Micro-Level Study of Deforestation in the Capital Terrotory of Pakistan

Fatima Khalid[a], Muhammad Babar Taj[bc]*, Asma Jamil[a], Ahmad Raheel[c], Muhammad Sharif[b], Huda Kamal[a], Tahira Afzal[a], Tahseenullah Khan[a], Muhammad Jamshed Iqbal[d], Muhammad Ashiq[e] and Shafia Iftikhar[c]

[a]Department of Earth and Environmental Sciences, Bahria University, Islamabad-44000, Pakistan
[b]Department of Chemistry, Islamia University, Bahawalpur-63100, Pakistan
[c]Department of Chemistry, University of Sahiwal, Sahiwal-57000, Pakistan
[d]WWF Pakistan Ferozpur road Lahore-54600, Pakistan
[e]Pakistan Agricultural Research Council, Islamabad-44000, Pakistan

Abstract. Wood products are better than artificial material, products when evaluating with environmental concerns, but our World's forests cannot be compromised for these products. As the increasing demand for wood product leads to deforestation, more rapid tree cutting even without permits and cause threat to human health and wildlife. The current study estimates the percentage of wood cutting and gives a comparison of green cover for a period (2009-2016) in Margalla Hills National Park (MHNP), Islamabad. Scale and after math of wood harvesting is a major area of concern. The wood consumption by villagers of MHNP, the role of authorities and communities to safeguard MHNP and its effects are also studied by incorporating villagers and forest guards' point of view through questionnaire and interviews, respectively. The forest cover of MHNP is reduced at high percentage due to deforestation and different land use pattern. It needs to be monitored and taken as the responsibility of the government and the public to protect forests.

Keywords: forests, conservation, incoherence, local, forest-users

Introduction

Margalla Hills National Park is a national park located in Islamabad capital territory, Pakistan falling in the IUCN category V (protected landscape/seascape). The park includes the Margalla Hills, which forms the foothills of the Himalayas, along with Shakarparian Park and Rawal lake. Established in 1980, Margalla Hills National Park covers approximately 17,386 hectares (67.13 mi²) (Khalid *et al*., 2019). The land use/land cover mapping activity of the Margalla Hills National Park (MHNP) is carried out by the WWF-Islamabad team and the steps involved are discussed below.

The Margalla hills national park (MHNP) is in the foothills of Himalayas in Pakistan (Khalid *et al*., 2019). The total area covered by Margalla hills is 203.9 km² (CDA, Islamabad capital territory map). The capital city Islamabad is divided into zones where Margalla hills are in zone 3. (CDA, Islamabad capital territory map).

A study on 'Illegal Logging and Related Timber Trade' reported that China depends upon all tropical forest regions and Russia for illegal timber whereas India

depends on southeast Asia. China consuming the illegal wood with a worth of USD (United States Dollar) 3295.7 million annually, Vietnam of USD 767.3 million, India of USD 596.5 million, EU of USD 453.9 million, Thailand of USD 101.4 million, USA (United States of America) of USD 88.2 million, South Korea of USD 22.4 million, Japan of USD 15.1 million, Malaysia of USD 12.1 million and Australia of USD 1.1 million (Maryudi, 2016). Whereas Pakistan contributes about USD 782 million for illegal logging, annual illegal wood harvesting (Chiabai *et al*., 2011).

Land cover classification methodology. Methodology for processing of classification of Margalla Hills National Park is done using open source software named "Quantum GIS (QGIS)" following the IPCC Good practice guidelines (GPG) & Global observation of Forest and Land Cover - FAO (GOFC-GOLD). The stepwise process is cumbersome but bears fine-tuned results. They can be summed up as follows:

Image acquisition. Freely available satellite imagery is downloaded from NASA's US-Geological Survey website. As a search criterion, it is best to select a search query of satellite imagery while browsing for the month's

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*Author for correspondence; E-mail: drbabartaj@gmail.com

range September - November because the cloud-cover is the least and the results achieved are more accurate.

Pre-processing. Top-of-Atmosphere (ToA) correction is applied along with some histogram stretches to improve visual interpretation for analysis of the imagery. To stack the individual bands into one seamless raster file, we concatenate the visible (RGB) and Infrared (NIR, SWIR) bands.

The projection system of all datasets should be kept the same i.e. UTM Zone 43 in our case which corresponds to code 32643 of the EPSG Geodetic Parameter Dataset, a structured dataset of Coordinate Reference Systems and Coordinate Transformations, accessible through this online registry (www.epsg-registry.org). We clip the imagery to our MHNP boundary with a buffer of 200m circular radius.

Classification. Using the semi-automated classification plugin (SCP), we create "Macro Class Ids" according to IPCC and Micro Class Ids" if any. We used several image composites along with freely viewable "Google Earth" or "Bing Imagery" as a reference to validate our classification. Taking the classifier sample sets of each class defined to train the classifier; we keep a minimum pixel size for the samples defined to avoid class mixing.

The classification process needs to be run several times to achieve the desired quality of results using different algorithms as "Spectral Signatures Mapping" or "Nearest neighbourhood method" etc. The processing of each signature set takes several hours to run depending upon the capabilities of the system. For this step, it may be helpful to check the RMS errors that each signature samples are generating and then replacing them with better pixel samples with RMS error closer to 1 or less. Root Mean Square Error (RMSE) is the standard deviation of the residuals (prediction errors). In simple words, it tells you how concentrated the data is around the line of best fit.

The results can be checked by computing the raster statistics and are refined until the desired accuracy is achieved. As a final step, the achieved output may have some sinks or "Outliers" and these can be removed by applying filtering tools to the "Salt and Pepper" from the scene.

Results and Discussion

**Villagers particulars.** *Villagers responses.* The responses of households are condensed into graphs in percentage against the specified options. The purpose of this survey is to evaluate the villages and other household depending upon the wood of Margalla Hills National Park. Their dependency affecting biodiversity and the role of authorities played to safeguard the MHNP. The responses to the household questionnaire are given in Fig. 1.

In Fig. 1, the villagers' response in percentage against specified options is summarized for their dependency on wood. The three possibilities are "Yes", "No" and "Sometimes". 100% Rumli and Shahdara villagers favoured the option "Yes". 93.3% of Nurpur villagers favoured the option "Yes" and 6.7% favoured the option "Sometimes". 40% of the Saidpur villagers favoured the option "Yes", 6.7% favoured the option "No" and 53.3% favoured the option "Sometimes".

In Fig. 2, the villagers' response in percentage against specified options is summarized for areas on which villagers depend on for wood. The three possibilities
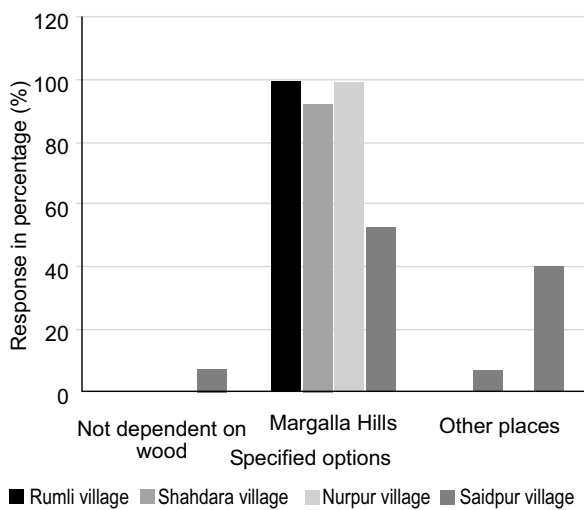
Table 1. Villagers particulars

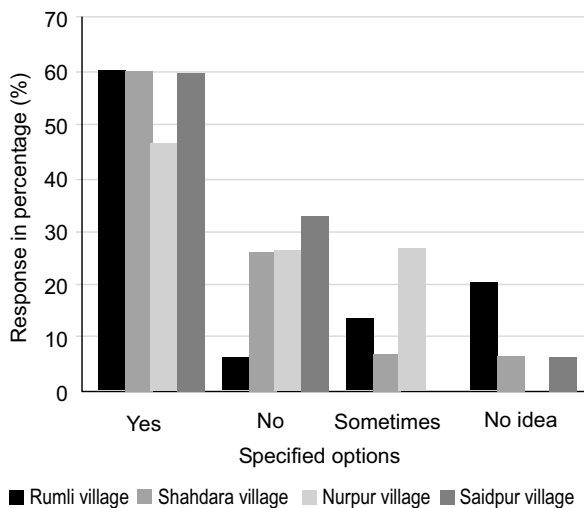| Status	Description
Number of villages	4
Name of villages	Rumli, Shahdara, Nurpur and Saidpur
Number of households per village	15
Gender	Male and Female
Age	25-45
Education	Under matric to graduate
Class	Low class
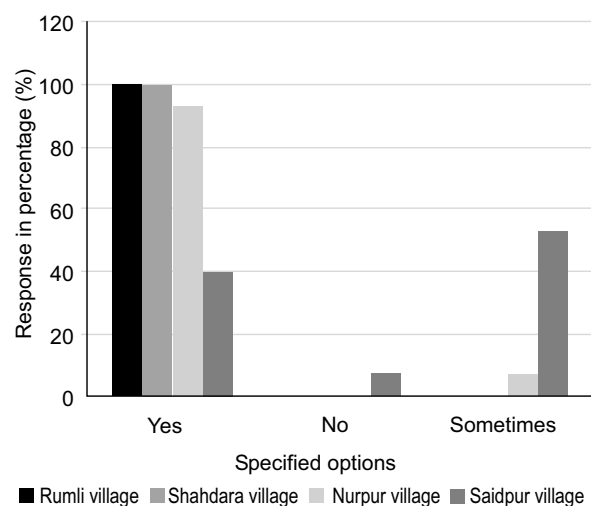
Fig. 1. Percentage of villagers depending on the wood.

are "Not dependent on wood", "Margalla Hills" and "Other Places". 100% Rumli and Nurpur villagers favoured the option "Margalla Hills". 93.3% of Shahdara villagers favoured the option "Margalla Hills" and 6.7% of villagers favoured the option "Other places". 53.3% of Saidpur villagers favoured the option "Margalla Hills", 6.7% of villagers favoured the option "Not dependent on wood" and 40% of villagers favoured the option "Other places". The responses to the household questionnaire are given in Fig. 3.

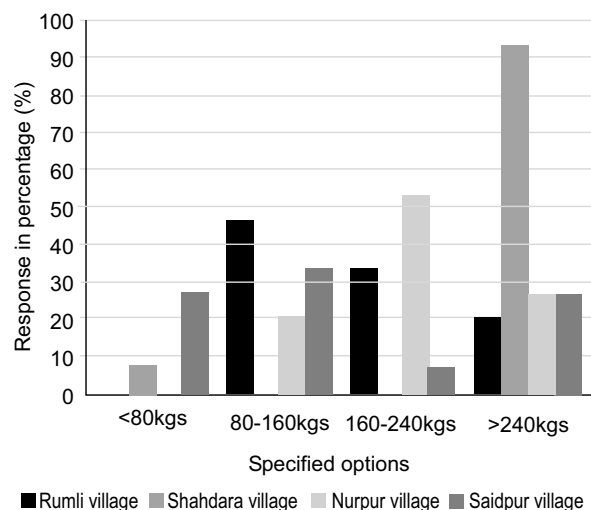In Fig. 3, the villagers' response in percentage against specified options is summarized for their wood depen-

dency in kilograms per month. The four possibilities are <80 Kg, 80-160 Kg, 160-240 Kg and >240 Kg. 20% Rumli villagers favoured the option >240 Kg, 33.3% villagers favoured the option 160-240 Kg and 46.7% of the villagers favoured the option 80-160 Kg. 93.3% of Shahdara villagers favoured the option >240 Kg and only 6.7% of villagers favoured the option <80 Kg. 26.7% of Nurpur villagers favoured the option >240 Kg, 53.3% villagers favoured the option 160-240 Kg and 20% villagers favoured the option 80-160 Kg. 26.7% Saidpur villagers favoured the option >240 Kg, 6.7% villagers favoured the option 160-240 Kg, 33.3% villagers favoured the option 80-160 Kg and 26.7% villagers favoured the option <80 Kg. The responses to the household questionnaire are given in Fig. 4.
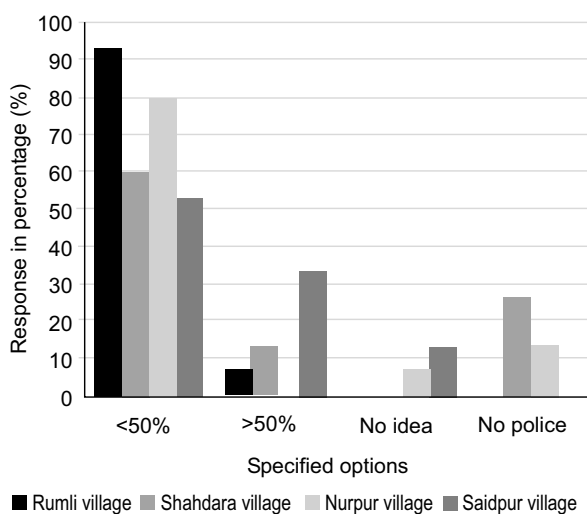
In Fig. 4, the villagers' response in percentage against specified options is summarized for a percentage of non-villagers cutting MHNP trees. The four possibilities are "Yes", "No", "Sometimes" and "No idea". 60% Rumli villagers favoured the option "Yes", 6.7% villagers favoured the option "No", 13.3% villagers favoured the option "Sometimes" and 20% villagers favoured the option "No idea". 60% Shahdara villagers favoured the option "Yes", 26.7% villagers favoured the option "No", 6.7% villagers favoured the option "Sometimes" and 6.7% villagers favoured the option of "No idea". 46.7% of Nurpur villagers favoured the option "Yes", 26.7% villagers favoured the option "No" and 26.7% villagers favoured the option "Sometimes". 60% of Saidpur villagers favoured the option "Yes", 33.3% of villagers

Fig. 2. Areas on which villagers depend on for wood.

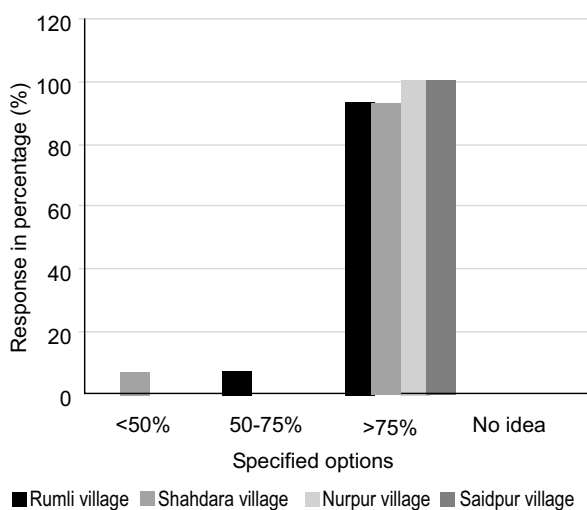**Fig. 3.** Wood dependency in kilograms per month.

Fig. 4. Percentage of non-villagers cutting MHNP trees.

favoured the option "No" and 6.7% villagers favoured the option "No idea". The responses to the household questionnaire are given in Fig. 5.

In Fig. 5, the villagers' response in percentage against specified options is summarized for the role of police in safeguarding MHNP. The four possibilities are <50%, >50%, "No idea" and "No police". 93.3% of Rumli villagers favoured the option <50% and 6.7% of villagers favoured the option >50. 60% of Shahdara villagers favoured the option <50%, 13.3% of villagers favoured the option >50% and 26.7% villagers favoured the option "No police". 80% of Nurpur villagers favoured

the option <50%, 6.7% of villagers favoured the option "No idea" and 13.3% of villagers favoured the option "No police". 53.3% of Saidpur villagers favoured the option <50%, 33.3% villagers favoured the option >50% and 13.3% villagers favoured the option "No idea". The responses to the household questionnaire are given in Fig. 6.

In Fig. 6, the villagers' response in percentage against specified options is summarized for the role of forest guards in safeguarding MHNP. The four possibilities are <50%, 50-75%, >75% and "No idea". 93.3% of Rumli villagers favoured the option >75% and only 6.7% of villagers favoured the option 50-75%. 93.3% of Shahdara villagers favoured the option >75% and only 6.7% of villagers favoured the option <50%. 100% Nurpur and Saidpur villagers favoured the option >75%. The responses to the household questionnaire are given in Fig 7.

In Fig. 7, the villagers' response in percentage against specified options is summarized for how illegal logging is possible. Four possibilities are "Bribed", "Threatened", "Hide from guards" and "Permission for illegal logging is not possible". 53.3% of Rumli villagers favoured the option "Bribed", 20% favoured the option "Threatened" and 26.7% favoured the option "Permission for illegal logging is not possible". 53.3% of Shahdara villagers favoured the option "Bribed", 26.7% favoured the option "Hide from guards" and 20% villagers favoured the option "Permission for illegal logging is not possible". 33.3% of Nurpur villagers favoured the option "Bribed",

Fig. 5. Role of police in safeguarding MHNP.

**Fig. 6.** Role of forest guards in safeguarding MHNP.
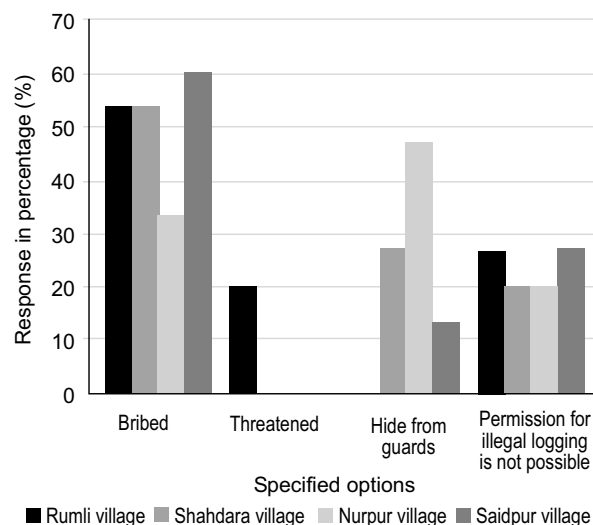
Fig. 7. Possibilities of illegal logging.

46.7% villagers favoured the option "Hide from guards" and 20% villagers favoured the option "Permission for illegal logging is not possible". 60% of Saidpur villagers favoured the "Bribed", 13.3% villagers favoured the option "Hide from guards" and 26.7% villagers favoured the options "Permission for illegal logging is not possible". The responses to the household questionnaire are given in Fig. 8.

In Fig. 8, the villagers' response in percentage against specified options is summarized for illegal logging in MHNP. The four possibilities are 20-30%, 40-50%, 60-70% and "Above 80%". 46.7% Rumli villagers favoured the option 20-30%, 33.3% favoured the option 40-50%, 6.7% villagers favoured the option 60-70% and 13.3% villagers favoured the option "Above 80%". 26.7% of Shahdara villagers favoured the option 20-30%, 53.3% favoured the option 40-50% and 20% of villagers favoured the option "Above 80%". 60% of Nurpur villagers favoured the option 20-30%, 26.7% of villagers favoured the option 40-50% and 13.3% villagers favoured the option "Above 80%". 46.7% of Saidpur villagers favoured the option 20-30%, 13.3% favoured the option 40-50% and 40% favoured the option "Above 80%". The responses to the household questionnaire are given in Fig. 9.

In Fig. 9, the villagers' response in percentage against specified options is summarized for change due to rapid tree cutting. The four possibilities are "Increased temperature", "Decreased animal count", "Both first and second options" and "No change". 20% Rumli villagers favoured the option "Increased temperature", 6.7%
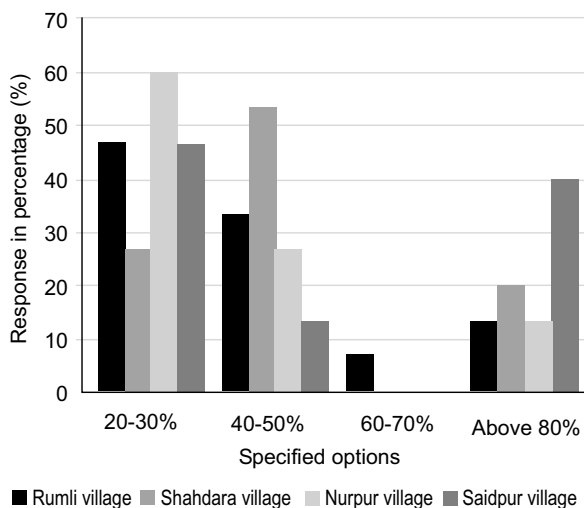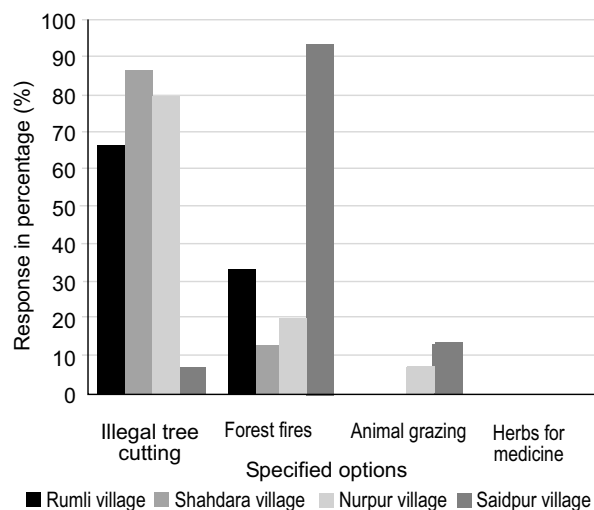
villagers favoured the option "Decreased animal count", 53.3% villagers favoured the option "Both first and second options" and 20% of villagers favoured the option "No change". 20% Shahdara villagers favoured the option "Increased temperature", 33.3% villagers favored the option "Decreased animal count", 53.3% villagers favored the option "Both first and second option" and 13.3% of villagers favored the option "No change". 13.3% Nurpur villagers favoured the option "Increased temperature", 26.7% villagers favoured the option "Decreased animal count", 53.3% villagers favored the option "Both first and second options" and
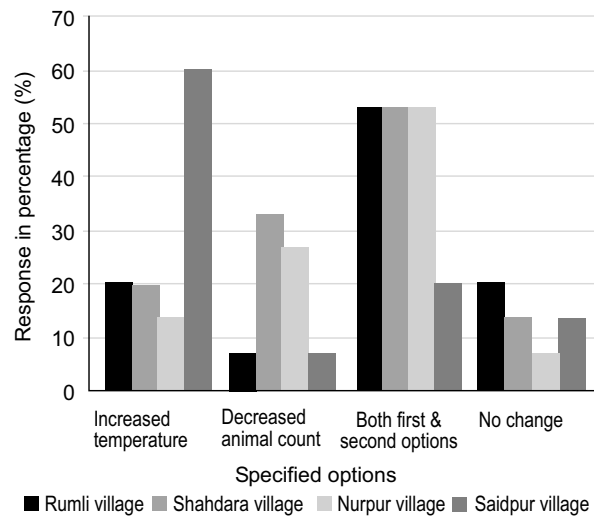
Fig. 9. Change due to rapid tree cutting .

Fig. 10. Activity responsible for MHNP tree decline.

Fig. 8. Illegal logging in MHNP.

6.7% villagers "No change". 60% of Saidpur villagers favoured the option "Increased temperature", 6.7% of villagers favoured the option "Decreased animal count", 20% villagers favored the option "Both first and second option" and 13.3% of villagers favoured the option "No change". The responses to the household questionnaire are given in Fig. 10.

In Fig. 10, the villagers' response is summarized for activity responsible for MHNP tree decline. 66.7% of Rumli villagers favoured the option "Illegal tree cutting" and 33.3% favoured the option "Forest fires". 86.7% of Shahdara villagers favoured the option "Illegal tree cutting" and 13.3% villagers favoured the option "Forest fires". 80% of Nurpur villagers favoured the option "Illegal tree cutting" and 20% of villagers favoured the option "Forest fires". 6.7% of Saidpur villagers favoured the option "Illegal tree cutting" and 93.3% of villagers favoured the option "Forest fires". The responses to the household questionnaire are given in Fig. 11.

In Fig. 11, the villagers' response in percentage against specified options is summarized for the decline in animals of MHNP. The four possibilities are "All types", "Animals providing meat and milk", "Animals not providing meat and milk" and "Birds". 20% of Rumli villagers favoured the option "All types", 60% of villagers favoured the option "Animals providing meat and milk" and 20% of villagers favoured the option "Birds". 53.3% Shahdara villagers favoured the option "All types", 26.7% villagers favoured the option "Animals providing meat and milk", 6.7% villagers favoured the option "Animals not providing meat and

milk" and 13.3% villagers favoured the option "Birds". 33.3% of Nurpur villagers favoured the option "All types", 40% of villagers favoured the option "Animals not providing meat and milk" and 26.7% villagers favoured the option "Birds". 53.3% of Saidpur villagers favoured the option "All types", 40% of villagers favoured the option "Animals providing meat and milk" and 6.7% villagers favoured the option "Birds". The responses to the household questionnaire are given in Fig. 12.

In Fig. 12, the villagers' response in percentage against specified options is summarized for the decline in trees of MHNP. The four possibilities are "All types", "Tradable wood", "Fruit trees" and "No idea". 20% Rumli villagers favoured the option "All types", 53.3% villagers favoured the option "Tradable wood", 6.7% villagers favoured the option "Fruit trees" and 20% villagers favoured the option of "No idea". 6.7% Shahdara villagers favoured the option "All types", 53.3% villagers favoured the option of "Tradable wood", 13.3% villagers favoured the option "Fruit trees" and 26.7% villagers favoured the option of "No idea". 20% of Nurpur villagers favoured the option of "All types" and 80% of villagers favoured the option "Tradable wood". 66.7% of Saidpur villagers favoured the option "Tradable wood" and 33.3% villagers favoured the option of "No idea". The responses to the household questionnaire are given in Fig. 13.

In Fig. 13, the villagers' response in percentage against specified options is summarized for villagers' opinion about animals and plants importance. The four possi-
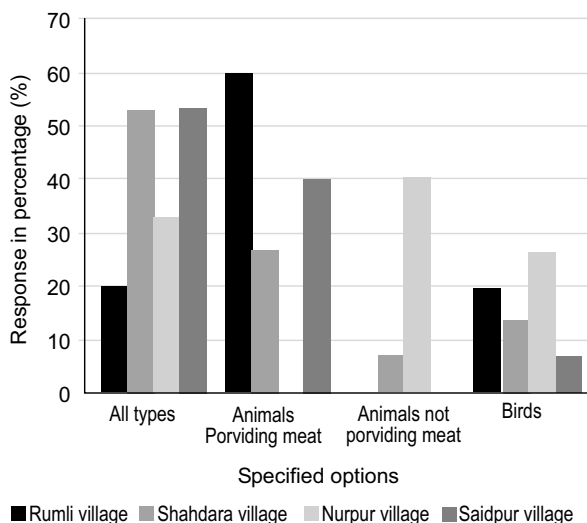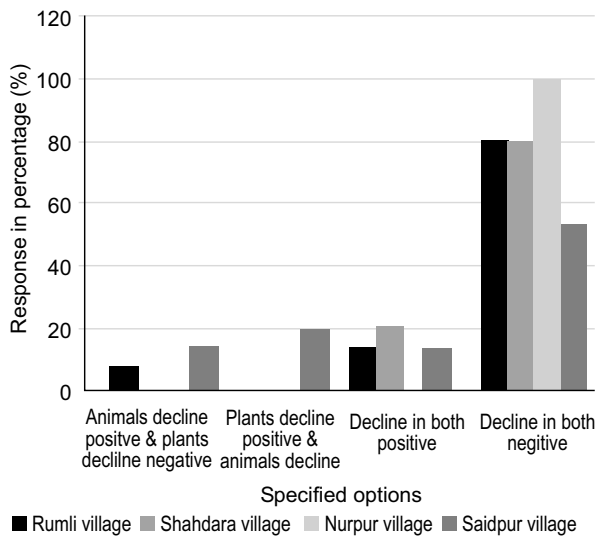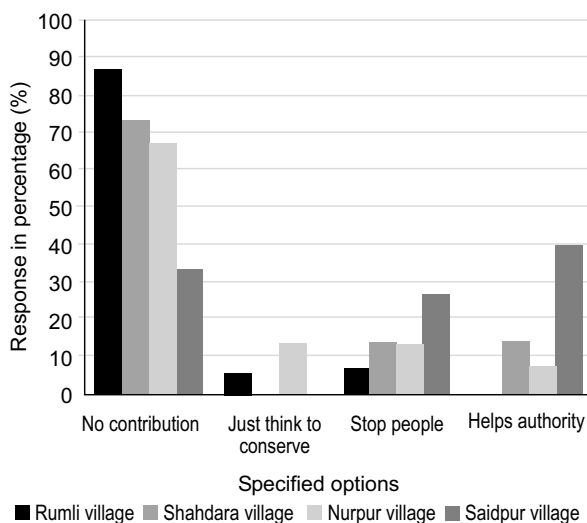

Fig. 11. A decline in animals of MHNP.
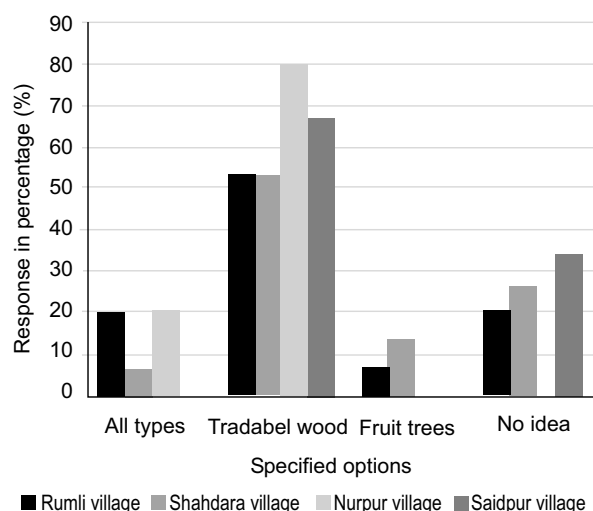
Fig. 12. The decline in trees of MHNP.

bilities are "Animals decline positive and plants decline negative", "Plants decline positive and animals decline negative", "Decline in both positive" and "Decline in both negative". 6.7% Rumli villagers favoured the option "Animals decline positive and plants decline negative", 13.3% villagers favoured the option "Decline in both positive" and 80% villagers favoured the option "Decline in both negative". 20% of Shahdara villagers favoured the option "Decline in both positive" and 80% of villagers favoured the option "Decline in both

negative". 100% of Nurpur villagers favoured the option "Decline in both negative". 13.3% Saidpur villagers favoured the option "Animals decline positive and plants decline negative", 20% villagers favoured the option "Plants decline positive and animals decline negative", 13.3% villagers favoured the option "Decline in both positive" and 53.3% villagers favoured the option "Decline in both negative". The responses to the household questionnaire are given in Fig. 14

Figure 14 shows villagers' response to the role of community in safeguarding MHNP. 86.7% of Rumli villagers favoured the option "No contribution", 6.7% favoured each option "Just think to conserve" and "Stop people". 73.3% of Shahdara villagers favoured the option "No contribution", 13.3% favoured each option "Stop people" and "Helps authority". 66.7% Nurpur villagers favoured "No contribution", 13.3% favoured the option "Just think to conserve", 13.3% favoured the option "Stop people" and 6.7% villagers favoured the option "Helps authority". 33.3% of Saidpur villagers favoured option "No contribution", 26.7% favoured "Stop people" and 40% favoured "Helps authority". The responses to the household questionnaire are given in Fig. 15.

In Fig. 15, the villagers' response is summarized for that how to conserve MHNP in future. 33.3% of Rumli villagers favoured the option "Prevent cutting and fires", 60% of villagers favoured the option "Responsibility of government" and 6.7% of villagers favoured the option "Awareness". 13.3% Shahdara villagers favoured

Fig. 13. Villagers' opinion about animals and plants importance.

Fig. 14. Role of community in safeguarding MHNP.
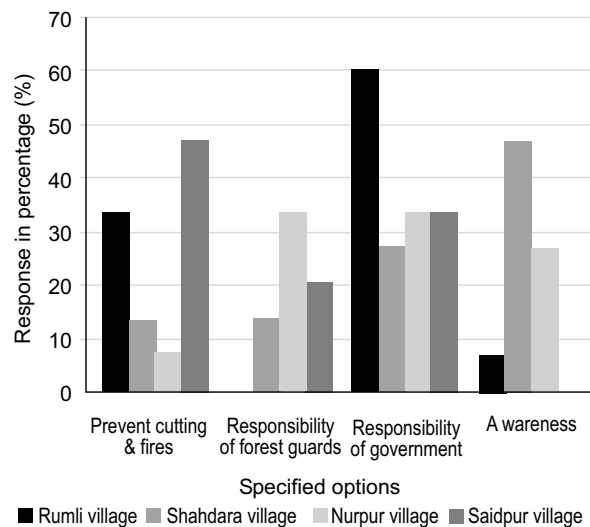
Fig. 15. How to conserve MHNP in future.

the option "Prevent cutting and fires", 13.3% villagers favoured the option "Responsibility of forest guards", 26.7% villagers favoured the option "Responsibility of government" and 46.7% villagers favoured the option "Awareness". 6.7% Nurpur villagers favoured the option "Prevent cutting and fires", 33.3% villagers favoured the option "Responsibility of forest guards", 33.3% villagers favoured the option "Responsibility of government" and 26.7% villagers favoured the option "Awareness". 46.7% Saidpur villagers favoured the option to "prevent cutting and fires", 20% villagers favoured the option "Responsibility of forest guards" and 33.3% villagers favoured the option "Responsibility of government".

Problems mentioned by forest guards. *Timing issues.* Their duty hours are very long (it's a 24 h job); in some situations (emergencies) they are even called at night. Many of the forest guards were positive on this thought that they should educate people about the importance of forests rather than punishing them so for that they should be educated but their hectic routine makes it quite impossible to acquire education.

Lack of guards. Lack of guards is another big issue which was noted during our study, as for a whole big area it's hard for just two people to check for the whole forest area. If the number of guards is increased, then checking over the forest area can be done effectively and efficiently. As it was quoted by most of them that if they patrol one area of their region mostly bad practices are done by (villagers or timber mafia) on another side, so it is advised that several guards should be increased for better protection of MHNP.

Monthly income. Most of them have a monthly income ranging from 18 thousand to 28 thousand. With supporting at least 5 to 9 people at the home, it's hard for them to manage in such a salary. Many of them confessed that they are left with no choice but to do this job to support their large families. According to our study, many of them are forced to do this job just to support their families even if the salaries are low. Their salaries should be increased to encourage them to love their job and forests. If bonuses are given to them for capturing ones that are involved in timber cutting than they can work more effectively without financial threats. Other facilities like medical should also be given to them.

Issues they come across during duty hours. Lack of coordination among local people is one of the issues which most of them are facing. As local people do not listen to them much if they try to stop them from cutting trees. Many of them including us are of this point of view that the government should provide gas facilities to the local people this could make a huge difference and a percentage of deforestation could be decreased. A similar study conducted by Tanvir Ali, Babar Shahbaz and Abid Suleri which focused deforestation in Swat highlighting that 90% of the local people are involved in the decline in forests, major reason the unavailability of gas facilities. And the wood is being used in constructing houses.

Many of them reported that the people of the villages are poor, and they are left with no choice but to cut trees and sell them for their living, so the government should be active to provide them with job opportunities. Timber mafia is another serious threat which they came across for some timber mafia threatens them directly and indirectly, even threats to their life. Some of them have even lost their lives in this battle. Forest is also another issue which they mentioned. They should be given special training for weaponry use while dealing across such mafias and local people.

Many of them while protecting the National park came across many prominent personalities involved in some illegal practices. It is very hard to raise voice against them. Our society will only flourish, and such activities will come to a halt when such personalities are also held responsible and punished.

Mysterious fires are also a threat to forests which are common here and can be controlled by proper management done by the forest department.

Role of government & NGOs. The government on its part has made a department of CDA which possess around 300 people and has more authority than IWMB concerning charging credits from people that are cutting timber. They mentioned to us that private organization like HWF and WWF plays a more important role in corresponding to protecting forest and SMEC Foundation which provides them with different instruments. Recently IWMB has been established for the protection of MHNP. So, it is being noted out that Government on his role has taken a part in making departments, but strict check and balance needs to be taken.

Afforestation activities. Everyone had a different point of view regarding afforestation activities some mentioned that such activities haven't taken place. Some mentioned that every spring plantation takes place, some mention

that this year in February recently on trial-3, afforestation did happen by Climate change authority as a part of the campaign "Green Pakistan". If afforestation activities happen, it also requires maintenance. Local people should take equal part in such activities and should make it their responsibility in protecting forests.

Means of transportation of timber. Most of them mentioned that timber gets transported on the head and shoulders of local people. In extreme cases, timber mafia cut trees in small pieces and then transports them through the vehicle. Sometimes they place timber inside seats and let a woman sit over to act as a family car. Many cut the trees and roll them down and then obtain it from the bottom. The extreme check should be placed to minimize such activities and police should perform their duties devotedly and sincerely.

Fuelwood. Fuelwood is a vital element for most of the households in the villages of Margalla Hills National Park, Pakistan. The results of the survey showed that around 83-88% of the villagers depend on wood to meet their daily requirement as according to Jabeen work, 70-79% of households in Pakistan depend on fuelwood as the energy source (Jabeen *et al*., 2009). The wood consumption varies with climatic conditions, geography and the socio-economic status of the area.

The results showed that most of the villagers depend on the forested area of Margalla Hills Nation park as they harvest the required wood themselves due to low economic status and the villagers that gather their fuelwood from other places told that they buy the wood from wood storage houses for fulfilling their need. It is discussed that the communities in the Himalayan Mountains face a serious shortage of energy sources because of their poor economic status (Khalid *et al*., 2015).

Illegal cutting and corruption. Ali and Benjaminsen explained that protected areas/forests are government property but all the rights to use are provided to local communities and commercial harvesting is restricted in protected areas (Ali and Benjaminsen, 2004). As the result shows that the non-villagers cut the trees from MHNP and the non-villagers represent the timber mafia, cutting for their benefits. As the results show that a high level of corruption is involved in gaining wood from the MHNP (Volkmer and Sharif, 2008) forestry sectors. According to the ministry of environment (G um artini, 2009), there is political interference to harvest wood illegally.

The G8 action programme on forests-Backgrounders (Gulbrandsen and Humphreys, 2006) stated that the developing nations are more involved in the illegal logging activities than the developed nations and Pakistan is one of the developing nations and practising high percentage of illegal logging. Moreover, the G8 action programme on forests is working with developing countries to prevent or reduce illegal logging activities. According to the G8 action programme on forests-Backgrounders (2002) involving public would help to make decisions to reduce illegal logging whereas the results of the study showed that the public or local people have no contributions.

Changes in temperature and biodiversity. The results showed that the temperature is increasing and the number of species and individuals is decreasing as it is also discussed by Cochard (2011) that the endemic species of the area can even lead to extinction if the deforestation activity gets common. According to Cochard, the climatic conditions may change locally due to the change in land-use patterns and deforestation and forest fires may lead to increase in temperature, change the air movements, reducing atmosphere moisture and cloud formation.

MHNP Comparison 2009-2016. The comparison of the green cover of MHNP is shown in Table 2.

Forest. Forest in the past used to be 13,597 and now its number is decreased to almost half in number that is 7,868. This indicates how the massive amount of deforestation activities corresponding to illegal logging are occurring (Mannan *et al*., 2018; Reboredo, 2013; Burgess *et al*., 2012).

Cropland. In past, our population was less so cropland area at that time was 219 and now the population has increased, and a large area of forest has cleared out for agriculture so now cropland is 1,234. This change in land cover with the advantage of agricultural production

Table 2. MHNP area comparison 2009-2016

Class	Area(ha) in 2009	Area(ha) in 2016
Forest	13,597	7,868
Cropland	219	1,234
Grassland	1,368	5518
Wetland	552	277.5
Settlements	1,259	589
Other land	391	1,899.5
Total	17,386	17,386

has many effects like a change in temperature, changes in the water availability, decrease in rainfall, evaporation and soil water (Elison *et al*., 2017; Kang *et al*., 2009).

Grassland. In the past Grassland used to be 1,368 and now it's 5,518. Grassland has a direct relationship with the rainfall pattern in seasons when rainfall increases grassland increases (Heisler-White *et al*., 2008; Harper *et al*., 2006; Fay *et al*., 2003; Knapp *et al*., 2002).

Wetland. Wetlands in the past were 552 and now its number has decreased to 277.5. The decline in rainfall pattern due to rise in temperature can have negative consequences on this as well leading to having intense droughts and inundation periods (Trenberth, 2011).

Conclusion

High level of deforestation activities is carried out in Pakistan as it is one of the major problems and need to be concentrated to save forests. Due to the low income of the villagers they use wood as fuel for survival. The deforestation rate must be reduced if the villagers will be provided with an alternate source for survival such as gas facility. Forest crimes are practised at a high rate in MHNP through prominent bodies to poor villagers, the laws should be implemented on each person how practice acts against laws. The forest guards should be provided with weapons and give authority to trap the people who violate rules. The forested area of Margalla Hills National Park has reduced from 2009-2016 about 42%. Many of the species are extinct or endangered due to extensive deforestation activities and to control the extinction rate plans need to be developed. Awareness of the importance of forests should be given to the people who practice illegal activities. Afforestation activities should be a common practice and it should be maintained and cared for later.

Conflict of Interest. The authors declare no conflict of interest.

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