

CAUSES AND IMPACTS OF LAND DEGRADATION: A CASE STUDY OF ZIARAT DISTRICT BALOCHISTAN

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Abstract

Land degradation is one of the most serious problem in the developing countries, especially in Pakistan. Land degradation is considered one of the greatest socio-economic and environmental problems. The main aim of this study was to investigate the causes and impacts of land degradation on livelihood local farmers of District, Ziarat in Balochistan province of Pakistan. The primary data were collected from a sample size of 400 local farmers through questionnaires and a set of interviews. Statistical Package for Social Sciences was used to analyse the data. Descriptive statistics was applied to show the frequencies and percentages of different variables. Binary regression was run to find the causes of land degradation in the study area. Out of the selected 15 variables, five variables i.e., excessive use of forest trees for fuel wood, shortage of agriculture labor, lack of agriculture training, use of marginal land and improper use of fertilizers were found to have significant effect on land degradation. The results are presented through tables, graphs and charts.

Keywords: Land degradation; Deforestation; Local farmers; Ziarat; Balochistan

1. INTRODUCTION

Today when the ecological balance is becoming worse throughout the world, the problem of land degradation is an agenda and human disturbance have covered the entire earth. It is much more necessary for us to understand our attitude to the nature, particularly the use of natural resources. Natural resources are also destroyed on a large scale. The natural ecosystem especially farmlands are destroyed throughout the world. Land degradation reduces land productivity on agriculture land, which leads to food insecurity (Sheikh & Soomro, 2006). Land degradation is defined as the reduction in the capability of the land to provide ecosystem goods and services to the people (Nachtergaele et al., 2010). Economic activities and rapid population growth have increased pressure on land use. Almost 250 million of the world population is affected by desertification (Qasim et al., 2011). About 90% of Pakistan land area fall into arid and semi-arid climatic conditions which is at threat of desertification (Anjum et al., 2010).

Land degradation is caused due to social, economic and environmental indicators. The root cause of land degradation is anthropogenic activities and natural factors. Due to land degradation over 1000 people in 100 countries are at high risk (UNEP, 1991). About 99.4% million ha is affected by land degradation in northern Mediterranean (Carvalho et al., 2002). Researchers working on land degradation have focused their studies on erosion of soil, agrochemical pollution, destruction of vegetation cover, soil nutrient depleting and salinization because of overgrazing and clearing of forest trees for agriculture land leading to land degradation. These activities lead to decreased crop yields and (Scherr & Yadav, 1997). Socio-economic activities of humans including overgrazing, extensive agricultural practices and rapid growth of population are the main causes of land degradation (Ge et al., 2016). Farmers in Myanmar reported that land degradation have decreased their crop yields, increased their expenditures on growing crops and have also decreased quality of the soil (Tun et al., 2015).

Land degradation has also affected District Ziarat in Balochistan. Increasing number of installed tube wells for agriculture purposes lower down the water table. Deforestation was done for fuel wood usage, erosion of soil, overgrazing and drought were the factors that degraded the land surface in the study area. These main factors have adverse impacts on the life of local people. Therefore we in this study tried to find out the causes and its impacts on livelihoods of local farmers in Ziarat in Balochistan.

2. MATERIALS AND METHODS

2.1. Data collection

The research is based on primary data. The primary data were collected through questionnaires and interviews. The questionnaires were prepared based on research objectives, to investigate the causes and impacts of land degradation.

2.2. Sample Size

Total population of Ziarat according to 2017 census was 160,422 (PBS, 2017). The number of households in District Ziarat was 28, 999. A sample of 400 respondents were selected through Yamane (1969) formula with 5% error of acceptance.

2.3. Statistical analysis and data processing

The primary data collected through questionnaire survey was analysed through Statistical software for social sciences (SPSS) software version 20. Descriptive statistics was used in this study, such as % ages and frequencies to describe the socio-economic factors. Binary logistic regression model was used to analyse 15 study variables. Land degradation was the dependent variable of the study.

2.4. Study area

District Ziarat was selected as the study area (Figure 1). Ziarat is divided into two tehsils namely Sinjawi and Ziarat. The district is located between 67°11'18" and 68°36' East longitudes and 30°09'46" and 30°35'56" North latitudes. Ziarat is situated at an elevation of 2543 meters above sea level. The main language of the district is Pashto and 99 % of the people of the area are Muslims. Geographically, it has great importance

because of juniper forests covering an area of 51,335 hectares, which accounts for 54% of the total land area. The second highest peak of Balochistan i.e., Koh-e-Khalifat with a height of 3475 m is present here. Some famous valleys such as Chutair, Kech, Kawas, Mangi and Zindra are also the part of Ziarat district. The economy of the people is totally based on agriculture. Apple, cherry and vegetables are the famous crops of the study area.

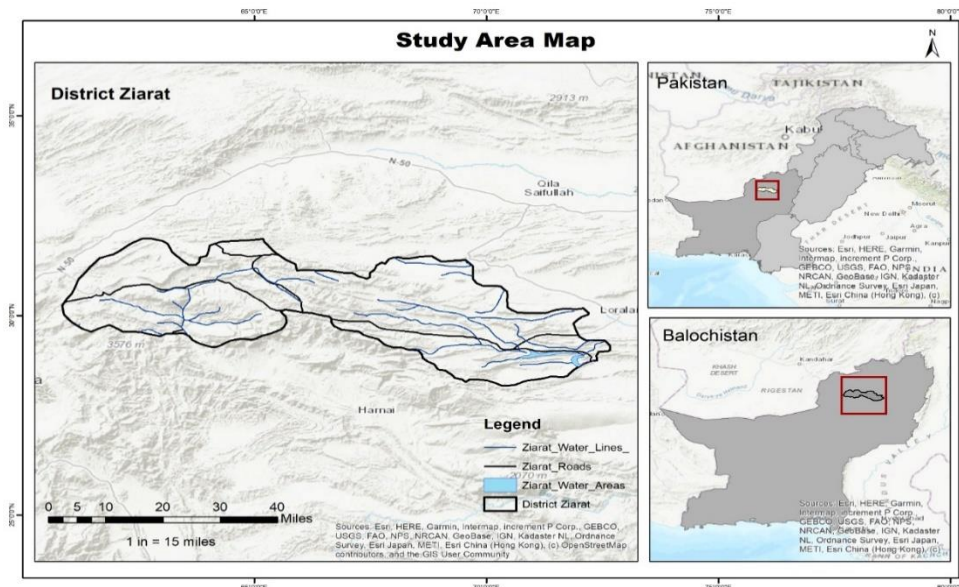


Figure 1: Location Map of District Ziarat

3. RESULTS

3.1. Knowledge of local farmers about land degradation on their farms

Results showed that 94% respondents knew about the issue of land degradation (Table 1). About 85% farmers reported that their farms were degraded.

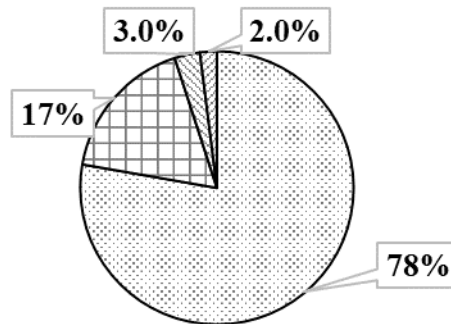
Table 1: Knowledge about land degradation

Item	Yes	No
Knowledge about Land Degradation	379 (94%)	21 (6%)
Presence of Land degradation	342 (85%)	58 (15%)
Own Tube well	329 (82%)	71 (18%)
Karez system	276 (69%)	124 (31%)
Knowledge about soil erosion	350 (87%)	50 (13%)
Knowledge about land fragmentation	318 (79%)	82 (21%)

About 82% farmers had their own tub wells on their farms. About 69% respondents were using water for irrigating fields from Karez sources. Almost 87% farmers had knowledge of soil erosion and nearly 79% had knowledge of land fragmentation.

3.2. Farm area degradation

About 78% of the farmers reported that about 1 to 5 acre of their farm area have been degraded during the last two decades (Figure 2). About 17 % farmers reported that 5 to 10 acre of their farm area have been degraded during the last two decades, while 3 % of the respondent reported that 10 to 15 acre farm area have been degraded. Nearly 2 % farmers reported that more than 15 acre of farm area have been degraded during the last two decades. Results suggest that farm land of almost all farmers has been degraded to some extent during the past two decades.

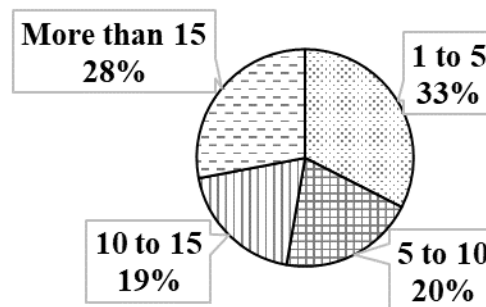


□ 1 to 5 acre □ 5 to 10 acre □ 10 to 15 acre □ more than 15 acre

Figure 2: Farmer's perceptions about their farm area degraded (in Acre)

3.3. Drying up of tube-wells

Results show that almost 33 % farmers reported that 1 to 5 tube wells have been dried in their area during the past two decades (Figure 3). About 20 % reported that 5 to 10 tube wells have become dried, while 19 % reported that about 10 to 15 tube wells have dried. Nearly 28 % respondents reported that more than 15 tube wells in the district have become dried during the last two decades. Results suggest the most of the tube-wells have dried in the study area during the past two decades.



□ 1 to 5 □ 5 to 10 □ 10 to 15 □ More than 15

Figure 3: Tube well dried during the last two decade

3.4. Declining of water table

Results show that almost 9 % farmers reported that the water table has declined 1 to 10 feet. About 23 % farmers reported that the water table has declined about 10 to 20 feet during the past two decades, while 26 % respondents reported that water table has declined 20 to 30 feet during the past two decades (Figure 4). About 42 % farmers reported that the water table in Ziarat district has declined more than 20 feet during the last two decades. This shows alarming situation of water table declination which is the result of increased number of tube-wells and less rainfall.

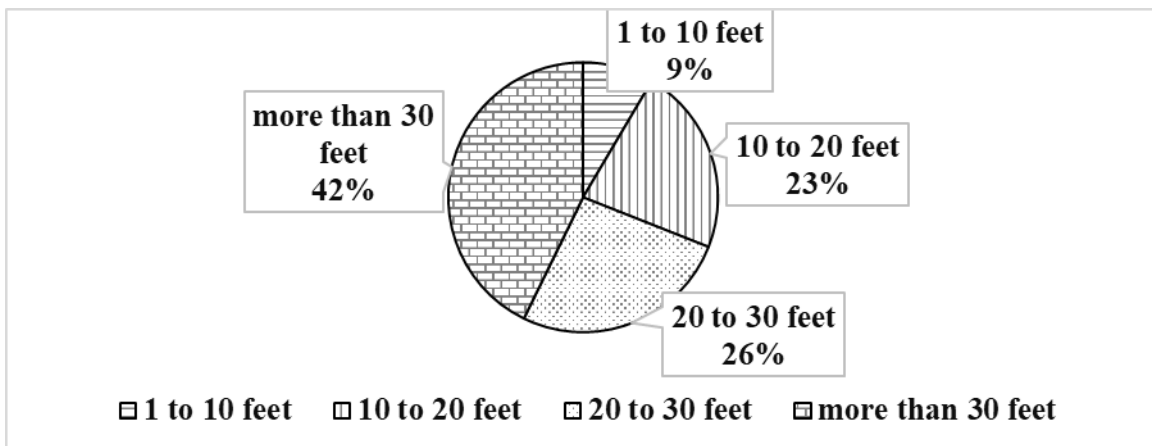


Figure 4: Decline of water table in (feet)

3.5. Drying up of Karez

Results showed that majority of the farmers (55 %) reported that 1 to 5 karez have been dried during the past two decades. About 29 % farmers reported that 5 to 10 karez have been dried, while 8 % reported that 10 to 15 karez have been dried (Figure 5). About 8 % reported that more than 15 karez have been dried. The results shows that karezes have been damaged and this may be because of the increased number of tube-wells.

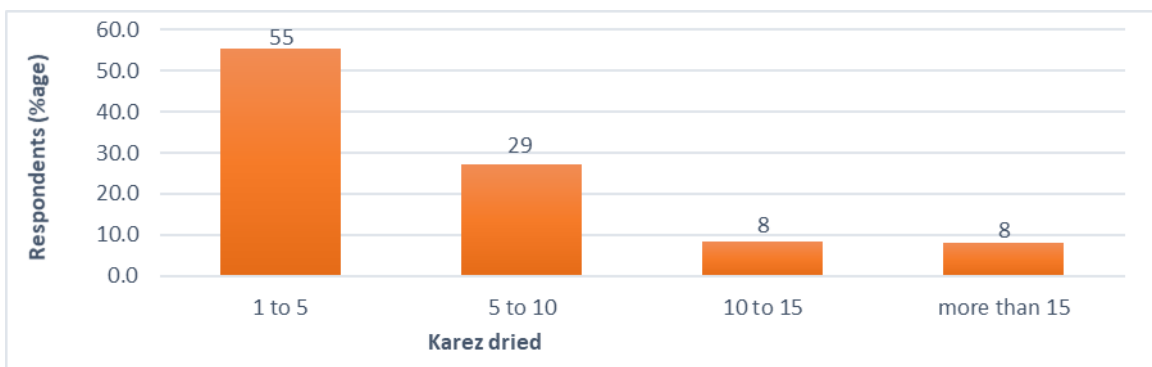


Figure 5: Number of dried karez in the study area

3.6. Drying up of apple trees on farmlands

Results about the drying up of apple trees on farmlands revealed that 79% of the farmers reported to have lost 500-1000 trees during the past two decades (Figure 6).

About 13 % of respondents reported to have lost 1000 to 2000 trees due to shortage of water. About 3 % farmers reported the loss of 2000 to 3000 trees and 5 % of respondents reported the loss of more than 3000 trees during the last two decades.

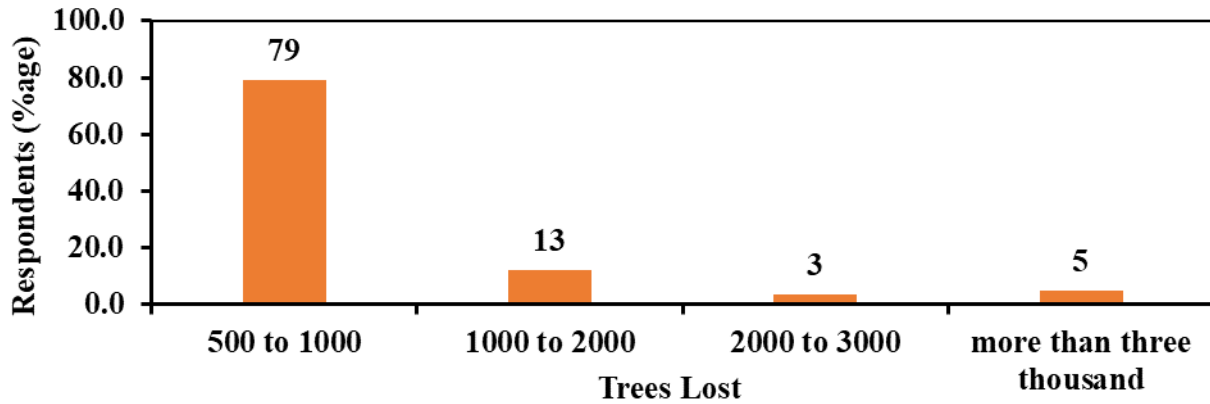


Figure 6: Number of trees lost by farmers on farmlands

3.7. Crops affected by land degradation

Results showed that 73 % respondents reported that crops including apple, peach and wheat were badly affected by land degradation (Figure 7). About 23 % of the respondents reported that only the production of apple was affected by land degradation on their farms. About 3 % farmers reported about wheat and only 1 % reported about the decline in peach production.

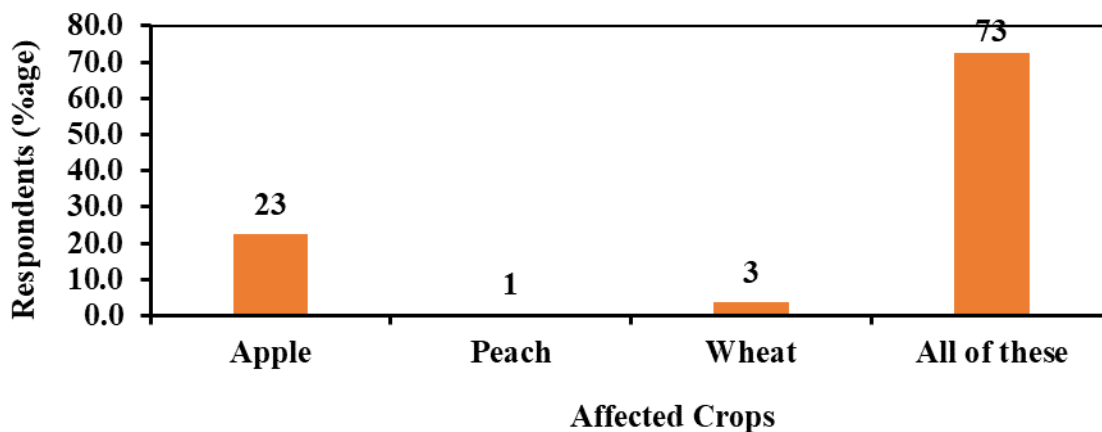


Figure 7: Different crops affected by land degradation

3.8. Farmers' perception about deforestation

Results revealed that 54 % of the farmers reported that cutting the trees for fuelwood purpose is the major cause of deforestation. About 19 % reported about the clearing forests for making agriculture land, while 6 % respondents reported cutting trees for selling. Only 4 % reported that people use the forest trees for home construction. About 17 % reported that people are clearing forest trees for all the above purposes (Figure 8).

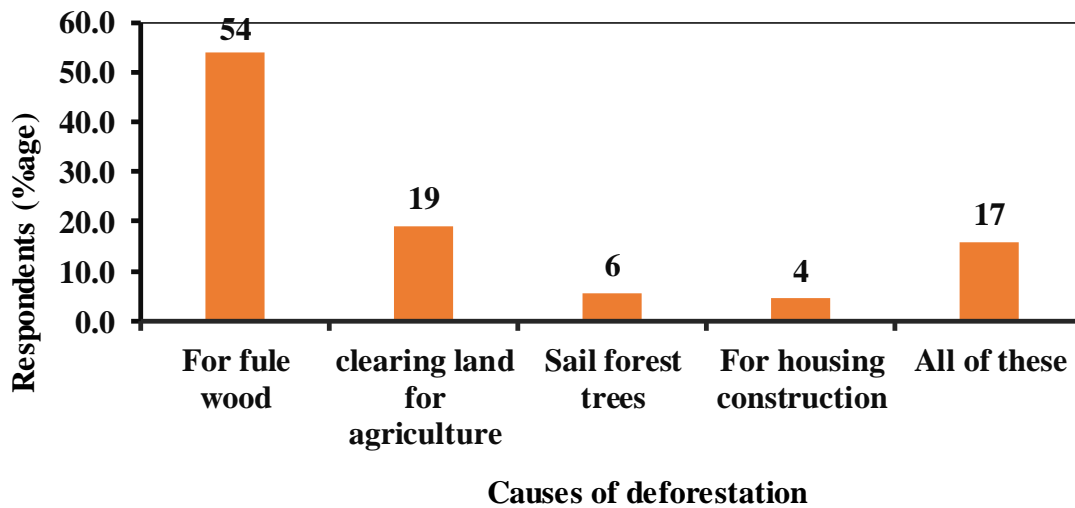


Figure 8: Causes of deforestation as perceived by the farmers

3.9. Effects of deforestation on local livelihood

Results revealed that 24 % of the respondent reported that deforestation has affected the tourism sector in the area (Figure 9). About 20 % reported that the economic activities of local people are affected due to deforestation. About 10 % reported the loss of biodiversity, while 18 % attributed climate change to deforestation. About 4 % farmers reported that the rainfall and snowfall pattern are affected due to deforestation and 24 % reported that deforestation leads to an increase air pollution.

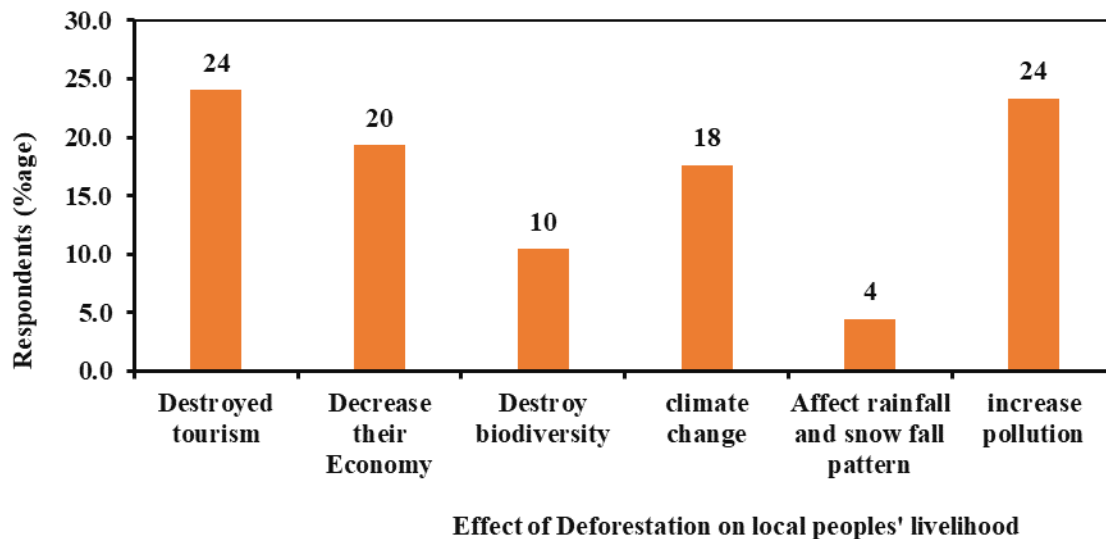


Figure 9: Effects of deforestation on local livelihood

3.10 Socio-economic determinants of land degradation

Results of the binary logistic regression showed that among 15 variables, the improper use of fertilizer was significant at 99 % confidence level and three including shortage of agriculture labor, lack of agriculture training programs and use of marginal land were significant at 95 % confidence level. Excessive use of forest trees as fuelwood was significant at 90 % confidence level (Table 2).

Table 2: Binary logistic for socio-economic determinants of land degradation

Independent Variables	B	S.E.	Wald	Sig.	Exp(B)
Farmers' Age	-.001	.009	0.017	0.897	0.999
HH member	-.002	.030	0.003	0.954	0.998
Farmers' education	-.083	.108	0.593	0.441	0.921
Off-farm activities	-.027	.067	0.168	0.682	0.973
Annual income	.000	.000	0.523	0.470	1.000
Land tenure	-1.280	1.167	1.204	0.273	0.278
Total land area	-.017	.017	0.962	0.327	0.983
Improper fertilizer use	.005	.002	8.335	0.004***	1.005
Lack of crop rotation	-.497	.402	1.528	0.216	0.609
Shortage of farm labor	0.351	.163	4.621	0.032**	2.073
Lack of agricultural trainings	0.729	.362	4.060	0.044**	2.073
Excessive use of forest trees as fuel wood	-.002	.001	2.925	0.087*	0.998
Use of marginal lands	-.818	.370	4.889	0.027**	0.441
Livestock ownership	0.155	.309	0.251	0.616	1.167
Total number of livestock	0.000	.007	0.001	0.977	1.000
Constant	0.177	1.870	0.009	0.925	1.194

Note: ***, **, * shows significance at 99, 95 and 90% confidence respectively. ; -2 Log-likelihood = _199.236a; Chi-square = 26.087; Cox and Snell R2 = .124; Nagelkerke R2 =.182.

4. DISCUSSION

In this study, causes and impacts of land degradation were investigated on livelihood of farmers in Ziarat. Agriculture was the main source of income of the people of the study area. Throughout survey the main causes of land degradation was linked with human activates. This study confirm that majority of the farmers in the study area were aware about the issues of land degradation. Deforestation is the major cause of land degradation because majority of the people used forest trees for fuelwood purposes. The same cause was also recorded by (Touré, 2020). Besides deforestation, improper use of chemical fertilizers, use of marginal lands for crop production, shortage of farm labors and lack of agricultural trainings were the causes of land degradation in the study area. No trainings given to the farmers by the extension agents. The farmers therefore, do not properly apply chemical fertilizers which affects their farmlands. The farmers also use marginal lands when they don't get sufficient production from their farmlands. Because of declining productions from the farmlands, majority of the people go to the nearby districts for earning their livelihoods and therefore, labor shortage occurs. The same factors were also detected in another study by Qasim et al., 2011 in Pishin area of

Pakistan. Land degradation affects daily life of local livelihood, because majority of population depends on agriculture. Land degradation decreased crops production, major crops like apple, peach and wheat were highly affected by land degradation. Many karez and tube wells have been dried, thousands of trees have dried, and the water table goes down more than 30 feet. Land degradation has also affected livestock because majority of the people reported that the number of livestock number has been decreased by land degradation during the last two decades.

5. CONCLUSION AND RECOMMENDATIONS

The aim of this study was to investigate the causes and impacts of land degradation on local livelihood of Ziarat. The main factors that detected were drought, deforestation, installation of illegal tube wells, extensive agriculture practices and declining of ground water table. Socio-economic factors such as clearing of forest trees for agriculture land and fuel wood was the root cause of deforestation. Land degradation has seriously affected the economic activities of the local communities. Deforestation has also affected the tourism industry from which the local community gets some sort of support. Deforestation has also triggered climatic change in the study area. Drilling more tube wells will lead to water crisis in the study area in the coming future. It is recommended that to protect the natural resources for our future generation, the Government should construct more dams and plant more trees that can fulfill the food necessities of the local communities. There should be an awareness campaign for the masses for protection of forests and destructive effect of deforestation on local livelihood. Provision of education to the public and creating employment opportunities can help us in tackling with the issue of land degradation.

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