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Determinants and Consequences of Deforestation in the Indus River Belt Area of Dera Ghazi Khan, Pakistan

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Abstract
Deforestation persists as a main environmental issue in majority of the nations of the world and decreases the number of trees and wildlife species. Many species of animals and plants has become threatened with extension due to loss and fragmentation of habitats. Households' perception knowledge regarding deforestation is significant for establishing suitable conservation and management strategies. To our know-how, this was the 1st research study that determined the perceptions of villagers' about the factor of deforestation and their effect on environment of Riverine forest which are important for their livelihoods. About 150 male respondents were interviewed from three villages in Dera Ghazi Khan, Pakistan. The data was analyzed with the aid of statistical package for social sciences (SPSS). The respondents perceived that fuel wood collection (74%), cutting of trees for income (92.5%), poverty (81%), population pressure (46%), political involvement (39.3%), corruption (74 %) and mismanagement (64%) were the key causes of deforestation. The major effects of deforestation as per perceptions were climate change (87.4%), increase in CO_2 (74.7%), increase in temperature (92.7%), lack of rain (63.2%) and decrease of wildlife species (73.3%). The respondents perceived that provision of alternate fuel source, control of corruption, creation of awareness among the people regarding the importance of forest and reforestation can minimized the deforestation rate.
Keywords: Deforestation, Perception, Riverine Forests. Rural People

1. Introduction

Deforestation is the alteration of forest areas to non forest land use and forest degradation is the decrease of the capability of a forest to supply goods and services (Puyravaud *et al.* 2010; FAO 2010). It has latterly become one of the burning land use issue for various countries in the globe. About 30% of the world forests are known to be deforested (Litvinoff 1990). Major losses are happened in the past 45 years and about 40% of the earth's surface has changed into farm lands and grasslands in early 1990s (WRI 1996). About 13 to 16 million hectares of forests have been converted yearly mainly for agriculture from 1990 to 2010 (FAO 2010). Presently deforestation is one of the key environmental issues facing by humanities throughout the globe (Kovacs 2000). Similarly, deforestation disturbs the environment and its consequences to release of CO_2 in the air, which impart to climate change (Lasco *et al*. 2008). Deforestation is also main reason of loss world terrestrial ecosystems and biodiversity (SCBD 2010).

Pakistan is a one of the most forest deficient country in the world and has only 4.6 m ha area. Out of this area, 1.96 m ha coniferous forests , 1.72 m ha scrub forests, 0.234 m ha irrigated plantations, 0.297 m ha riverine forest and 0.35 m ha mangroves forest. Majority of forests are existed in the north region (Khyber Pakhtunkhwa has 40%, Gilgit Baltistan has 15.7% and Azad Kashmir has 6.5%). These standing forests resources impart considerably to the economy of Pakistan for performing various ecosystem services like keeping a sustainable provision of wood and wood products, soil protection, regulation flow of flood, extending the lifespan of reservoirs, dams and canals, maintenance the ecological balance, provision of food, fuel, sustaining plant pollination and aesthetic value (Qazi 1994; Khan & Mahmood 2003; Mehmood 2003). Their damage could have substantial harmful influences on livelihoods and health, particularly those rural poor people who are totally depend on forests (Wunder 2001). The women are at the most high-risk due to large infant mortality rate, low nutritive status and low life expectancy (Madhurima & Banerjee, 2013). Deforestation and forest degradation also have association with raise prevalence of transmittable ailments (Patz *et al.*2004).

Pakistan faces gigantic problems of deforestation and forest degradation both qualitatively and quantitatively. Deforestation rate varies from 0.2% to 0.5% yearly which is biggest in the globe and forest cover is cut down from 3.59 mha to 3.32 mha with mean rate of 27,000 ha per annum (Pak. 2007). The deforestation rate in riverine forest is 2300 ha/year while in mangrove forests is 4,900 ha/year. The rate of deterioration of forest cover in Khyber Pakhtunkhwa (KPK) province will result to complete desertion of the forest within 30 years in majority of the areas (Suleri 2002). The major causes of forest depletion in KPK are timber mafia, the elimination of forest areas for growing crops by the forest occupants, urbanization, roads construction, rural people dependency on fuel wood and over gazing (Mahmood 2003). The serious threats to juniper forests are

population increases, forest dweller poorness, inadequacy of awareness, ruthless trees cutting by the local people, elimination of undergrowth due to trampling and overgrazing (Khan & Mahmood 2003).

For understanding the problems concerning with natural resource depletion, considering people's perception have a significant role for sustainable management. Various environmental professionals are even so reluctant to consider people's perception in managing the natural resources (Lindemann-Matthies *et al*. 2014). Thus, this study was conducted to assess the views the local people concerning reasons and consequences of deforestation on the riverine forest in Indus River area of Dera Ghazi Khan.

1.1 Hypothesis of the study

I. Higher will be the corruption in forest department; higher will be deforestation.
II. Higher will be the deforestation; higher will be the increase the temperature.

2. Material and Methods

The study was conducted during 2013 in Indus River belt area of Tehsil Dera Ghazi Khan. The total area of the Riverine forest in district is 13522 acres. The tehsil Dera Ghazi Khan has total 34 union councils, among them nine union council (Jakar Imam Shah, Jhok Utra, Ghous abad, Samina, Haji Ghazi, Peer Adil, Kala, Shadan Lund, Shah Sadardin) are situated within river belt area (Fig. 1). Among nine union councils, only three union councils were selected through convenient sampling techniques and two villages were selected from each union council. Samples of 25 respondents were selected from each village with a total of 150. To make the research effective and reliable, all age groups were included for data collection. The data was collected through questionnaires by interviewing face to face including personal demographics characteristics of respondents (age, marital status, education level, occupation, family type, family size, house type, monthly Income), causes and effects of deforestation and how to mitigate deforestation. About eight variables like climate, carbon dioxide, pollution, temperature, rainfall, soil fertility, soil erosion and wildlife were selected to know the effect of deforestation (Adamu and Alarima 2013). The data was pretested on 15 respondents conveniently. Univariate and bivariate methods were made by applying SPSS software. In univariate analysis, frequency and percentage were applied to depict the data. In bivariate analysis, association among dissimilar variables were analyzed by using Pearson Chi-Square ($\chi 2$) and Gamma test.

3. Results and Discussion

3.1 House hold characteristic

In present study, 150 men were interviewed for data collection. Based on current survey records, the relationships of demographic features of the respondents were shown in Table 1. The marital status during survey indicated that the majority (92%) of the responders were married. Regarding age of the answerers, 12 % were between 18 and 22 years of age, 12.7% of the respondents were between 23 and 27 years of age, 12 % respondents were between 28 and 32 years of age, and 18.7% were between 33 and 37 years of age and 44.6% were above 38 years of age. In relation to educational back ground of the respondents, 41.3% were illiterate, 24.7% were primary, 8.7% were middle, 12.6% were matriculation and 4.7% were graduate and above. This indicated that great figure of individuals in the research sites didn't achieve higher education, that may believably hid them to assure better occupations which would support them to make a lot of money for their livelihood. This is so recognizable that the low level of education in the area might be one of the key elements that drive them to join in deforestation activities. Similarly, Kajembe *et al.* (2012) viewed that higher level of education was required which was a vital element for decreasing the deforestation rates. With respect to occupation, agriculture was the main source of livelihood of the respondents (48%), while remaining were labour + agriculture (36.7 %), Govt. job + agriculture (10 %), business (4%) and private jobs (1.3%). According to Ekong (2003), rural was a village area where one half or greater than one half of the populace was involved in agriculture. Generally, farmers were considered as people of rural residents. The respondents whose monthly income up to 10000, their ratio was highest (51.4%) while income in range from 60001 to 70000 were lowest (1.3%). The joint family type was highest (54.7%) whereas extended family type was lowest (6%). House hold size varied from 1-4 (22%), 5-7 (27.3%), 8-10 (33.4%), 11-13 (9.3%) and above 14 (8%). In term of houses styles, most of the respondents were living in kacha houses (46.6%) while remaining in concrete (16.7%) and semi concrete (36.7%).

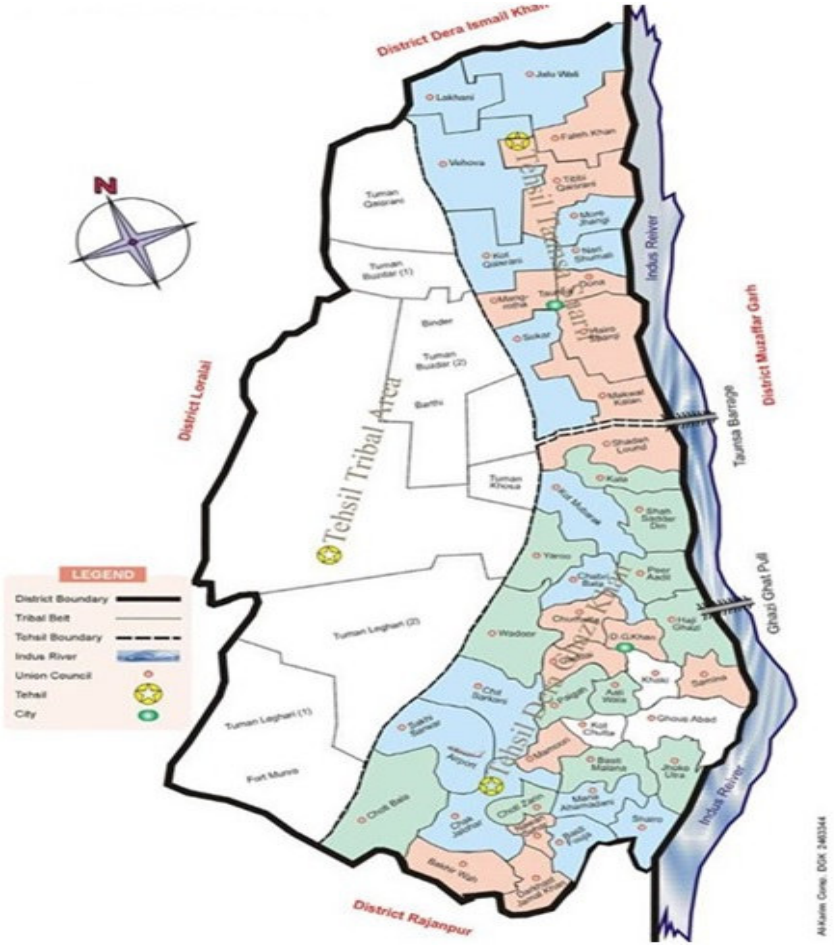

Figure 1. Map of district Dera Ghazi Khan showing the study sites

Table 1: Demographic profile of the respondents (N=150)

Demographics	Variables	Frequency (%)
Marital status	Unmarried	12 (8.0)
	Married	138 (92.0)
Age (years)	18-22	18 (12.0)
	23-27	19 (12.7)
	28-32	18 (12.0)
	33-37	28 (18.7)
	38 & above	67(44.6)
Education	Illiterate	62 (41.3)
	Primary	37 (24.7)
	Middle	13 (8.7)
	Matriculation	19 (12.6)
	Graduation & above	7 (4.7)
Occupation	Agriculture	72 (48.0)
	Agriculture + labour	55 (36.7)
	Govt. job+ Agriculture activities	15 (10.0)
	Business	6 (4.0)
	Private job	2 (1.3)
Monthly Income	Up to 10000	77 (51.4)
	10001-20000	41 (27.3)
	20001-30000	18 (12.0)
	30001-40000	3 (2.0)
	40001-50000	5 (3.3)
	50001-60000	4 (2.7)
	60001-70000	2 (1.3)
Family type	Nuclear	59 (39.3)
	Joint	82 (54.7)
	Extended	9 (6.0)
Family size	1-4	33 (22.0)
	5-7	41(27.3)
	8-10	50 (33.4)
	11-13	14 (9.3)
	Above 14	12 (8.0)
House type	Concrete	25 (16.7)
	Semi concrete	55 (36.7)
	Kacha	70 (46.6)

Source: Field survey 2013

3.2 Perceptions of causes of deforestation

Our study results revealed that about 52% of the respondents were involved in deforestation (Table 2). Matloob *et al*. (2014) reported that about 87% and 75% respondents viewed that illegal logging and timber smuggling was key cause the deforestation. Majority of respondents (92.5%) viewed that people were involved in deforestation for income generation purposes (Table 3). Sen *et al*. 2004 and Mehmood (2003) stated that forests were very important for living things, mostly for the human beings from the economic point of view. We observed that about 39.3% respondents were involved in getting of timber from forest for their domestic use and around 78.3% of the respondents stated that deforestation was due to fuel wood. Our results were in accordance with the finding of Ali and Benjaminsen (2004) who stated that fuel wood was essential element of deforestation in Pakistan because 90% rural population relied on fuel wood. Forest provides 53% domestic energy needs every year, 70 to 79% Pakistani utilized fuel wood for attaining of energy. Similarly, Ali *et al*. 2006 reported that 90% of the responders utilized wood for heating and making of food. Matloob *et al*. (2014) found that 90% of the respondents agreed that household consumption was the cause of deforestation.

Table 2: Distribution of the respondents according to their own involvement in deforestation (N=150)

Are you ever involved in deforestation	Frequency	Percent
Yes	78	52.0
No	72	48.0
Total	150	100.0

Source: Field survey 2013

We found that 65.3% of the respondents agreed that poverty was a human factor of deforestation. Poverty is defined as when a person (his & her) income and consumption is below threshold level (Coudouel & Hentschel 2000). The globe environmental problems were the reasons and consequences of the poverty because poor's met all their needs for survival mainly from the natural resources which were highly degraded by their activities (Binswanger 1980; WCED 1987). Onuche (2010) stated that the continuous living in poverty has enforced the people to utilize the forest resources. Bessie *et al*. 2014 reported that poverty was also the main cause of deforestation. Misana (1999) reported that shortage of fuel wood was main element of deforestation because due to poverty most of the people unable to pay for other fuel sources.

Table 3: Distribution of the respondents according to their opinion about causes of deforestation

Factors	Fuel wood		Timber Purpose		income		Poverty		Population pressure		Political interference		Corruption		Mismanagement	
			F	P	F	P	F	P	F	P	F	P	F	P	F	P
Not applicable	-	-	-	-	-	-	13	5	13	8.7	-	-	-	-	13	8.7
St. Agree	33	22.0	27	18.0	94	62.5	44	54	26	17.3	5	3.3	33	22.0	45	30.0
Agree	78	52.0	32	21.3	45	30.0	54	27	43	28.7	54	36.0	78	52.0	51	34.0
Neutral	12	8.0	36	24	-	-	11	30	28	18.7	27	18.0	12	8.0	18	12.0
Disagree	8	5.3	45	30.0	9	6.0	11	34	36	24	30	20.0	8	5.3	5	3.3
Strongly Disagree	19	12.7	10	6.7	2	1.5	17	11.3	4	2.6	34	22.7	19	12.7	18	12.0
Total	150	100	150	100	150	100	150	100	150	100	150	100	150	100	150	100

Source: Field survey 2013 F=Frequency P=Percentage

Gabol, *et al.*, (2012) reported that poverty was associated with deforestation, but the rich people were also involved in deforestation. They further revealed that in 1997 in the district Ghotki, Sindh province, about 8500 ha of land was deforested. In the present study, about 46% respondents opinioned that population pressure was the cause of deforestation. According to Ingram *et al*. 2005, anthropogenic activities had vital effect on changing the forest. The increase in population and poverty could be one of the significant elements for hastening human activities on forest. The main elements of deforestation were agriculture, charcoal, timber, pole, livestock, overpopulation and urbanization (Forester-Kibuga & Samweli 2010). Bessie *et al*. 2014 stated that deforestation was the cause of unstoppable population growth. People cut the forest trees for numerous purposes i.e. firewood, timber wood and land for agriculture.

Our cumulative results showed that 39.3% of the respondents agreed that due to political interference forests were reducing. According to Saeed (2002), deforestation was linked with the elements that were social, institutional, political and economic. The political involvement also promoted tree cutting activities and helped timber mafia (smugglers) to violate the rules and regulations of the government.

We observed that most of the (74%) respondents were agreed that corruption in forest department was an essential element of deforestation (Table 3). The hypothesis No 1 was tested and found that there was a highly significant association between corruption in forest department and respondents perception regarding deforestation (Chi-Square ($\chi 2$) =19.64 DF = 12, P-value = 0.018; Table 4). FAO (2009) reported that corruption was the main threats to global forest resources and a worldwide crime which happened in many countries and a

core issue of deforestation (Anon. 2001). Koyunen and Yilmaz (2009) gave similar findings and found a significant relationship between corruption and forest cutting in various parts of the globe. Gorte & Sheikh (2010) revealed that the main reason of deforestation was corruption and defective land tenure. The corruption practices may include the approval of unlawful agreements with private contractors by forestry officials, forest products smuggling and permitting unlawful logging (Contreras-Hermosilla 2001). Our findings were also in close in agreement with Ali *et al*. (2006) who stated that 79% of the respondents charged the forest department for illicit deforestation, 16% expressed that the native individuals were involved in unlawful cutting. The officials of the forest department acquired bribe from the outsiders and local villagers to allow them for cutting the trees. The higher rank forest officers also took huge quantity of money from the wood smugglers and permit them for cutting the trees in the forest areas.

We found that about 64% of the respondents opined that mismanagement in forest department was one of the core factors of deforestation. Our findings supported the findings of Ali *et al*. 2005 who revealed that deforestation was due to weak forest management and ill administration. Similar findings were also reported by Bessie *et al.* 2014 who stated that deforestation was due to imperfect forest sector establishments. Our results were also agreed with the findings of Matloob *et al*. (2014) who highlighted that 50% of the respondents revealed that ineffective role of forest department were a key element of deforestation. The management of forest resources was ineffective in Pakistan and Azad Kashmir due to ill-defined forestry institutions that were suffering from serious deficiencies (Kreuseman & Pellegrini 2008). The forest departments were devoid of adequate plans to check the illegal forest trees cutting. The country had inadequate institutionalized structure, disputed tenure and ineffective public involvement as the fundamental elements of deforestation (FAO 1998).

Table 4. Association between corruption and respondents perception regarding deforestation

Deforestation	Corruption in Forest Department										Total	
	St. Agree		Agree		Neutral		Disagree		St. Disagree			
	F	P	F	P	F	P	F	P	P	F	P	F
St. Agree	14	35.8	27	18	5	3.3	9	6	9	6	64	42.6
Agree	22	14.6	36	24	2	1.3	9	6	9	6	78	52
Neutral	4	2.6	1	0.7	1	0.7	0	-	0	-	5	3.4
Disagree	2	1.3	-	-	0	-	0	-	0	-	3	2
Total	42	28	64	42.6	8	5.4	18	12	18	12	150	100

Chi square= 19.64 df= 12 p-value= 0.018 ** Gamma = -0.259 F=Frequency P=Percentage

3.3 Perceptions of effect of deforestation

Climate change was a cause of deforestation according to the perception of about 87.4% respondents in the study area (Table 5). According to United Nations Framework Convention on Climate Change (UNFCCC 2007), it is a variation of climate that is attributed to human activity (directly or indirectly) that changes the formation of world weather. Climate change is attracting worldwide concern because it is realized dangers to the ground, mankind and environment. Major variations in climate were happened due to greenhouse gases emissions (GHG) in the last 30 years (Akinbami *et al* 2003). GHG are groups of naturally occurring gases in the atmosphere which can capture heat energy close to surface of the earth. The main greenhouse gases are water vapour, carbon dioxide (CO_2), methane and ozone and their contribution to greenhouse effect are 36 to 70%, 9 to 26%, 4 to 9% and 3 to 7% respectively. Similarly, man-made gases which also affected the greenhouse are sulphur hexafluoride (SF6), hydro fluorocarbons (HFCs) and fluorocarbons (Phillip & William 2004). The carbon dioxide accumulation with methane and nitrous oxide (trace gases) also increased the greenhouse gases effect which leaded to climate change. The anthropoid actions were heating the earth and induced to climate change (IPCC 2007). Similarly, Lasco *et al*. (2008) revealed that there was a significant direct relationship between climate change and forests. Variations in climate were impacting the forest and its capability to supply its ecological services. Further, deforestation impacted the environment and it effects contributed to climate change by released of CO_2 in the air. The clearing of land and deforestation by human activities released about 1.7 billion metric tons carbon per year in the atmosphere (CBD 2007). Our results were in close agreement with Khan *et al.* 2013, who reported that 57% of the respondents were agreed that climate change in the area was due to anthropogenic activities like populace pressure, excessive cropping, deforestation, grazing above carrying capacity, spoil of land and air pollution. They further revealed that about 90% respondents voted for declined in forests area due to illicit trees cutting for their domestic purposes. They also observed that due to raising temperature (80%) and falling precipitation (90%) during 1990 to 2011, the climate was changed into hot climate in arid region. These changes were not merely persisted in the dry areas, but it had also affected the whole area of Pakistan. The climate change was also due to deforestation, industrial pollution and modernization (Nyanga *et al*. 2011). In our study, majority of the respondents (74%) viewed that due to deforestation, concentration of carbon dioxide had increased while 32.6% respondents agreed that pollution was increased due to deforestation. Similar finding were founds by Gorte and Sheikh (2010) who revealed that due to deforestation, various

environmental problems were created like climate change, pollution, global warming and toughness in climate (Lasco *et al*. 2008).

Table 5. Distribution of the respondents according to their opinion about effect of deforestation

Effect of deforestation	Climate change		Increased in Co2		Pollution increases		Increase in temperature		Lack of rain		Decrease fertility of soils		Soil erosion		Effect on wildlife	
	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P
St. Agree	43	28.7	69	46.0	14	9.3	93	62.0	40	26.4	28	18.7	24	16.0	35	23.3
Agree	88	58.7	43	28.7	35	23.3	46	30.7	55	36.8	25	16.7	39	26.0	75	50.0
Neutral	11	7.2	17	11.3	52	34.7	4	2.7	25	16.8	32	21.3	35	23.3	12	8.0
Disagree	4	2.7	11	7.3	30	20	4	2.6	21	14.0	25	16.7	24	16.0	9	6.0
St. Disagree	4	2.7	10	6.7	19	12.7	3	2.0	9	6.0	40	26.6	28	18.7	19	12.7
Total	150	100	150	100	150	100	150	100	150	100	150	100	150	100	150	100

Source: Field survey 2013 F=Frequency P=Percentage

We observed that about 92.7 % respondents noticed that increased in temperature was due to deforestation. The hypothesis No 2 was tested and observed that there was a significant association between deforestation and respondents perception about increased in temperature (Chi-Square ($\chi 2$) =23.48, DF = 12, P-Value = 0.024). Gamma value showed a positive relationship between the variables (Gamma = 0.232; Table 6). With regard to rainfall, 63.2% of the respondents agreed that deforestation had decreased the rainy season. Similar findings were given by Volpi (2007) who stated that deforestation affected negatively on the natural resources such as rainfall, temperature and fresh water. The raised in temperature enhanced the threat of disease and due to loss of forest, flooding was increased which highly promoted the malaria incidence (Patz *et al*. 2005). Matloob *et al*. (2014) reported that 55% of respondents had strong opinion that changed in rainfall pattern and temperature was due to deforestation. Huge forest clearing changed the pattern of rainfall, humidity and microclimates regime (Phillips & Marden 2005). Cutting of forests straightly affected the agricultural climate of local areas which impacted the sustenance's due to influence of forests on rainfall and water availability. This change in the rainfall patterns leaded to decline of water availability and food production (Zingari & Fiebiger 2002; Alexander 2005).

Table 6. Association between increase in temperature and respondents perception regarding deforestation

Forest are decreasing	Increase in temperature										Total	
	St. Agree		Agree		Neutral		Disagree		St. Disagree			
	F	P	F	P	F	P	F	P	P	F	P	F
St. Agree	43	35.8	17	11.3	2	1.7	1	0.7	1	0.7	64	42.6
Agree	48	32	25	16.6	1	0.7	3	2	1	0.7	78	52
Neutral	2	1.7	1	0.7	1	0.7	1	--	0	0.7	5	3.4
Disagree	0	-	3	2	0	--	0	--	0	--	3	2
Total	93	62	46	30.6	4	2.6	3	2.6	3	2	150	100

Chi square=23.48 df= 12 p-value= 0.024* Gamma = 0.232 F=Frequency P=Percentage

Our results showed that about 42% of the respondents perceived that deforestation spoiled the land in the form of soil erosion while 35.4% of the respondents viewed that deforestation decreased the fertility of the soil. Coe *et al*. (2009) found similar results and revealed that deforestation increased the soil erosion due to surface runoff, enhanced area of bare soil and decreased in agriculture productivity. In Tanzania deforestation leaded adverse effects on fertility of soil, water flows and biodiversity (Misana & Nyaki 1993). Similarly, Matloob *et al*. (2014) reported that 93% respondents believed that soil erosion was a consequence of deforestation.

Our outcomes revealed that about 73.3% respondents agreed that deforestation had badly affected the wildlife species (Table 5). Similar findings were observed by Abbasi *et al*. (2011) who revealed that deforestation had damaged many animals species and also millions species of plants. Similarly, Saeed (2002) found related results regarding the effects of deforestation on resources. According to FAO (2009), deforestation changed the habitats of wild animals and destroyed the species of wildlife. Due to over misused of the natural habitats, wildlife habitat and biodiversity were lost (Misana 1999). Biodiversity had been seriously affected in the district Gotki, Sindh province of Pakistan due to deforestation (Gabol *et al*. 2012).

4. Conclusion

The significant relation was observed between deforestation and corruption and also between deforestation and rise in temperature. Majority of the people perceived that fuel wood collection, cutting tree for income, poverty, population pressure, political involvement, mismanagement and corruption were the key causes of deforestation. The major effects of deforestation were climate change, increase in CO_2, increase in temperature, lack of rain and decrease of wildlife. The provision of alternate source of energy, control of corruption, awareness creation

and reforestation can reduce the deforestation rate.

Table 7. Perceived solutions to deforestation in river belt areas of Indus River

Response	Provision of alternate fuel source		Eliminate corruption		Enhancing awareness		Reforestation	
	F	P	F	P	F	P	F	P
St. Agree	90	60.0	91	60.6	95	63.3	109	72.7
Agree	50	33.3	52	34.7	54	36.0	41	27.3
Neutral	7	4.7	6	4.0	1	0.7	-	-
Disagree	3	2.0	1	0.7	-	-	-	-
Total	150	100	150	100	150	100	150	100

Source: Field survey 2013 F=Frequency P=Percentage

5. Recommendations

In order to overcome deforestation, following recommendations were made as per perception (Table 7) of the respondents.

1. **Provision of alternate fuel source**. Most of the respondents (93.3%) perceived that provision of alternate fuel source will reduce the deforestation rate (Khan *et al.* 2013). The government should provide biogas plant in rural areas. This act can be minimized the pressure on the forests.
2. **Elimination of corruption**. Many respondents (95.3%) opined that by controlling the corruption, deforestation can be reduced. The forest department should manage good governance and implement forest laws strictly to minimize the corruption.
3. **Awareness creation**. Majority of respondents (99.3%) viewed that creation of awareness to the people could minimize the deforestation. Most of the populations in the study area were illiterate (66%). They were unaware about the benefits of forests and adverse effects of deforestation. Therefore, it is need of time to educate the people about the benefits of forests and negative effects of cutting of trees. Awareness is a serious factor of observation (Alarima 2011). The government should arrange seminars and provide extension service to educate the rural communities for mitigating the associated problems of deforestation.
4. **Reforestation**. All the respondents were agreed that reforestation can reduce the deforestation in the river belt areas. Reforestation is a positive step towards control of deforestation. People should be motivated through proper awareness campaign and every individual should be involved to participate in tree plantation to bring back the forest into the original condition (Khan *et al.* 2013). This step will help to decrease the level of CO_2 through carbon sequestration due to releases from human activities and fuel ignition. In carbon sequestration process trees absorb carbon from the air for preparation of their food through the process of photosynthesis and decreases harmful consequences on the environment. Trees also serves to improve the utmost of climate by cleaning air and making a comfortable living environment for people and animals (Adamu *et al*. 2013).
5. **Policy for protection of forests.** Pakistan is losing approximately 27000 ha of forest land in each year. If this situation will continue, Pakistan will loss majority of forests areas in near future. It is assumed that increasing population pressure is the main root cause of deforestation and forest degradation. Further, the people who reside near the forests utilized the wood to meet their daily needs (FAO 2001). It is duty of the government to make policy of poverty reduction and determined the solution to control the people away from forest and also strengthen the Forest department.

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