FARMERS ATTITUDE TOWARDS AGROFORESTRY IN TEHSIL RAZZAR AND SWABI, KHYBER PAKHTUNKHWA

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ABSTRACT

In the wake of global overpopulation, agroforestry has the potential to help sustain agriculture, livelihoods, ecology, and food security. It is, however, difficult to implement sustainable agroforestry practices because it is necessary to understand the characteristics and perceptions of farmers. It is complex but crucial to anticipate and analyze these aspects. The aim of this study is to investigate factors affecting farmers especially small land owner farmers and their intentions to plant trees on their farmland, as well as potential hindrances to their efforts. Two-stage random sampling was adopted to collect the required information from forty respondents through a structured questionnaire. Our results revealed that about 72.5% of respondents have the primary reason for planting is economic return, while 15% plants for shelterbelt purposes. Whereas, results further revealed that 12.5% farmers planted trees for land stabilization. In addition to that 57.5% of households gets benefits from agroforestry in the form of cash and fuel wood 10% in the form of fuel wood. From the survey it is also revealed that 45% of farmers are directly benefited from fuel wood from farmland, while 32.5% of farmers relied for fire wood on their land as well as from market. Overall, the findings indicated that factors related to socio-economic status, such as family size, land possession, subsidies received, livestock raising, types of energy used, and total income, significantly impacted the planting of trees on agricultural land. For the promotion of national agroforestry, policies that improve forestry and agricultural extension services and agricultural education are imperative.

Keywords: Agroforestry, Farmers, Fuel wood, Household

INTRODUCTION

In order to combat global poverty and hunger while simultaneously safeguarding the environment, the international community has recently developed regulations to encourage farmers to embrace sustainable agricultural practices. (Hak et al., 2016). Due to issues including population expansion, climate change, and land degradation, the globe still struggles to supply the high demand for food with low levels of agricultural output. Global risk report (2022). Around 3 billion people lack the financial means to buy the food they need for a nutritious diet, and millions of farmers in areas with food insecurity struggle to support their families (FAO, 2022). While it only contributes for 4% of GDP globally, agriculture makes up more than a quarter of the GDP in some

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developing nations (FAO, 2022). Pakistan's agricultural industry, which employs roughly 37.4 percent of the labour population and provides 22.7 percent of the country's GDP, is crucial for rural development and food security. Government of Pakistan's Ministry of Finance (2021–2022). Bureau of statistics (Government of Punjab, 2022) reports that the majority of people who live in rural areas, or about 64.6% of the total population, are smallholder farmers who have less than 2 hectares of land and are therefore particularly vulnerable to climate change. This results in fewer harvests, which makes it difficult for farmers to make a living and worsens poverty in the nation.

People who are below the poverty line use forests as a secondary source of income, but Pakistan's high rate of deforestation threatens the country's natural ecology (Fahad and wang, 2018). Only 4.786 million hectares, or 5.45 percent of the nation's territory, are covered in forests, according to the Ministry of Pakistan and the Pakistani Government of 2022. Between 1990 and 2010, Pakistan's forest cover decreased by an average of 8400 km2, or 33.2% of its total area, at a rate of 420 km2 each year, according to FAO (2010). The per capita area of forest cover is just 0.0208 hectares, which is much less than the global average because of the growing population's reliance on the few forest resources (Ahmed et al., 1998). The demand for wood in Pakistan exceeds the entire amount produced yearly, with farmlands producing 60% of the nation's timber and 90% of its fuelwood (Caviglia et al., 2001). By converting 10% of domestic farmlands to forest cover, agroforestry is a dependable solution that can meet the rising demand for wood products without hurting agricultural crops (Qureshi et al., 2003).

Agroforestry, or the practice of planting trees on farmlands, gained international recognition during the late 1970s and developed into a contemporary and enhanced method of land utilization. (ICRF 2022). Unlike traditional methods of agriculture and forestry, agroforestry serves as an interface between the two disciplines, incorporating not only physical and biological sciences but also social sciences (Mercer and Miller 1996). Agroforestry is a comprehensive and sustainable agricultural system that involves the integrated management of crops, trees, and livestock on the same plot of land, arranged temporally and spatially FAO (2022). Many benefits of agroforestry have been substantiated by extensive research. Furthermore, tree planting in agroforestry systems contributes to food diversity, improves food security, and increases income opportunities, thus alleviating poverty (Jahan et al., 2022). Moreover, agroforestry demonstrates potential in conserving biodiversity and offering alternative livelihood options for rural communities (Kidd and Pimental 2012) and (Jordon and Bentley 1990). Consequently, agroforestry practices are increasingly embraced worldwide due to their capacity to yield social, ecological, and economic benefits. As a result of the adoption of agroforestry, multiple benefits can be realized, including the production of

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additional marketable goods and the enhancement of soil fertility. Moreover, it provides a protective barrier against wind for standing crops, aids in the preservation of deteriorated lands, and reduces wind and soil erosion. It also contributes to the improvement of water quality, while acting as a deterrent to pest attacks (Jose, 2009). Agroforestry systems are commonly implemented by smallholder farmers in developing countries (Scherr 2004). Rural communities are recognized as having the greatest potential to adapt to environmental changes and improve their livelihoods, agrobiodiversity, and economic stability by developing these systems (Tscharntke et al., 2011). Furthermore, agroforestry is a sustainable and environmentally friendly method that enables farmers to fulfill their financial requirements (Hanif et al., 2015). Socioeconomic factors should be taken into consideration when analyzing farmers' interactions with agroforestry. In this study, the aim was to describe the agroforestry system in the Swabi (Razzar) district and determine the factors affecting its adoption. Furthermore, this study also provide the assistance in identifying and tackling the requirements of small-scale farmers especially. This study aims to determine the primary reason for planting and primary benefits derived from agroforestry and to know farmer perceptions towards economic and environmental importance of agroforestry.

MATERIAL AND METHODS

Study Area

District Swabi is a sub-division of Mardan and was created a district in 1988 and comprised of four tehsils; Razzar, Swabi, Topi and Lahore. The district is located between 34.70N and 72.280E. 78.0% of the district's territory is mountainous, and the remaining 21.0% is dry. Swabi is bordered by Haripur, Mardan, Buner, and Mansehra. The District's yearly temperature is 19.22°C (66.6°F). Swabi typically receives about 129.0 mm (5.08) inches of precipitation and has 142.56 rainy days.

MAP OF STUDY AREA
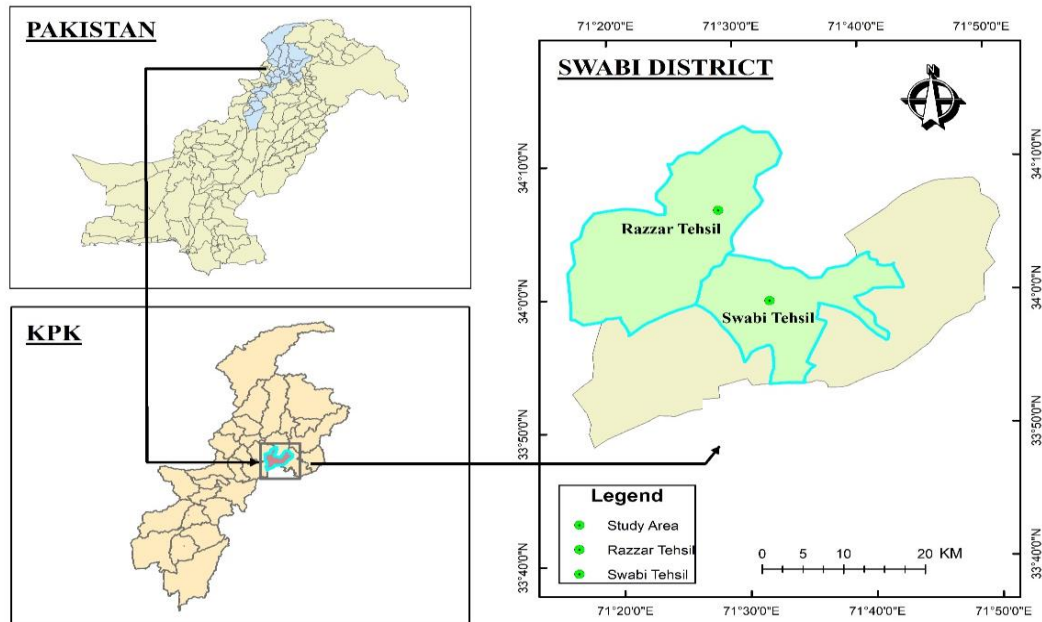
Data collection and sampling strategy

Primary data was gathered by means of a questionnaire that was carefully prepared. In addition, the research was conducted in two distinct tehsils within the Swabi district: the first was tehsil Razar, and the second was tehsil Swabi. The questionnaire was prepared bearing in mind the objectives of the study. The questionnaire was revised in order to boost its validity and reliability and eliminate the uncertainty that had arisen in its later stages. Two-stage Random sampling was implemented for the collection of respondents. At initial, four union council were selected randomly from the list of 34 union council in both tehsils. In the second stage, ten farmers were selected randomly from each selected village. Thus, a total of forty farmers were interviewed for gathering the desired information related to the purpose of the study. The detail of the union council and the number of respondents is given in table.

Table 1.   List of Union Councils' Sample

S.No	Name of union council	No of respondents
1	Turlandi	10
2	Dagai	10
3	Maneri	10

4	Zaida	10

The sampling intensity was maintained at 12% out of 34 union councils, and four union councils were chosen at random. Following that, ten respondents were chosen from each union council by assuming that there were one thousand households in each union council and using a sampling intensity of 1%. From the 20th to the 30th of July, 2022, a field survey was carried out. A systematic questionnaire consisting of 32 questions was used to collect information from forty different respondents. In order to establish the authenticity of the questionnaire, it was first drafted, and then it was piloted in the field. Due to the fact that all of the selected respondents were given the opportunity to be interviewed, we received a response rate of one hundred percent.

Data Analysis and compilation
In order to compile and tabulate the data, it was necessary to move all of the acquired information into a tally sheet. The analysis and discussion of the data, the derivation of findings, and the drafting of relevant recommendations and suggestions were all accomplished through the use of straightforward statistical methods such as the average and percentages.

RESULTS
The study shows that the respondents have different land holding size in which 35% percent of respondents have land hold size of 11 to 20 kanals, 22.5% of respondents have land of 21 to 30 kanals, 17.5% of respondents have land 31 to 40 kanals, and 10 % of respondents have land of 41 to 50 kanals (Table 2 and Fig 4). This attributes that respondents with high land hold size are dependent on farming i-e. 65% of respondents have farming as a source of income, 25% were government employees and 10% of respondents were labor (Fig 1). And whereas, the respondents with high land hold size i-e. 60% prefer poplar specie and respondents with low land hold size prefer poplar and mulberry specie which is 15% and the rest of respondents prefer mixed species due to very low land hold size (Table 3). Furthermore, the source of fuelwood also varies with land hold size and population size that is 45%, using fuel wood from there farm land, 22.5% buying fuel wood from market and others using both farmland and market for fuelwood which is 32.5% (Table 7). On the other aspect the source of income is somewhat dependent on the milk production of livestock. Milk production of Number of cows is 61.6%, No of buffaloes is 35.3%, and No of goats is 3% and the production of milk in kg (Fig 2 and 3). The reason pertaining to main purpose of planting out of which 72.5% is economic return, 15% have shelter belt purpose and 12.5% have land stabilization purpose (Table 5). Though, 90% bring seedling from private nurseries and 10% bring seedling from government

nurseries (Table 4). The importance of agroforestry is reflected with the findings and comparison of the monthly income before and after agroforestry (figure 10). That is 57.5% get the cash and fuel wood from agroforestry and 32.5% get cash directly from agroforestry while 10% get fuel wood from agroforestry practice (Table 6).
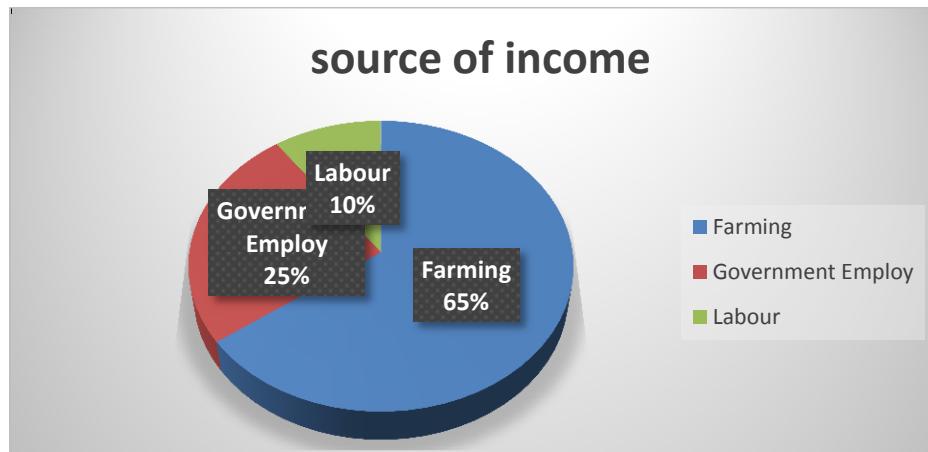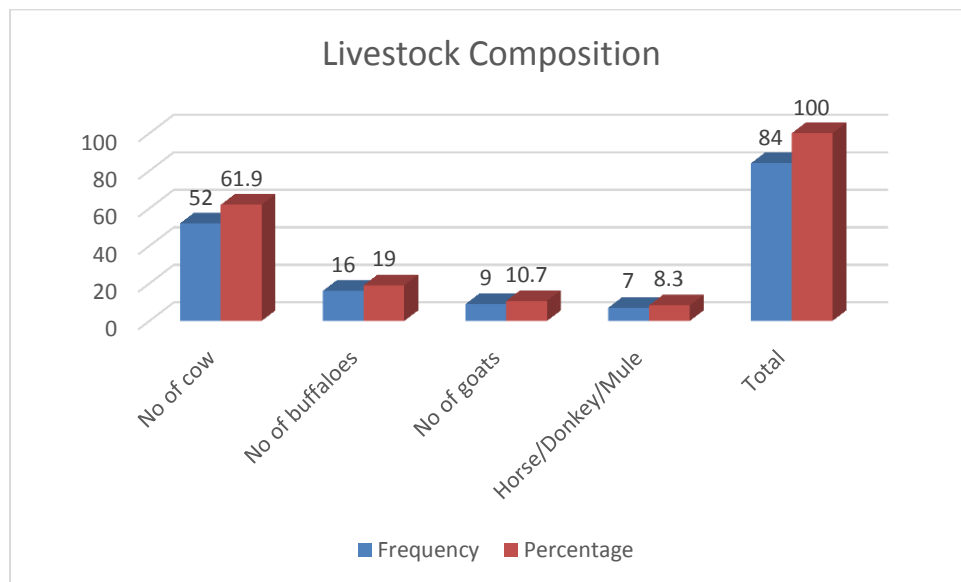

Fig.1 Source of Income
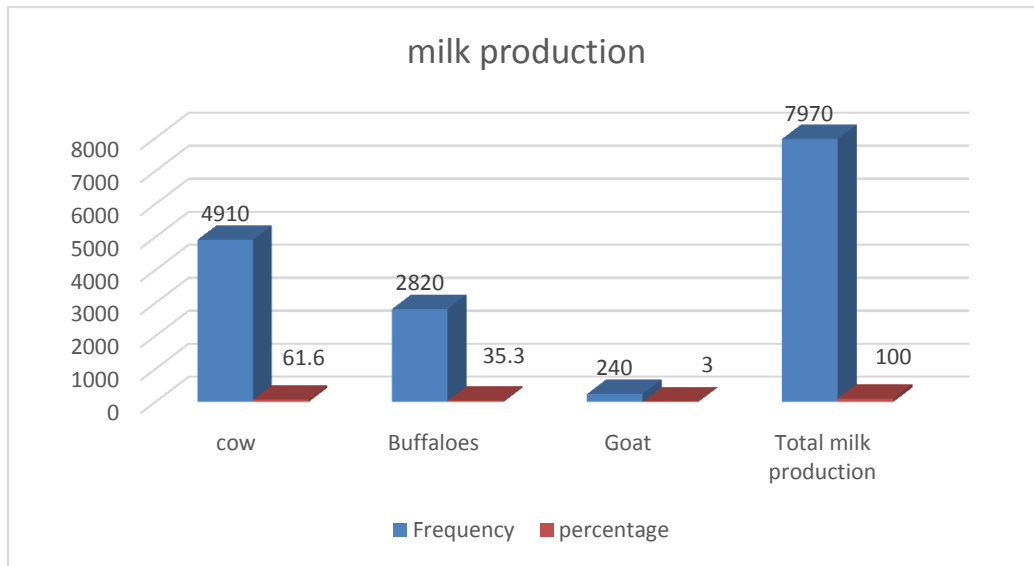

Fig.2 Livestock Composition

Fig.3 Milk Production from Livestock

Table 2.   Land holding size in Kanal

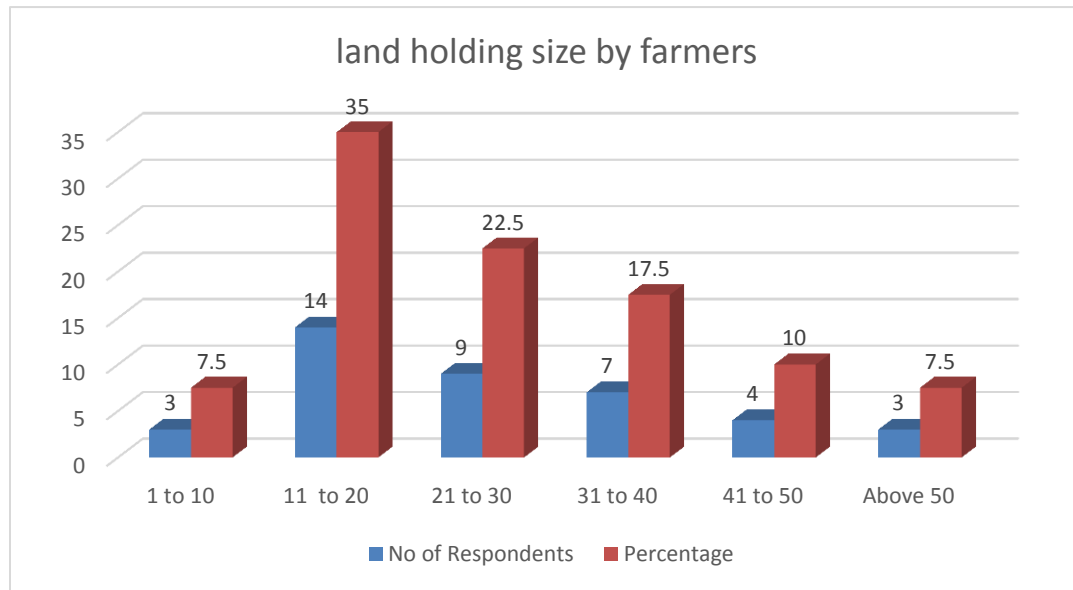| Area in kanal	No of Respondents	Percentage
1 to 10	3	7.5
11 to 20	14	35
21 to 30	9	22.5
31 to 40	7	17.5
41 to 50	4	10
Above 50	3	7.5

Fig.4 Land holding size by formers

Table 3.   Species prefer for agroforestry

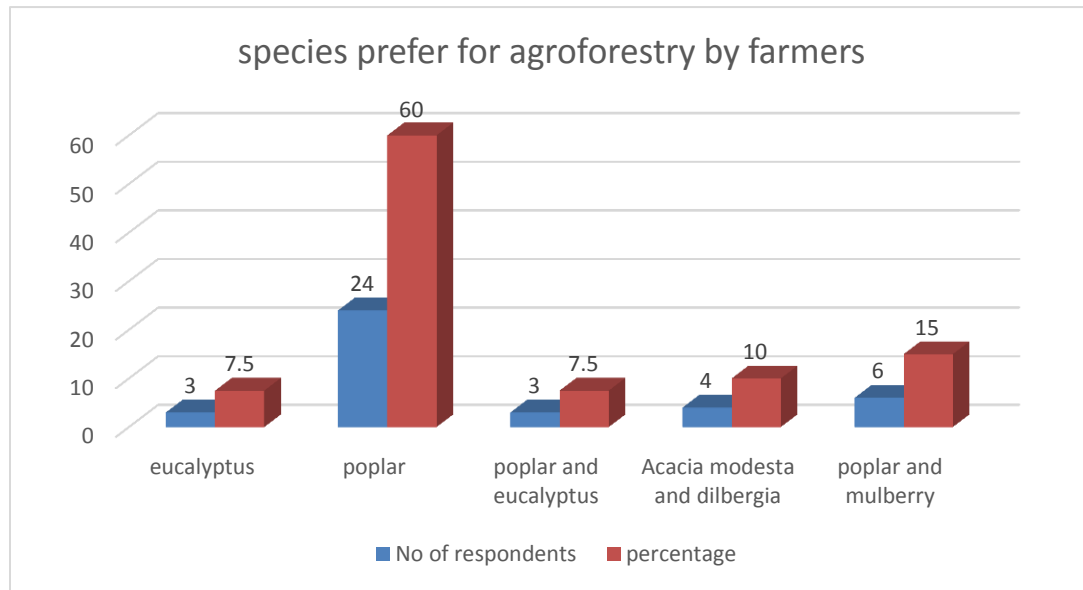| Species Prefer for Agroforestry	No of respondents	Percentage
Eucalyptus	3	7.5
Poplar	24	60
poplar and eucalyptus	3	7.5
Acacia modesta and dilbergia sisso	4	10
poplar and mulberry	6	15

Fig.5 Species prefer for agroforestry by farmers

Table. 4   Source of Seedling

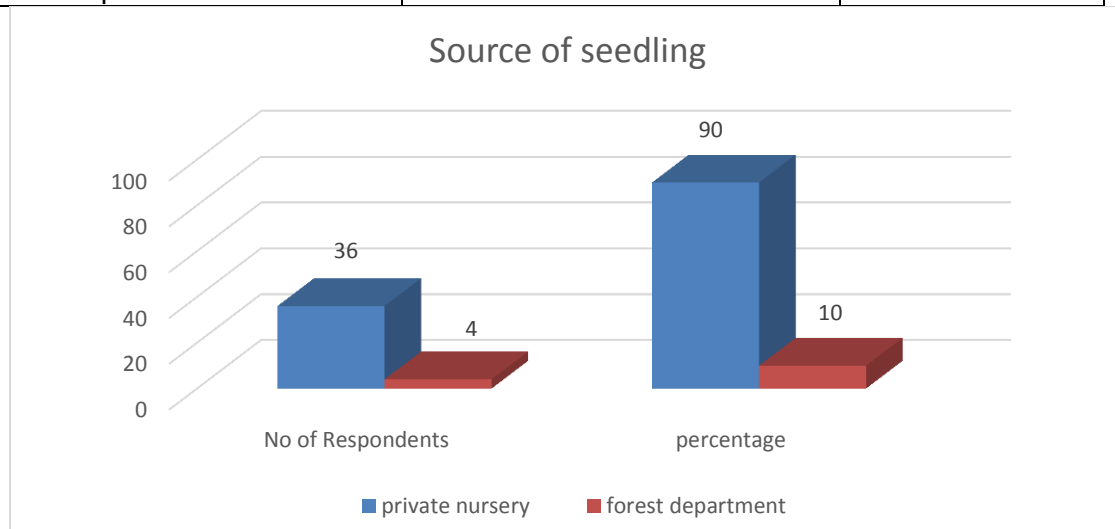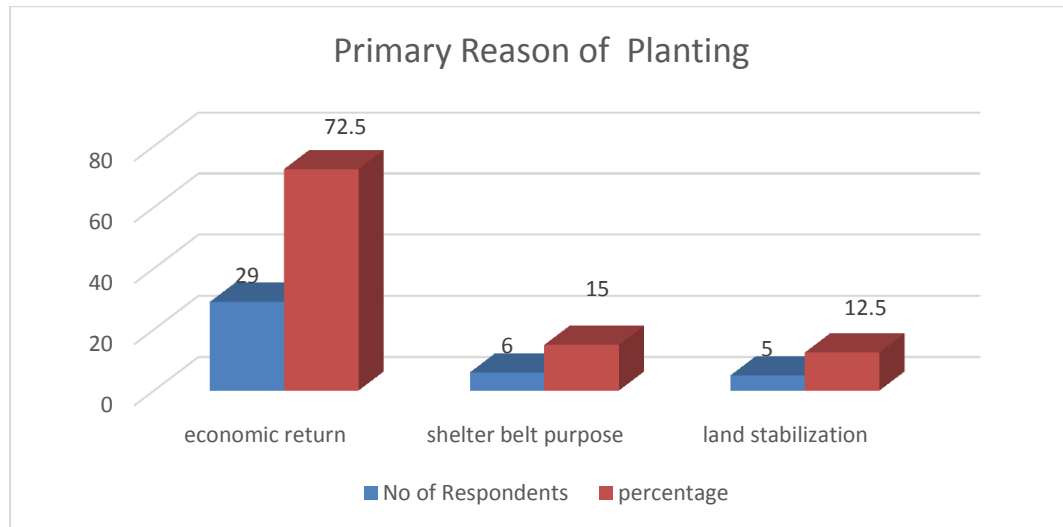| Source of Seedling	No of Respondents	Percentage
private nursery	36	90
forest department	4	10

Fig.6 Source of Seedling

Table. 5   Primary reason of planting

Primary Reason for planting	No of Respondents	Percentage
Economic return	29	72.5
Shelter belt purpose	6	15
Land stabilization	5	12.5

Fig.7 Primary Reason of Planting

Table 6   Benefits from agroforestry

Benefits from Agroforestry	No of respondents	percentage
Cash and Fuel wood	23	57.5
Fuel wood	4	10
Cash	13	32.5
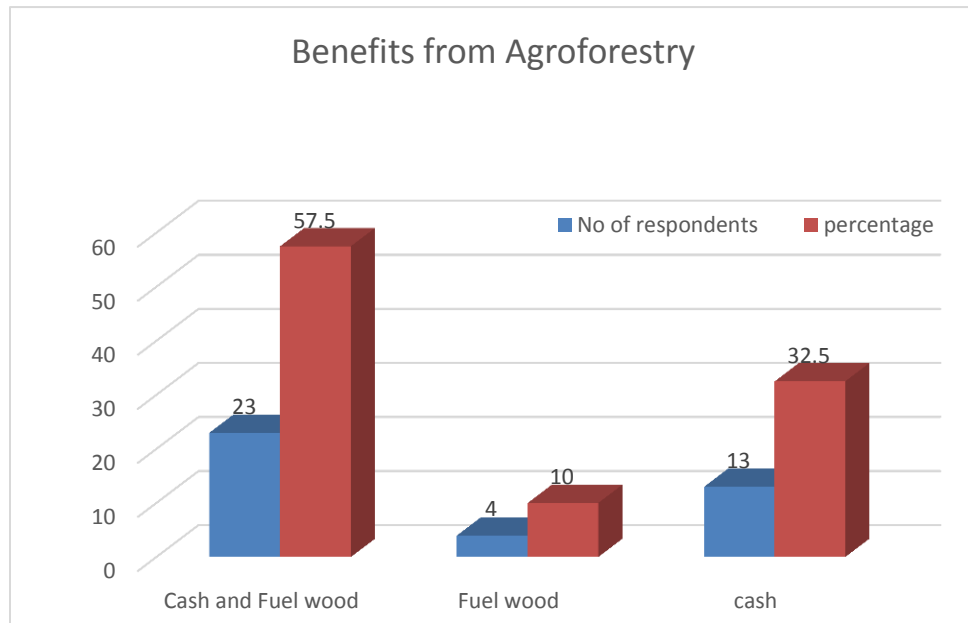
Fig.8 Benefits from Agroforestry

Table 7   Source of fuel wood

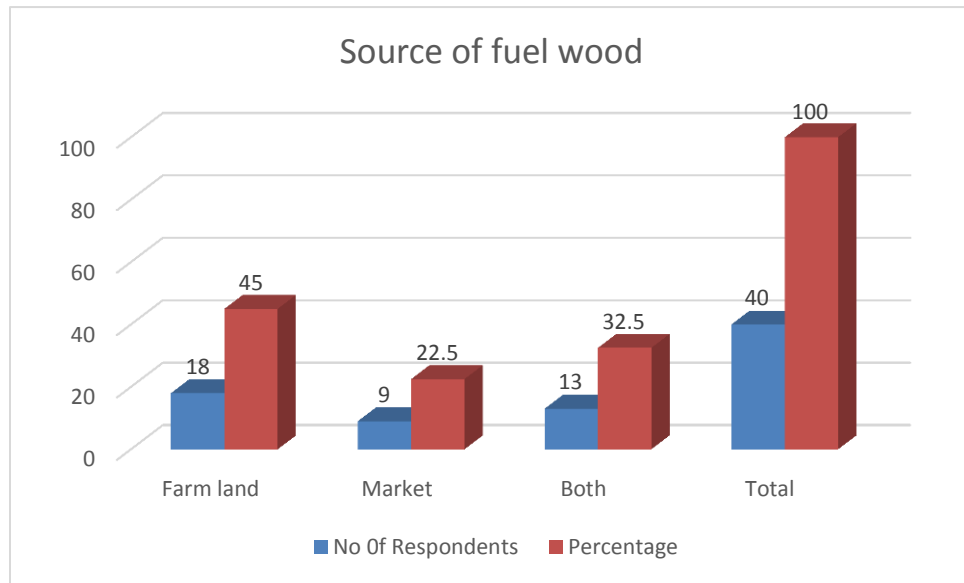| Source of fuel wood	No 0f Respondents	Percentage
Farm land	18	45
Market	9	22.5
Both	13	32.5
Total	40	100

Fig.9 Source of Fuel Wood

Table 8. Monthly incomes before and after agroforestry

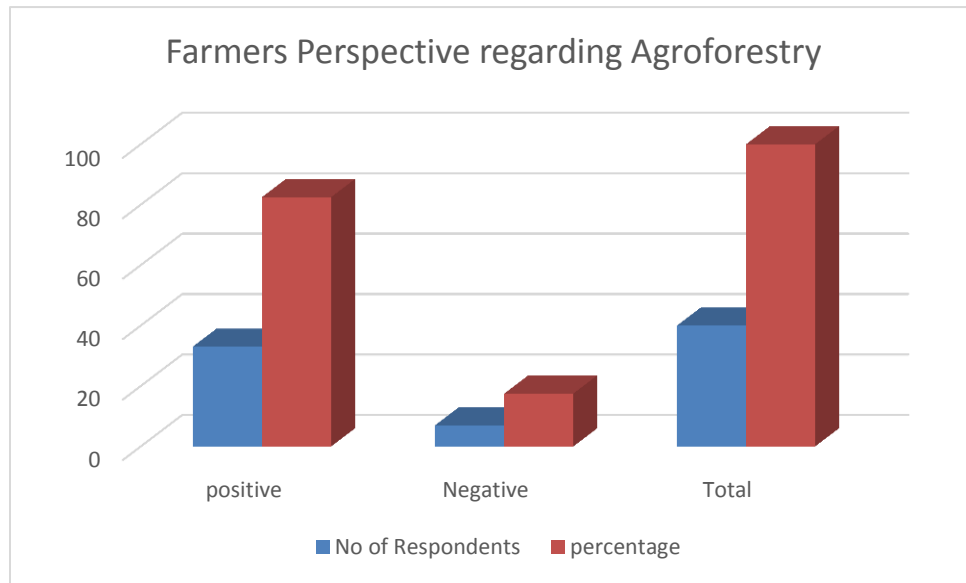| Number of respondents	Monthly Income before Agroforestry	Area in kanal before and after agroforestry	Monthly Income After Agroforestry
7	8000-12,000	up to 3 canals	10000-15000
19	13,000-17,000	4 to 5	17000-22000
9	18,000-22,000	6 to 7	24000-29000
5	more than 20,000	More than 8	More than 30000

Fig.10 Farmers Perspective regarding Agroforestry

Discussions

In our findings farmer's perception reveals that about 57.5% of people have benefits from agroforestry in the form of both cash and fuel wood, 32.5% of respondents have benefits in the form of cash and 10% have benefits in the form of fuelwood. The data also reveals that 90 percent of people purchasing seedling from private nurseries and only 10% from forest department and data also reveals the livestock composition of people due to which 61.9% of people rearing cow due to which the milk production is also high and monthly income from selling of milk is from Rs 6000 to 10000 and about 35% of people not selling milk because of self-use. Suman Saha et al (2018) have stated in line with our findings that Agroforestry was thought to boost agricultural productivity by 82.14% of the respondents, increase household income by 73.8%, and provide food security by 30.95% of the respondents. Contrarily, 34.52% of respondents said that agroforestry methods reduced the output of cash crops, and 17.85% said that agroforestry was a challenging practice. The study recommends offering technical help as well as spreading awareness of the advantages of agroforestry approaches.

In our findings major source of fuelwood is from farmland due to agroforestry practice which is 45% and fuelwood consumption of majority people is from 1600 to 2500 kg per Annum. Monthly income before and after agroforestry were also asked from farmers so as to know the importance of agroforestry and to solve their economic problems and improve the livelihood of the people. The data reveals that monthly income before agroforestry from same land is less as compared to income after agroforestry so the income after agroforestry from

same land is increased.

A.H Tokede et al (2020) stated that the majority of respondents (66%) did not engage in any agroforestry activities and had a limited understanding of these activities. The views of the respondents toward the practice were poor. Additionally, it was discovered that attitudes toward the practice of agroforestry as well as understanding of it affect intention to adopt it in the research area. Based on the findings, this study suggests that extension agents and other stakeholders step up efforts to provide farmers with sufficient information about the practice and benefits of agroforestry in the clearest possible terms, in order to change their attitudes and increase the rate at which agroforestry practices are adopted.

Wasif Nouman and et. al (2008) came to the conclusion that the primary reason why farmers did not use agroforestry was that they were unaware of the benefits that trees may provide to their farms. They were under the impression that the trees were responsible for the destruction of their fields, as well as the fact that agricultural crops had to compete with the trees for water and nutrients. The government ought to get the ball rolling on programmes to expand the capabilities of farmers by organizing seminars for their training and orientation. In addition to that, she ought to provide the farmers with scientific guidance concerning the right tree species that may be cultivated on agricultural land and that are less competitive with agricultural crops for nutrients and water.

Conclusion

In agroforestry, various components are cultivated simultaneously in one place in order to improve the farmer's socioeconomic position and the state of the environment. According to our results, approximately 72.5% of respondents planted for economic reasons, while 15% planted for shelterbelt purposes. Furthermore, 12.5% of farmers planted trees in order to stabilize their land. Additionally, 57.5% of households receive cash benefits from agroforestry and 10% receive fuel wood benefits. Additionally, the survey found that 45% of farmers directly benefit from the production of fuel wood from their land, and 32.5% rely on both farmland and market sources for firewood. The study concluded that factors related to socioeconomic status, such as family size, land ownership, subsidies received, livestock raising, type of energy used, and total income, significantly influenced the planting of trees on agricultural land. To promote national agroforestry, it is imperative to implement policies that enhance forestry and agricultural extension services, as well as agricultural education.

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