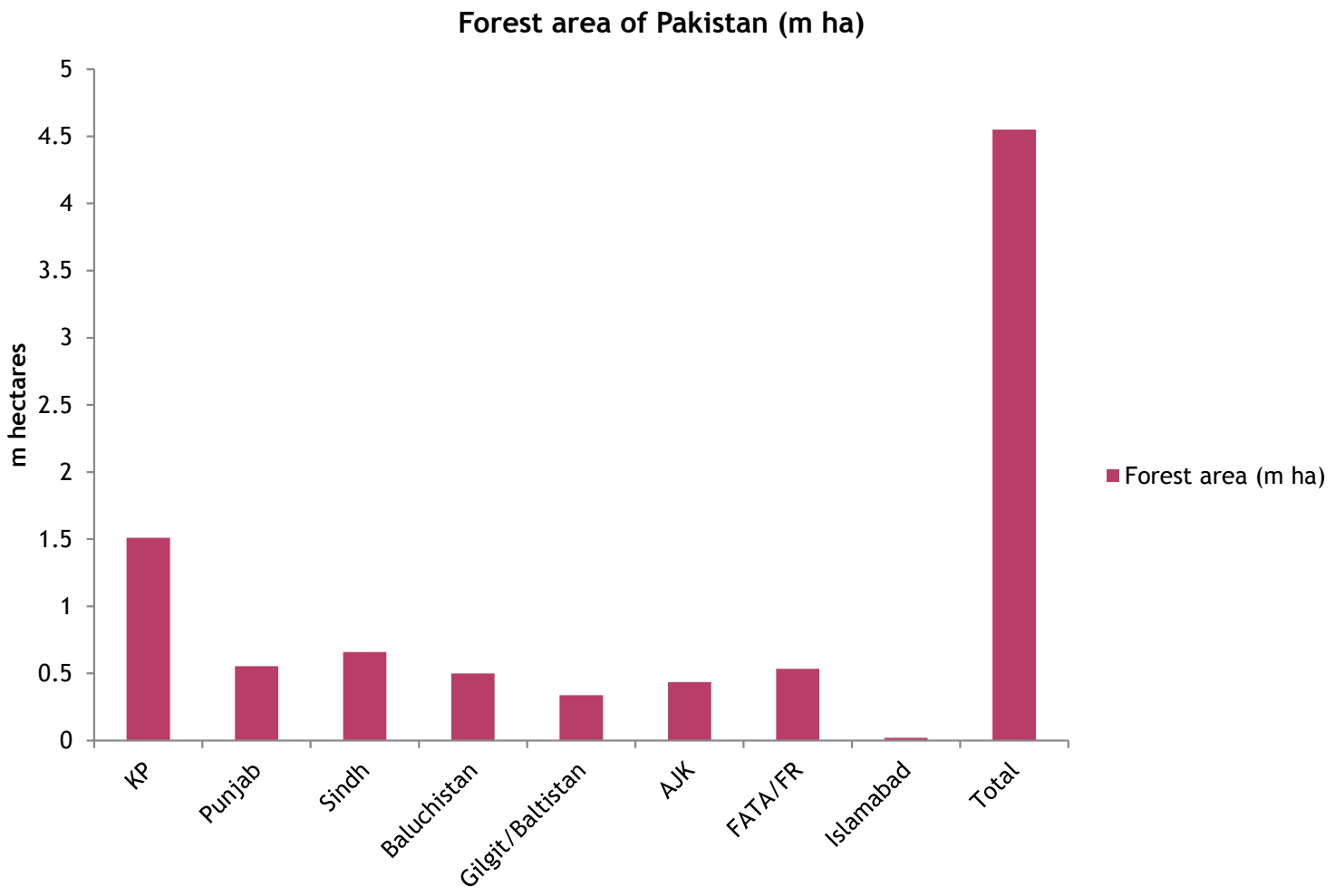
STUDY AREA

- 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.

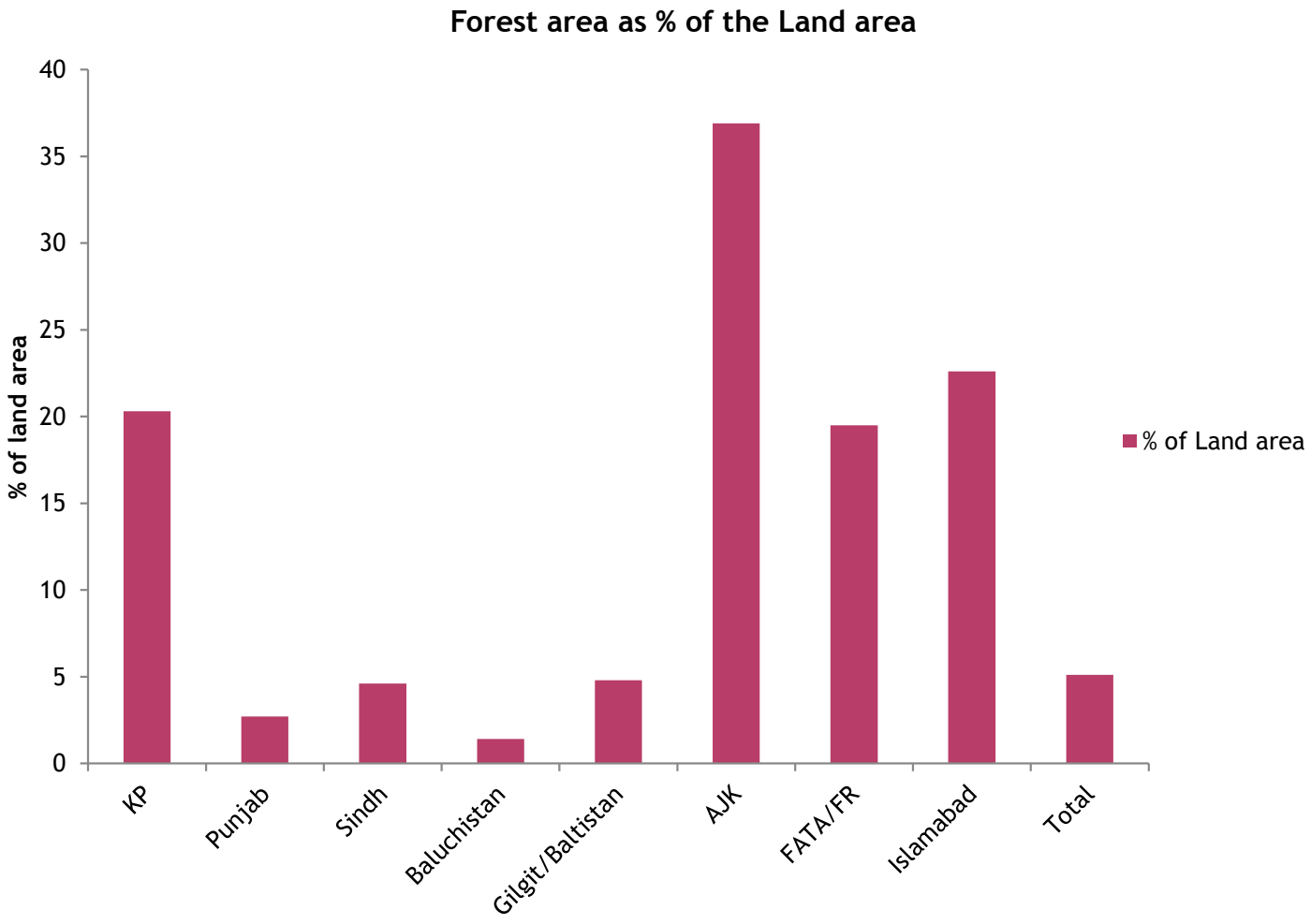
- District Abbottabad has 10th position with respect to area and population wise its ranking is 7th in the province. Mansehra has 5th in area and 4th in population wise ranking of the province.

- 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).

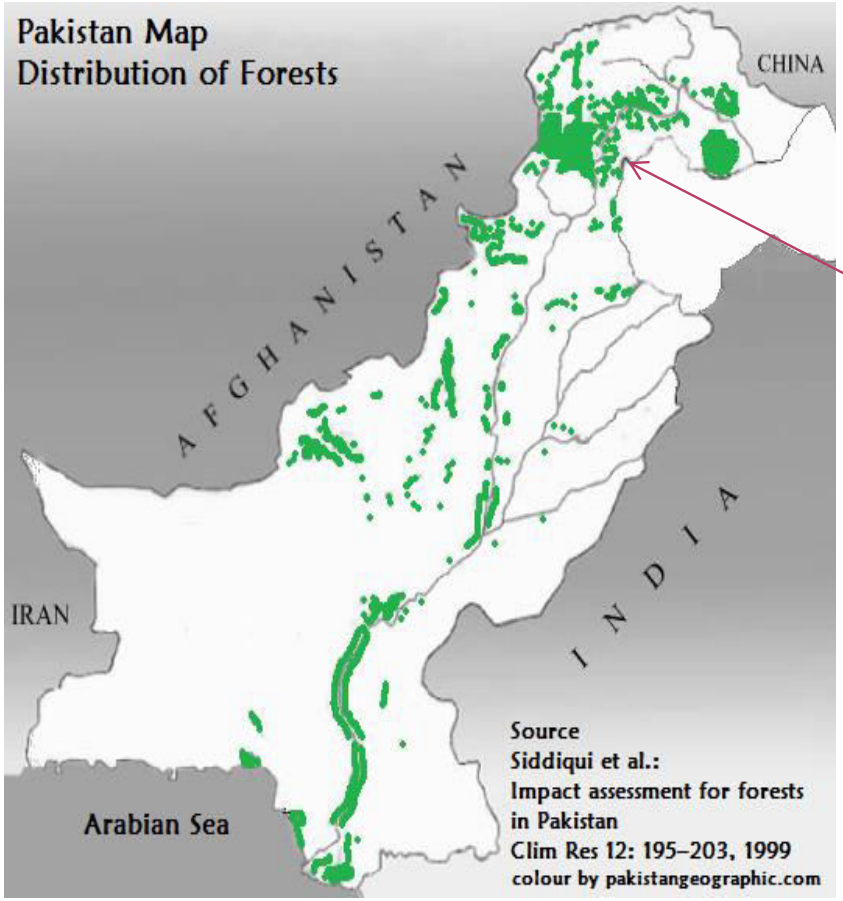
FOREST AREAS IN PAKISTAN (M. HA)



FOREST AREAS (% OF LAND AREA)



STUDY AREA



- Hazara Division forests are 55% of the provincial forests

Forests study area

WOOD CONSUMPTION, POPULATION GROWTH AND LAND USE IN THE STUDY AREA (2010-11)

- Per capita wood consumption in Pak. .285 m^3
- Per capita wood consumption KPK 0.35 m^3
- 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

- 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

PEACEMAKING

METHODOLOGY CONTINUED...

- 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.

METHODOLOGY CONTINUED…

- Model architecture is developed by two sets of models;

Model A

a) Wood consumption and

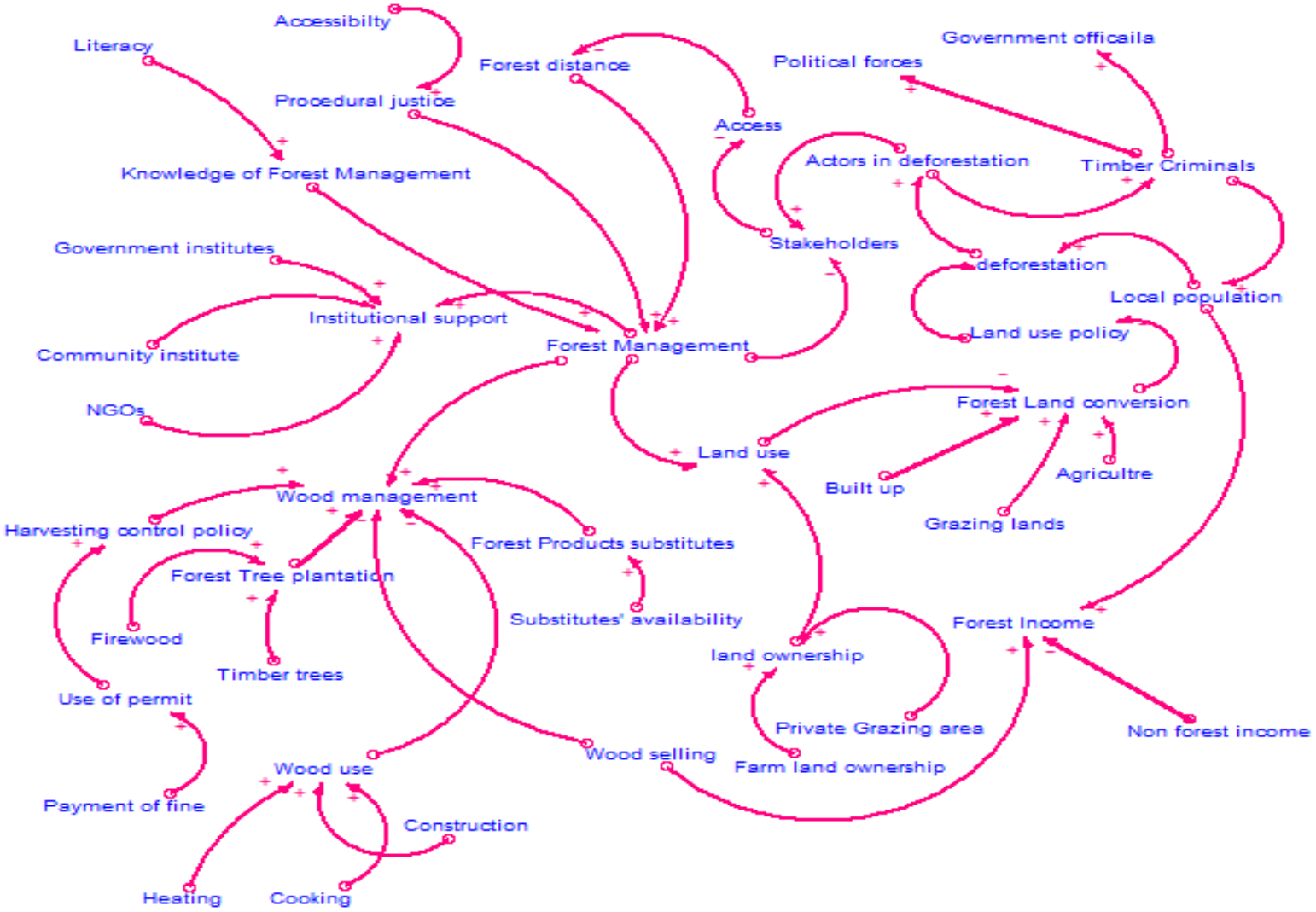
b) Land use in the study area

Model B

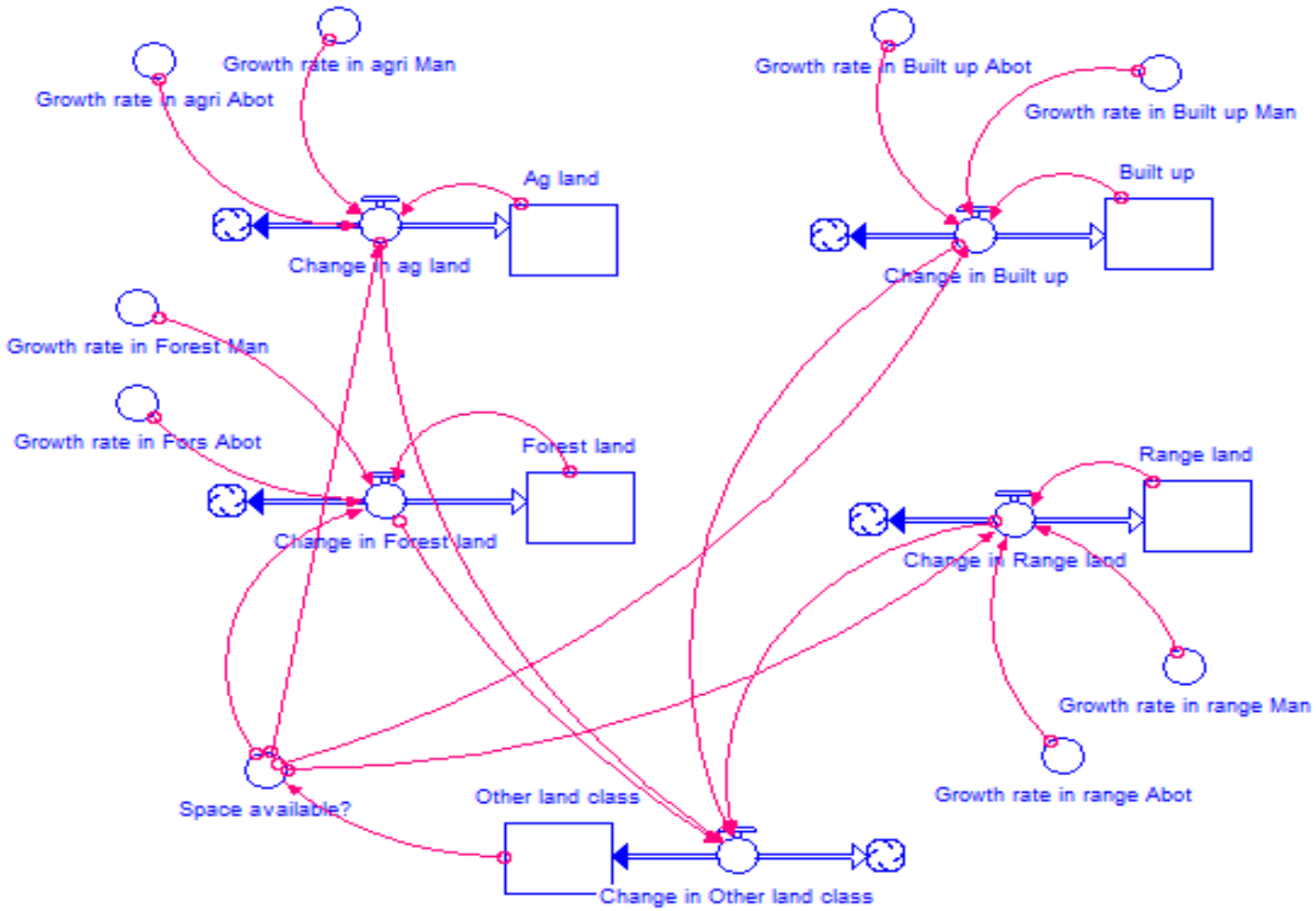
Qualitative variables identified by the community.

- 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

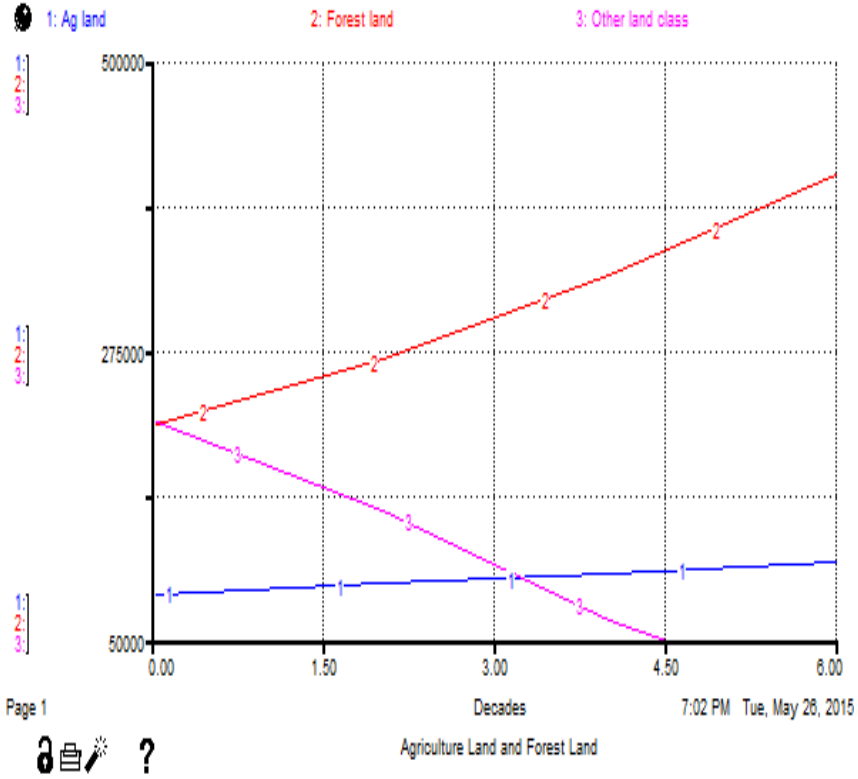
CAUSAL LOOP DIAGRAM



PART A- MODEL A- LAND USE

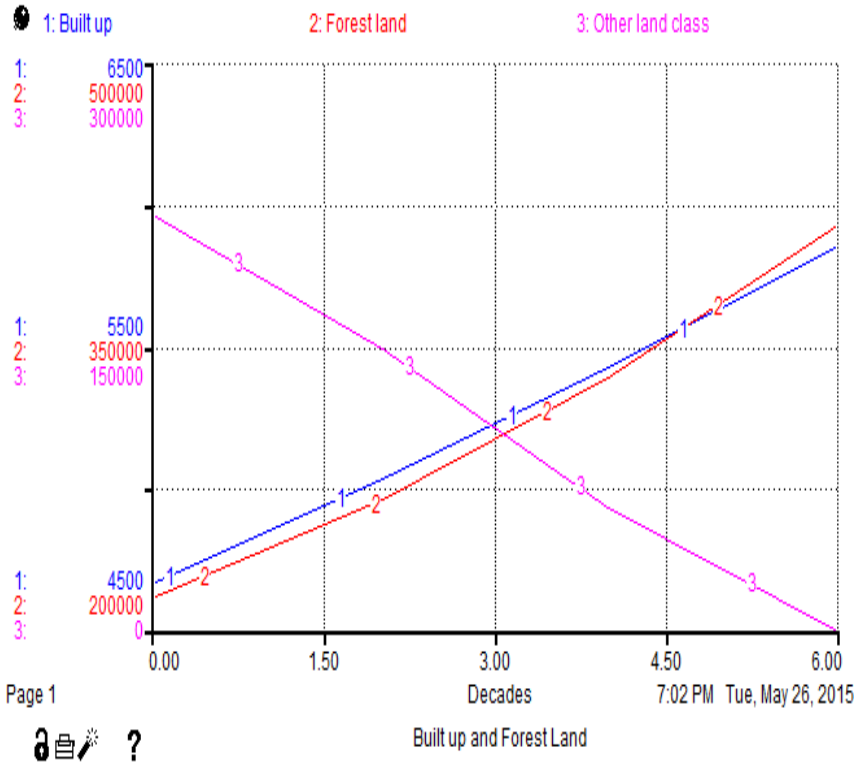


AGRICULTURAL LAND AND FOREST LAND



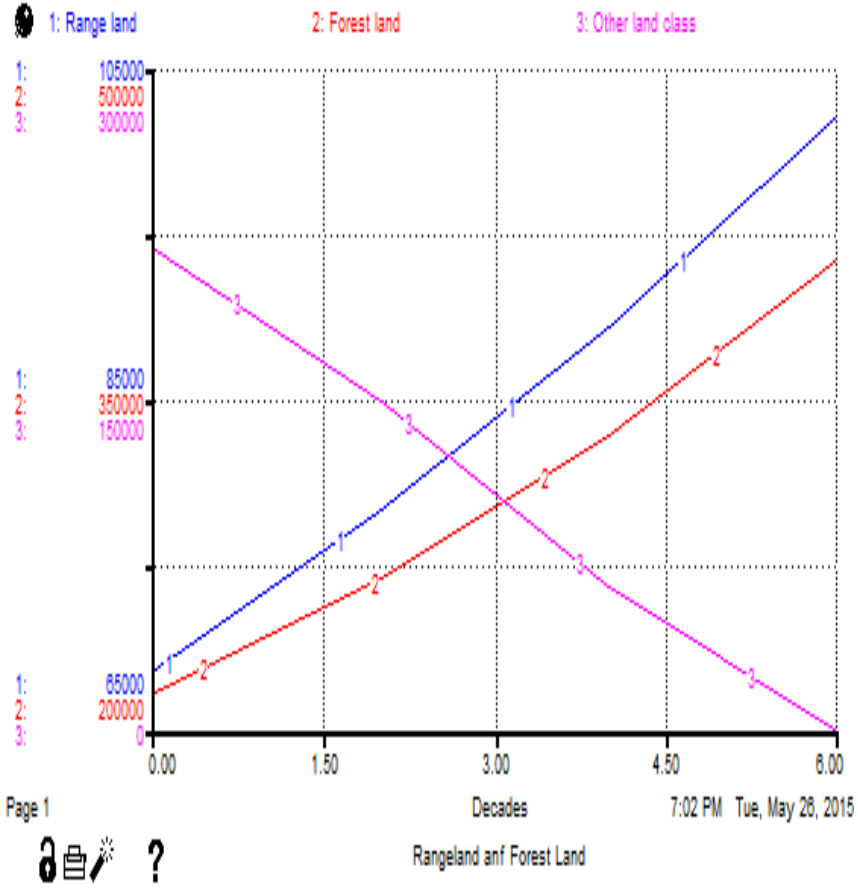
- Forest area is growing.
- Agriculture area is not expanding at higher rate because most of the people depend on other sources of income.

BUILT UP AREA AND FOREST LAND



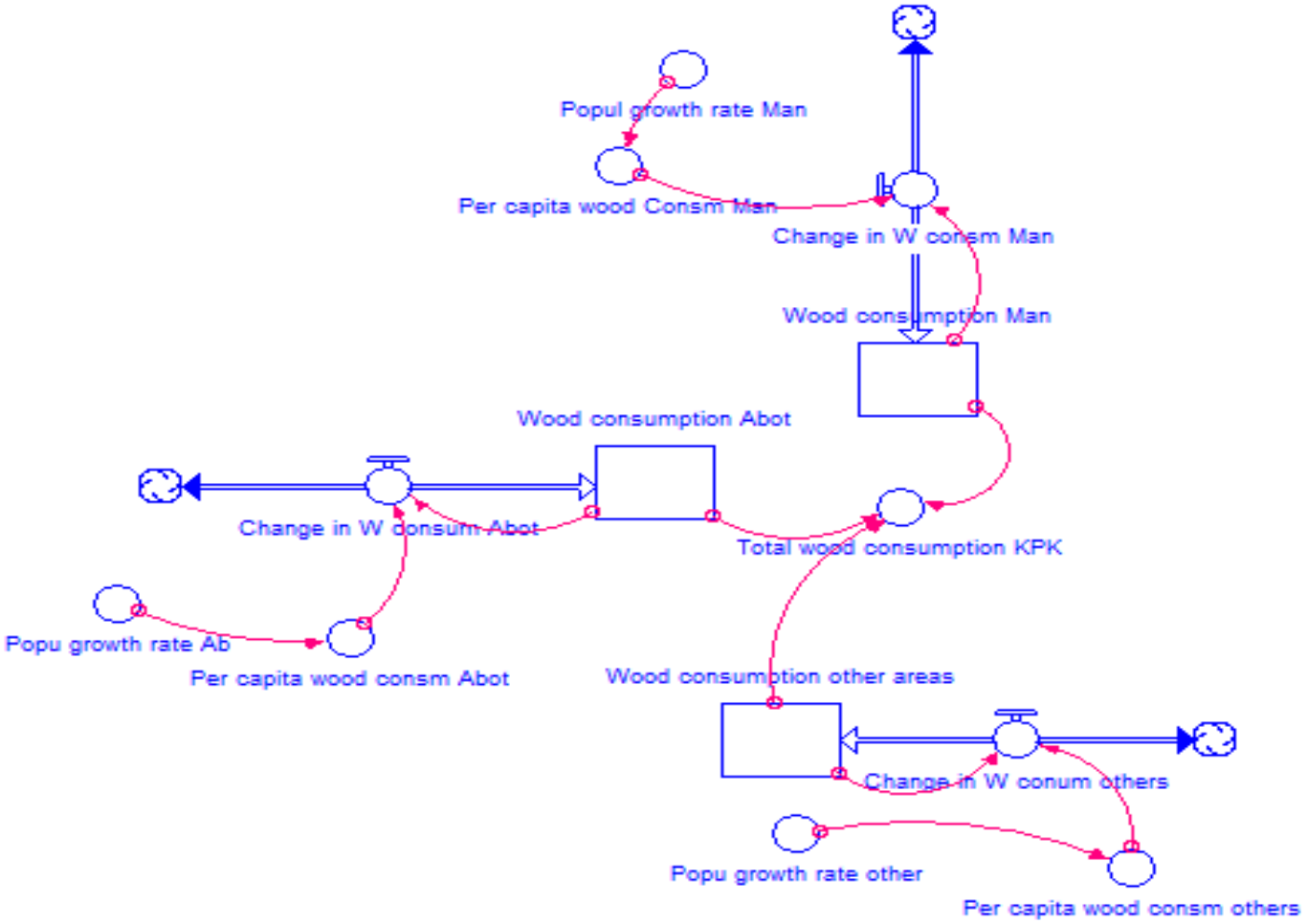
- Built up area is increasing in the study area.
- There is no control on the expansion of built up area.

RANGELAND AND FOREST AREA

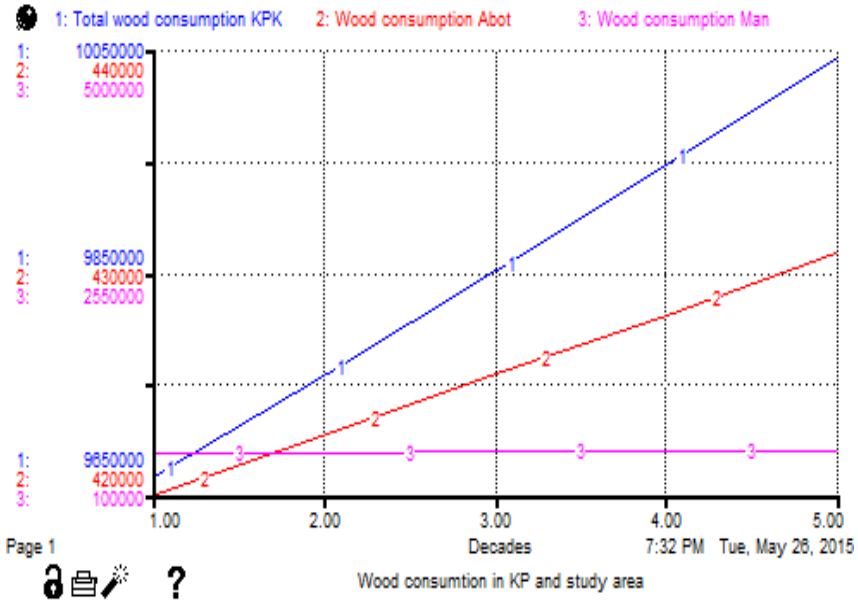


- Rangeland area is more than 48% of the land area of the province and it is growing further.

PART A-WOOD CONSUMPTION

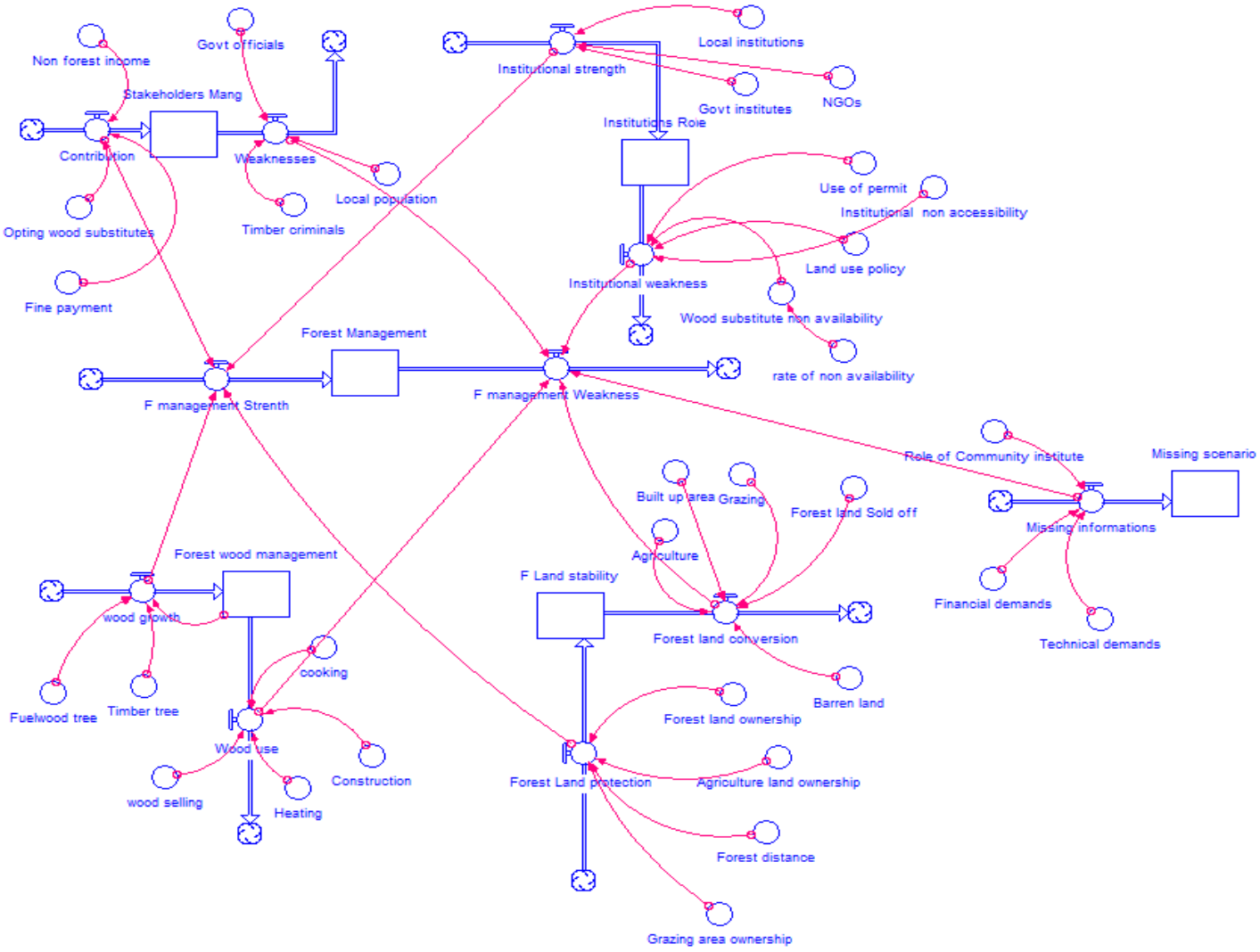


WOOD CONSUMPTION

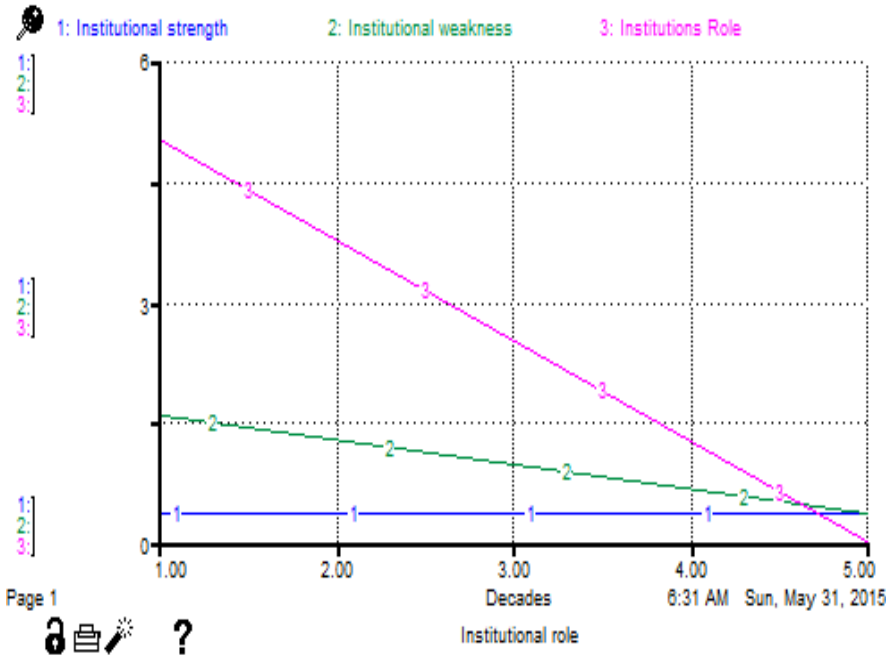


- The rate of growth in wood consumption in District Abbottabad is more than the other district. Overall wood consumption in the province is increasing because of shortage in fuel wood substitutes.

MODEL
PART B
COMMUNITY'S FOREST MANAGEMENT PRACTICES

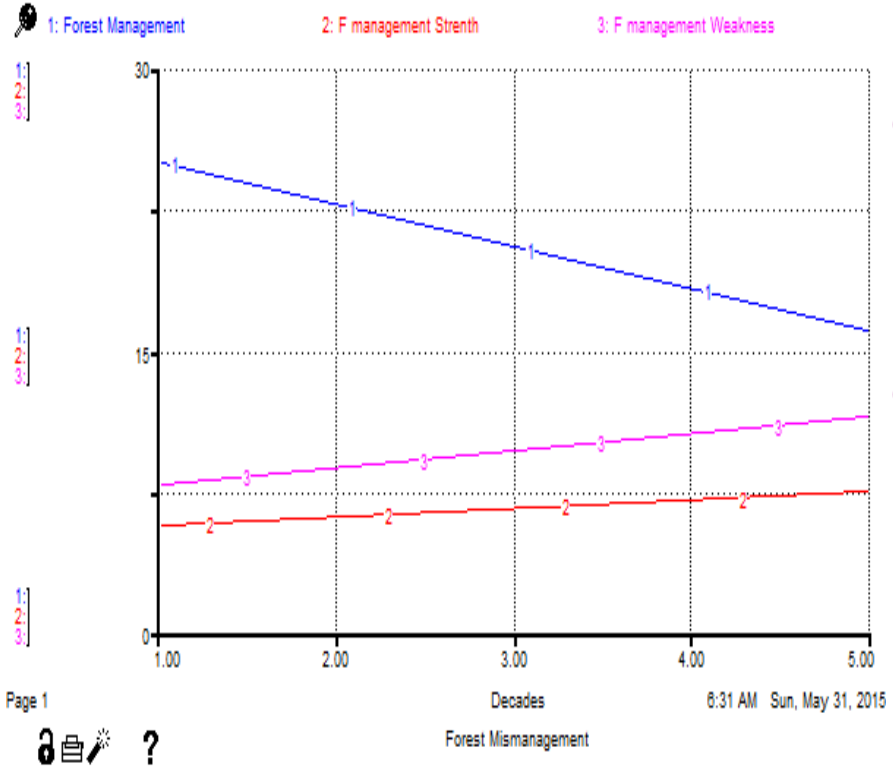


INSTITUTIONAL ROLE



- Institutions are weak, their role is becoming further weakened.

FOREST MANAGEMENT

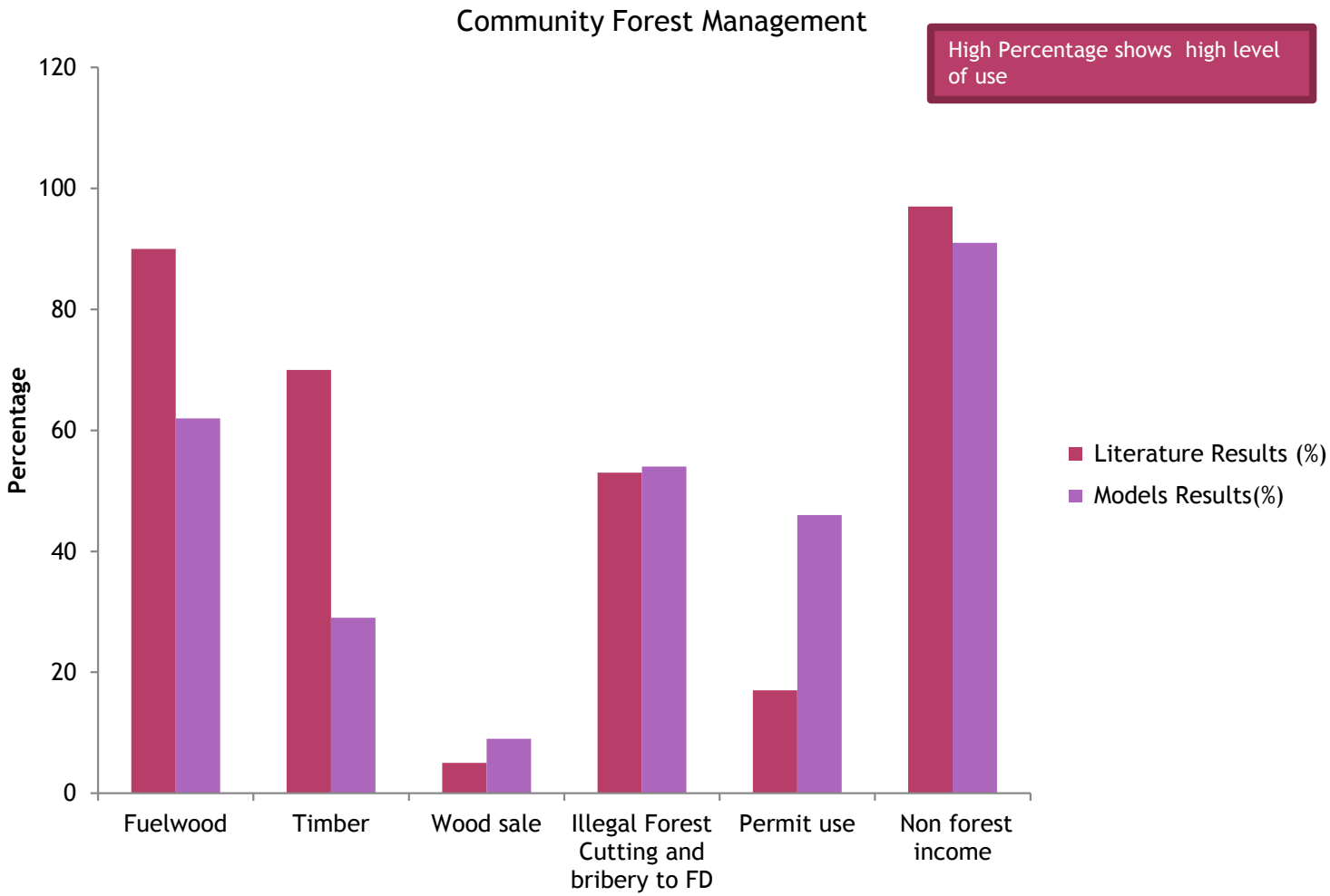


- Overall, factors contributing to better management are not improving.
- Management weakness is higher than strength showing poor forest management.

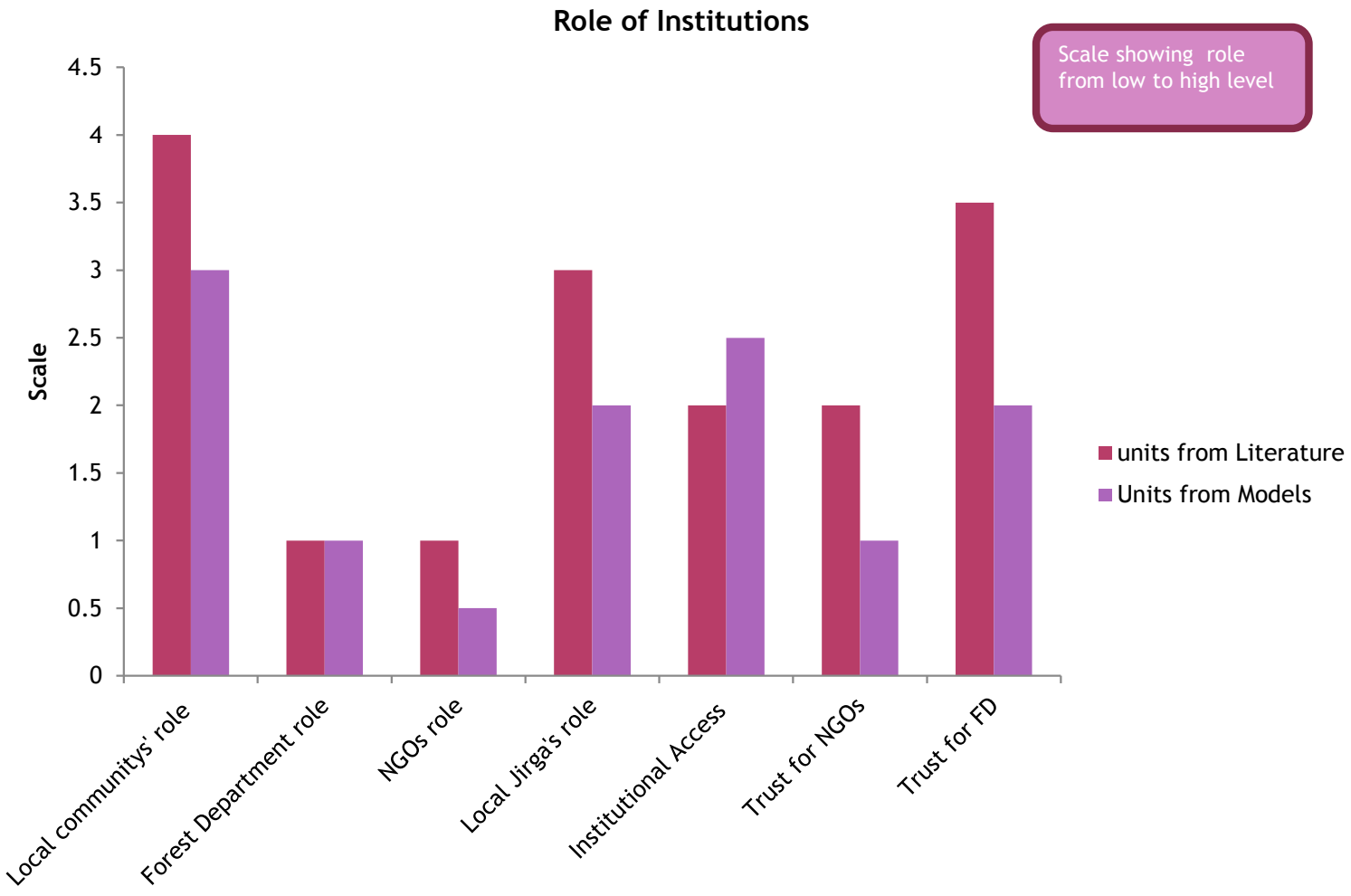
VALIDITY OF THE MODEL

- 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".

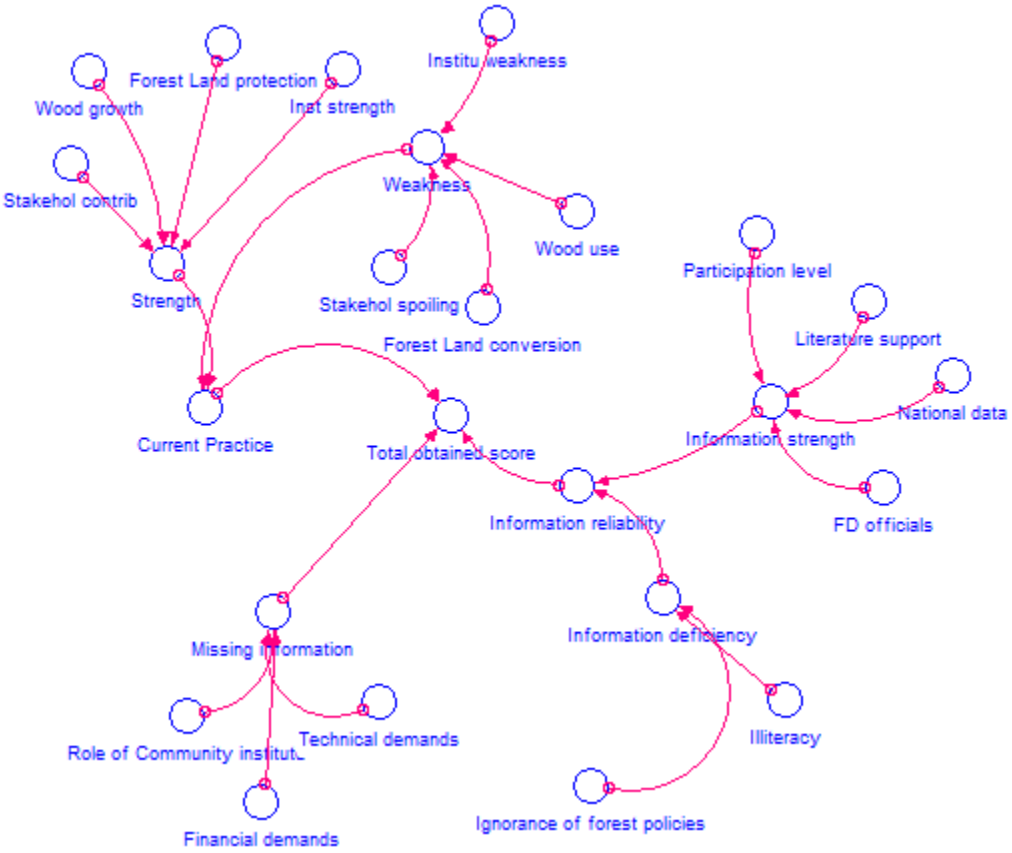
MODEL VALIDITY



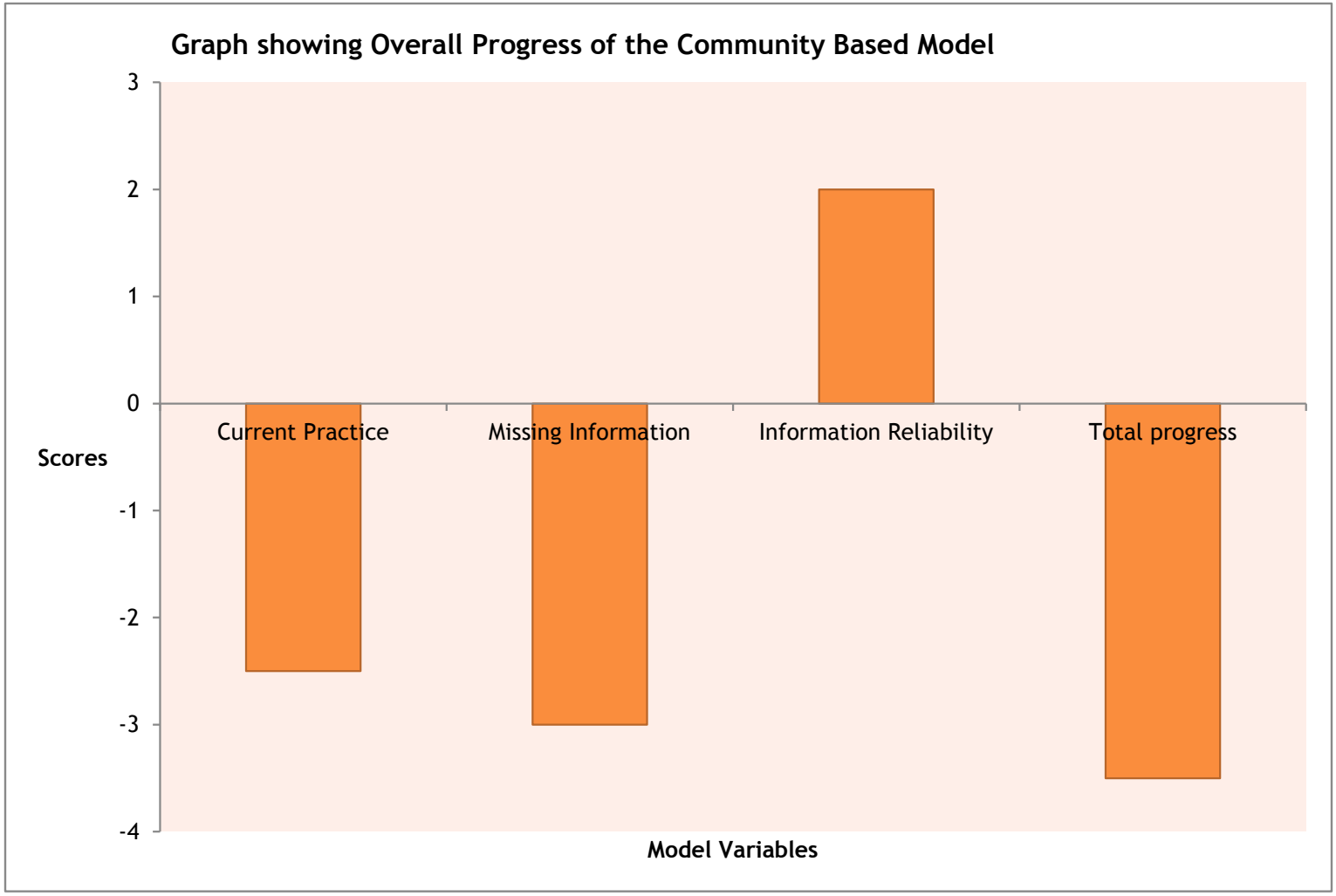
MODEL VALIDITY



EFFECTIVENESS TEST FOR FOREST MANAGEMENT PRACTICES IN THE STUDY AREA



EFFECTIVENESS TEST FOR FOREST MANAGEMENT PRACTICES IN THE STUDY AREA



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.

CONCLUSION

- 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.