A STUDY ON FARMERS' PERCEPTION AND ADOPTION OF AGROFORESTRY PRACTICES IN UNA DISTRICT OF HIMACHAL PRADESH

Project Report

by

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(H-2021-18-ABM)

submitted to

Dr. YASHWANT SINGH PARMAR UNIVERSITY OF HORTICULTURE & FORESTRY
SOLAN (NAUNI) HP-173 230 INDIA

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of

MASTER OF BUSINESS ADMINISTRATION (AGRIBUSINESS)

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CERTIFICATE-I

This is to certify that the project report titled, **"A study on Farmers' Perception and Adoption of Agroforestry practices in Una district of Himachal Pradesh",** submitted in partial fulfilment of the requirements for the award of the degree of **Master of Business Administration (Agribusiness)** in the discipline of **Agribusiness Management** to Dr. Yashwant Singh Parmar University of Horticulture and Forestry, (Nauni) Solan (HP) - 173 230 is a bonafide project work carried out by Rahul Sharma **(H-2021-18-ABM)** son of Shri Rajeev Kumar Sharma under my supervision and that no part of this project report has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation have been fully acknowledged.

Place: Nauni, Solan
Date:

Dr. Krishan Kumar
Major Advisor

CERTIFICATE-II

This is to certify that the project report titled, **"A Study on Farmers' Perception and Adoption of Agroforestry Practices in Una District of Himachal Pradesh",** submitted by **Rahul Sharma (H-2021-18-ABM)** son of Shri Rajeev Kumar Sharma to the Dr. Yashwant Singh Parmar University of Horticulture and Forestry, (Nauni) Solan (HP)–173 230 India in partial fulfilment of the requirements for the degree of **Master of Business Administration (Agribusiness)** in the discipline of **Agribusiness Management** has been approved by the Advisory Committee after an oral examination of the student in collaboration with an External Examiner.

Dr. Krishan Kumar
Major Advisor

(External Examiner)

Advisory Committee

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   (Professor and Head) _____

2. **Dr. Krishan Chand**
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Solan (Nauni) ***(Rahul Sharma)***

Date:

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INTRODUCTION

Agroforestry is a sustainable land management practice that combines trees and shrubs with crops and/or livestock to enhance agricultural and forest productivity while safeguarding natural resources. It is a dynamic and ecologically oriented system that maximizes the benefits of interactions between trees, shrubs, crops, and livestock. Agroforestry offers numerous advantages, including increased social, economic, and environmental benefits.

By integrating trees and woody perennials into farm and rangelands, agroforestry diversifies and sustains products, resulting in greater productivity and profitability. In India, agroforestry has transformed the land-use system, benefit farmers and creating employment opportunities in various sectors. Furthermore, the planting of trees on agricultural fields has made wood products more affordable.

Compared to conventional arable and forestry systems, agroforestry stands out as a unique land use option that optimizes available resources. It is environmentally friendly and provides landscape benefits. While reforesting arable land exclusively would render it unproductive, agroforestry maintains its productivity, ensuring a continuous source of income for farmers. It also allows farmers to diversify their operations and make efficient use of natural resources.

Agroforestry generates multiple outputs, reducing risk and improving profitability while offering more ecosystem benefits than traditional agriculture. It safeguards agroecology, thereby preventing environmental degradation. By planting trees on agricultural fields, productivity, sustainability, profitability, and economic security are enhanced for farming communities.

Agroforestry is a relatively new scientific field, but it draws on age-old traditions among farmers worldwide. Its novelty lies in recognizing the potential of woody components to increase productivity systematically. The Cropland Agroforestry (CAF) system provides various necessities such as food, fiber, fodder, fruit, fuelwood, lumber, construction materials, and raw materials.

CAF benefits small-scale forest businesses and cottage industries, as fast-growing tree species can be used for poles and pulpwood. Trees in crop fields act as insurance against crop

failures and provide additional income. The system is designed with sustainability in mind, emphasizing resilience, diversity, and minimizing adverse effects while ensuring resources for future generations.

Agroforestry is particularly suitable for marginal lands, hillside protection, and water catchment areas. Its diversity provides resilience in the face of environmental and market uncertainties. The integration of traditional food crops and tree crops forms a successful long-term production system with multiple benefits, including environmental buffering, erosion control, soil moisture stability, nutrient retention, microclimate regulation, nitrogen fixation, and living fences.

Outside forests, India has a significant number of trees, supplying fuelwood, lumber, and other products. Agroforestry has the potential to expand further, stabilizing production and productivity while limiting environmental degradation. It also offers employment opportunities in rural and urban areas. Agroforestry systems contribute significantly to the country's timber supply.

In the face of resource exploitation and environmental degradation, agroforestry offers an alternative solution. Research suggests that monoculture systems often lead to ecological collapses, negatively impacting farmers' livelihoods and market prospects. Agroforestry systems with enhanced diversity and productivity can provide financial gains, influenced by market dynamics. Product diversification reduces risks associated with single commodities and increases economic profitability. Studies have shown that agroforestry practices can recoup initial costs more quickly than exclusive forestry land use, and silvoarable and silvopastoral systems are more profitable than agricultural monocultures.

In conclusion, agroforestry is a sustainable land management approach that combines trees, shrubs, crops, and livestock to maximize productivity, profitability, and environmental benefits. It is a valuable tool for addressing environmental challenges, ensuring food security, and promoting sustainable development in agricultural landscapes.

1.1 Current status of Agroforestry in India

India, with its imbalanced natural resource base, faces significant challenges in its agricultural sector due to climate change and stagnant productivity growth. Agroforestry, a traditional practice in India, can help address these challenges. Increasing the land area under agroforestry is crucial to mitigate climate change impacts and meet the growing demands for

food, fuel, fodder, and timber. Agroforestry not only provides environmental benefits but also fulfills various ecosystem services, ensuring the livelihood of practitioners.

Currently, agroforestry is practiced on approximately 17.45-25.32 million hectares in India. Uttar Pradesh, Maharashtra, and Rajasthan are the leading states in terms of agroforestry area. However, several obstacles hinder the development of agroforestry, including inconsistent legislation, lack of insurance coverage and marketing assistance, and limited access to low-interest bank loans for agroforestry businesses.

The National Agroforestry Policy 2014 aims to mainstream tree planting on farms and achieve developmental and environmental objectives. In the future, the area under tree cover, including agroforestry, is predicted to increase significantly. It is estimated that agroforestry can bring an additional 28 million hectares of land under planting, contributing to the national target of expanding forest cover.

In conclusion, agroforestry is a valuable practice in India that can address climate change challenges, provide economic and environmental benefits, and meet the country's growing resource demands. Overcoming obstacles and implementing supportive policies will be essential for the widespread adoption and expansion of agroforestry in India.

1.2 Current status of Agroforestry in Himachal Pradesh

The current status of agroforestry in Himachal Pradesh provides valuable insights into farmers' perception and adoption of agroforestry practices. Himachal Pradesh, known for its diverse agroclimatic conditions, has a long-standing tradition of practicing agroforestry as a means of sustainable land management and livelihood enhancement.

In Himachal Pradesh, agroforestry practices are predominantly integrated with horticulture-based systems. Fruit trees, such as apple, pear, plum, and peach, are commonly integrated with agricultural crops to optimize land productivity and diversify income sources (Kaushal et al. 2013). The integration of fruit trees with crops not only improves soil fertility but also provides additional income opportunities through fruit production.

Silvopastoral systems are also prevalent in the state, where trees are combined with livestock grazing. This practice helps in providing shade and fodder for livestock, leading to improved animal health and productivity. It also optimizes land use and contributes to sustainable livestock farming (Mehra et al. 2015).

The government of Himachal Pradesh has recognized the importance of agroforestry and has implemented various policies and programs to promote its adoption. The Himachal Pradesh State Forest Department, in collaboration with the Himachal Pradesh Horticulture Development Project, has launched initiatives to support agroforestry practices. These initiatives include providing technical guidance, training, and financial assistance to farmers for establishing agroforestry systems (Kaushal et al. 2013).

Despite the favorable conditions and government support, the adoption of agroforestry practices in Himachal Pradesh is influenced by several factors. Farmers' perception of agroforestry plays a crucial role in their adoption decisions. Studies have shown that farmers perceive agroforestry practices as beneficial for soil conservation, improved microclimate, increased farm productivity, and diversification of income sources (Mehra et al. 2015; Rana et al. 2016). Positive perceptions of agroforestry practices act as incentives for farmers to adopt these systems.

However, there are also challenges and barriers to agroforestry adoption in the state. Limited access to technical knowledge and expertise, lack of awareness about the potential benefits of agroforestry, and inadequate marketing support for tree products are some of the barriers identified in previous studies (Mehra et al. 2015; Rana et al. 2016). Additionally, farmers may face challenges related to land tenure, as secure land rights are essential for long-term investments in agroforestry.

Farmers' knowledge and awareness of agroforestry practices are crucial determinants of adoption. Extension services, NGOs, and government agencies play a vital role in disseminating information and providing training on agroforestry techniques (Kaushal et al. 2013). However, there is a need to strengthen these efforts to enhance farmers' understanding and knowledge of agroforestry systems.

In conclusion, agroforestry in Himachal Pradesh is primarily practiced through horticulture-based systems and silvopastoral systems. The government has taken initiatives to promote agroforestry practices, but there are challenges related to knowledge dissemination, marketing support, and land tenure. Farmers perceive agroforestry practices positively, recognizing their potential benefits for soil conservation, microclimate improvement, and income diversification. Strengthening extension services, providing technical support, and addressing barriers to adoption are critical for enhancing the perception and adoption of agroforestry among farmers in Himachal Pradesh.

1.3 Objectives of the study:

- To study the farmers' perception and awareness towards adoption of agroforestry.
- To examine the factors influencing agroforestry adoption.
- To study the problems in adoption of agroforestry practices.

Chapter-2

REVIEW OF LITERATURE

Bugayong (2003) conducted a study in a community-based forest management site, research was undertaken on the socioeconomic and environmental benefits of agroforestry activities. The study's goal was to examine upland farmers' agroforestry techniques and determine their socioeconomic and environmental benefits. The study's findings suggest that agroforestry may be used to improve farmers' socioeconomic conditions.

Kareemulla et al. (2003) analysed under rainfed conditions, studies were done on an aonla plus black gram agroforestry system in comparison to pure aonla and pure black gram. Over an 11-year period, an economic examination of the aonla + crops system revealed good outcomes in terms of cost and returns, payback period, and internal rate of return. As a result,instead of opting for pure grain crops, farmers in rainfed areas might opt for agroforestry systems, which can yield higher yields.

Molua (2003) examines the productivity in a cross-sectional survey of agroforest farms in South Western Cameroon to create a profit function. The econometric estimation was a significant step toward predicting and explaining the elements that influence agroforestry farmprofitability. Market pricing, farm operating costs, and contact with extension service workerswere found to be important positive variables in agroforestry in the research region.

Sufa (2005) performed research in the Bura mountain region to investigate the socioeconomic characteristics of farmers that influence the financial performance of agroforestry and non-agroforestry farms. Farmers' incomes were found to be influenced by education, area, livestock holding, family size, and whether or not coffee was grown, but not by the age of the farmer. The study's findings revealed that the farmers in the studied area required financial and technical assistance from the government in order to raise their income.

Sood (2006) looked into the impact of household economics and agricultural practices on the adoption of traditional agroforestry in the Western Himalaya and came up with some recommendations for how to improve agroforestry adoption. With increasing crop diversification, agricultural production, food sufficiency, agricultural income, off farm income, total household income, number of livestock

units, restrictions on on farm grazing, and sale of horticultural and forestry tree produce from the farm, the extent of agroforestry adoption was found to have increased significantly. The study stressed the importance of taking a comprehensive approach to agroforestry development by including agroforestry programs into other economic and agricultural development initiatives.

Jhariya et al. (2007) highlighted that the tree species such as Acacia nilotica, Dalbergia sissoo, and Eucalyptus spp. were dominant species in traditional systems, but Populus deltoides and Eucalyptus spp. were the primary species in commercial agroforestry. In traditional agroforestry locations, fuel wood (50.6%) was the primary motivator for agroforestry adoption, followed by additional revenue (24.4%) and shade (17.3%). In commercial agroforestryregions, however, greater income (71.3%) was the most important reason. For marginal, small, and medium farmers, the net returns from tree output per hectare per annum under the conventional system were Rs. 989, 541, and 440, respectively. In the commercial region, the benefit-to-cost ratio for poplar-based agrisilviculture was found to be greater (3.00) than for Poplar (2.84) and Eucalyptus (2.68)-based bund systems. Traditional agroforestry may appear to be less promising than commercial agroforestry, but it is nonetheless important to farmers' livelihoods.

Rao et al. (2007) emphasized the significance of integration of trees and shrubs with the production of annual crops which is an age-old management approach used by farmers to offer shade, a consistent supply of food, and/or revenue throughout the year, stop soil degradation and sustain soil fertility, diversify income sources, boost and stabilize income,improve soil nutrient, water, and radiation usage efficiency, and give consistent employment.

Sood et al. (2008) conducted a study in the Jaintia hills of Meghalaya and discovered that family literacy, government employment, the size of an agricultural holding, and the mobility of the head of household all had a substantial impact on on-farm tree cultivation. Cropping intensity, amount of agricultural holding, annual agricultural income, on-farm income, total household income, and paddy cultivation area were all economic factors that influenced tree cultivation on farms. The study suggests that in order to increase the amount of on-farm tree planting and build a socially acceptable agroforestry program, socioeconomic considerations must be

considered.

Chauhan et al. (2009) corroborated the presence of trees in a poplar-wheat agroforestry system alters the growing conditions of wheat, and hence the response of wheat differs from that of a treeless agricultural system. The most critical factor impacting wheat grain output is the age of poplar trees. With a one-year poplar plantation, grain yield was reduced by 20.10 percent on average, increasing to 54 per cent under a four-year-oldplantation.

Boeckmann and Lolster (2010) stated that agroforestry research has created a wide range of practical and robust technologies for different agroecological zones over time, which have shown positive and encouraging outcomes in boosting food security, livelihoods, and environmental resilience, according to the study. Farmers use agroforestry practices for two reasons, according to the authors. They aspire to improve the management of natural resources under their control and to strengthen their economic stability.

Noor et al. (2012) analyzed that the trees in the agroforestry system have a number of advantages, including reduced soil erosion, increased soil organic matter, improved biological nitrogen fixation, improved physical soil characteristics and moisture retention, and increased crop nutrient efficiency. Farmers can produce a sustainable high income by combining compatible high-value tree species with marketable agricultural crops and animals in an agroforestry environment, producing both agricultural and forest products from the same farming unit.

Kareemulla et al. (2012) conducted a research in Western Uttar Pradesh, India on poplar-based agroforestry which is one of the most common commercial agroforestry systems used by farmers. Around 78% of the farmers in the study employ poplar-based bund/boundary systems, while the rest use agrisilviculture. In a poplar-based (Populus deltoides) bund/boundary system, tree density was 146 trees per hectare, compared to 481 trees per hectare in agrisilviculture. Farmers adopted agroforestry for a varietyof reasons, including increased revenue (70 per cent) and an emergency cash source (almost 30 per cent).

Maleknia et al. (2013) stated that agroforestry is a mix of trees and shrubs with crops and/or livestock that can increase rural people's income and forest productivity while conserving natural resources. Farmers may be hesitant to adopt agroforestry

since it has a variety of tangible and intangible costs and benefits, including environmental and financial ones. They looked at the social elements that influence farmers' agroforestry system adaptation. Agroforestry acceptance levels were determined at three different levels. The results revealed strong relationships between agroforestry acceptance levels and total agriculture area, as well as the family's highest educational level. This relationship was negative for the total agricultural area and positive for family members with the highest educational attainment. According to the findings of the study, farmers on smaller farms strive to compensate for their poor profits with agroforestry programs.

Linger (2014) Homegarden agroforestry is thought to be more diverse and provide multiple household services than monocropping systems. Homegarden agroforestry approaches dramatically increase farmers' cash income compared to non-tree-based gardens, and they provide good socioeconomic and agro-ecological benefits.

Bijarpas et al. (2015) conducted a research in two villages in Guilan Province, Northern Iran, which looked into the socioeconomic values of various land uses in the agroforestry system. For cost-benefit analysis, the Internal Rate of Return (IRR) and Profitability Index (PI) were utilized. The Net Present Value (NPV) of several farming techniques has been calculated. To compare the consequences of different land uses, the ANOVA test was used. The findings revealed thatliteracy and the range of land uses in two communities have a substantial association. The IRR and PI indices showed that in poplar plantations, these indices were greater than in other land uses (paddy and tea field. horticulture and vegetable). The results of the ANOVA test revealedthat net revenues from different farming strategies in one village differ significantly. Furthermore, the ANOVA test revealed that in the second village, there is no significant difference in net revenues from various farming strategies. Farmers are more likely to participate in training and promotion classes related to land use efficiency.

Ashok et al. (2016) highlighted the potential of agroforestry to achieve multiple goals at the same time, such as maintaining and stabilizing the ecosystem, producing a high level of economic output, and providing steady employment. Improve the rural population's income and access to essential materials. Agroforestry has the

ability to conserve natural resources through a variety of systems in a variety of agroclimatic areas, including India's hot desert zone. Due to minimal rainfall, high evaporation, and high wind speeds, this area's productivity is very low, resulting in a significant loss of soil and vegetation resources. Several alternative land use systems created in the hot desert zone, including Prosopis cineraria, Acacia tortilis, Acacia senegal, Ailanthus excels, and Zizyphus spp.-based silvipastoral/agrisilvicultural systems, are substantially more profitable than mono-cropping. Millions of farmers rely on agroforestry farming systems as a means of boosting and maintaining agricultural productivity, as well as providing a supply of needed food, fuel wood, fodder, and construction materials, as well as a supplemental source of revenue to offset agricultural income volatility.

Bijalwan et al. (2017) examined the status and pattern of tree-crop combinations of agroforestry practices across various regions of the state, as well as productivity under various agroforestry systems, which revealed traditional agriculture in Uttar Pradesh transforming into multifunctional agroforestry. Farmers' economies and livelihoods have been transformed by the commercialization of poplar, cucalyptus, and aonla-based agroforestry systems. Landless and marginal farmers, as well as the rural poor, benefit greatly from marketing support for the sale of products at a minimum support price and the further development of commercially viable agroforestry plantations.

Kumar et al. (2018) carried out a research in Kandaghat block in the Solan district of Himachal Pradesh with the purpose of identifying various current agroforestry systems and analysing the demographic and socio-economic situations of farmers. Agrisilviculture (AS), Agrisilvipastoral (ASP), Agrisilivihorticulture (ASH), Agrihortisilviculture (AHS), Hortipastoral (HP) and Silvipastoral (SP) were the dominant systems in the examined region. Five kinds of agroforestry systems were practised by the marginal and six systems each by small and medium categories. Amongst these, ASP and SP were most generally accepted irrespective of farmers' categorized .

Chapter-3

MATERIALS AND METHODS

3.1 Area of Study

Una district of Himachal Pradesh has been purposely selected as study area for the project work undertaken. The data was collected from the surrounding of this region.

3.2 Population of Study

The study population comprised of all the farmers practicing Agroforestry practices.

3.3 Sample Size

The sample size of 100 farmers was chosen for conducting the present study.

3.4 Sampling Technique

The final sample was selected in two stages. In the first stage, the farmers practicing Agroforestry were conveniently approached at different blocks. During the second stage, the other farmers were approached using snowball sampling.

Sample Selection

Stage I → Farmers reached out with convenience sampling

Stage II → References of farmers (snowball sampling)

3.5 Data Collection

Primary data

Information that is gathered for the first time is referred to as primary data. The primary data for the present study was collected by personally interviewing the respondents with the help of a structured questionnaire.

Secondary data

Information that has already been gathered by someone else for a different reason and can be used for research or analysis is referred to as secondary data. Various

research papers, books, journals, and verified articles were used as secondary data for the study.

3.6 Applied Analytical Tools

Data analysis and data simplification are done with the aid of analytical tools. The objectives were attained using straightforward mathematical techniques, which made the analysis easy to understand.

Percentage method

This technique is used to pinpoint the key characteristics of respondents' responses. Individual frequency was divided by the total frequency and multiplied by 100 to determine the percentage.

Percentage = X/Y*100

Where:

X = Individual frequency

Y = Sum of frequencies

Total weighted score method

The Maximum Weighted Rating system involves multiplying the values of the elements (X) by the weights (w) as specified, with various weights being assigned in accordance with their significance. After applying scores to determine the total weights of all products, the product with the greatest score is ranked first, while the product with the lowest rating finds place at the bottom of the list.

Arithmetic mean

On a 5-point scale, the researcher calculated the numerical mean of several statements to gauge survey respondents' opinions. This quantitative analysis allowed the researcher to draw specific conclusions from the respondents' responses. The numerical values assigned to qualitative responses were: 1 for very strong disagreement; 2 for disagreement; 3 for neutral;

4 for agreement; and 5 for very strong agreement. The formula used to determine the arithmetic mean was applied to these numerical values.

$$\mathbf{X = (\Sigma x) / N}$$

Where:

X = Arithmetic mean

X = Sum of the values of the variables

N = Number of Observation

Standard deviation

The measure of standard deviation demonstrates the degree of variation from the mean. A "typical" variation from the mean is shown by the standard deviation. Because it uses the data ser's original units of measurement, it is a well-liked measure of variability. The standard deviation determines how much the values deviate from the mean. The most popular way to assess dispersion is standard deviation, which is based on all values. As a result, even a small change in one value can modify the standard deviation value.

$$\mathbf{\sigma = \sqrt{((\Sigma(x - \mu)^2) / N)}}$$

Here,

σ = Population standard deviation

μ = Assumed mean

N = The size of the population

x = Each value from the population

Chapter-4

RESULTS AND DISCUSSION

4.1 Gender of respondents

Gender	Frequency	Percentage (%)
Male	85	85
Female	15	15
Total	100	100

(Source: Field Survey 2023)

The analysis of the gender distribution among respondents revealed a significant gender imbalance, with 85 per cent of the participants identifying as male and only 15 per cent as female. This finding underscored the need to explore the underlying factors that contributed to this disparity and examine its potential implications.

4.2 Age of respondents

Age	Frequency	Percentage (%)
20 to 30	0	0
31 to 40	62	62
41 to 50	34	34
51 and above	4	4
Total	100	100

(Source: Field Survey 2023)

The analysis of the age distribution among respondents indicated that none of the participants fell within the 20 to 30 age range. The majority of respondents, 62 per cent, were between the ages of 31 to 40, followed by 34 per cent falling within the 41 to 50 age range. Only 4 per cent of the participants were aged 51 and above. These findings suggest that the majority of the respondents in this study were in their thirties and forties, while the younger age group was not represented.

4.3 Education Qualification of respondents

Education Qualification	Frequency	Percentage (%)
Primary	58	58
High school	28	28
Senior secondary	12	12
Graduate	2	2
Post graduate	0	0
Total	100	100

(Source: Field Survey 2023)

The analysis of the education qualification of the respondents revealed that the majority, 58 per cent, had a primary level education. 28 per cent of the participants had completed high school, while 12 per cent had attained a senior secondary education. Only 2 per cent of the respondents held a graduate degree, and there were no participants with a post-graduate qualification. These findings suggest a relatively low level of educational attainment among the respondents, with a significant proportion having completed only primary education.

4.4 Martial Status of respondents

Martial status	Frequency	Percentage (%)
Married	100	100
Unmarried	0	0
Total	100	100

(Source: Field Survey 2023)

The analysis of the marital status of the respondents revealed that all participants, representing 100 per cent, were married. There were no unmarried individuals in the sample. This finding indicates a homogeneous marital status within the population being studied.

4.5 Annual income of respondents

Annual income	Frequency	Percentage (%)
Less than 1 lakh	5	5
1 lakh to 2 lakh	32	32
2 lakh to 3 lakh	48	48
More than 3 lakh	15	15
Total	100	100

(Source: Field Survey 2023)

The analysis of the annual income of the respondents revealed that 5 per cent had an income of less than 1 lakh, while 32 per cent fell within the 1 lakh to 2 lakh income. The majority, 48 per cent, had an annual income ranging from 2 lakh to 3 lakh. Additionally, 15 per cent of the participants had an income exceeding 3 lakh. These findings suggest a diverse distribution of income levels among the respondents, with a significant proportion falling within the 2 lakh to 3 lakh range.

4.6 Agriculture is main occupation

Statement	Frequency	Percentage (%)
Yes	98	98
No	2	2
Total	100	100

(Source: Field Survey 2023)

The analysis of the respondents' statements revealed that 98 per cent answered "Yes," while only 2 per cent responded with "No." This indicates a strong consensus among the

participants, with the majority expressing agreement or affirmation. The high percentage of "Yes" responses suggests a prevailing sentiment or opinion within the surveyed population.

4.7 Land holding of respondents

Land size	Frequency	Percentage (%)
< 1 ha	5	5
1-2 ha	32	32
2-4 ha	48	48
More than 4 ha	15	15
Total	100	100

(Source: Field Survey 2023)

The analysis of the land holding of the respondents revealed that 5 per cent had land holdings of less than 1 hectare, while 32 per cent had land holdings ranging from 1 to 2 hectares. The majority, 48 per cent, had land holdings between 2 and 4 hectares. Additionally, 15 per cent of the participants had land holdings exceeding 4 hectares. These findings indicate a diverse distribution of land sizes among the respondents, with a significant proportion falling within the 2 to 4 hectare range.

4.8 Familiar with concept of Agroforestry

Statement	Frequency	Percentage (%)
Yes	92	92
No	8	8
Total	100	100

(Source: Field Survey 2023)

The analysis of respondents' familiarity with the concept of agroforestry revealed that 92 per cent answered "Yes," indicating that they were familiar with the concept. In contrast, 8

per cent responded with "No," suggesting that they were not familiar with agroforestry. These findings suggest a relatively high level of familiarity with agroforestry among the surveyed population

4.9 Implementation of Agroforestry practices

Statement	Frequency	Percentage (%)
Yes, extensively	24	24
Yes, to a limited extent	76	76
No, not yet	0	0
Total	100	100

(Source: Field Survey 2023)

The analysis of respondents' implementation of agroforestry practices revealed that 24 per cent reported implementing agroforestry extensively. The majority, 76 per cent, indicated implementing agroforestry to a limited extent. None of the respondents reported not implementing agroforestry practices. These findings suggest that a significant proportion of the surveyed population has engaged in some level of agroforestry implementation, with the majority implementing it to a limited extent.

4.10 Reasons for adopting Agroforestry

Reasons	Frequency	Percentage (%)
Soil conservation and soil erosion control	15	15
Diversification of income sources	62	62
Improved water management	18	18
Biodiversity conservation	5	5
Total	100	100

(Source: Field Survey 2023)

The analysis of respondents' reasons for adopting agroforestry practices revealed that 62 per cent cited diversification of income sources as their main reason. Soil conservation and soil erosion control were reported by 15 per cent of the participants, while 18 per cent mentioned improved water management. Only 5 per cent indicated biodiversity conservation as their reason for adopting agroforestry. These findings suggest that the primary driver for agroforestry

adoption among the surveyed population is the desire to diversify income sources, followed by considerations for soil conservation, water management, and biodiversity conservation.

4.11 Farmers Perception for agroforestry adoption

Statements	S.A.	A	N	D	S.D.	TWS	Rank	Mean	Standard Deviation
Agroforestry minimises the risk	20	49	24	7	0	383	VII	3.83	0.82
Agroforestry increases the farm income through diversification	48	40	10	2	0	435	I	4.35	0.73
Agroforestry protects the crop against wind and animals	30	52	13	5	0	422	III	4.22	0.66
Agroforestry improves the soil fertility	17	63	20	0	0	397	VI	3.97	0.61
Input cost in agroforestry is less	0	20	30	40	10	260	VIII	2.60	0.92
Small land holding size does not permit agroforestry	28	67	5	0	0	423	II	4.23	0.52
Problem of timber and fodder availability will be solved through agroforestry	20	72	8	0	0	412	V	4.12	0.51
Agroforestry increases self sufficiency	18	80	2	0	0	416	IV	4.16	0.42
Assistance provided by agriculture department for adoption of agroforestry	0	8	39	50	3	252	IX	2.52	0.68

S.A.-Strongly Agree; A-Agree; N-Neutral; D-Disagree; S.D.-Strongly Disagree; TWS-Total Weighted Score; SD-Standard Deviation **(Source: Field Survey 2023)**

It can be inferred from the table 4.11 that farmers had positive perceptions of agroforestry in several areas. They strongly agreed that agroforestry increases farm income through diversification, with 48 per cent expressing strong agreement and 40 per cent agreeing. Additionally, farmers believed that agroforestry protects crops against wind and animals, with 30% strongly agreeing and 52 per cent agreeing. They also recognized the potential of agroforestry to increase self-sufficiency, with 18 per cent strongly agreeing and 80 per cent agreeing. Moreover, farmers agreed that agroforestry solves the problem of timber and fodder availability, as 20 per cent strongly agreed and 72 per cent agreed. However, there were mixed perceptions regarding the risk reduction potential of agroforestry, with 20 per cent strongly agreeing, 49 per cent agreeing, and 24 per cent neutral. Similarly, farmers had mixed opinions on the input cost in agroforestry, with 20 per cent agreeing, 30 per cent neutral, and 40 per cent disagreeing. It was also noted that farmers disagreed with the notion that small landholding sizes do not permit agroforestry, as 28 per cent strongly disagreed and 67 per cent disagreed. Understanding farmers' perceptions is crucial for designing targeted extension programs and policies that address their concerns and promote the successful adoption of agroforestry practices.

4.12 Motivational factors influencing the adoption of agroforestry

Statements	**S.A.**	**A**	**N**	**D**	**S.D.**	**TWS**	**Rank**	**Mean**	**Standard Deviation**
Crop diversification	20	73	7	0	0	413	III	4.13	0.50
High returns	23	68	9	0	0	414	II	4.14	0.55
Proper land-use	25	65	10	0	0	435	I	4.35	0.47
Source of income	15	80	5	0	0	410	IV	4.10	0.43
Availability of fuel, fodder and timber	10	90	0	0	0	410	IV	4.10	0.30
Risk minimization	9	85	6	0	0	403	V	4.03	0.38

S.A.-Strongly Agree; A-Agree; N-Neutral; D-Disagree; S.D.-Strongly Disagree; TWS-Total Weighted Score; SD-Standard Deviation

(Source: Field Survey 2023)

It can be inferred from the table 4.12 that there are several key factors that motivate farmers to adopt agroforestry practices. Firstly, farmers expressed a positive attitude towards crop diversification as a motivator, with a significant percentage (20 per cent strongly agreeing

and 73 per cent agreeing) recognizing the benefits of diversifying their crop portfolio through agroforestry. Secondly, the potential for high returns was identified as a strong motivator, with 23 per cent strongly agreeing and 68 per cent agreeing that agroforestry can lead to increased profitability. Proper land-use was also seen as a significant motivator, with 25 per cent strongly agreeing and 65 per cent agreeing that agroforestry allows for more efficient and sustainable use of land resources. Additionally, farmers acknowledged agroforestry as a valuable source of income, with 15 per cent strongly agreeing and 80 per cent agreeing that it provides an additional revenue stream. The availability of important resources such as fuel, fodder, and timber was another motivating factor, with 10% strongly agreeing and 90 per cent agreeing that agroforestry can fulfil these needs. Lastly, risk minimization was recognized as a positive aspect of agroforestry, with 9 per cent strongly agreeing and 85 per cent agreeing that it helps mitigate risks associated with traditional farming practices. These findings highlight the multiple motivational factors that drive farmers towards adopting agroforestry, including the desire for diversified income, improved land-use practices, increased profitability, resource availability, and risk reduction. Understanding these factors can inform strategies and interventions aimed at promoting the widespread adoption of agroforestry as a sustainable agricultural practice.

4.13 Problems in the adoption of agroforestry practices

Statements	S.A.	A	N	D	S.D.	TWS	Rank	Mean	Standard Deviation
Small land holding size	10	83	5	2	0	401	V	4.01	0.48
Lack of seedlings	8	91	1	0	0	407	IV	4.07	0.29
Poor market accessibility	8	80	12	0	0	396	VI	3.96	0.44
Lack of subsidy	30	68	2	0	0	428	I	4.28	0.49
High initial cost of inputs for agroforestry practices	30	64	6	0	0	424	II	4.24	0.55
Lack of awareness and poor knowledge	8	92	0	0	0	408	III	4.08	0.27
Longer gestation period of tree crop	10	88	2	0	0	408	III	4.08	0.33

S.A.-Strongly Agree; A-Agree; N-Neutral; D-Disagree; S.D.-Strongly Disagree; TWS-Total Weighted Score; SD-Standard Deviation

(Source: Field Survey 2023)

It can be inferred from the table 4.13 that there were several key challenges that farmers face in the adoption of agroforestry practices. Firstly, farmers recognized that small landholding sizes posed a significant obstacle to adopting agroforestry practices, with 10 per cent strongly agreeing and 83 per cent agreeing. This limitation ranked V, indicating that farmers perceive their land size as a barrier. Secondly, the lack of seedlings was identified as a problem, with 8 per cent strongly agreeing and 91 per cent agreeing. This perception ranked IV, highlighting the need for accessible and adequate seedling supply to support agroforestry adoption. Poor market accessibility was another challenge acknowledged by farmers, with 8 per cent strongly agreeing and 80 per cent agreeing that limited market access hampers agroforestry adoption. This perception ranked VI, indicating the importance of addressing market-related barriers. The absence of subsidies was recognized as a significant obstacle, with 30 per cent strongly agreeing and 68 per cent agreeing. This perception ranked I, emphasizing the need for financial support and incentives to encourage agroforestry adoption. Additionally, farmers expressed concerns about the high initial costs of inputs for agroforestry practices, with 30 per cent strongly agreeing and 64 per cent agreeing. This perception ranked II, highlighting the financial burden associated with adopting agroforestry. Lack of awareness and poor knowledge regarding agroforestry practices was identified as a challenge, with 8 per cent strongly agreeing and 92 per cent agreeing. This perception ranked III, underscoring the importance of educational and outreach initiatives. Lastly, the longer gestation period of tree crops was acknowledged as a hurdle, with 10 per cent strongly agreeing and 88 per cent agreeing. This perception ranked III, suggesting the need for patience and planning in agroforestry implementation. Addressing these challenges through targeted support, including financial incentives, improved market access, knowledge dissemination, and technical assistance, can facilitate the wider adoption of agroforestry practices among farmers.

Chapter-5

SUMMARY AND CONCLUSIONS

5.1 Socio-demographic Profile

The study provides for the demographic characteristics and opinions of the respondents. The findings reveal a significant gender imbalance, with 85% of participants identifying as male and 15% as female. The majority of respondents fall within the 31-40 age range, while the younger age group is not represented. Educational attainment is primarily at the primary level, with limited participants holding graduate or post-graduate degrees. All respondents are married, indicating a homogeneous marital status within the population being studied. There is a diverse distribution of income levels and land holdings among the participants. The majority of respondents have an annual income ranging from 2 lakh to 3 lakh, and the most common land holdings are between 2 and 4 hectares. The respondents' statements show a strong consensus, with the majority expressing agreement or affirmation. These findings provide important insights into the demographic characteristics of the participants and their opinions.

5.2 Awareness and Perception of Farmers

The analysis of respondents' familiarity with agroforestry indicates a high level of familiarity, with 92% of participants reporting that they are familiar with the concept. When it comes to implementation, 24% of respondents reported extensive implementation of agroforestry practices, while 76% implemented it to a limited extent. None of the respondents reported not implementing agroforestry practices. The primary reason cited for adopting agroforestry practices was the diversification of income sources, mentioned by 62% of participants. Soil conservation and erosion control were reported by 15%, while improved water management was mentioned by 18%. Biodiversity conservation was indicated as the reason by 5% of respondents. Perceptions of agroforestry were generally positive among the farmers surveyed. They strongly agreed that agroforestry increases farm income through diversification, with a significant percentage expressing strong agreement or agreement. Farmers also believed that agroforestry helps protect crops against wind and animals, contributing to their agreement. Additionally, they recognized the potential of agroforestry to increase self-sufficiency and address timber and fodder availability concerns. However, perceptions were mixed regarding the risk reduction potential of agroforestry, as well as input

costs. There was disagreement with the notion that small landholding sizes do not permit agroforestry.

5.4 Motivational Factors influencing agroforestry adoption

The provided information presents a summary of the factors that motivate farmers to adopt agroforestry practices. Several key motivating factors can be identified. Farmers expressed a positive attitude towards crop diversification through agroforestry, recognizing the benefits it brings. The potential for high returns and increased profitability was another significant motivator for adopting agroforestry practices. Proper land-use, allowing for more efficient and sustainable utilization of land resources, was seen as an important factor. Agroforestry was also acknowledged as a valuable income source, providing an additional revenue stream for farmers. The availability of essential resources such as fuel, fodder, and timber further motivated farmers to engage in agroforestry. Lastly, the risk reduction aspect of agroforestry, mitigating risks associated with traditional farming practices, was recognized as a positive factor. These findings emphasize the diverse set of motivations that drive farmers towards agroforestry adoption, including income diversification, increased profitability, land-use efficiency, resource availability, and risk minimization. Understanding these factors can inform the development of strategies and interventions aimed at promoting widespread adoption of agroforestry as a sustainable agricultural practice.

5.5 Problems in agroforestry adoption

The key challenges faced by farmers in adopting agroforestry practices. Small landholding sizes were recognized as a significant obstacle, along with the lack of seedlings and poor market accessibility. The absence of subsidies, high initial costs of inputs, and limited awareness and knowledge about agroforestry were identified as additional challenges. The longer gestation period of tree crops was also acknowledged as a hurdle. These challenges indicate the need for targeted support measures such as financial incentives, improved market access, educational initiatives, and technical assistance. By addressing these challenges, farmers can be better equipped to overcome barriers and embrace agroforestry practices.

5.6 Suggestions

Educational Initiatives: Implement educational programs and workshops to increase awareness and knowledge about agroforestry practices. This can be done through agricultural

extension services, farmer training centers, and collaborations with local agricultural universities or research institutions.

Market Access: Improve market accessibility for agroforestry products by creating marketing channels and connecting farmers to potential buyers. This could involve forming farmer cooperatives or partnerships with agribusinesses.

Capacity Building: Provide technical assistance and training to farmers on agroforestry best practices, including soil conservation, crop management, and integrated pest management. This can enhance the success rate of agroforestry projects.

Financial Incentives: Offer financial incentives and subsidies to encourage farmers to adopt agroforestry practices. These incentives can help offset the initial costs of inputs and seedlings, making it more attractive for farmers to start agroforestry projects.

Seedling Availability: Establish and support nurseries to ensure the availability of quality seedlings at affordable prices. This can be done in collaboration with government agencies, NGOs, or private organizations.

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APPENDIX

I am **Rahul Sharma,** a student of Agribusiness Management from **Dr. Yashwant Singh Parmar University of Horticulture and Forestry,** having a research topic **Farmers Perception and Adoption of Agroforestry Practices in Una District.** I am here to conduct a survey for my research project which would help me in fulfillment of my project.

Demographic Profile

Q1. Gender

(a) Male (b) Female (c) Transgender

Q2. Age

(a) 20 to 30 (b) 31 to 40 (c) 41 to 50 (d) 51 and above

Q3. Educational Qualification

(a) Primary (b) High school (c) Senior secondary (d) Graduate
(e) Post graduate

Q4. Marital Status

(a) Married (b) Unmarried (c) Single

Q5. Annual income (Rs.)

(a) Less than 1 lakh (b) 1 lakh to 2 lakh (c) 2 lakh to 3 lakh (d) More than 3 lakh

Q6. Is agriculture your main occupation?

(a) Yes (b) No

Q7. How much land do you own?

(a) < 1 ha (b) 1 – 2 ha (c) 2 – 4 ha (d) More than 4 ha

Q8. Are you familiar with concept of Agroforestry?

(a) Yes (b) No

Q9. Have you implemented any agroforestry practices on your farm?

(a) Yes, extensively (b) Yes, to a limited extent (c) No, not yet

Q10. What are main reasons for adopting agroforestry on your farm?

(a) Soil conservation and soil erosion control
(b) Diversification of income sources
(c) Improved water management
(d) Biodiversity conservation

Q11. Farmers perception for agroforestry adoption

Sr.No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	Agroforestry helps Risk minimization					
2.	Agroforestry increase the farm income through diversification					
3.	Agroforestry protects the crops against wind and animals					
4.	Agroforestry helps in improvement in soil fertility					
5.	Agroforestry helps in reducing input cost					
6.	Small land holding size does not permit agroforestry					
7.	Problem of timber and fodder availability will be solved through agroforestry					
8.	Agroforestry increases self sufficiency					
9.	Assistance provided by agriculture department for adoption of agroforestry					

Q12. Motivational factors influencing the adoption of agroforestry.

Sr.No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	Agroforestry helps in Crop diversification					
2.	Agroforestry helps in high returns					
3.	Proper land-use can be done with the help of agroforestry					
4.	Agroforestry can be considered as a alternate source of income					
5.	Availability of fuel, fodder and timber can be done with agroforestry					
6.	Agroforestry helps in risk minimization					

Q13. Problems in the adoption of agroforestry practices.

Sr.No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	Small land holding size					
2.	Lack of seedlings					
3.	Poor market accessibility					
4.	Lack of subsidy					
5.	High initial cost of inputs for agroforestry practices					
6.	Lack of awareness and poor knowledge					
7.	Longer gestation period of the tree crop					

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Title of the Project	**:**	**A Study on Farmers' Perception and Adoption of Agroforestry Practices in Una District of Himachal Pradesh**
Name of the Student	**:**	Rahul Sharma
Admission Number	**:**	H-2021-18-ABM
Degree Awarded	**:**	Master of Business Administration (Agribusiness)
Year of Award of Degree	**:**	2023
Major Advisor	**:**	Dr. Krishan Kumar
Major Subject/Discipline	**:**	Agribusiness Management
Minor Field	**:**	Agribusiness Management
Total pages in Project Report	**:**	28 + iii
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Abstract

This study investigates the socio-demographic profile, awareness, perception, and adoption of agroforestry among farmers. The findings reveal a significant gender imbalance, with a majority of male respondents and limited representation of younger age groups and higher education levels. However, the participants display a diverse distribution of income levels and land holdings. The study highlights a high level of familiarity with agroforestry, with most farmers implementing it to some extent. The primary motivation for adopting agroforestry practices is income diversification, followed by soil conservation and improved water management. Farmers perceive agroforestry positively, recognizing its potential to increase farm income, protect crops, and address resource availability concerns. Nevertheless, there are mixed perceptions regarding risk reduction and input costs. Small landholding sizes, lack of seedlings, poor market accessibility, limited awareness, and high initial costs are identified as challenges hindering agroforestry adoption. Addressing these barriers through financial incentives, improved market access, educational initiatives, and technical support can foster widespread agroforestry adoption and promote sustainable agricultural practices. Understanding farmers' perceptions and motivations is vital for the successful integration of agroforestry into farming systems.

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12th Class	2016	Gurukul Public Senior Secondary School, Amb	Himachal Pradesh Board of School Education, Dharamshala	64.60	First
B.Sc Agriculture	2020	School of Agriculture	Lovely Professional University	68.58	First
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Fellowships/Scholarships/Gold Medals/Awards/any other Distinction: University Stipend

Publications : Nil

Research Papers : Nil

Scientific Popular Articles : Nil

Others : ----------

Visits aboard along with duration and purpose of visit : Nil

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