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An Overview of Deforestation Causes and Its Environmental Hazards in Khyber Pukhtunkhwa

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Abstract
The current review study is design to highlight the facts, main causes and impacts of deforestation and forest degradation in Khyber Puthtunkhwa, Pakistan. This study is based on literature review. According to the findings of the current study the people are dependent on these forests and contribute to deforestation in one of different ways. The study shows that the extensive deforestation in Khyber Pukhtunkhwa occurred for household needs such as cooking, furniture, heating, earning etc. Another growing cause is the role of black marketing and stake holders on these forests. Meanwhile the ineffective management and ignorance of the forest department is one of the major contributing factors in deforestation. In addition to this, the nonscientific grazing is a key point in the deforestation. Unemployment and poverty is another attractive factor in the degradation of these forests. The most adverse impacts of deforestation in Pakistan are flooding, climatic changes, land sliding, land degradation, soil erosion and desertification. The underlying causes of deforestation in Pakistan need the attention of government authority to resolve these causes, implementing strong rules regulations in order to mitigate the adverse impacts of deforestation and save this ecosystem.
Keywords: Deforestation, Causes, Environmental hazards, Khyber Pukhtunkhwa.

Introduction

A forest can be defined as a land with canopy cover more than 10%, straddling an area greater than 0.5 hac, including the trees with height larger than 5m (Ahmad and Abbasi, 2011). Forests provides carbon storage and other benefits while delivering a lot of environmental and social benefits, such as timber and biomass resources, clean water, wildlife habitat, and recreation (Malmsheimer et al., 2011). Forests cover was just 4 billion hac (30% of land) in 2005, 36% of which are classified as primary forests. About two third of known land-based species are in forests but now these are going to extinction. Approximately 8000 tree species which make 9% of the total number of tree species are under threat of extinction (Liaison, 2012).

Deforestation is the removal of the existing natural vegetation cover, especially where the native cover is largely forest (Mawalagedara and Oglesby, 2012). Deforestation is the clearing away of forests by a process in which an area depleted its existing natural forest vegetation and resources (Abere and Opara, 2012). The conversion of forest to an alternative permanent non-forested land use such as agriculture, grazing or urban development is called deforestation (Chakravarty, 2012).High rate of deforestation is one of the major problems in Pakistan. According to different studies and surveys it is stated that forests are spread over less than 4.6 M hac of total area. These forests undergo rapid degradation especially in the mountain area and the deforestation rate is nearly 1.5% which is very high alarming and threat to ecosystem (Ali et al., 2006).

Description of the study area

Khyber Pukhtunkhwa is one of the five provinces of Pakistan, which is more prone to climatic changes and deforestation due to the presence of climate-sensitive sectors. "Khyber Pukhtunkhwa is located in the North West corner of the country. The province has an area of about 28,773 mi² (46,295 km^2) with estimated population of about 21 million, and most of its territory link with Iranian plateau. The climate is extreme with intensely hot summers to freezing cold winters. Despite these extremes in weather, agriculture remains important and viable in the area. The northern zone is cold and snowy in winters with heavy rainfall and pleasant summers with the exception of Peshawar basin, which is hot in summer and cold in winter. It has moderate rainfall. The southern zone is arid with hot summers and relatively cold winters and scanty rainfall. Its snow-capped peaks and lush green valleys of unusual beauty have enormous potential for tourism. The air is generally very dry and consequently the daily and annual range of temperature is quite large. Rainfall also varies widely. Although large parts of Khyber Pukhtunkhwa are typically dry, the province also contains the wettest parts of Pakistan in its eastern fringe (Powenski, 2012).

Khyber Pukhtunkhwa is very important province for the country from the environmental and climatic point of view. A large portion of the country's forests are in K.P.K, and majority of the people of this area are related with agriculture and forest sector. "According to an estimation K.P.K contribute 40% of the total forest in

the country" (Ahmad *et al*,. 2012). But the rate of deforestation in this area is also high and thus at more risk to climatic changes such as flooding, drought, ice caps melting, decline in biodiversity, etc. The flooding of 2010 in Pakistan represents an example of climatic changes all over the world. Out of the 1767 deaths in 2010 flooding, 1156 were occurred in K.P.K and 1193 injured out of the 2701. Similarly only in K.P.K 200,799 houses were damaged and 43, 659, 09 people were affected (Kroonstad *et al*,. 2010). As we know that all these changes occur mainly due to the deforestation in K.P.K and northern areas. The highest rate of deforestation is of conifer forests, which are mainly located in Dir, Swat, Mansehra etc. These forests are found at altitude of 1000 to 4000 meters (Ahmad *et al*,. 2012).

Causes of Deforestation

Fuel wood and Timber: Shahbaz and Ali, (2010) studied that in Mansehra 90% of the respondents were using the forest wood for cooking. However 56% of the respondents were using forests for timber in the same villages. In Swat district, 96% of the respondents were using fuel wood for cooking purposes, and 84% of the respondents used forests for their timber needs. Ali *et al,*. (2005) studied that fuel wood is an important component of house hold economies. In Pakistan fuel wood covers about 53% of total annual domestic energy. This dependence on fuel wood is expected to remain high in Pakistan in the future, because the economy of our country is not so strong that shift the traditional fuel wood to modern fuels. It is estimated that the population growth and fuel wood consumption will increase by 3% per year. The high demand for domestic fuel wood is believed to be rapidly depleting the forests. Tariq et al,. (2014) conducted a research study and stated that lack of alternate resources for fuel wood, timber and fodder are the main and first causes of deforestation in Dir Kohistan. According to them 83% of survey respondents the main cause of deforestation in Dir Kohistan is lack of alternate resources in which the main item is fuel wood. Kissinger et al,. (2012) stated that findings on global patterns of deforestation indicate that timber consumption and logging activities account for more than 70% of total deforestation. Fuel wood collection, charcoal production, and to a lesser extent, livestock grazing in forests are the most important drivers of deforestation. Angelsen and Kaimowitz, (1999) predicted that deforestation rates may increase because the population is growing and needs more land for food, fuel wood, timber, or other forest products. Saddozai, (1995) estimated that average house hold need for fire wood is 15.43 kg/day in summer and 31.94 kg/day in winter, while average timber needed for a house construction is 364 cft. It is also estimated that 30% of the population migrates to lower areas during winter season and 85% of the total needs of people met from the forests. Ali et al,. (2006) observed that in northern areas, the forest wood is intensively using for the construction of new and repair of existing houses as was informed by 73% of the respondents. Most of the houses in all of the villages are made of wood. Even if the house is made of mud/stones or brick yet timber is need for the construction.

Poverty and Unemployment: Tariq *et al,*. (2014) investigated that 75% of survey respondents the second main cause of deforestation in Dir Kohistan is unemployment. The literacy rate of Dir Kohistan is low which results in the unemployment of local people. To fulfill their daily basic needs and requirements the unemployed and jobless people of the area use these forests as a source of income by illegal manners. Chakravarty *et al,*. (2012) determined that poverty and over population are believed to be the main causes of forest loss according to the international agencies such as FAO and intergovernmental bodies. Zaman *et al,*. (2011) investigated that poverty, population and pollution (3Ps) are interlinked. As the population growth and poverty increases, the area is getting more polluted and the natural environment is degrading.

Policies and Management: Tariq et al,. (2014) researched that 63% of survey respondents, one of the causes of deforestation in Dir Kohistan is non judicial policies/rules and ineffective management. During the survey, most of the local people in Dir Kohistan complained that only the stake holders get benefit from these forests and the share (60%) of total sale proceeded from the forests goes to them. To fulfill their requirements and basic needs the local people are unable to follow the rules of local community and government. They get the benefits from the forests by illegal means. Ali *et al*,. (2006) studied that deforestation result in northern areas is due to the ineffective forest management strategies and bad governance by the provincial forest department. The forestry extension service offered by the department is quite ineffective and doesn't address the real problems. Saddozai, (1995) stated that in 1972 it is decided that all forests in Dir Kohistan belong to the state. Before this, out of the total sale proceed only 15% was paid to the stake holders /right holders, which is now 60%. In 1975 the Forest Act 1927 was implemented and the forests were declared as protected forests. Shahbaz and Ali, (2010) stated that in district Swat 28% of the respondents used forests for qalang and 44% of the respondents got royalty from the forests in the past.

Medicinal plants and fodder: Shahbaz and Ali, (2010) stated that only 20% of the respondents in Mansehra used forests for the collection of medicinal plants for household needs. There were 42% of the respondents who collecting fodder from the forests for their livestock. There were 50% of the respondents who were using forest lands as pastures. Similarly in district Swat, about 42% of the respondents were collecting medicinal plants from the forests for domestic use. In this village, 22% of the respondents told that they cut the trees from the forests and

sell the wood to earn the cash income.

Black marketing: Tariq et al,. (20104) stated in his work that according to the 53% of survey's respondents one f the main causes of deforestation in Dir Kohistan is black marketing of timber. The people complained that the staff of FDC, Sheringal is not honest in their duty and take bribes from the smugglers. Ali et al,. (2006) also indicates that the foresters take bribe from the villagers and outsiders are allowed to cut trees. Similarly the higher forest officials take heavy amount of money from the timber smugglers and allow them to cut the trees.

Agricultural activities and access: Tariq et al,. (2014) determined that after the construction of road and enhance in the agricultural activities, a dramatically increased occurred in the rate of deforestation. Congressional Budget Office, (2012) estimated that the destruction and degradation of forestland, caused mainly by expanded agricultural activity in tropical developing countries, currently accounts for an estimated 12 percent of global greenhouse gas emission.

Mawalagedara and Oglesby, (2012) carried out that greater access such as roads, rivers and railroads, to forests and markets accelerates deforestation. Besides this forest fragments are more accessible than large compact forests and forests in coastal areas and islands are more accessible than others. All those forests which are far at 2 or 3 kilometers from roads are declining at slow rate of deforestation.

Poverty: Zaman *et al*,. (2011) estimated that about 62 million people in Pakistan live below the poverty line during 2008-09. The relationship between population growth, poverty and environmental degradation is very closed and interlinked. There is a general consensus that poverty is a major cause of population growth and environmental degradation and reversely population growth is the major cause of poverty and environmental degradation such as pollution and deforestation. Poverty, population growth and other factors such as bad governance, income inequality and weak economic growth are the main causes responsible for environmental degradation and deforestation. In Pakistan poverty has been increased more in rural areas as compare to urban areas. Poverty rose more harshly in the rural areas in the 1990s, and in 1999 the rural poverty (36.3 %) was higher than urban poverty (22.6 %). According to the latest estimates, poverty head count ratio was 29.2% in 2004-05 which increased to 36.1% in 2008-09.

Livestock grazing: Tariq *et al,.* (2014) determined that according to the 50% of respondents one of the main causes of deforestation in Dir Kohistan is livestock grazing and trampling. The natural small vegetation is the only main source for livestock grazing in Dir Kohistan. The livestock affect the forests by two means, one by using the vegetation as a fodder and grazing. Secondly, large number of cattle and herds crush and trample the small vegetation. Thus over grazing and trampling of livestock contributes to deforestation and has adverse effects on forests in Dir Kohistan. According to the F.A.O, (2012) report the link between deforestation and cattle ranching are strongest. Forest area has been reduced by almost 40 percent over the past 40 years. Over the same period, pasture areas and the cattle population increased rapidly.

Deforestation triggered Environmental hazards in Pakistan

Floods: Congrong et al,. (2014) defined that flood is a natural event of too much water that badly affects people and the environment. In other words, a flood is too much water in the wrong place. A flood is generated by a combination of heavy rainfall causing river / oceans to over flow their banks, and can happen at any time of the year. Similarly Zaman, (2012) stated that flooding is the unusual presence of water on land to a depth which affects normal activities. Flooding can arise from overflowing rivers, heavy rainfall over a short duration, or an unusual inflow of sea water onto land. Ocean flooding can be caused by storms such as hurricanes, high tides, seismic events or large landslides.

Tariq et al,. (2014) carried out a research study in Dir Kohistan and found that as the rate of deforestation increased, the flood is also increased. Gilbuena et al,. (2013) determined that element which are at more risk during floods are structures situated within a flood plain, earth buildings or masonry with water-soluble mortar, buildings with shallow foundations or weak resistance to lateral loads or impact, roads and bridges, basements or underground buildings, machinery and electronics, including industry and communications equipment, food stocks, cultural artifacts, fields and orchards, confined livestock fishing boats and other maritime industries.

Alderman et al., (2012) reported that floods are the most common natural disasters and significant flooding events have often resulted in increased morbidity, mortality and environmental impacts throughout the world. Among the natural disasters flooding is the most harmful and havoc disaster which affect everything specially agriculture sector. Khan and Mohmand, (2011) reported that flood have devastating effects especially in the developing countries like Pakistan. Floods in Pakistan during the year 2010, was one of the most damaging in the history of the country. Rainfall with unexpected intensity started by the end of the month of July and continued until September. These high intensity rainfall victimized Pakistan of the devastating floods in 2010, which were the worst since 1929, for its extensive devastation across the country. The death rate was nearly 2000, 1 million houses were either damaged or destroyed, and devastated cultivated land was 5 m acres while more than 20 m people were displaced.

Land sliding: Tariq et al,. (2014) mentioned in their work that deforestation caused landsliding in Dir Kohistan. Khan, (1994) also mentioned in his worked that deforestation causing landsliding. Khan, (1999) stated that like most parts of the world, Pakistan has been frequently subjected to a variety of natural hazards like land sliding. Throughout the mountainous part of Pakistan, Murree is considered to be the worst slide-affected areas. Pearce, (1987) stated that landslide hazard in Murree, therefore, has been a cause of great concern for the safety of life and property since the earliest times.

Khan, 1994 also stated that during the last three decades, the extent and severity of the adverse effects of landslides have increased tremendously. Considerable damage has occurred to housing, roads, communication lines, electricity and water supply, as well as the retaining structures, in the recent years. Field studies revealed that more than 70% of houheholds in the area have been directly or indirectly affected by landslide hazards.

Land degradation and Soil erosion: Lal, (2003) stated that deforestation in northern areas of Pakistan has an important role in soil erosion and land degradation. Tariq et al,. (2014) also mentioned that as the rate of deforestation increased with the passage of time, the land degradation and soil erosion also increased in Dir Kohistan. The albedo are more expose to soil erosion and land degradation and thus forest and vegetation helps to reduce these adverse impacts.

Climate change: Pakistan contributes very little but receives great impacts of climate changes such as floods, droughts, increase in temperature, melting of ice caps, etc. The main reason of such great impacts of climate changes is that the economy of Pakistan mainly depends on climate sensitive sectors such as forests and agriculture sectors. The GHGs emissions rank the Pakistan at 135th but in the sense of impacts of climatic changes, Pakistan is at 12th position all over the world (Shahid and Paracha, 2010). Similarly the rate of deforestation is also high, which is 4.6%, and ranked the Pakistan on 2nd position in deforestation all over the globe (Ahmad *et al*,. 2012). From the above few lines we can easily understand that deforestation and climatic changes are closely linked with each other. As the rate of deforestation increases, more climatic changes will be occurring. Since the beginning of the 20th century, in Pakistan the annual mean surface temperature raise from 0.6^{o}C to 1^{o}C, the winter and summer rainfall decrease at the rate of 10 to 15 %, monsoon rainfall increase at the rate of 18 to 32%, humidity decrease by 5% and an increase occur in the solar radiation by the rate 0.5% to 0.7% over southern part of Pakistan (Farooqi *et al*,. 2005).

According to an estimation of World Bank and Asian Developing Bank, the flooding of 2010 in Pakistan, causes more than $ 9.7 billion damages, affected about 20 million Pakistani, one fifth of the country, which make a size of Florida, was submerged, eight million people were displaced, more than 3000 were injured and approximately 2000 people were killed in this havoc flood. The heavy rainfall & flooding was started around July 22, 2010 and last for the whole month of August and September. As the rain water of northern areas downpours to the southern parts of Pakistan, this adds a large amount of water to the Indus River which became more than 40 time of their normal size. The huge amount of flood water breaches the levees of Indus River and its tributaries, and reached to the urban and rural house plains (Kroonstad *et al,*. 2010).

Conclusion

Lack of alternate resources, unemployment, ineffective forest management and government policies, Livestock grazing, black marketing of timber are main causes of deforestation in Khyber Pukhtunkhwa. The most adverse impacts of deforestation in Khyber Pukhtunkhwa are flooding, climatic changes, land sliding, land degradation and soil erosion. The underlying causes of deforestation in Khyber Pukhtunkhwa need the attention of government authority to resolve these causes by implementing strong rules regulations, environmental awareness and provision of alternate resources, in order to mitigate the adverse impacts of deforestation and save this ecosystem.

Suggestion and Recommendation

It is imperative to know that there is no such thing as a small, insignificant act when it comes to defeating deforestation. No matter how small your deed maybe, the important thing there is 'every act can make a difference'. Deforestation can be prevented and you can be an active force in achieving that. As remedies the following steps should be taken to stop deforestation and its adverse impacts.

- Government should employ more and more people for plantation in forest department.
- Government and NGO arrange workshop for public awareness about forest importance.
- Government should formulate effective policies and enforce wise and judicial rules/regulations.
- Government must take steps to stop the bribery in whole Pakistan by the forest department and prevent the smuggling and punish the timber mafia.
- Those plants should be used for fuel wood which can easily grow and have high mass density.
- We should grow such species of plants which are more suitable for the climatic, geographical and topographical condition of the particular area.
- Government should provide facilities to the local community for seeking different skills to find sources

of livelihood other than just forests cutting.

- Environmental awareness groups that would help in reforestation in the area.
- Instead of using firewood, use other sources to heat up your fireplaces during the winter season.
- Support the laws or programs that were made to protect the forests and to stop any form of deforestation.
- Children should be taught to plant trees as hobbies.
- Reduce the usage of wood for construction, furniture and products. Choose alternative material.
- Government should provide funds, skill, to restore the degraded agriculture land.
- Safety measure should adopt specially along the river side agriculture land.
- Woody trees should be grown along the river/water body to reduce the water velocity during flood.
- Small dam should be constructing to store flood water and reduce flood chances.
- Use simple and effective method of land reclamation.
- Slops of the agriculture land should be minimizing.

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