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Incorporating agroforestry approaches into commodity value chains: A review

Alok Kumar Singh, Nasam Midhun Kumar, Bipin Kumar Singh, Dheer Agnihotri and Makhan Singh Karada

Abstract
Agroforestry is a unique land management approach that blends Agriculture, Forestry and or Livestock/Pasture on the same land to enhance productivity, profitability and environmental stability. It provides direct and indirect benefits and produces variety of products like timber, fuelwood, fruits, fodder etc., to meet household needs and to generate some income through sale in local markets. Market system approach focuses on connecting farmer to local and regional markets supporting farmer organizations can strengthen their positions in negotiating prices and enables them to access finance, training, input services. The provision of a market support system for a wide range of pulp wood, plywood, timber exerted a significant influence among tree-growing farmers. Commodity value chains are the full range of activities which are required to bring a product or service from conception, through the different phases of production, transformation and delivery to final consumers, and eventual disposal after use. Marketing at the farmer level has received little attention in the past and poorly understood. In order to sustain these value chain innovations and interventions the institutional development mechanisms and activities need to be accelerated which shall help to resolve the issues of raw material security. By understanding market linkages and interactions, it should be possible to improve smallholder farmers' livelihoods by focusing their agroforestry production towards market opportunities. The commodity value chains have found that agroforestry can become an increasing part of a production and marketing system for different products that is sustained by the value chain participants.

Keywords: Agroforestry, commodity value chain, marketing, livelihood, provision

Introduction
The goal of agroforestry is to increase productivity, profitability, and environmental sustainability by combining agriculture, forestry, and/or animal grazing on the same piece of land (Palsaniya *et al*., 2009) [28]. Agroforestry has long been practised in India as subsistence farming, but it is increasingly being recognised from an economic standpoint, in addition to its good contribution to the wood-based industrial sector, which is relatively new. Low forest cover, low productivity, and legal constraints, along with rising demand for wood and wood products owing to increased population, industries, and policy changes, have resulted in a complete mismatch between demand and supply. This has drawn more attention to agroforestry (Dhyani, 2018) [10]. The National Forest Policy of India, enacted in 1988, urged all wood-based enterprises to create their own raw material supplies by collaborating with farmers and providing technical and market support. It generates a range of goods, including lumber, fuelwood, fruits, and fodder, among others, to fulfil family requirements and make a little money by selling them in local marketplaces (Millard, 2011) [23]. It has environmental advantages including easing forest strain, enhanced nutrient recycling by the site's deep-rooted plants improved ecological system protection, reduction of soil erosion, nutrient leaching and surface runoff due to the inhibition of these processes by tree roots, leaf litters and stems (Powlson *et al*., 2011) [38]. A combination of mulching and shadowing can improve the microclimate by lowering the soil surface temperature and reducing the loss of soil moisture. Through the addition and breakdown of litter-fall, soil nutrients are increased. It offers societal advantages such a rise in rural living standards due to increased income and continuous employment (Jafari *et al*., 2022) [18]. Due to the higher quality and greater variety of food products, nutrition and health are improving. Communities will be stabilised and improved by not having to move the locations of agriculture operations. The market system strategy focuses on linking farmers to local and regional markets, supporting farmer organisations, and enabling them to access finance, training, and input services.

This strengthens their negotiating positions. The availability of a market support system for a variety of plywood, pulp wood, and timber had a big impact on farmers who grew trees (Scherr, 2004) [40].

What is Commodity value chain?

Commodity Value Chains are the entire set of actions necessary to bring a good or service from conception through the various manufacturing stages, transformation, and delivery to ultimate users, and finally disposal after usage. In the past, marketing to farmers has gotten little attention and has been poorly understood (Kaplinsky and Morris, 2002) [19]. These actions often increase a product's value as it goes through the supply chain. From the micro to the global scale, a chain can exist. Or, 'actors'-individuals or groups who carry out a range of activities-such as gatherers, processors, traders, merchants, and service providers-may carry out this range of activities. Chain governance refers to the interactions between actors and chain control. (Gereffi and *et al*., 2005; Helmsing and Vellema, 2011) [14, 17].

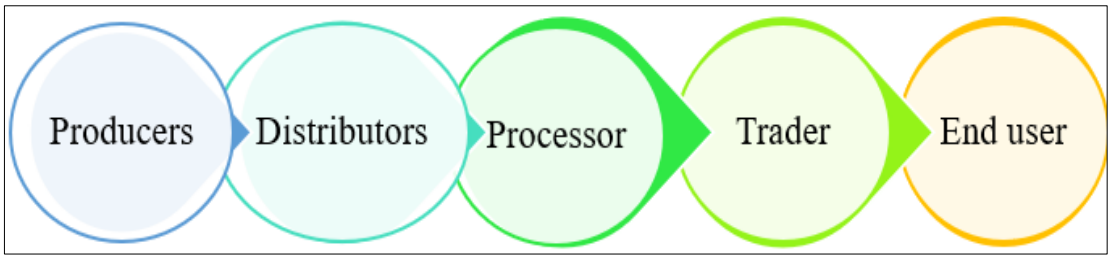


Fig 1: Commodity value chain

How does the Commodity value chain work?

The value chain has to be broken down into its strategic components to better understand each component's influence on cost and value as a framework for study of both firm-level and industry-level competitive strengths and weaknesses. (Stabell and Fjeldstad, 1998) [42] Imply further that value configuration analysis must develop from value chain analysis, “an approach to the analysis of firm-level competitive advantage based on the theory of three value creation technologies and logics”. The value shop and the value network were two additional value configurations that Stabell and Fjeldstad presented in addition to the value chain. The value chain is founded on the conversion of inputs into products; the value shop, on addressing and resolving customer issues; and the value network, on connecting consumers. All three configurations are based on the logic of value creation. The major activity and support activity categories are different for each of the value configurations, according to Stabell and Fjeldstad. (Baig and Akhtar, 2011) [2] studied the supply channels of Delhi-based logistics provider Sea Air Land (SAL). They developed the following theoretical hypotheses based on the findings of their research: Porter's value chain model (a) offers a helpful but incomplete understanding of value creation in supply chain relationships; (b) the value network model, (c) assuming that various value models coexist in establishing effective supply chain relationships, we accept that value logic interaction and (d) understanding of co-producing, layered, and interconnected supply chain systems is necessary to supplement the supply chain literature's emphasis on single and interconnected chains.

Table 1: Commodity value chain activities

	Primary activities	Support activities
Commodity Value Chains	Inbound logistics	Procurement
	Operations	Technological development
	Outbound logistics	Human resources management
	Marketing and sales	Infrastructure
	Service	

Source: (Porter, M. 1985) [9]

Agroforestry value chain approach

Agroforestry market system links are less established or apparent than those in value chains for single staple crop because of their inherent complexity. While reducing direct measures that run the danger of further disrupting the market system, a flexible market systems approach may be used to connect, develop value-added services, and improve market access among smallholder producers and agribusinesses (Ripley and Nippard, 2014) [39].

- With a focus on vulnerable and disadvantaged populations, especially women, the market systems approach seeks to increase the efficiency, effectiveness, and profitability of value chains for all stakeholders in the short to medium term (Eastwood *et al*., 2010) [11].
- The market system approach seeks to facilitate structural change in relevant markets over the medium to long term. It also encourages smallholder farmers to organise themselves into farmer organisations and cooperatives to strengthen their market position and affect systemic change on a larger scale to benefit a large number of smallholders. Since agroforestry is a diversified market system, using a market systems approach is favoured to facilitate sustainable, equitable, and inclusive reform. (Source: Kinyili and Ndunda, 2021) [20].

Table 2: Pre-requisite for an integrated value chain approach for Agroforestry

Area	Illustrative activities	Investment types
Research	Research must continue in areas that have a significant impact on production, such as shade systems and the ideal density of shade, plant types, pest and disease management, climatic patterns, etc. Through the World Cocoa Foundation, the cocoa industry contributes jointly to much of this research, assisting regional research institutes and scientists.	Funding of research institutions; scholarships; internships; conferences.
Training and extension	Millions of isolated, small-scale growers of cocoa and coffee lack access to education about agroforestry techniques. Only a small number of nations have national systems to assist farmers, like the National Federation of Coffee Growers of Colombia, and for the most part, farmers rely on locally run programmes with insufficient funding or externally funded programmes like the Sustainable Tree Crops Programme, which operates in West African nations that produce cocoa. Large coffee and cocoa corporations employ professionals who spend a lot of time helping local organisations in origin countries. Some firms have also opened technical offices in producing nations, like Starbucks Farmer Support Centre in Costa Rica.	Funding for neighbourhood organisations; knowledge transmission.
Business services	Companies might install quality control equipment and train producer representatives on how to use it, or they might help them increase the quality of their products by testing and reporting on samples. They might also support the development of service centres, which have a lot of potential for disseminating information and inputs. Many coffee and some cocoa farmer organisations have received loans from ethical investors like Root Capital and Verde Ventures because they have contracts for products with certifications from the Rainforest Alliance, C.A.F.E. Practises, or other certification programmes.	Transfer of technology, information services, introductions to service organisations, and creation of regional resource centres.
Buying policy	Normally, coffee or cocoa with unique growth characteristics demands a premium on the market, increasing the cost to the consumer. Daily fluctuations in commodity prices mean that businesses tend to be more focused on comparative costs than real costs when making decisions. A company's profit and loss account will be impacted if it invests in purchasing raw materials at a premium unless it can offset the cost with higher sales or market share. To make this promise, the company's top echelons must support it.	Dedication to purchasing from agroforestry sites and certified goods.
Brand development and promotion	Mainstream brands make significant investments in defining their personalities and core beliefs. These are outlined in consumer language for the target market segment and supported by in-depth market research on how that segment acts when making purchases of products. It is doubtful that these businesses would include agroforestry themes in their customer pitch since they are too technical for the average consumer and might skew their impression of the company. In specialist markets, this kind of product advertising is more likely. A more extensive message regarding the growing practises on the farm would at most be a brief reference on the box to the origin for mainstream market brands that will talk about sustainability or perhaps the local farmers and community, and more detail on off-pack literature and the company's web site.	Leveraging the certification label and brand values to promote agroforestry.
Community benefit	Communities gain from agroforestry practises intrinsically in a number of ways, including the protection of shared water supplies from contamination by farm or farm residence waste, the preservation of forests and wildlife, and the longer-term projected advantages of improved soil fertility and climate stabilisation. Additionally, businesses have contributed to initiatives aimed at enhancing the quality of life in the communities that provide them with their coffee or cocoa. Examples include the Mars Partnership for African Cocoa Communities of Tomorrow and the Cadbury Cocoa Partnership in Ghana.	Health, education and gender projects; commitment to Sustainable Agriculture Standard
Public policy engagement	Companies are interested in the success of coffee and cocoa producers for a number of reasons, including to prevent the abandonment of farming by future generations and to avoid unfavourable social and environmental effects on their own operations. To advance legislation and government action that can support this interest, they have ongoing conversations with the governments of the producing nations. In the recent past, several regional and national governments have vowed to grow their agricultural products in a sustainable manner.	Membership of representative bodies; dialogue with governments.

Source: (Millard, 2011) [23]

Why value chain management in agroforestry?

Over the last two decades, India stands out as one of the few tropical countries that have experienced a consistent increase in forest cover. As a result of its crucial role in meeting both domestic and industrial wood needs, agroforestry has garnered considerable attention as a viable land-use system. However, the escalating demand for wood, coupled with legal challenges in obtaining wood from Government-owned forests, has created a significant disparity between the demand and supply of wood and wood products. To address this issue and ensure sustainability in industrial wood generation and supply, the implementation of a 'value chain model' has become essential. This model involves a wide array of stakeholders, aiming to foster cooperation and coordination throughout the wood supply chain for long-term viability and ecological balance.

Markets and marketing of agroforestry in India

In India, the markets and marketing of agroforestry encompass the journey of products and services from their creators to the end customers. The agroforestry market centers on the exchange of forest, agricultural, and livestock products in specific locations. Although there are similarities with agriculture marketing, there are also distinct differences in agroforestry marketing, such as the lack of well-established marketing organizations, market data, and standardized quality grades (Parthiban *et al*., 2020) [31]. Despite these challenges, agroforestry offers numerous benefits, including efficient resource administration, optimized output, increased agricultural revenue, market expansion, and the growth of industries reliant on forests (Parthiban and Fernandaz, 2017) [29].

Agroforestry plays a pivotal role in providing price cues for involved parties, encouraging the adoption and dissemination of new technologies, creating employment opportunities, and enhancing the overall quality of life for people. Due to the availability of wood, there has been a surge in small-scale companies, and corporate enterprises like ITC, WIMCO, West Coast Paper Mills Ltd., Hindustan Paper Mill Ltd., and financial institutions like IFFCO have recognized agroforestry as a profitable venture. Industries such as Pulp and Paper, Veneer and Plywood, Hardboard, and Safety match units confront shortages of wood-based raw materials sourced from forests. In this context, agroforestry plantations can play a crucial role in supplementing wood production and meeting the demands of these industries (Parthiban *et al*, 2019) [32].

Table 3: Details on major markets for forest/ farm/ agroforestry products in India

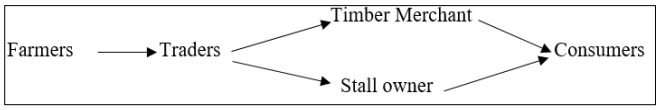
State	Market
Andhra Pradesh	Chittor, Hyderabad, Jannaram, Karimnagar, Vijayawada and Warangal
Assam	Dhoraj, Guwahati, Jorhat and Prilkia
Bihar	Daltonganj, Muzzafarpur
Gujarat	Amreli, Junagadh, Songarh and Umarpada
Haryana	Chika, Kurushetra, Kaithal, Ladwa, Peoha, Pundri, Radhaur and Yamunanagar.
Madhya Pradesh	Akaltara, Balaghat, Bilaspur, Jabalpur, Jagdalpur and Ratnapur
Tamilnadu	Dharmapuri, Denkamkotta, Madras and Trichur
Tripura	Agartala, Dhramnagar and Udaipur
Uttar Pradesh	Jhansi, Jwalapur, Kanpur, Ramnagar and Tanakpur
West Bengal	Calcutta

Source: (Negi, 2014**)**

Marketing Channels

Market pattern for eucalyptus plantation such as Border and Block plantation done at different stages of maturity.

Channel 1



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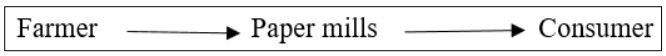

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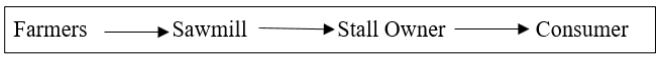

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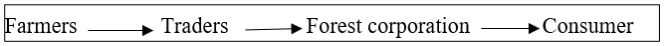
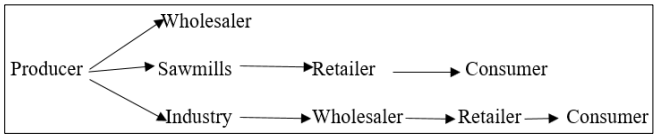
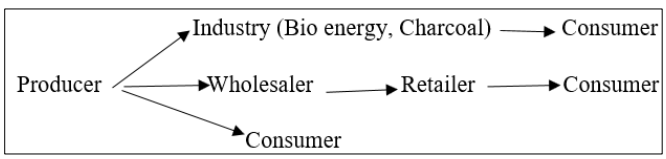


(*Source*: Bangarwa and Sirohi, 2017**)** [3]

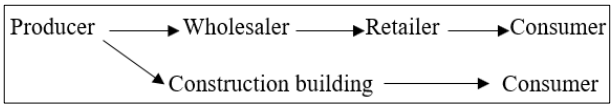
Marketing channels for major Agroforestry products in Tamil Nadu (Partiban, 2012) Timber



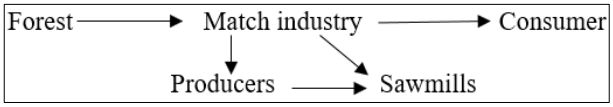
Fire wood



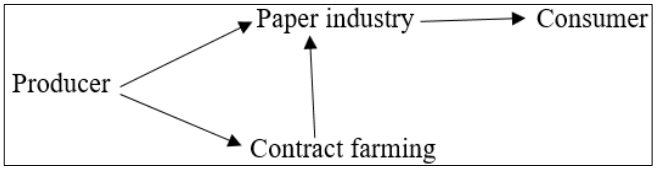
Poles



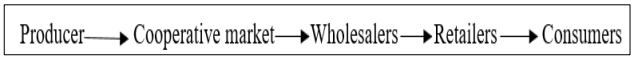
Matchwood



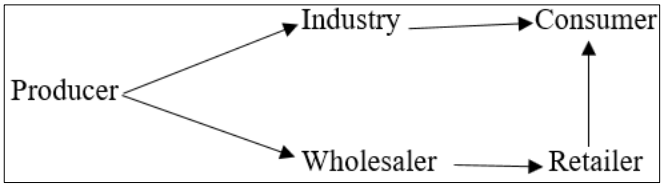
Pulpwood



Pulses



Poultry



How to develop agroforestry that is value-added and sustainable

Developing value-added and sustainable agroforestry requires several key strategies and policy incentives. First and foremost, establishing strong linkages with all stakeholders, including government entities, businesses, and organizations, is essential. Encouraging productive cooperation among these stakeholders can foster effective collaboration and coordination in agroforestry practices (Arifin, 2010) [1].

Additionally, creating a robust research and development (R & D) system will facilitate innovation and knowledge dissemination, leading to improved agroforestry techniques. Independence in the supply of raw materials can be achieved by formulating and recommending policy guidelines that support sustainable sourcing and management of resources (Devaux *et al*., 2018) [8]. Implementing value chain management in agroforestry entails improving harvesting and marketing institutions, organizing wood-based industries on a larger scale, and developing price-supportive mechanisms for all stakeholders. A mechanism for tree insurance can help reduce risk factors for tree growers, providing them with greater confidence in investing in agroforestry (Chavan *et al*., 2015) [16]. To enhance the effectiveness of agroforestry policies, a clear framework for implementation and research initiatives should be established. Ensuring access to quality planting materials for tree growers is crucial for the successful establishment and maintenance of agroforestry systems (Verma *et al.*, 2023) [43].

A improving harvesting and market institutions is essential to address challenges faced by farmers and tree producers. Current manual felling practices lead to significant wood waste and reduced financial returns, necessitating more efficient and sustainable harvesting methods. To incentivize farmers and promote agroforestry, government policies play a vital role. However, effective implementation, funding, and enforcement of these policies on both national and local levels are often lacking. Strong coordination among market system parties and clear institutional mandates are necessary to address this issue. Reforms in incentives, such as taxes and subsidies, can further support agroforestry initiatives.

Research and Knowledge gaps

Since India's independence, several agencies, institutions, and organisations have worked to promote forestry and agroforestry, both in natural forests and in agricultural land use systems. This is demonstrated by how Indian forests and agroforestry plantings helped to supply the need for wood for home and industrial use (Handa and Dhyani, 2015) [16]. The first National Forest Policy for independent India was established by the Indian government in 1952, and it stipulated that trees and forests must cover one-third of the nation's entire land area. (National Forest Policy, 1988) [27]. The development of new wood-based industries received more attention at the same time, and these sectors predominantly relied on natural forests for their raw material needs.

Directives for forestry and agroforestry policy on advancing agroforestry with expanded involvement of wood-based businesses (National Forest Policy, 1988) [27]. The Honourable Supreme Court of India's entire ban on cutting down any natural forests has brought about a complete mismatch between supply and demand. India's demand for wood will reach 153 million cubic metres in 2020 (FAO, 2009) [27]. However, the nation also has a number of unorganised and small-scale enterprises for which the required amount of wood is not readily available. Particularly, India's furniture and handicraft industries are very poorly organised, and there is no information on demand.

Similar to this, the main wood-based sectors with extremely disorganised supply chains are the match and catamaran industries, musical instruments, agricultural tools, etc. More than 380 million m^3 of energy are needed in the country each year for home and other industrial facilities. (Dhyani and Handa, 2013) [9] and the demand is also growing at an alarming rate.

The state of Tamil Nadu has been asked to establish an innovative agroforestry model to promote industry-based agroforestry in light of these developments in India, and the Tamil Nadu Agricultural University has been instructed to make industrial agroforestry a significant focus area for research. Prior to implementation, a detailed baseline analysis was carried out to determine the state of the science and knowledge gaps in the entire agroforestry production to consuming system. The study team has found several issues and knowledge gaps that may be divided into production, processing, and consumption-related categories. (Parthiban and Fernandaz, 2017) [29].

Innovative Technology Development

Innovative technology development has played a crucial role in overcoming research gaps, problems, and limitations in agroforestry. This progress encompassed organizational, technical, and marketing advancements. Traditional approaches in forestry and agroforestry relied on unimproved genetic resources, leading to low production and prolonged harvesting periods. Additionally, practices were based on conventional knowledge, resulting in a disorganized and multipartite supply chain (Buck, 1995) [5]. However, innovative technical methods were employed to address these challenges. The one significant advancement is the development and deployment of High Yielding Short Rotation (HYSR) clones, which have significantly improved productivity. With the use of better genetic stocks, these high yielding clones now produce more than 25 m^3/ha/year compared to less than 10 m^3/ha/year before. These clones are tailored to specific technical requirements, allowing for harvesting between 16 and 18 months for pulp and paper utility and over 48 months for plywood utility.

The adoption of Mini clonal Technology has also been transformative. Traditionally, agroforestry plantations relied on seed-based progenies with varied and unequal production. The introduction of Mini clonal technology has enabled genetic homogeneity and large-scale multiplication, providing a substantial advantage over conventional mass multiplication methods. To address the small size of agricultural holdings in India, a multifunctional agroforestry model has been developed, encompassing tree, agriculture, horticulture, and animal components (Kumar *et al*., 2023) [21]. This model ensures sustainable income generation for farmers in various agroclimatic zones. Value Addition Technology has been employed to convert agroforestry wastes, including plantation residues and agricultural crop leftovers, into briquettes, a valuable industrial energy source (Sharma *et al*., 2016) [41]. This technology has not only increased earnings but has also stimulated the growth of new agroforestry businesses. Another crucial aspect of technological development in agroforestry is the design and development of machineries. Tasks like pitting and debarking have been made more efficient with the use of machines, addressing labour scarcity and reducing human hardship (Pollini, 2009) [36]. Debarking and chipping machines have played a pivotal role in accelerating agroforestry plantation growth and adding value to the supply chain process. These innovative technologies have propelled agroforestry towards greater sustainability, productivity, and income generation, making it a more viable and attractive land-use system.

Organizational Innovations

The transformation of the disorganized supply chain in agroforestry led to the design and deployment of contract tree farming, ensuring better collaboration between farmers and industries. The previous multipartite supply chain was replaced by an organized value chain model. In partnership with pulp and paper, energy, match wood, plywood and timber industries, three contract tree farming models were developed and implemented. These models aimed to establish viable quadripartite, tripartite, and bipartite structures, defining roles and responsibilities for each stakeholder in the value chain. A significant milestone in this endeavour was the establishment of the Consortium of Industrial Agroforestry (CIAF). As a pioneering institution, the CIAF played a crucial role in sustaining the organizational structure and addressing issues across the entire agroforestry production-to-consumption system. The CIAF adopted a self-sustainability model and included all supply and value chain participants from various wood-based sectors. This consortium promoted and facilitated organized agroforestry growth and development.

Under India's National Agroforestry Policy (2014) [26], the establishment of the consortium was aligned with technology-based agroforestry promotion to achieve policy objectives in both forestry and agroforestry sectors (Kumar *et al*., 2021) [22]. The consortium introduced various organizational innovations, such as providing high-quality seedlings, establishing institutions for plantation management, felling, loading, transportation, and facilitating multiple market outlets. The Consortium of Industrial Agroforestry operates as a self-supporting organization, generating revenue through diverse ventures (Minz *et al*., 2021) [24]. Wood-based industries within the consortium provide financial support for research and development. Membership fees, capacity building, consulting, and testing fees contribute to the corpus fund, which is invested as a fixed deposit. The interest earned from the fund is used for outreach and research projects. At the time of writing, the consortium had accumulated USD 62,371 in corpus funds. Overall, the design and deployment of contract tree farming and the establishment of the Consortium have played a pivotal role in promoting organized agroforestry, fostering collaboration, and advancing sustainable wood-based industries.

Marketing Innovations

The implementation of technology-based value chain interventions has significantly addressed the challenges faced by farmers engaged in tree planting. One of the primary issues, the absence of a guaranteed buyback and price support, has been effectively handled through the creation of a market support structure and assurance of buyback by Consortium industries (Parthiban *et al*., 2023) [30]. Over the past decade, the promotion of agroforestry has garnered increased trust from both industries and farmers due to the established and expanded price support system. Business innovation played a crucial role in advancing the forestry and agroforestry land use systems. The Consortium of Industrial Agroforestry institutionalized organizational, technological, and commercial initiatives, providing sustainable growth prospects for companies. The establishment of India's first agroforestry business incubator in 2018 further enhanced interest from value chain participants. The impact of value chain-based industrial agroforestry promotion has been significant, attracting more farmers, wood-based industries, and other value chain participants. This has led to increased productivity, greater industry participation, socioeconomic development, and improved carbon sequestration. The development of organized industrial agroforestry plantations has expanded over the past decade, with over 73,957 hectares established in collaboration with Consortium businesses. These structured plantings now meet at least 25% of industrial raw material needs.

Efforts to improve productivity have incorporated precision Silvicultural, mini clonal technology, High Yielding Short Rotation (HYSR) clones, and the multifunctional agroforestry model. Productivity levels have significantly increased, reaching upto 40 m^3/ha/year depending on the species used. Profitability has also been enhanced, with technology-based value chain interventions contributing to a higher benefit-cost ratio and increased revenue generation. The participation of industries in the value chain model has grown significantly, leading to greater financial support for research. The promotion of agroforestry has had positive effects on socio-economic development, creating sustainable employment and revenue generation activities (Patel *et al*., 2022). Agroforestry-related activities have provided substantial employment opportunities, benefiting both farmers and other value chain participants. In terms of environmental amelioration, agroforestry has been recognized for its contribution to carbon sequestration and microclimate regulation, helping combat environmental issues such as climate change.

Despite the progress made, there are still key constraints in the value chain, including non-availability of adequate raw materials, intensively managed plantations with unimproved seed-based progenies, underdeveloped markets, limited mechanization in silvicultural operations, and lack of awareness. Addressing these challenges will require enhancing the supply chain structure, establishing direct connections between farmers and industry, and ensuring reliable buy back and support prices. Overall, the value chain-based industrial agroforestry promotion has made significant strides in overcoming challenges, improving productivity, and driving socio-economic and environmental benefits.

Recommendations to policy and decision makers

Investments in specific areas can significantly boost the adoption of agroforestry and other sustainable production methods, crucial for biodiversity and climate resilience. The following key areas deserve attention:

Linking farmers to markets: Establishing fair market relationships is vital for building agroforestry value chains. Connecting farmers with local markets, with a focus on marginalized and disadvantaged groups, and exploring regional and export markets for premium and niche goods can efficiently achieve this goal (Franzel *et al.*, 2004) [13].

Enabling knowledge exchange and capacity building: Effective extension services and technical support are essential to empower smallholder farmers to access markets and embrace agroforestry. Knowledge of intricate agroecological systems and diverse market systems is crucial for successful agroforestry implementation (Dawoe *et al*., 2021) [7].

Improved communication on the benefits of agroforestry: Enhanced marketing efforts and strong communication are needed to raise awareness of agroforestry products. Distinctive labelling for different markets, traceability, and reliability are essential for gaining acceptance among end-

users (Bansal, 2021) [4].

Government policy incentives for diversified farming systems: To encourage farmers to transition to agroforestry practices, appropriate incentives are necessary, considering the long-term engagement and investment required. Existing government policies should be implemented, funded, and coordinated at both national and local levels. Coordination between market system stakeholders and clear institutional mandates are crucial for effective policy implementation (Ghosh and Sinha, 2016) [15].

Focus on agroforestry over monoculture farming: Shifting incentives from monoculture farming to agroforestry systems is essential for promoting diversified farming approaches. Rethinking subsidies and taxes to support agroforestry practices will contribute to sustainability and resilience in agriculture (Nair, 2011) [25].

By investing in these areas, policymakers and stakeholders can accelerate the adoption of agroforestry and sustainable production methods, fostering biodiversity conservation and climate resilience.

Conclusion

The idea of sustainability is now widely accepted and has evolved from a corporate social responsibility concern to a strategic business concern. Farmers require a source of income from their farms in order to embrace agroforestry systems. Connecting farmers to local and regional markets is a key component of the market systems strategy. Numerous options exist for supporting farmer organizations to increase farmers' resilience. Accelerating these institutional development procedures and activities would not only assist to address the issue of raw material security but will also be essential for maintaining ecosystem stability and assuring sustainability.

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