

Asian Development Policy Review

ISSN(e): 2313-8343

ISSN(p): 2518-2544

DOI: 10.18488/journal.107.2018.63.115.128

Vol. 6, No. 3, 115-128

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URL: www.aessweb.com



RETRACTED: IMPORTANCE OF FORESTRY AND ITS ROLE IN REDUCTION OF POVERTY IN SWAT VALLEY, KPK, PAKISTAN



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ABSTRACT

Article History

Received: 11 July 2018

Revised: 8 August 2018

Accepted: 13 August 2018

Published: 17 August 2018

Keywords

Farm forestry
Poverty reduction
Income
Natural resource conservation
Swat, kpk, Pakistan.

Farm forestry plays a significant role in the reduction of poverty and natural resource protection. This study shows the importance of forest and its role in the reduction of poverty. The study was accompanied in January to march, 2018. Collection of data a well-designed questionnaire was used and sixty (60) respondents were selected from ten (10) villages through randomly in the study area. From the study, it is clear that daily wood need was 19.76 kg per household while annual requirements were 61.41 cubic feet per household and majority obtain from forest trees. The study also showed that forest plays a key role in income generation and the reduction of poverty of household. In the study area average income from farm trees were PKR 517558.13 per household. While on the other hand study shows that farm trees have a significant role in natural resource conservation which reduces pressure on natural forest, provide wildlife habitat and soil conservation. Chi-square test was used to know the positive role of farm forestry in poverty reduction and natural resource conservation.

Contribution/ Originality: This study shows the importance of forest and its role in the reduction of poverty. In the study area average income from farm trees were PKR 517558.13 per household. On the other hand study shows that farm trees have a significant role in natural resource conservation. Chi-square test was used to know the positive role of farm forestry in poverty reduction and natural resource conservation.

1. INTRODUCTION

In Pakistan, the forests and planted trees cover an area of about 4.2 million which is equal to 4.8 percent of the total area (Govt of Pakistan, 2005). 85% of this is public forest under the legal categories of state reserve and state protected forests, which has implication for community rights and user participation (Nizamani and Shah, 2004) most of these forests are found in the northern part of the country (40% in kpk province, 15.7 % in the Northern areas, and 6.5 % in the AJK (state of forestry in Pakistan 1999/2000, Nizamani and Shah (2004). Pakistan has one of the lowest proportions of forest area and has poor forestry in the world according to McKetta (1990). In Pakistan forest is unable to meet the requirement for the growing demand for wood and wood-based product. According to the GOP (2003) the forest area is only 4.7% of the total area of Pakistan which is very limit. The net output from the forest is not enough for the demand for timber and fuel wood, provide a raw material for industry, a

requirement of energy for farm sectors, and fodder for the livestock, Leach (1993). While on the other hand trees also play a key role in economics development and protection of watersheds and also Maintenance of biodiversity, and quality of the environment, according to Bukhari (1997). Trees planting play a very important role in the development of a country because trees provide wood which is used for many purposes and its play a key role in rural livelihood (Khan, 1989).

Despite rapid economic development, forest resources continues to plays an important role in households income in developing countries (Das, 2010; Kar and Jacobson, 2012; Hogarth *et al.*, 2013; Angelsen *et al.*, 2014). In the developing world, a large section of smallholder farmers still derives a substantial part of their income from forest based livelihoods (Wunder *et al.*, 2014) forest supply a wide range of goods and services to the households located in and around forests and are the major source of livelihood for people in developing countries (Behera, 2009; Dash *et al.*, 2016). In these countries, the forest plays a significant role in poverty reduction and reducing income inequality among forest-dependent people. Studies from the globe find that the forest environmental incomes make significant contributions to rural livelihoods (Shackleton *et al.*, 2007; Babulo *et al.*, 2009; Pouliot and Treue, 2013; Jagger *et al.*, 2014).

Forest cannot be neglected because at provide wood and income to the people of the country. Forest is also the important source for protection of land and water resources (Ansari and Iftikhar, 1985). According to the FAO, Report 3.9 billion hectares of areas is cover by forest in the world, which is about 30% of the total land area (FAO, 2000). Pakistan lost approximately 0.21 million hectares of forest with a deforestation rate of about 2.1% meaning it lost an average of 0.043 million hectares of forest annually in 200–2005 (FAO, 2000). Pakistan is that country where forest is deficient with only 0.3 hectares as per capital compared to world average of 1 hectare per capita.it is estimated that state forests contribute only 14% of timber and 10% of fuel wood whereas, 46% of timber and 90% of fuel wood requirement are being met from farmlands (GOP, 2004). In kpk, the area is estimated to be 525,000 ha or 1,296,750 acres. In kpk, the forest resources extend over 1.684 million hectares, which forms about 17% of the total surface of the province. The forest cover in kpk is considerably higher than the national average of about 4.7% (Mohammad, 2004).

Forest play a key role in the lives of communities and nations according to Mogaka *et al.* (2001). Forests as a soil erosion barriers, as a water catchments and also a source of timber and non-timber materials. Forest also provide very important ecosystem services that are generally considered to be free. According to Anonymous (2002) during the year 2001-2 forest had contributed 270. Thousand cubic of timber and 473.5 thousand cubic meters of fuel wood. In Pakistan, there are limited forest resources from which they earned Rs.1.09 billion are exports of various value-added woods products, including's sports goods worth Rs.356 million, during 2001. Accordings to Sunderlin *et al.* (2005). Forest resources help to lift the household out of poverty by functioning as a source of saving, investment, accumulation.

According to the Gurr *et al.* (2009). Farm forestry plays a very important role in our economy. It provides benefits to birds, insect biodiversity, and bat. According's to him, shelterbelts helped to suppress exotic bird species and others pests. According to Forrester *et al.* (2006). Farmers were demanding fast growing tree species with high economic returns and minimum, damaging effect to their arable crops (Fakiha, 2002). They conducted a study to identify species mostly grown by the farmers. 60 farmers were interviewed in district Haripur and data was processed. The farmers used mostly for obtaining fodder, fuel wood, and timber for domestic consumption. Only 3.4% of the respondent planted trees for additional income whereas 8.4% of the farmers planted areas just for the soil conservation. According to Patil *et al.* (2000) that the growth of trees + fruit plants + field crops generated 46% more income compared to growth of field crops + fruit plants only.

1.1. Study Area

The study was done in the kpk province of Pakistan in swat district which is the most beautiful and mountainous areas in Pakistan. Swat valley lies between 34°- 29' and 35°- 29' north latitude and 72°-76' and 72°- 48' East longitude. The local lands area is 2, 45,038 ha (%337 sq.km) (Census Report, 1998). In swat in 22.84% of the land is in the forest, 39.46% of the area is agriculture, and 37.70% wasteland area, according to the report of Chowdhury and Koike (2010). The Swat valley is rich in natural resources. The valley of Swat is neglected in development Due to natural inaccessibility, illiteracy, tribal setup, physical, etc. The map of valley swat is shown in the following figure (1.1).

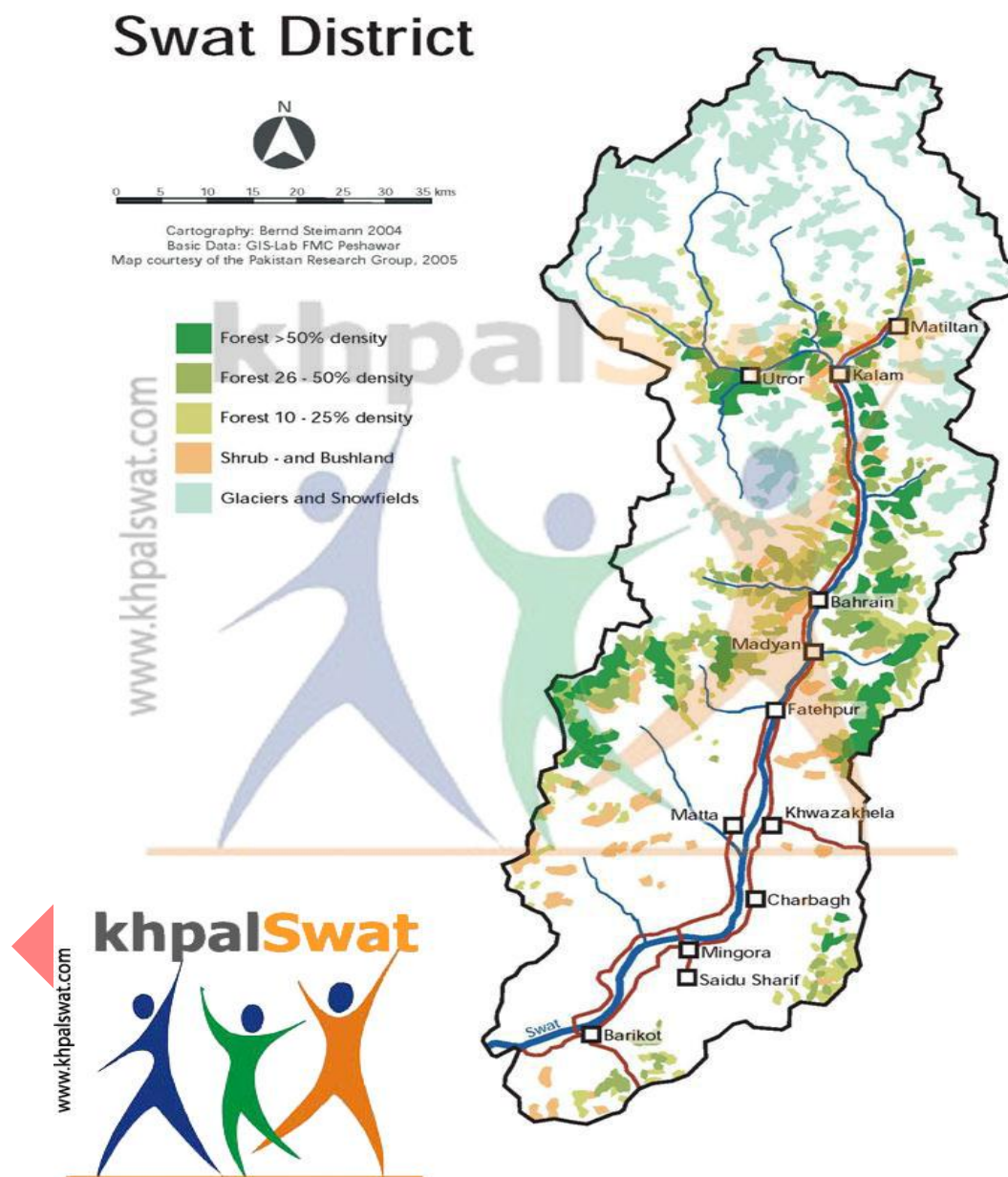


Figure-1.1. Map of swat valley

Source: www.kplswat.com

1.2. Justification of the Study

Majority of the population of Swat valley fulfill their requirement from the forest, but there is still a lack of research. But there is no documentation regarding the role of forestry in poverty alleviation and natural resource

management in Swat valley. The main objective of this research is to study the role of forestry in the reduction of poverty.

1.3. Objective of the Research

- To study the status of farm forestry in the study area.
- To find out the productive role of farm forestry of domestic requirements in the study area.
- To compare income from farm forestry to other sources of income.
- To find out the key role of forestry in natural resource conservation in the study area.

2. METHODOLOGY AND DATA

2.1. Description of the Study Area

This study was conducted in district swat, kpk province Pakistan during January to march, 2018. Swat valley lies between 34°- 29' and 35°- 29' north latitude and 72°-76' and 72°- 48' East longitude. Swat is a growing city and economic hub for all surrounding areas. The government is also focusing on investing in this sector to improve the number of trees and improve the beauty of the forest. Secondary data was obtained from map and (CR (1998) of district swat. For the collection of primary data, a well-designed questionnaire was used.

2.2. Sampling Procedure

For the selection of the respondents, two-stage random sampling was adopted. Ten villages were selected randomly from the list of all villages in the valley. From each selected villages six farmers were selected randomly. A total of sixty farmers were interviewed for the study. The detail is in the following table1.

Table-1: List of Sample Villages

S.No	Name of Village	No.of respondents
1	Ogdai	06
2	Qamber	06
3	Tirang	06
4	Simbat	06
5	Nagoha	06
6	Gorra	06
7	Rahimabad	06
8	Barkali	06
9	hayatabad	06
10	Sejban	06

Source: Swat Report (2010)

2.3. Data Collection

Random sampling technique was used for the collection of data. A structured questionnaire was determined through face to face interview. The total numbers of respondents cover were 60. this survey collected quantitative data relating to socio-economic, demographic, etc.

2.4. Data Analysis

After data collection, simple statistical techniques of the mean (average), percentage were used for the interpretation and discussion of the data. The data was analyzed using SPSS -21, software.

2.5. Significant Test

Chi-square tests were used to compare the observed frequency distribution with the expected frequencies. This was done to form different categories. Chi-square is applied to data with the help of a computer, but in this study, the value of chi-square has been calculated manually and compared with the tabulated value 95% confidence level.

2.6. Materials

For the collection and analysis of data, the following material was used.

- Questionnaire.
- Study area map.
- Literature about forestry.
- CR (1998).
- SPSS programs used for the data analysis.

3. RESULT AND DISCUSSION

3.1. Demographic Characteristic of the Respondents

From the following table 1 it is clear that Age plays a very important role as far as sharing of knowledge and reliability of data. 60% of the respondent age is above 40 years, and 38.34% of the respondent age is 20–40 years, while 1.66% of the respondent age is less than 20 years. The majority family population is between 8-14 persons. 15% of household had 1-7 family members, 36.67 had more than 14 family members, and 48.33% had 8-14 family members. From 60 respondents' data was collected in which 78.33% were found literate while 21.67% were illiterate. And about 38.3% were a primary pass, and also 28.3% were matriculated, while 19.14% were undergraduate, 17.02 % were graduate, and 12.78% were postgraduate. According to the respondent's occupation majority were farmer 68.33%, while 21.67% were Government and NGO servants, while 10% were businessman and labors but also doing farming. According to the data majority of the respondents, 95% were the owner of the land while 5 % were tenants, and 0 % was owner cum tenant. 45% of the respondents have farm size between 1-5 acres while 41.67% of the respondents have less than one acre, while 13.33% have above 5 acres farm sizes. 41.67% of the respondents grow trees in the form of woodlots/block plantation on their farmlands while 40% grow trees on their farm boundary and bounds in one or both sides of the farmland, while 1.66% have trees in home garden, 5% have trees on the Riverside and only 11.67% have trees near gully areas. 68.33% of the farmers prefer poplar while 11.67% prefer acacia, 10% prefer ailanthus, 6.67% respondents prefer willow and 3.33% prefer mulberry. 58.33% of farmers grown agriculture and horticulture crop while 41.67% of the respondents were not grown agricultural and horticultural crops because they were grown farm trees in the form of woodlot. 51.67% of the respondents were rearing different kinds of livestock while 48.33% were not rearing any kind of livestock due to the reason that they manage their trees for the income purposes. 61.67% of the respondents were willing to have more trees on their farmland for present and future requirements while 38.33% of the respondents or farmers were not more interested in planting trees on their farmlands. 50% of the respondents said that there is inverse effect of farm trees on agricultural crop while 13.33% said there is positive effect while 36.67% were in the view of the no effect of farm trees on agricultural crop. out of 60 only 5 respondents disclosed that they had used very less firewood and depended on natural gas and kerosene oil, while 55 respondents were using firewood, dung and agricultural residue. 41.67% of the respondents used only firewood as fuel whereas 30% used dung along with firewood, 20% of the respondents used dung and agricultural residue in combination with firewood while 5% of the respondents used natural gas in combination with firewood and 3.33% of the respondents use kerosene oil along with firewood. 63.33% of the respondents obtained fuel wood from trees growing on their farmland, whereas 20% of the respondents purchase fuel wood from market while 16.67% of the respondents obtained their fuel wood by collecting in their native. 41.67% obtained their domestic timber from farm trees but they use it for low-quality

construction, while for standard construction, furniture and other needs 33.33% respondents obtained timber from the market while 25% of the respondents rely on the market as well as on-farm trees.

Table-1.1. Demographic Characteristic of the Respondents

Variables	Frequency	Percentage
Age		
Less than 20	1	1.66
20-40	23	38.34
Above 40	36	60
Total	60	100
Household Size		
1 to 7	9	15
8 to 14	29	48.33
Above 14	22	36.67
Total	60	100
Education Status of the respondents		
Literate	47	78.33
Illiterate	13	21.67
Total	60	100
Education level of the respondents		
Primary	20	33.3
Matric	17	28.3
Undergraduate	9	19.14
Graduate	8	17.02
Postgraduate	6	12.78
Total	60	100
Occupation of the respondents		
Farmers	41	68.33
Government +NGO Servants	13	21.67
Businessman + Labors	6	10
Totals	60	100
Farmer Category		
Owner	57	95
Tenant	3	5
Owner cum tenant	0	0
Total	60	100
Farm household size of the respondents		
Farm size (area)		
Less than 1	25	41.67
1 to 5	27	45
>5	8	13.3
Total	60	100
Pattern		
Farm boundary & Bounds	24	40
Home garden	1	1.66
Woodlots	25	41.67
Riverside	3	5
Gully areas	7	11.67
Total	60	100
Species		
Poplar	41	68.33
Acacia	7	11.67
Ailanthus	6	10
Willow	4	6.67
Mulberry	2	3.33
Total	60	100
Crop		
Rice	14	23.33
Maize	6	10
Vegetables	7	11.67
Fruits trees	8	13.33
Nil	25	41.67
Totals	60	100
Livestock		
Buffaloes	23	38.34
Goats	3	5
Cows	5	8.33
Nil	29	48.33
Totals	60	100
Willingness		
Yes	37	61.67
No	23	38.33

Total	60	100
Effects		
Positive	8	13.33
Negative	30	50
Nil	22	36.67
Total	60	100
Sources of fuel		
Fire wood	25	41.67
Dung + Firewood	18	30
Dung +Firewood +Agricultural ;Residual	12	20
Natural Gas +Firewood	3	5
Kerosene +Firewood	2	3.3
Total	60	100
Sources of fuel wood		
Farm Trees	38	63.33
Market	12	20
Negative Forest	10	16.67
Total	60	100
Sources of timber		
Farm Trees	25	41.67
Farm Trees + Market	15	25
Market	20	33.33
Total	60	100

Source: (Survey data, 2018)

3.2. Chi-Square Analysis of Data

This test is used to know the relationship between different variables, like a household, education status, average number of farm trees per acre, average income from farm trees, farmer category, effect on soil erosion, soil fertility, wildlife habitat, reduce pressure on natural forest, average annual fuel wood consumption, etc.

From the chi-square test value (12.49) it is concluded that the relationship is significant, hence the null hypothesis is rejected, and the alternative hypothesis is accepted.

Table-1.2. Relationship between effect on soil erosion and average numbers of farm trees per acre.

Effect on soil erosion	Average numbers of farm trees per acre	
	<473	>473
Yes	15	35
No	9	1
Total	24	36

Source: (Survey data, 2018)

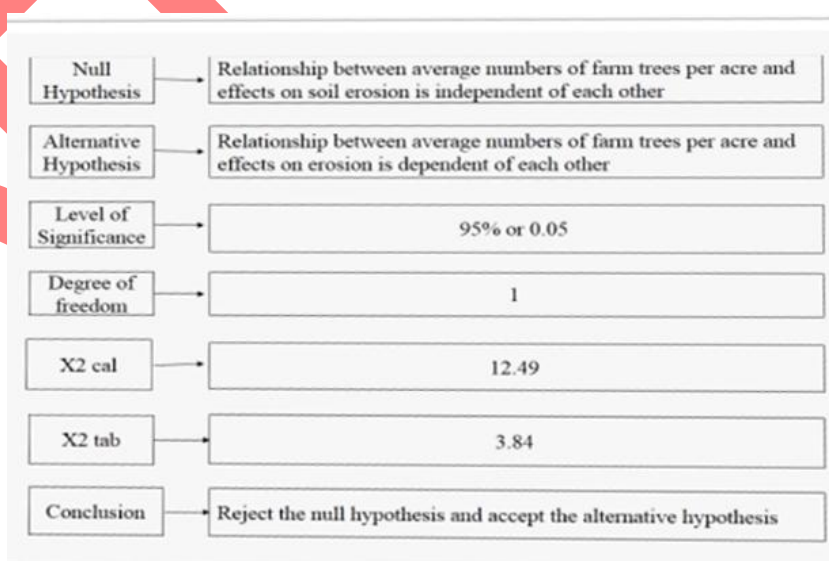


Figure-1.2. Relationship between effect on soil erosion and average numbers of farm trees per acre.
Source: (Survey data, 2018)

From the chi-square test value (0.05) it is clear that the relationship between farmer category and an average number of farm trees per acre is not significant.

Table-1.3. Relationship between farmer category and an average number of farm trees per acre. □

Farmer category	Average number of farm trees per acre	
	<473	>473
Owner	23	34
Tenant	1	2
Total	24	36

Source: (Survey data, 2018)

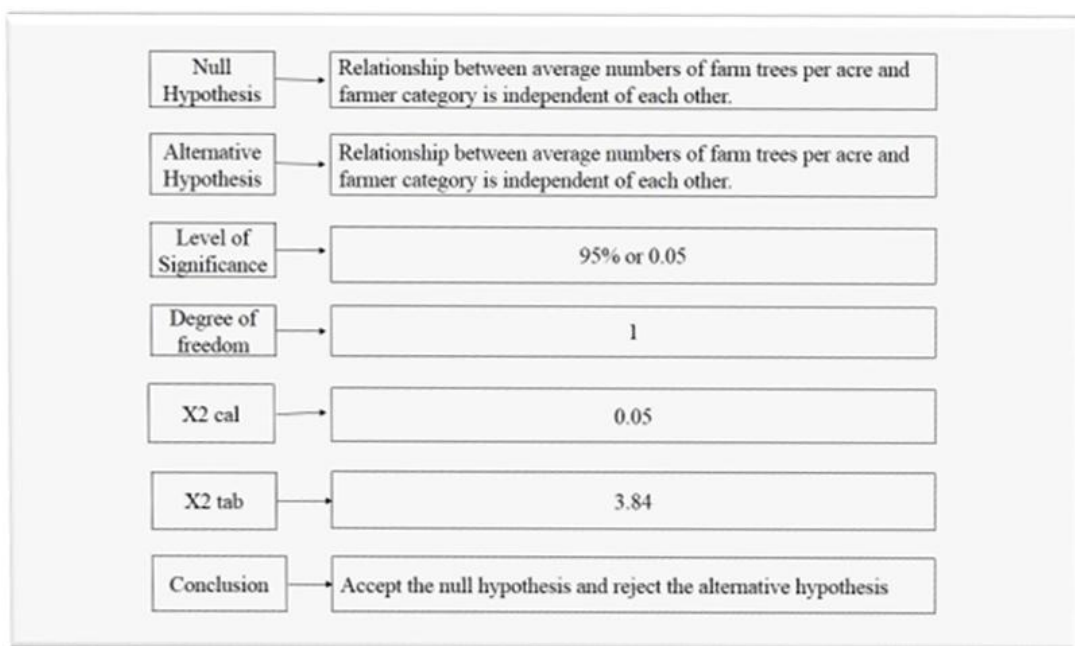


Figure-1.3. Relationship between farmer category and an average number of farm trees per acre.

Source: (Survey data, 2018)

From the calculated value of chi-square (29.27) it is clear that the relationship is highly significant, so the null hypothesis is rejected and accepted the alternative hypothesis.

Table-1.4. Relationship between an average amount of fuel wood consumption and an average number of the household size. □

Average number of household size	Average annual fuel wood consumption □	
	<144 mounds	>144 mounds
1-7	9	0
8-14	24	6
>14	3	18
Total	36	24

Source: (Survey data, 2018)

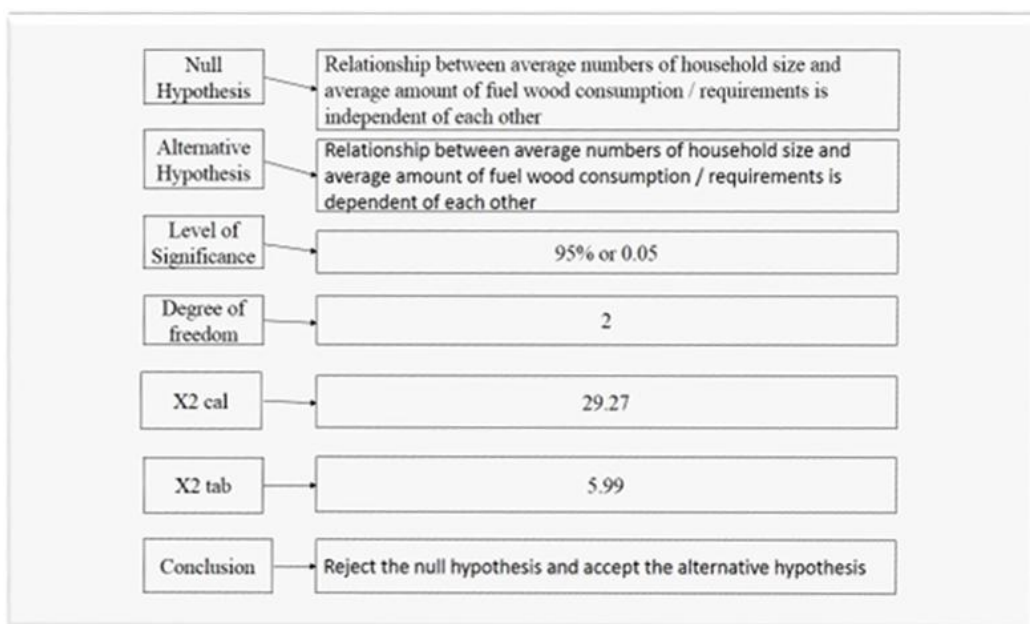


Figure-1.4. Relationship between an average amount of fuel wood consumption and an average number of the household size. Source: (Survey data, 2018)

From the chi-test value (0.49) it is clear that the relationship is not significant hence the null hypothesis is accepted and reject the alternative hypothesis. □

Table-1.5. Relationship between perception about farm trees as wildlife habitat and educational status of respondents.

Educational status	Farm trees as a wildlife habit	
	Yes	No
Literate	40	7
Illiterate	10	3
Total	50	10

Source: (Survey data, 2018)

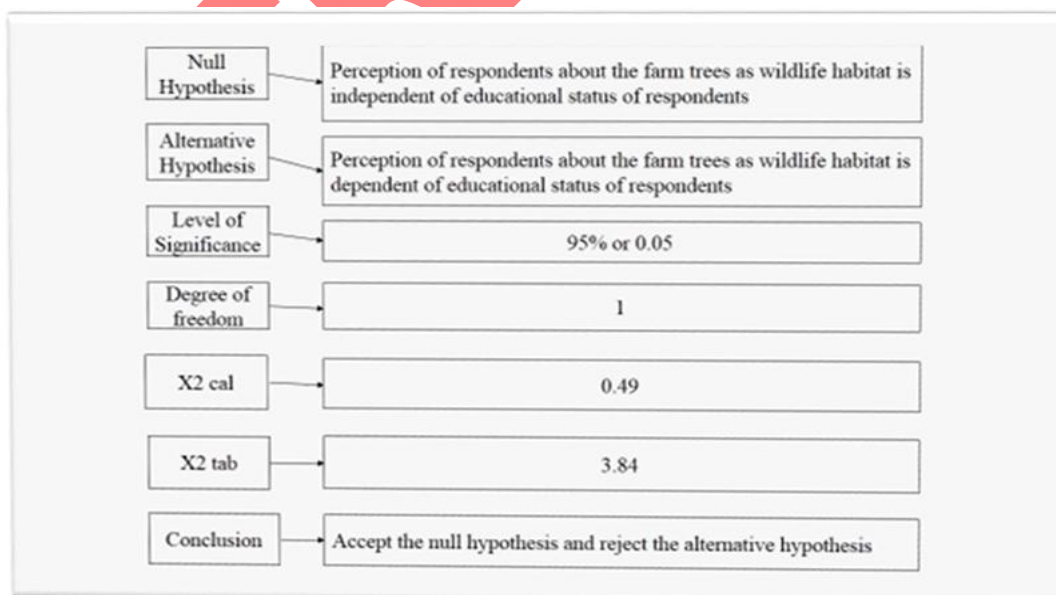


Figure-1.5. Relationship between perception about farm trees as wildlife habitat and educational status of respondents. Source: (Survey data, 2018)

From the calculated value of chi-square (7.75) it is clear that the relationship between willingness to grow and its uses are highly significant, so the null hypothesis is rejected and accepted the alternative hypothesis.

Table-1.6. Relationship between willingness to grow and its uses.

Willingness to grow trees	Uses	
	Timber	Fuel wood + Fodder
Yes	8	29
No	13	10
Total	21	39

Source: (Survey data, 2018)

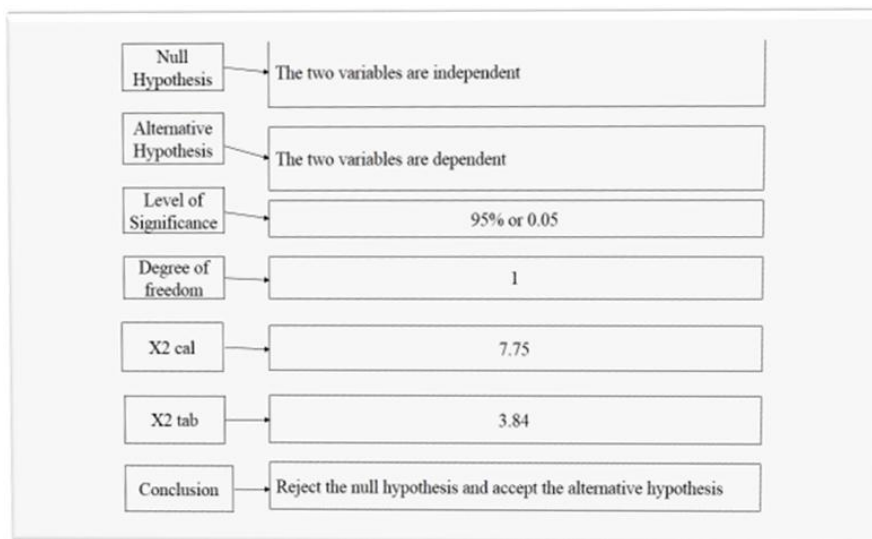


Figure-1.6. Relationship between willingness to grow and its uses.

Source: (Survey data, 2018)

As the chi-square test value is 0.022 which means that the relationship is not significant, hence we accept the null hypothesis and reject the alternative hypothesis.

Table-1.7. Relationship between perception about effects of farm trees on agriculture crop growth and educational status of respondents.

Educational status	Effects of farm trees on agricultural crop growth	
	Yes	No
Literate	30	17
illiterate	8	5
Total	38	22

Source: (Survey data, 2018)

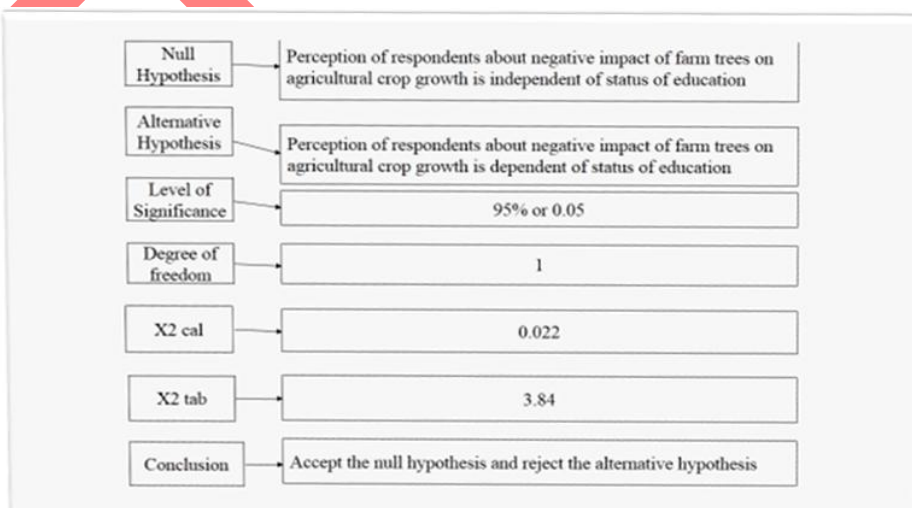


Figure-1.7. Relationship between perception about effects of farm trees on agriculture crop growth and educational status of respondents.

Source: (Survey data, 2018)

From the chi-square test value (4.5) it is clear that the relationship between the variables is significant so we reject the null hypothesis and accept the alternative hypothesis.

Table-1.8. Relationship between effects of farm trees on soil fertility and average numbers of farm trees per acre.

Effects of farm trees on soil fertility	Average numbers of trees per acre	
	<473	>473
Yes	17	33
No	7	3
Total	24	36

Source: (Survey data, 2018)

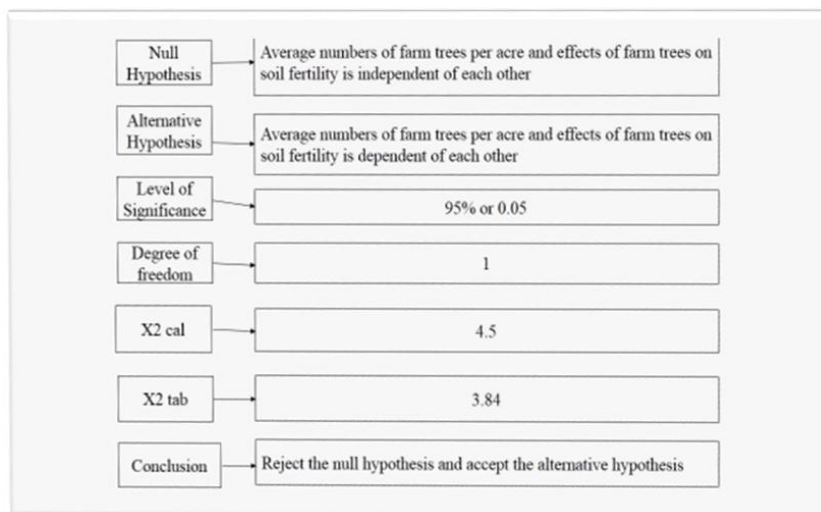


Figure-1.8. Relationship between effects of farm trees on soil fertility and average numbers of farm trees per acre.

Source: (Survey data, 2018)

From the calculated value of chi-square (7.99) it is clear that there is a significant relationship between reduce pressure on natural forest and an average number of farm trees per acre. Hence, we reject a null hypothesis and accept the alternative hypothesis. □

Table-1.9. Relationship between reduce pressure on natural forest and average number of farm trees per acre.

Reduces pressure on natural forest	Average numbers of farm trees	
	<473	>473
Yes	16	34
No	8	2
Total	24	36

Source: (Survey data, 2018)

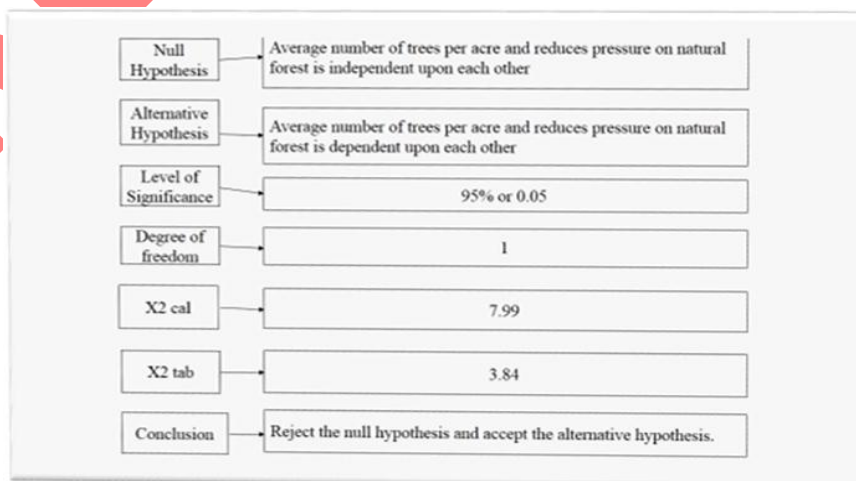


Figure-1.9. Relationship between reduce pressure on natural forest and average number of farm trees per acre.

Source: (Survey data, 2018)

From the chi-square value (15.38) it is clear that there is a significant relationship between an average income from farm trees per household and an average numbers of farm trees per acre. Hence we reject the null hypothesis and accept the alternative hypothesis.

Table-1.10. Relationship between average income from farm trees per household and average numbers of farm trees per acre.

Average number of farm trees per acre	Average income from farm trees per household	
	<2225500	>2225500
<473	22	1
>473	17	20
Total	39	21

Source: (Survey data, 2018)

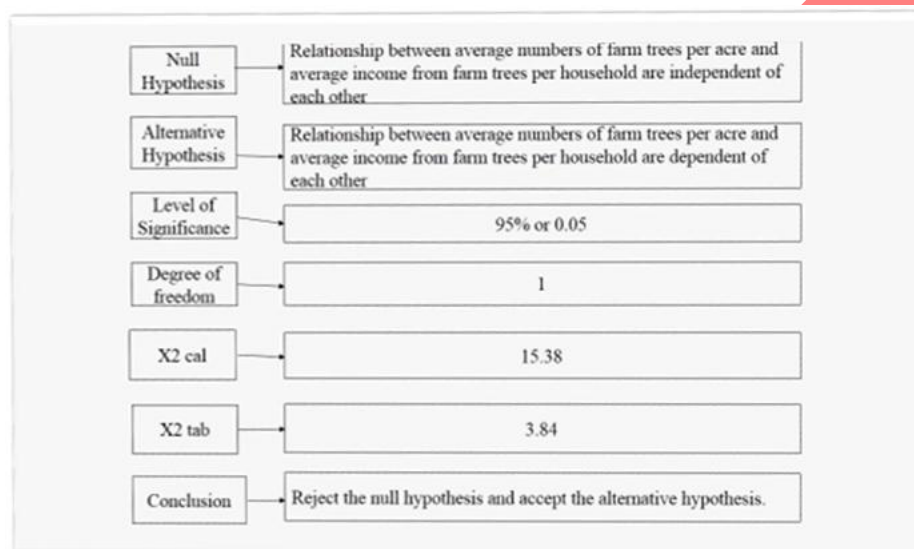


Figure-1.10. Relationship between average income from farm trees per household and average numbers of farm trees per acre.

Source: (Survey data, 2018)

4. CONCLUSION

Pakistan is that country in which forest resources are not enough for the demand for wood. Fuel wood is the basic need of poor particularly the rural people. Hence, for this reason, plantation on farmland or farm forestry maybe preferred to meet the demands of the poor people. In the poverty alleviation, farm forestry has a great role, because 50% of the timber and 80% of the fuel wood come from the farmlands and hence fulfill the demands of the people. According to the survey data 2018, it is concluded that 60% of the responded were aged and experienced persons. Also from the study, it is clear that majority of the respondents family members were 8-14. While 78% of the respondent were literate, and 68.33% of the respondent occupation was farming. Also, 95% of the respondents were landowners. 45% of the respondents having land size up to 3 acres.58.3% of the respondent had agriculture and horticulture practices. 51% of the respondents keep livestock. From the study at is clear that firewood is the primary source of fuel which people obtained from trees. Average income from farm forestry was PKR 43129.84 per household. Average monthly income from agriculture and horticulture crop was 25451.11 per household. Average monthly income employments were 12150 per household.□

Hence, it is concluded that forestry is the main source of income and its play a great role in the poverty alleviation.83% of the respondents says that farm forestry has a great role in natural resource conservation, provide wildlife habitat, improve soil fertility, and reduce soil erosion. From the chi-square analysis, it is concluded that farm forestry plays a positive role in respect of reducing pressure on its resources, e.g., fuel wood, timber, and fodder. More trees inland increase the income of household which reduces poverty in rural areas. While on the other hand relationship between educational status and perception about farm trees as wildlife habitat and effects of

farm trees are non-significant. The major source of fuel wood is farm trees in the study area due to highly significant value.

5. RECOMMENDATIONS

Based on the findings of this study, the following points are recommended.

- Forest extension service be expanded and intensified in the area so that farmers are made fully aware of the multi-purpose role of farm trees.
- Farmers should be motivated and educated to grow a trees along with the periphery of the agriculture field in the North-South direction to minimize its effect on the agriculture crop.
- Privatization of nurseries will transfer skill and increase job opportunities.
- The forest department is required to bridge the gap between the farmers and researchers.
- Awareness has to be created among the farmers regarding planting for fodder species.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

- Angelsen, A., P. Jagger, R. Babigumira, B. Belcher, N.J. Hogarth, S. Bauch, J. Börner, C. Smith-Hall and S. Wunder, 2014. Environmental income and rural livelihoods: A global-comparative analysis. *World Development*, 64(Supplement 1): S12-S28. [View at Google Scholar](#) | [View at Publisher](#)
- Anonymous, 2002. Economic survey 2001-2002. Islamabad: Government of Pakistan, Economic Advisor's Wing, Finance Division.
- Ansari, M.A.A. and M. Iftikhar, 1985. Food and forest. *Pakistan Agriculture*, 7(11): 5-6.
- Babulo, B., B. Muys, F. Nega, E. Tollens, J. Nyssen, J. Deckers and E. Mathijs, 2009. The economic contribution of forest resource use to rural livelihoods in Tigray, Northern Ethiopia. *Forest Policy and Economics*, 11(2): 109-117. [View at Google Scholar](#) | [View at Publisher](#)
- Behera, B., 2009. Explaining the performance of state–community joint forest management in India. *Ecological Economics*, 69(1): 177-185. [View at Google Scholar](#) | [View at Publisher](#)
- Bukhari, A.S., 1997. The role of NGOs in promoting fuel wood production in Pakistan. National Workshop on Wood Fuel Production and Marketing in Pakistan. RWEDP Report No.49. Faisalabad, Pakistan: FAO Regional Wood Energy Development Programme in Asia (GCP/RAS/154/NET).
- Census Report, 1998. Census Report of District Swat.
- Chowdhury, M.S.H. and M. Koike, 2010. An overview on the protected area system for forest conservation in Bangladesh. *Journal of Forestry Research*, 21(1): 111-118. [View at Google Scholar](#) | [View at Publisher](#)
- Das, N., 2010. Incidence of forest income on reduction of inequality: Evidence from forest dependent households in milieu of joint forest management. *Ecological Economics*, 69(8): 1617-1625. [View at Google Scholar](#) | [View at Publisher](#)
- Dash, M., B. Behera and D. Rahut, 2016. Determinants of household collection of non-timber forest products (NTFPs) and alternative livelihood activities in simlipal Tiger reserve, India. *Forest Policy and Economics*, 73(C): 215-228. [View at Google Scholar](#) | [View at Publisher](#)
- Fakiha, 2002. Socio-economic suitability of multi-purpose forest tree species in rain fed area of Haripur District. M.Sc Forestry Thesis (2000-2002).
- FAO, 2000. Forestry extension organization. Rome: Food and Agriculture Organization (FAO).
- Forrester, D.I., J. Bauhus and A.L. Cowie, 2006. Carbon allocation in a mixed-species plantation of eucalyptus globulus and acacia mearnsii. *Forest Ecology and Management*, 233(2-3): 275-284. [View at Google Scholar](#) | [View at Publisher](#)

- GOP, 2003. Economic survey of Pakistan, 2002-2003. Islamabad: Government of Pakistan (GOP).
- GOP, 2004. Economic survey of Pakistan, economic advisor's wing. Islamabad, Pakistan: Finance Division.
- Govt of Pakistan, 2005. Economic survey, ministry of finance. Islamabad: Economic Affairs Division.
- Gurr, G., S. Gamez-Virus, R. Bonifacio, C. Kinross and A. Raman, 2009. Farm trees: Enhancing biodiversity, nature conservation and pest control. Canberra, Australia: Rural Industries Research and Development Corporation.
- Hogarth, N.J., B. Belcher, B. Campbell and N. Stacey, 2013. The role of forest-related income in household economies and rural livelihoods in the border-region of southern china. *World Development*, 43: 111-123. [View at Google Scholar](#) | [View at Publisher](#)
- Jagger, P., M.M.K. Luckert, A.E. Duchelle, J.F. Lund and W.D. Sunderlin, 2014. Tenure and forest income: Observations from a global study on forests and poverty. *World Development*, 64: S43-S55. [View at Google Scholar](#) | [View at Publisher](#)
- Kar, S.P. and M.G. Jacobson, 2012. NTFP income contribution to household economy and related socio-economic factors: Lessons from Bangladesh. *Forest Policy and Economics*, 14(1): 136-142. [View at Google Scholar](#) | [View at Publisher](#)
- Khan, S.A., 1989. Channels of communication in the diffusion of farm forestry in Pakistan. M.S. Thesis. Columbia, MO: University of Missouri-Columbia.
- Leach, G., 1993. Farm trees and wood markets. Pakistan Household Energy Strategy Study (HESS). Prepared for the Government of Pakistan (Energy Wing) under United Nations Development Programme (Pak/88/036) by energy Sector Management Assistance Programme.
- McKetta, C.W., 1990. The wood shortage in Pakistan: Hypothetical contradictions. *Pakistan Journal of Forestry (Pakistan)*.
- Mogaka, H., G. Simons, J. Turpie, L. Emerton and F. Karanja, 2001. Economic aspects of community involvement in sustainable forest management in Eastern and Southern Africa (No. 8). IUCN.
- Mohammad, H., 2004. Role of farm forestry/agroforestry in wood production and farmer perception. M.Sc Thesis Pakistan Forest Institute Peshawar.
- Nizamani, A.A. and A.A. Shah, 2004. A review of forest policy trends for community participation in Pakistan. *Policy Trend Report 2004*: 28-34.
- Patil, S., B. Nadagoudar, S. Mutanal, S. Madiwalar and S. Devaranavadjgi, 2000. Suitability of tree species in an agroforestry system in hill zone of Karnataka. *Indian Forester*, 126(11): 1187-1190. [View at Google Scholar](#)
- Pouliot, M. and T. Treue, 2013. Rural people's reliance on forests and the non-forest environment in West Africa: Evidence from Ghana and Burkina Faso. *World Development*, 43: 180-193. [View at Google Scholar](#) | [View at Publisher](#)
- Shackleton, C.M., S.E. Shackleton, E. Buiten and N. Bird, 2007. The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa. *Forest Policy and Economics*, 9(5): 558-577. [View at Google Scholar](#) | [View at Publisher](#)
- Sunderlin, W.D., A. Angelsen, B. Belcher, P. Burgers, R. Nasi, L. Santoso and S. Wunder, 2005. Livelihoods, forests, and conservation in developing countries: An overview. *World Development*, 33(9): 1383-1402. [View at Google Scholar](#) | [View at Publisher](#)
- Swat Report, 2010. Socio-economic baseline and displacement impact of district swat by Centre for Public Policy and Research (CPPR).
- Wunder, S., A. Angelsen and B. Belcher, 2014. Forests, livelihoods, and conservation: Broadening the empirical base. *World Development*, 64(Supplement 1): S1-S11. [View at Google Scholar](#) | [View at Publisher](#)

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