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Effects of deforestation on socio-economy and associated insect pests in district Swat, Pakistan

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Abstract

The research was carried out to investigate proximate causes and underlying driving forces of deforestation and its socio economic impacts on the local people of district Swat Pakistan. Different methods were used for investigating the desired objectives. Assessment of forest dependencies as a source of livelihood in Swat, to document underlying forces and drivers of deforestation in the Swat forest division and to assess the impacts of deforestation on the socioeconomic conditions of the local community of Swat were the main objectives of the study. Primary data was collected through pre structured Questionnaires. The major findings were that most of respondents were given the rights for consumption of forest products on the basis of their needs and the effects of rights given to them have positive effects on them. The main cause of deforestation was fuel wood collection from the forest and the role of overgrazing in deforestation was moderate. Deforestation has adverse impacts on the biodiversity including the insect's fauna. Deforestation has reduced the population of beneficial insects which has important role in pollination and natural products development including honey, silk and lac products. It was found that beneficial insects has important role in feeding on harmful insects which clearly states their role as predatory insects.

Keywords: Deforestation, district swat, socioeconomic conditions, insect pests

1. Introduction

A forest can be defined as a land enclosed by more than 10% of canopy cover, and that cover is more than 0.5 hectare area, comprising of trees with a height greater than 5 meters [1]. The land surface is covered by about 30% of forest cover, or approximately 3.9 billion hectares of forest [2].

Forest resources are of vibrant importance to preserve the soil and water resources and biodiversity all over the world which play a significant role in meeting the product requirements of the forest on both wooden timber and non-timber forest products [3]. The forests are an important constituent of the environment and are an essential portion of the life of people living in the rural areas, particularly in the developing countries. Forests store carbon and deliver various paybacks whereas giving many ecological and social welfares, like provision of fuel wood, role in cleaning of water and offers habitat for wildlife, and also used for recreational activities [4].

Pakistan, due to the inadequate forest resources with deforestation of 4.6% annually ranks second in the world and represents the destruction of ecological services [5]. Rapid increase in population, enlargement of agricultural land, and the ruthless cutting of forest for the export of wood contributes to deforestation in various areas of the world even though the time difference between the causes and results may differ considerably [6].

The foremost purpose of this study was to highlight the major and fundamental causes and effects of deforestation in the district Swat. The present study also suggest some methods to control deforestation, such as providing alternatives to firewood, involving more and more people in reforestation, making effective punishment policies for timber Mafia and smugglers, delivery of services to the local population, awareness in the local people regarding viable use of the forest resources, supporting the rules and regulations issued by the forest department, and reducing the use of wood in construction, and making furniture suggesting alternative materials for this purpose. The underlying causes of deforestation in the district Swat needs attention of the law making authorities and a good forest management can play a vibrant role

in controlling the ruthless cutting of trees and conserving them. The application of strong rules and regulations can obviously diminish the negative effects of deforestation and can help a lot in saving the biodiversity and can maintain the natural balance of the ecosystem.

Besides above implications the deforestation has adverse effects on both the beneficial as well as harmful insects. Physical factors which affects insect pests includes climate, soil and landscape features such as elevation, slope and aspect. Major disturbances to insect pests include wildfires, severe storms and various human activities that can have a great influence on quality and quantity of food and their breeding spots. A favorable environment delivers abundant food, low risk of mortality from natural enemies or predators, possibility of successful mating and reproduction^[7].

Owing to the importance of forests and alarming consequences of deforestation on the local community and environment the study aimed at the following objectives.

- Assessment of forest dependencies as a source of livelihood in Swat.
- To document underlying forces and drivers of deforestation in the Swat Forest Division.
- To assess the impacts of deforestation on socio economic conditions of the local community of Swat.

2. Materials and methods

2.1 Study area description

District Swat is located at 34°-40° to 35°-55° North Latitude and 72°-08" to 74°-6" East Longitude, in the temperate zone of Pakistan, and the climate was controlled by numerous factors including altitude, latitude, the Indian summer monsoon in the summer and the cyclonic current, coming in from the Mediterranean Sea, in the winter. The total land area of district Swat is 5,337 square kilometers (sq. km) (2,060.6 square miles, or 1,251,653 acres). This total area is divided in two tehsils, namely Matta and Swat, having areas of 683 sq. km and 4654 sq. km, respectively^[8].

The total forest cover in district Swat was 497,969 acres as of 2007-2008, containing mostly conifers species such as *Pinus wallichiana* (Kail), *Abies pindrow* (Fir), *Picea smithiana* (Spruce) and *Pinus roxburghii* (Chir)^[8]. This area was divided into resumed land (spread out over 338,544 acres), private plantations (159,081 acres) and miscellaneous categories (344 acres)^[8].

The study area covers an area of 97,339 hectares and it was divided into four "Planning Units" which were resource sub-units comprising a major valley or a continuation of sub-valleys or small valleys within a 'Planning Area' and which were contiguous. The forest area was divided into these planning units because to carry out effective and sustainable mangement and the division was done by a team of professionals comprising Natural Resources experts, Social Scientists, Planning and GIS experts. The names of these planning units were Miandam, Charbagh, Marghuzar and Barikot planning unit, every planning unit comprised of various union councils^[8].

2.2 Research observations and design

The study was carried out in two of the planning units i.e. two Union Councils were selected randomly from each planning unit. Four villages were selected from each Union Council of both the selected Planning Units. The villages were selected on the basis of stratified random sampling i.e. 2 villages from dense forest and two from sparse forest. Twenty respondents were interviewed from each village. The data was collected from the community, stakeholders and surveys based on personal observation in the forest area^[9].

Two units were selected from these four units i.e. Charbagh unit and Miandam unit, in both of these two union councils were selected from each, in Charbagh unit the union council Talegram and union council Kishawra were selected and then from union council Talegram the 4 villages selected were Ser, Dughalgai, Khwar Patai and Jekot, while the villages selected from union council Kishawra were Malam, Spinoba, Mangarkot and Koo. While from Miandam unit two Union Councils were selected namely union council Miandam and union council Shin, from union council Miandam the 4 villages selected were Miandam village, Khair Abad, Senai and Jukhtai, while from union council Shin the villages selected were Bar Bargin, Kuz Bargin, Lakhar and Degan. These villages were selected randomly from each union council.

2.3 Data Collection

Primary data was collected through pre structured Questionnaires. Local community dependent on the forest was interviewed. The responses of the household heads and the key informants were recorded immediately on the pre structured questionnaire. First part of questionnaire covered basic information such as age, educational level, information about house hold size, occupation and income of respondents. While the secondary data source involved the search of published and unpublished materials relevant to the subject matter.

2.4 Statistical analysis

The raw information was tabulated and subjected to descriptive statistical analysis to assess the impacts of deforestation on socio-economic development in the study sites. Statistical Package for Social Scientists (SPSS) software and Microsoft excel were used for the analysis of data.

3. Results and Discussion

3.1 Effects of deforestation on insect's fauna

It was found that deforestation influenced the insect's fauna in various ways as their habitat was disturbed, food sources were suppressed, and the nesting and egg laying sites were also distressed. Insects like pollinating insects, seed predators and decomposers were extremely vulnerable to the harmful effects of deforestation and habitat loss and much affected by extreme weather conditions and climate change. Several insect species (harmful/beneficial) found in the study area have been identified which were effected by deforestation. Some of them are listed in Table 1.

Table 1: List of Insects found in the study area during the present study

Common Name	Scientific Name	Status
Ambrosia Beetle	<i>Platypus quercivorus</i>	Harmful
Asian Pine Caterpillar	<i>Dendrolimus punctatus</i>	Harmful
Bag Worm	<i>Thyridopteryx ephemeraeformis</i>	Harmful
Brown lacewings	<i>Micromus tasmaniae</i>	Beneficial
Budworm	<i>Choristoneura fumiferana</i>	Harmful

Cone Beetle	<i>Conophthorus radiatae</i>	Harmful
Douglas Fir Beetle	<i>Dendroctonus pseudotsugae</i>	Harmful
Douglas Fir Tussock Moth	<i>Orgyia pseudotsugata</i>	Harmful
Dry Twig And Cone Beetle	<i>Ernobius punctulatus</i>	Harmful
Fir Budworm	<i>Choristoneura murinana</i>	Harmful
Forest Tent Caterpillar	<i>Malacosoma disstria</i>	Harmful
Honey Bee	<i>Apis mellifera</i>	Beneficial
Hoverflies	<i>Melangyna viridiceps</i>	Beneficial
Lacewings	<i>Micromus tasmaniae</i>	Beneficial
Lady Bird	<i>Coccinellidae</i>	Beneficial
Long Horn Beetle	<i>Anoplophora glabripennis</i>	Harmful
Mountain Pine Beetle	<i>Dendroctonus ponderosae</i>	Harmful
Pine Processionary Caterpillar	<i>Thaumetopoea pityocampa</i>	Harmful
Pine wood nematode	<i>Bursaphelenchus xylophilus</i>	Harmful
Silkworm	<i>Bombyx mori</i>	Beneficial
Southern Pine Beetle	<i>Dendroctonus frontalis</i>	Harmful
Spruce Beetle	<i>Dendroctonus rufipennis</i>	Harmful
Spruce Budworm	<i>Choristoneura fumiferana</i>	Harmful
Walnut Twig Beetle	<i>Pityophthorus juglandis</i>	Harmful
Wood Wasp	<i>Sirex noctilio</i>	Harmful

3.2 Role of Insects in the Ecosystem

Insects play an important role in the ecosystem and performs multiple functions such as seed dispersal, nutrient cycling, pollination, bioturbation (mixing of soil sediments/particles), feeding on microorganism or parasites and can also help in enhancing plant growth. So it means that all the insects are not harmful, some of them are beneficial too and contribute in maintaining the natural balance of the ecosystem.

3.3 Age classes of the respondents

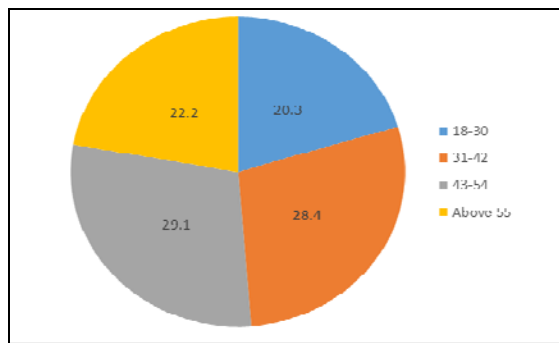


Fig 1: Respondents age classes of the study area during the present study.

- Statistical analysis (Chi-square tests) of Age vs Main causes of deforestation:** The age of the respondents was cross checked with main causes of deforestation and statistical test of association Chi-Square was applied using SPSS software. The results showed that there was significant association between two variables i.e., Age vs main causes of deforestation, the Pearson Chi-Square value was 526.131^a which gave significant results i.e..000, while the likelihood ratio was 560.845 and the results were significant.000.

3.4 Level of Education

It was found that out of 320 (100%) respondents, most of the people 110 (34.4%) were illiterate (Fig. 2) and it assumes that the lack of awareness and insufficiency of knowledge about the valuable natural resources results in the destruction and obliteration of these resources with the passage of time thus leading towards deforestation. So it means that the lack of knowledge and awareness plays a vital role in deforestation.

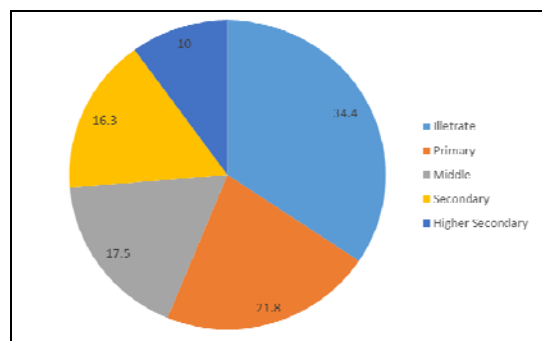


Fig 2: The educational level of the respondents of the study area in the present study.

- Statistical analysis (Chi-square tests) of Educational level vs Impact of deforestation on socio economic activities:** The educational level of the respondents was cross checked with impact of deforestation on socioeconomic activities, statistical test of association Chi-Square was applied using SPSS software. The results showed that there was a significant association between two variables i.e., Educational level vs impacts of deforestation on socio economic activities, the Pearson Chi-Square value was 232.398^a which gave significant results i.e..000, while the likelihood ratio was 230.814 and results were significant.000.

3.5 Family size

In the total 320 (100%) respondents the majority of 130 (40.6%) respondents were having a family size of 10 to 15 members (Fig. 3). This expresses the relationship of family size with deforestation, larger the number of members in a family greater will be the rate of deforestation, because as the number of people increases their needs also increases as compared to a smaller family size, thus the family size also contributes a lot to deforestation and forest degradation.

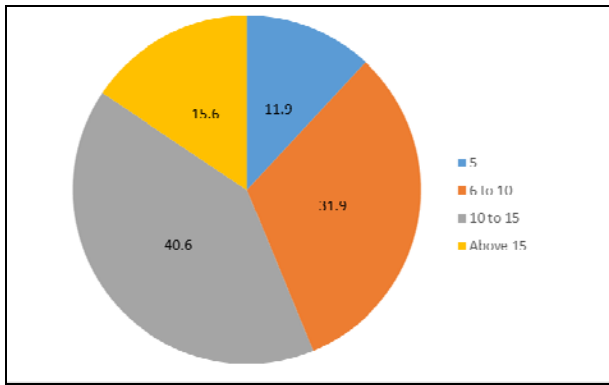


Fig 3: The family size of the respondents of the study area under the present study.

- Statistical analysis (Chi-square tests) of Family size vs Main cause of deforestation:** The Family size of the respondents was cross checked with the main cause of deforestation, statistical test of association Chi-Square was applied using SPSS software, the results showed that there is significant association between two variables i.e., Family size vs the main cause of deforestation, the Pearson Chi-Square value 483.157^a which give significant results i.e..000, while the likelihood ratio was 477.495 and results were significant.000.

3.6 Occupation

In the total 320 (100%) respondents it was found that most of the respondents 142 (44.4%) were linked to the occupation of farming (Fig. 4). It is observed from the table 4 that most of the respondents of the study area were farmers. So for the purpose of farming activities it is obvious that they will cut the standing trees for growing agricultural crops and by revising these activities after a specific period of time it will result in the destruction of forest resources and finally will lead towards deforestation so it means that agricultural expansion has a great impact on deforestation.

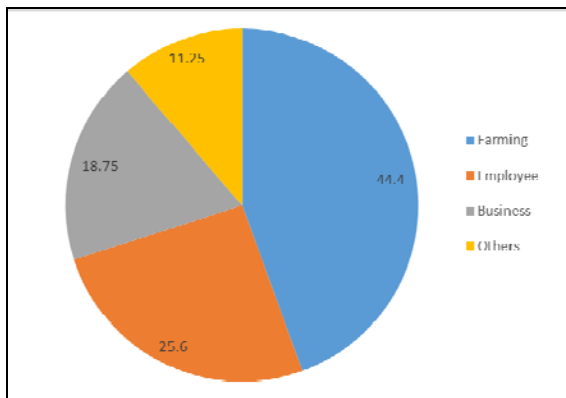


Fig 4: The occupation of the respondents of the study area under the present study.

3.7 Monthly income of the family

It was found that most of the respondents (31.9%) were consuming more than 25 thousand rupees monthly (Figure. 5). So it means that most of the people of the study area were poor and they depend mostly on the forest resources for their day to day needs.

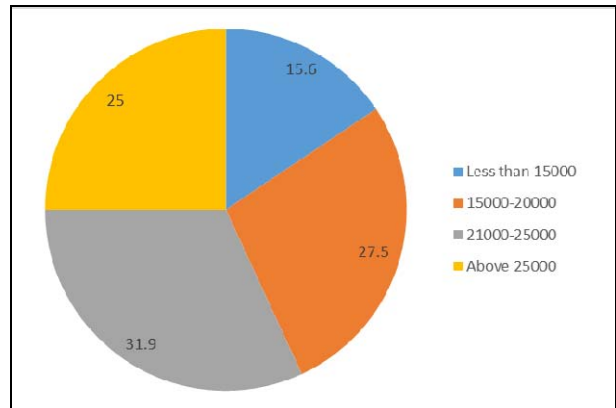


Fig 5: The family monthly income of the respondents of the study area under the present study.

- Statistical analysis(Chi-square tests) of Family monthly income vs Occupation:** The family monthly income of the respondents was cross checked with occupation, statistical test of association Chi-Square was applied using SPSS software, the results showed that there was significant association between two variables i.e., Family monthly income vs Occupation, the Pearson Chi-Square value 535.0477^a which give significant results i.e..000, while the likelihood ratio was 581.152 and results were significant.000.

3.8 Land use

Most of the respondents (79.4%) were having cultivated lands (Fig. 6). So it means that a large number of local people of the study area used to grow crops on their lands for their income as well as for their food.

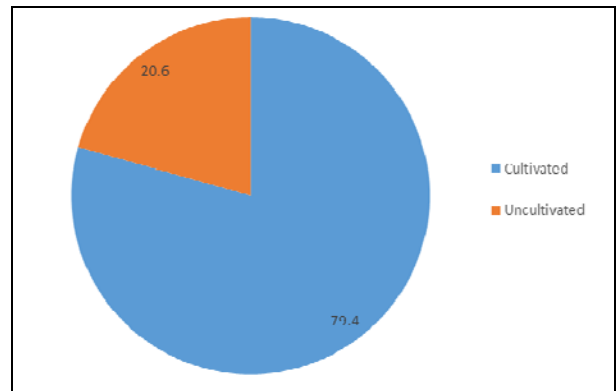


Fig 6: The land use of the respondents of the study area under the present study.

3.9 Land use system

It was found that most of the respondents (37.5%) respondents used their lands for agriculture (Figure. 7). So it means that majority of the local people grow agricultural crops on their lands followed by agroforestry.

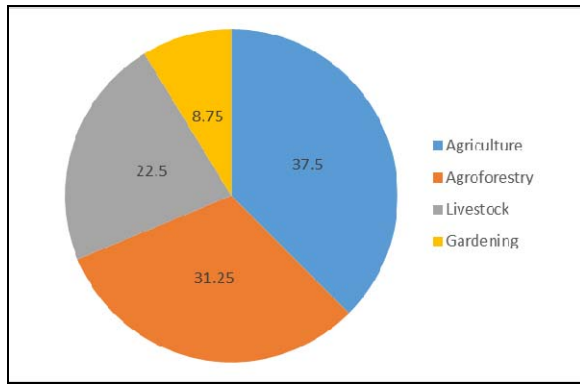


Fig 7: The land use system of the respondents of the study area under the present study.

3.10 Livestock

It was found that most of the respondents (37.5%) respondents used their lands for agriculture (Figure.8). So it means that majority of the local people grow agricultural crops on their lands followed by agroforestry.

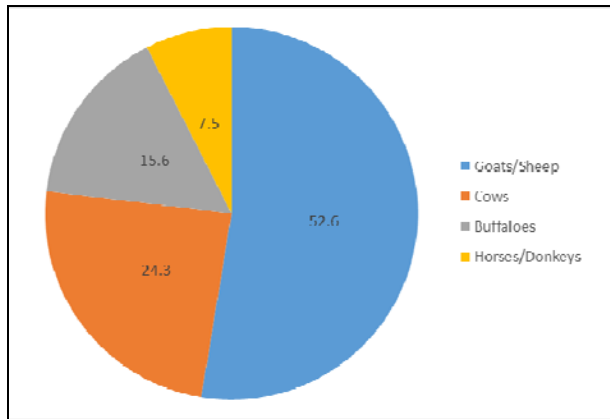


Fig 8: The livestock of the respondents of the study area under the present study.

It was found that majority of the community are dependent on open grazing animals, goats and sheep.

- Statistical analysis(Correlation) of Livestock vs Role of overgrazing in deforestation:** The Livestock of the respondents was correlated with Role of overgrazing in deforestation, statistical analysis of correlation was applied using SPSS software, the results showed that both variables were correlated with each other i.e., Livestock vs Role of overgrazing in deforestation, the Pearson's R value was.699 which gave significant results i.e..000°, while the Approx. T^b value was 16.043 and results were significant.000° and Spearman correlation value was.744 which gave significant results i.e..000°.

3.11 Dependency of the local people on forest

It was found that most of the respondents (48.7%) were highly dependent on forest (Figure. 9). People living in the forest areas depend heavily on them, they consume different products from the forest which they use in their houses as well as they also sell these products in the local market for economic purposes. So this dependency on forest for such a long period of time and increase in population have great impact on the depletion of these forests and it have a strong link with deforestation in the area.

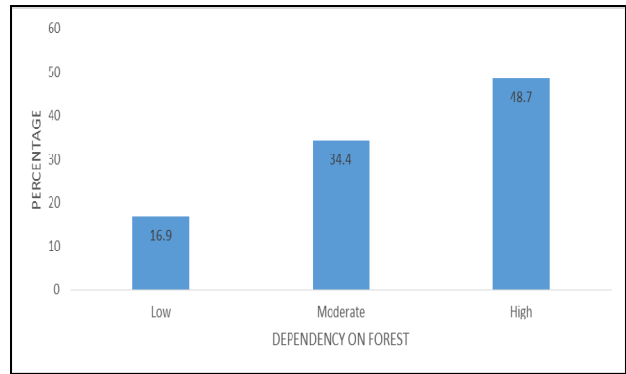


Fig 9: The dependency of the respondents on forest of the study area under the present study.

Similar study was conducted by [10] which revealed the significant importance of forests for the economy and livelihood of the local people. Authors in the study discussed the mythologies and realisms concerning to illicit cutting of forest trees in the Khyber Pakhtunkhwa. They also presented the insights of the people dependent on forests in the province concerning the use patterns of forests, situation of forests, and transformations occurring in forest cover. The reasons or agents which are responsible for deforestation is the day by day increase in illicit cutting of the valuable forest trees, the demanding use of wood for house hold requirements like heating of houses in winter, cooking purposes and the wood used in construction and useless forest managing plans.

3.12 The main cause of deforestation in the study area

It was found that majority (41.8%) respondents stated that the main cause of deforestation is fuel wood collection from the forest (Fig. 10). As the local people dependent on the forest collects a large amount of fuel wood daily so it is resulting in the depletion of the natural resources, next to it the agricultural expansion is the second major cause of deforestation in the area.

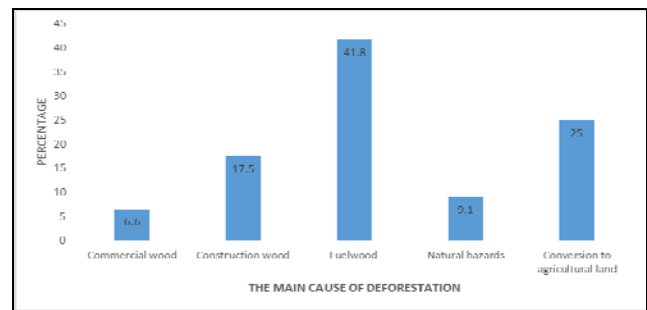


Fig 10: The main cause of deforestation in the study area under the present study.

Similar study was carried out by [11] and that fuel wood is the main constituent of household of the rural communities. Authors further specified that it covers approximately 53% of the annual domestic energy and he assumed that 3% increase in the annual consumption of fuelwood is expected because the economy of Pakistan is not so strong that fuelwood can be replaced by alternative fuels.

3.13 Role of natural disasters in deforestation

It was found that the majority (59.4%) respondents stated that the natural disasters are not the cause of deforestation. As there is a great impact of natural hazards or natural disasters

on the forests like thunder storms, hail, snowfall or even rains and floods but the local residents of the area stated that anthropogenic causes have more influence on the forests as compared to the natural disasters.

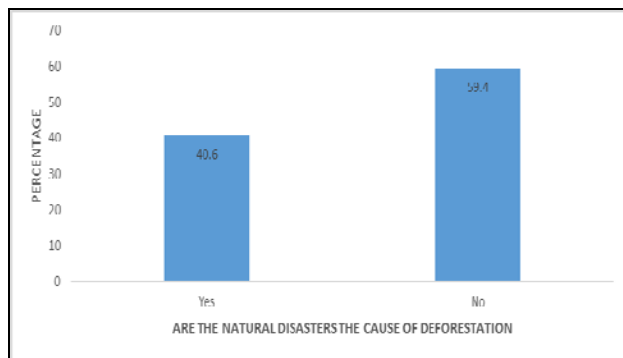


Fig 11: Role of natural disasters in deforestation in the study area under the present study.

3.14 Role of over grazing in deforestation

It was found that the majority (45.6%) respondents stated that the role of overgrazing in deforestation is moderate. As the livestock can never survive without grazing so the local residents let them graze in the forests, unaware of damaging the standing crops or the seedlings which arise from natural regeneration. But as there is ban on most of the activities in forest, overgrazing has been controlled up to some extent which is helpful in controlling deforestation.

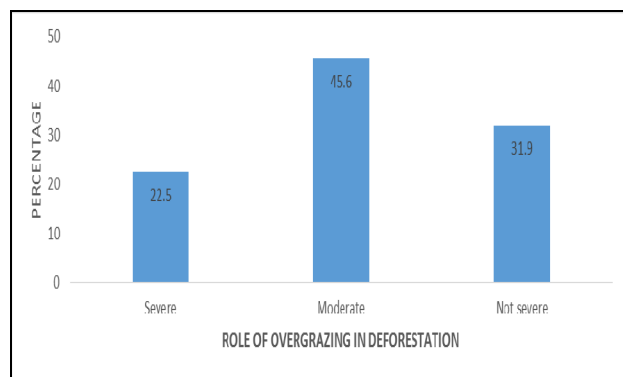


Fig 12: The role of overgrazing in deforestation in the study area under the present study.

Similar research work was carried out by [12] and their research showed that in drier areas of tropics some pastures in China had been converted to barren lands and were prone to erosion. They further specified that large areas of Qinghai province which were grasslands have turned into desert due to overgrazing.

3.15 The role of tourists in deforestation

The majority (51%) respondents stated that the main role of tourists in deforestation was fire hazards. Swat valley is known for its scenic beauty and greenery so it attracts a lot of tourists and visitors each year which provides a bunch of opportunities to the local people as their business activities are concerned with these tourists and it helps in their earnings but these tourists also play their role in ruining the natural resources as in the picnic spots they use to cook their own food and there is a high risk of causing fires to the forest, they also disturb the natural environment by doing a lot of activities in the forest areas so the tourists play their role in

deforestation by this way.

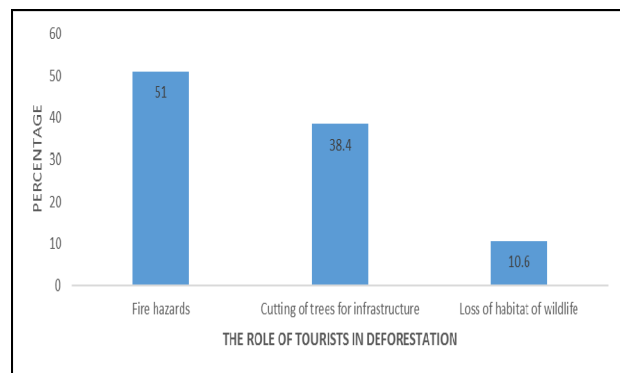


Fig 13: The role of tourists in deforestation in the study area under the present study.

The research study of [13] showed the positive and negative effects of tourism and recreation activities as the positive effects of tourism are providing employment opportunities to the local people, improvement in the economic level and exchange of ideas and culture etc. The negative effects of tourism include the adverse effects on the quality and quantity of the air and water resources, obliteration of landscapes, pollution increase in the prices of goods and the risk of forest fires is increased and the major cause of these environmental challenges are human activities.

4. Conclusion

It was concluded that in the study area the major population was illiterate. The average family size was 10-15 members. The major occupation of the residents was farming. The average family monthly income of the residents was 21-25000 rupees and majority of people were having cultivated lands and kept goats and sheep. Most of the respondents were highly dependent on forest. The main cause of deforestation was fuel wood collection. Majority of the people believed that the natural disasters were not the cause of deforestation. The role of overgrazing in deforestation was moderate. The major role of tourists in deforestation was fire hazards. Most of the respondents specified that the role of government and NGOs in forest protection was satisfactory. The majority of the local people stated that the available resources were enough to fulfill the needs of the local people.

5. Suggestions and Recommendations

Some of the suggestions and recommendations to control deforestation and to reduce the negative effects of deforestation on the local people are suggested below.

- The forest department and government should involve more and more people in plantation practices in order to lessen the high rate of deforestation and for the reclamation of deforested lands.
- Forestry extension workshops and seminars should be arranged for the awareness of the local people about the environment and the long standing benefits of forests.
- The availability of basic facilities such as Gas or other low cost alternatives must be insured in the rural areas where possible which can be very helpful to decrease the pressure on the forests.
- Making of effective policies, rules and regulations can also control the increasing rate of deforestation.
- Government should provide job opportunities and employment to the local people which can help in

- reducing rate of cutting trees.
- For the cooking purposes and heating of houses alternative materials should be used like cow dung or charcoal etc.
- Government and Forest Department should provide funds and labor for the recovery of degraded and deforested areas.
- Strict punishment to the smugglers and timber mafia should be given by the government.
- Farmers should be given the basic and effective knowledge of farming activities in order to reduce the rate of agricultural expansion and clearing of forest.
- Overgrazing should be controlled in the forest areas.
- The people should support the local communities made by government and Forest department.

6. References

1. Ahmad S, Abbasi Q. Assessment of Forest Cover Decline in Pakistan: A GIS Perspective. *International Journal of Environmental Sciences*. 2011; 2(1):220-227.
2. Bryant D, Nielsen D, Tangley L. *The last frontier forests-Ecosystems and Economies on the Edge*. World Resource Institute, Washington DC, 1997.
3. Siry PJ. Sustainable forest management: global trends and opportunities. *Forest policy and economics*. 2005; 7: 551-561.
4. Malmshemer RW, Bowyer JL, Fried JS, Gee E, Izlar RL, Miner RA *et al*. Managing Forests because Carbon Matters: Integrating Energy, Products, and Land Management Policy, *Journal of Forestry*. 2011; 109(7):7-50.
5. Khan SR, Khan SR. poverty-deforestation links: Evidence from Swat, Pakistan. *Ecological Economics*. 2009; 68:2607-2618.
6. Kricher J. *A Neotropical Companion*. Land Management Policy, Princeton University Press, *Journal of Forestry*. 1997; 109(7):7-50.
7. Berryman A. *Forest insects: Principles and practice of population management*. New York: Plenum Press. 1986, 279.
8. Government of Pakistan. *Resource Management Plan for the Swat forest Range of Swat Forest Division*, 2014.
9. Blay D, Appiah M, Damnyag L, Dwomoh FK, Luukkanen O, Pappinen A. Involving local farmers in rehabilitation of degraded tropical forests: Some lessons from Ghana. *Environment, Development and Sustainability*, Springer. 2007; doi: 10.1007/s10668-006-9077-9.
10. Ali T, Shahbaz B, Suleri A. Analysis of myths and realities of deforestation in Northwest Pakistan: implications for forestry extension. *International Journal of Agriculture and Biology*. 2006; 8(1):107-110.
11. Ali J, Benjaminsen TA, Hammad AA, Dick OB. The road to deforestation: An assessment of forest loss and its causes in Basho valley, Northern Pakistan *International Journal of Global Climate Change*. 2005; 15:370-380.
12. Chakravarty S, Ghosh SK, Suresh CP, Dey AN, Shukla G. Deforestation: causes, effects and control strategies. *Global perspectives on sustainable forest management*. 2012; 1:1-26.
13. Belsoy J, Korir J, Yego J. Environmental impacts of tourism in protected areas. *Journal of Environment and Earth Science*. 2012; 2(10):64-73.