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Farm-Forestry, Smallholder Farms and Policy Support – The Way Ahead

Vinod Chandra Pande

Abstract

Farm forestry, interchangeably used for the term agroforestry, encompasses growing trees and/or shrubs on farms, mainly to support agricultural production and supplement farm income on smallholder farms. This, as a bonus, also provides for ecosystem services *viz.*, protection of soil and water resources, biodiversity enhancement, carbon sequestration, and improvement in landscape values to the farm holding. In Indian context, this encompasses raising trees mainly on bunds or field boundaries on small holdings or sometimes intercropped in an agroforestry type configuration, if holding size is bigger. The techno-economic viability of this system has been extensively assessed and wide adoption, therefore, warrants a conducive policy support at local and community level. Governments have framed enabling policies towards this goal; however, desired outcome is still awaited. This study attempts to map out the present development and suggest the measures required at local and community level to make the government policies more fruitful. Policies framed at macro level need recalibration to suit local and community specific requirements in the changing climatic conditions for wider adoption and sustenance.

Keywords: farm forestry, smallholder farms, climate change, policy implication, adoption

1. Introduction

Agro-forestry, encompasses growing trees and/or shrubs on farms, mainly to support agricultural production and supplement farm income on smallholder farms, where agricultural production is the major livelihood support and yet most vulnerable to climate change [1–5]. The smallholder farms occupy world's farmland ranging from 62% in Africa to 85% in Asia [6] and, therefore, invulnerability support to these farms makes sense and promotion of agroforestry holds promise. In fact, diversification to agroforestry from monocropping has occupied prominence as monocropping annihilates nutrients from the earth and leaves soil weak and incapable to support healthy plant growth. This enhances dependency on chemical fertilizers to support plant and crop growth. These problems are to a great extent addressed, apart from others, by shifting from mono cropping system to tree based system [7]. Crop diversification to agroforestry is, in fact, necessitated by socio-economic and environmental problems arising from mono-cropping.

The decision is largely governed by dynamic and sustainability factors such as soil health, soil degradation, environmental benefits and nutrient loss prevention [8–12]. Conservation of natural resources such as water and soil on smallholder farms is, among others, also a significant reason for introducing agroforestry considering the water footprint of crops [10]. This is crucial in a climate change scenario as the smallholder farms mostly bear the brunt of this phenomena. In fact, agroforestry has been recognized as an efficient tool to address the issues of climate change by IPCC [13]. The importance of smallholder agroforestry should, in fact, be reinforced with increased attention and resources to climate change adaptation and mitigation, possibly linked to climatic variables such as rainfall and CO₂ levels, to protect forests while simultaneously expanding tree growing on farms [14–16]. Agroforestry land use, in fact, enhances the provision of ecosystem services such as carbon sequestration [17], watershed protection and biodiversity. These positive externalities could be spatial, for example watershed protection for downstream users, or temporal, such as soil health and land rehabilitation.

Despite importance of agroforestry and the support it has received world over, much remains to be done to promote it in developing countries, for example, for enhanced fuelwood in countries like Ethiopia and Bangladesh. Large areas need to be planted with trees alongside crop for improved catchment protection in the agricultural landscape of India. There is, in fact, a need for shifting to a potential agroforestry cropping system from mono cropping system. The change suggested should also essentially address the income, employment and viability concerns of local stakeholders, particularly smallholder farms, for larger adoption. These farms have limited capacity to adapt to climate change due to various constraints such as low education levels, low income, limited land areas, and poor access to technical assistance, market and credits, and often chronic dependence on external support [18, 19]. The decision to shift is largely governed by dynamic and interactive factors such as agronomic and environmental characteristics, economic and policy considerations, skills and personal attributes of farm managers, and social concerns [20, 21].

2. Farm-forestry and climate

Agriculture is vulnerable to the vagaries of climate change, and smallholder farmers are most susceptible to its impact. It is projected that cereal yields may change by –5 to +2.5 per cent across different regions (**Table 1**).

Agricultural practices helpful in mitigation of climate change, such as agroforestry production system is one such hope, particularly in tropical climate. Climate variability is well buffered by agroforestry because of permanent tree cover and varied ecological niches, that is, the presence of different crops, *e.g.* shade-tolerant and light-demanding. The diversified temporal and spatial management options make agroforestry resilient. Permanent tree cover protects and improves the soil, while increasing soil carbon stocks (**Table 2**). Diversification of commodities allows for adjustment to market needs. The non-harvested components of agroforestry production play an important role to protect soil and local environment. In fact, carbon sequestration by trees contributes to climate change mitigation. The efficient integration of natural resource capture and use in agroforestry contributes to high greenhouse gas mitigation [9]. Overall, the sustainability attributes of agroforestry make a strong case for climate change adaptation. Because of their root and woody biomass, in the agro-ecosystems, along with the food, fiber, energy and vegetative soil cover, the agroforestry production systems are sustainable in the changing climate conditions.

Region	Percentage change	
	2020	2050
Sub-Saharan Africa		
Sahel and southern Africa	–2.5 to 0	–5 to +5
Central and East Africa	0 to +2.5	–5 to +2.5
Latin America and the Caribbean		
Tropics and subtropics	–2.5 to 0	–5 to –2.5
Temperate	0 to +2.5	0 to +2.5
Near East/North Africa	–2.5 to +2.5	–5 to +2.5
South Asia	–2.5 to 0	0 to –5
East Asia	–2.5 to +2.5	–2.5 to +2.5
Canada and the United States	–5 to +2.5	–10 to 0

Source: Parry et al, 1999 [22].

Table 1.
Potential change in cereal production across regions.

Agroforestry system	Carbon storage potential
Agri-horticulture	12.28 tC/ha
Agri-silviculture	13.37 tC/ha
Silvipasture	31.71 tC/ha
Silvopastoralism	6.55 Mg/ha/yr

Source: Toppo and Raj, 2018 [23].

Table 2.
Carbon storage potential of some agroforestry systems.

The climate change priorities of agroforestry models encompass trees to ameliorate the impact of climatic variability and extreme weather events on agricultural productivity and the farm resource base. It contemplates diversification of farming enterprises by producing products and services that are independent of traditional agricultural markets, produce fewer emissions and are less susceptible to climatic variability and carbon dioxide sequestration in living biomass, soils and woody products as a means of offsetting agricultural emissions and providing marketing and partnership opportunities. In addition, there are ecosystem services viz., producing carbon-neutral green energy (bio-fuels) and carbon-storing/low energy building material (wood), expanding and linking natural habitats to support biodiversity adaptation and reducing the impacts of extreme weather events on agricultural production.

This approach, however, largely emphasizes the local climate mitigation/adaptation, as the value of planting trees for climate change has been driven by notions of carbon sequestration and trading. This overlooks the immediate value of trees on farms and the role they might play in helping farmers remain viable. Further, the climate change, particularly the temperature increase suggests that selection of tree species in agroforestry may be crucial in the mitigation of climate change. What worked in the past, including the local indigenous species, may not be right for the future. Therefore, identification of suitable species for region specific applicability is paramount to wider dissemination of agroforestry production system.

3. Farm-forestry and smallholder farms

In order to cope with extreme climate variation, many smallholder farmers are already implementing practices that maintain complex agrobiodiversity and a higher capacity of their production units to resist such risks [24, 25]. Yet the poor tree cover in agricultural land, world over, suggests poor adoption despite economic viability and environmental benefits of agroforestry systems [26]. Several issues plague the much-desired adoption level at farmers' end. The low adoption of agroforestry, despite huge potential, is explained, among others, by the lack of regulations and guidelines related to harvesting, transportation and marketing of agroforestry produce [27]. The smallholder farms, in particular, suffer from low quality infrastructure *viz.*, access to markets, financial assistance, disaster relief, technical assistance or government support [19] due to remote location in developing countries.

The long rotation of trees hinders their adoption on farms as forest policies in countries like India inhibit harvesting, transport and marketing of certain tree species declared as prohibited species. This discourages farmers in taking tree enterprise in their farms. The purpose of such policy is well intentioned but lacks in desired encouragement to stakeholders in large scale adoption of farm forestry.

Property rights, particularly land tenure, has been suggested to greatly affect adoption of agroforestry on smallholder farms. While longer gestation of tree enterprise along with the annual crop enhances profitability and environmental sustainability of farming, it warrants right to land to encourage farmer to invest in agroforestry, apart from other factors.

There are no supports for agroforestry-based land use practices, similar to those in crop production and inputs such as fertilizer, credit for smallholder farms, which discourages them going for tree-based crop production on their small holdings. In fact, the policy support for fertilizer encourages more fertilizer use rather than going for agroforestry which builds nutrients in the soil over a period of time.

The poor extension system in updating farmers' knowledge regarding sustainable tree-based land management also discourages farmers in larger adoption of agroforestry on their farms in developing countries. Farmers' traditional practice of growing trees on field boundaries does not support the farm profitability and environmental sustainability. Innovative and new ways of managing trees on farms (*e.g.* intercrop systems for soil health) are not yet known to the vast majority of farmers. The combination of suitable tree species with the cropping systems practiced by them needs scientific/technical backup not only about choice of tree species but also the desired silvicultural practices.

Although farm-forestry projects fail for a number of different reasons, one common factor is the inadequate attention given to socioeconomics in the development of systems and projects [28]. The socio-economic studies of agroforestry systems have revealed the vulnerability of farm profit in medium to longer term to output prices. With gestation period of more than a couple of years, the smallholder farmers are not convinced enough to adopt them. Because of higher initial establishment costs, the net capital inflow in the initial years, in agroforestry, is not favorable even for tree species of short duration. This is also true for agri-horticultural plantation where fruit bearing occurs some years later [29]. The right combination of crop and tree species is, therefore, crucial to win the faith of stakeholders.

4. Policy reforms promoting agroforestry/farm-forestry

The policy reforms directly targeting the expansion of agroforestry have experienced good success world over (Table 3). The re-interpretation and

Country	Programme	Ministry	Activities
Rwanda	Rwanda agroforestry and action plan 2018–2027	Ministry of Environment	Roadmap for promoting leadership and synergies in agroforestry
India	The India National Agroforestry Policy 2014	Ministry of Agriculture and Farmers Welfare	Providing a platform for converging the various tree planting programs outside of forest areas
Ethiopia	Ethiopian National Watershed and Agroforestry Multi-stakeholder Platform	Ministry of Agriculture and Livestock	Facilitates stakeholder linkages within and among national, regional, and international agroforestry and watershed networks
Niger	Reinterpretation and implementation of the Forest Code	Ministry of Environment	Strengthening on-farm tree access, reduced punitive punishment for tree cutting, discussion on access rights
Ghana	National Agroforestry Policy 1986	Ministry of Food and Agriculture	Supporting research (adaptive trials and demonstration), training and extension education
Nepal	National Agroforestry Policy 2019	Ministry of Agriculture and Livestock Development	Site specific appropriate agroforestry systems and species, availability of planting material, credit and insurance for agroforestry plantation
Brazil	The National Program for Strengthening Family Farming 2003	Ministry of Agrarian Development	Refining financing mechanisms, enhancing training of extension agents
EU	Rural Development Policy 2007–2013	Agriculture and Rural Development Ministry of member states	Capital investments, grants to businesses and training for improvement of agriculture, forest and forestry products
USA	Agroforestry Strategic Framework 2019–2024	U S Department of Agriculture	Supporting research, tools and information for adoption of agroforestry

Source: Bernard et al, 2019; Chavan et al., 2010; USDA, 2019; Smith, 2010 [13, 30–33].

Table 3.
Agroforestry policy and reforms.

implementation of the Forest Code in Niger leading to expansion in farmer managed natural regeneration to over 5 million hectares of land [34] is good example. Similarly, granting communities the long-term rights to forest land in return for environmental stewardship of the land (HKM programme), in Indonesia, created a village forest concept (HutanDesa) providing villages rights to benefits of carbon or other environmental services [35]. In response to deforestation, increase in agricultural land area and to motivate farmers for planting trees, the Government of Kenya, in 2009 enacted new Farm Forestry rules requiring farmers to cover 10% of all farms with trees. Guatemala simplified the Forest Act, 1966 regarding procedures for timber harvesting in agroforestry systems resulting in diversification of land use by farmers in their farms as another source of income [36]. Several other countries developed or modified the agroforestry policies. Brazil refreshed agroforestry policy of 1997. The United States Department of Agriculture (USDA) developed an Agroforestry Strategic Framework 2011–2016 [37]. France passed an agroforestry policy, in 2010, to establish agroforestry as a legal agricultural land

use qualifying for European Commission agricultural subsidies in the framework of the common agricultural policy (CAP). This helped farmers receive investment support for the establishment of the agroforestry systems on agricultural lands [38]. Asian countries like China (Grain for Green) and India (Greening India) have also embarked on ambitious programs to increase tree cover outside of forests, including some attention to smallholder agroforestry by providing necessary support such as providing market and/or establishing floor price for agroforestry product.

Development programs, such as National Adaptation Programs of Action (NAPAs) and Nationally Appropriate Mitigation Actions (NAMAs), as a result of increased attention to climate change, have helped advance agroforestry in some countries. Agroforestry has been recommended to make agricultural production and income more resilient to climate change and variability, transformations in the management of natural resources (*e.g.* land, water, soil nutrients, and genetic resources), resulting in higher efficiency in the use of these resources and inputs for production. Agroforestry, for climate-smart agriculture, is now considered as one of the strategies along with institutional and policy options to promote the transition to climate-smart agriculture at the smallholder farms [39]. The Comprehensive African Agricultural Development Programme (CAADP) endorsed an agriculture climate change adaptation and mitigation framework highlighting agroforestry in 2010. The United Nations Framework Convention on Climate Change (UNFCCC), similarly, recognized agroforestry as a key climate mitigation method within agriculture [40]. The African ministers of agriculture, in the same manner, endorsed wide scaling up of agroforestry to address climate change adaptation and mitigation objectives in agriculture in 2009.

The recognition of agroforestry in development programs and the reforms enacted highlight the good intention of the planners and policy makers world over. There are several case studies corroborating the resultant impact of the reforms and strengthening the belief on agroforestry production system, yet the evidences fall short of universal replicability due to poor adoption by and large. The climatic and bio-physical constraints, apart from socio-economic constraints, still hinder the desired spread of the successful models across the globe. The region-specific approach to address the issues need further studies to understand the constraints,

Barrier	Mean ¹	SD
Does not seem profitable	2.46	1.5
Lack of information on agroforestry	2.44	1.44
Not familiar with technology	2.3	1.56
No market for agroforestry products	2.29	1.51
Lack of seedlings	2.29	1.47
Lack of technical assistance	2.28	1.48
Lack of demonstration sites	2.25	1.52
Trees use much water	2.22	1.41
Insufficient land	2.04	1.32

¹Scale: 1 = most important barrier, 2 = important barrier, 3 = less important barrier, 4 = least important barrier, 5 = not a barrier.
Source: Faulkner et al, 2014 [41].

Table 4.
Barriers to adoption of agroforestry technologies.

yet some broad consensus on general issues, based on the literature, have been extensively highlighted for limited farmers such as smallholders (**Table 4**).

5. Policy reforms implications

Policy reforms in agroforestry has played an important role in promoting agroforestry in different regions/countries differently. The policy reforms have helped promote agroforestry, at macro level, in facilitating adoption and expansion, yet there remains some concern related to, among others, tree germplasm multiplication and dissemination, long term private property rights over land and trees, recognition of agroforestry as an attractive investment area within agricultural institutions and programme. Some of these are outside the domain of agroforestry reforms, yet these are crucial for success of agroforestry reforms.

High quality seedlings production and supply across the farms which need quality trees is crucial. There is good involvement by governments in many instances. In some countries, governments have directly involved in providing seed and seedlings for tree planting efforts in non-agricultural areas to provide watershed protection services. The Ethiopian government, for example, has played an active role in all facets of upscaling tree planting including the establishment of government nurseries and sales at subsidized rates. The Kenyan government has, similarly, supported agroforestry tree seed and seedling supply to meet the newly enacted regulation that all farms must have 10% tree cover. Timber and fruit seedlings are being produced and sold by private sector nurseries, yet seed and seedling systems for tree systems are still not well privatized. The efforts still lack the up-scaling required to provide quality seed and seedlings to different agro-climatic regions. The efforts for local production and supply chain development is warranted with larger role at community and private level. Incentivization and technical back up of such units meeting requirements of region-specific demand of tree species needs a mass movement.

The likelihood of farmers' ability to adopt and reap benefits from agroforestry enhances with long-term tenure security to land [42] due to longer time periods required in testing, adapting and eventually adopting the agroforestry technologies and practices. Trees require lengthy periods to mature, and, therefore, the goods and services produced can affect the incentives for adoption, distribution of benefits, and the impacts leading to poor incentivization of the agroforestry production programme [43]. Absence of land secure rights have poorly impacted even the development of Payment for Ecosystem Services schemes [44], a self-sustaining model to promote agroforestry. Therefore, there is much to be done on this in several regions. While insufficient long-term rights to land have demotivated long term investment on land including agroforestry, this has also manifest itself as conflict between state and smallholder land users within *de jure* forest land such as in the Philippines and Indonesia.

Agroforestry is getting recognition in agricultural strategies, but often merely in a list of options for addressing sustainability. The capacity for agroforestry to generate income is hardly ever recognized in policy documents and, therefore, the associated policy support for its profitability at farms, particularly, smallholder is not quite evident. The micro studies conducted on agroforestry profitability provide ample evidence in favor of market linkage in general and price in particular. The long gestation period of tree harvest postpones the positive net returns flow because of higher initial costs of tree establishment. Smallholder farmers are quite susceptible to initial cash inflow and outflow in sustaining the production enterprise.

The price fluctuations, lack of assured market and poor accessibility to credit apart from other inputs adversely affect the profitability, cash flow and, in turn, perception about agroforestry production.

6. The way ahead

Agroforestry systems promoted through various policy interventions provide benefits such as wood products, fruits, fodder, and improved soil fertility which benefit farmers directly. Where farmers perceive private benefits the demand for agroforestry knowledge and germplasm is expected to be higher. In addition, there is more promotion of agroforestry for other benefits as well, such as for environmental services that accrue to broader society. Despite greater policy recognition of the importance of agroforestry, a number of constraints hinder wider adoption of agroforestry among smallholder farmers in developing countries, both at formulation and implementation levels.

Insufficient attention is paid to the needs of farmers regarding agroforestry trees as regards tree germplasm is concerned. Smallholder farms operate in tight budget constraints and therefore, tree species fetching good market price with shorter duration in combination of the local food crops is crucial to attract and sustain agroforestry enterprise. Of late, some efforts have been redirected exclusively to address this, yet much remains to be done. Similarly, agroforestry is getting attention in the climate change scenario, and this is much needed even in case of smallholder farmers, where more focus is required on tree species which serve the other objectives of small farmers. In particular, the tree species must also help increase their food security, increase or diversify their sources of income generation, take advantage of local or traditional knowledge, be based on local inputs, and have low implementation and labor costs. The agroforestry practices must be suiting to small holdings in combination with the traditional crops grown and meeting the profitability criteria to the extent possible.

While smallholder farmers may be motivated and supported with appropriate incentives to sustain the profitability of agroforestry on their marginal lands, the incentive systems for farmers to produce societal level benefits need to be established and clarified [45]. Payment for Ecosystem services (PES) have been extensively adopted in many regions but appropriate and sustainable models for a wider application is required for which extensive studies should be encouraged in different socio-economic set up. Government involvement in PES market is necessary in the context of smallholders particularly in developing countries. Involvement of corporate sector through Corporate Social Responsibility (CSR) fund is one possibility to promote tree species in agricultural landscape such as multinational company Unilever's investment in the upscaling of *Allanblackia*, a tree species producing oil with properties that are attractive for a range of food products [46]. The possibilities of a value chain development may be explored with focus on local tree species of a particular region by interlinking the interests of the private sector with appropriate forward and backward linkages with group of smallholder farmers. The initial success of Coca-cola, Pepsi, and Del Monte in food market chain in some African states may be upscaled in similar other areas by promoting enabling market and credit policies supportive of these partnerships between private company and smallholder farmers.

One of the ways to help smallholder farmers strengthen their farm-based livelihoods, in the face of the increasing stresses posed by climate variability, is to focus on helping them use farm management practices based on agro-biodiversity and ecosystem services that provide adaptation benefits. However, the existing policies

undermining the maintenance and/or adoption of ecosystem-based approach that promote the simplification of agro-ecosystems, while increasing the use of agrochemicals and fossil fuel should be revisited. Agroforestry practices that help improve farming systems' profitability including increased resiliency to climate change should be promoted to support and protect the vulnerable group of smallholder farms.

Efforts are needed to support extension services to ensure smallholder farmers' access to best available information on adaptation strategies to enable them to make informed decisions in agroforestry production systems [47]. The agricultural extension programs, farmer field schools, agricultural technical programs that are going on in different parts of the world should be strengthened by the local, regional and/or the national governments especially for smallholder farmers under financial stress including climate change impact. The lackluster support to extension programs in many countries [48] need rigorous support in present time more than ever [49]. The farmer field schools and effective extension programs strengthen linkages and information exchange between technical institutions and smallholder farmers [47, 50]. Higher synergies among the efforts of NGOs, governments, scientists, private sector and the groups of farmers would go a long way in filling the extension services gaps and help promote suitable agroforestry practices [51].

7. Case studies

7.1 Family Farming Development Programme, Niger

The programme, implemented over several years in Niger, supported the resilient family enterprise and promotion of agro-sylvo-pastoral production [52]. This included natural regeneration of agricultural land with *Faidherbia albida*, watershed development, dune stabilization with *Acacia senegal*, restoration of pastoral land and establishment of hedge rows.

The interventions resulted in tangible and intangible benefits such as increased yields, volumes of produce marketed and resilience of agricultural system to drought and improved adaptation to climate change through positive environmental externalities viz., carbon sequestration and reduced carbon emission.

7.2 Sustainable agriculture, Indonesia

The farmers group 'Suka Maju' in Golo Ngawan village in the East Manggarai district on the island of Flores, Indonesia adapted sustainable agriculture with the support from local NGO Ayo. The interventions included land conservation and agroforestry to increase land productivity [53].

People initiated planting trees from the pea family and cash crops viz., cocoa, bananas, mahogany, cloves and *Gmelina arborea* and food crops on the terraced land. Following a pattern, the inner side of the land was planted with cash crops and food crops. Calliandra, mahogany and *Gmelina arborea* were planted on the outer side of the land with 3 x 4 metres planting space between each tree. This resulted in increased the productivity of the land, through agroforestry, without requiring money and materials from outside the local area. Further, agroforestry prevented landslides and erosion, thereby, increasing the amount of water absorbed by the soil in the rainy season. Apart from sustaining income and food security, the agroforestry system improved the environment. The success of the system lead to its wider adoption in more areas in the region.

7.3 Grain for Green programme, China

The programme was introduced in 1999 in China, with the objective of improving grassland and forestry on slopes and included, among others, reforesting uplands to reduce erosion, downstream flooding and rural poverty. The was envisaged to be implemented by providing grain, saplings and/or subsidies, over a period to encourage up to 30 million rural households. To support this strategy, the forest law was revised to recognize the importance of compensation in return for environmental services.

The compensation and subsidy support ensured farmers' participation in spectacular development of agroforestry technologies mainly through fruit tree intercropping. Between 1999 and 2010, programme covered more than 15 million ha in 20 provinces [54].

8. Conclusion

Smallholder farms hold prominence world over, especially in Asia and Africa. Socio-economic constraints, apart from climatic stress, enhances their vulnerability making the livelihood difficult. Introduction of tree species provides cushion to production loss risks along with environmental benefits in climate change scenario. Many of the agroforestry practices are well known and have been proven to help smallholder farmers adapt to climate change, but current financial, political and technical constraints limit a more widespread adoption of these practices among smallholder farmers. The advantages of agroforestry, notwithstanding, the challenges and obstacles it faces adversely affects the desired adoption. Despite the fact that trees become profitable as they produce positive net present values over time, the breakeven point for agroforestry systems takes longer time. Similarly, markets for tree products are both less efficient and less developed than for crop and livestock commodities and value chains related to agroforestry systems receive little support.

While agricultural policies offer incentives for agriculture that promote certain agricultural models, such as monoculture systems, and tax exemptions are usually aimed at industrial agricultural production, agroforestry production enterprise, by and large, gets second hand status. Agricultural price supports or favorable credit terms, which are granted for certain agricultural activities but hardly ever for trees, are also discouraging agroforestry adoption.

Further, the conventional agroforestry methods and insufficient knowledge of sustainable production models, including germplasm, restrict the inclination of policy-makers in agroforestry development. The resources dedicated for research, dissemination, market information and propagation of quality germplasm, crucial for wide adoption of agroforestry practices fall short of the desired expectations. The existing land tenure practices also results in confusion about land delineation and rights, discouraging people from adopting and continuing agroforestry practices. In many developing countries, lack of long-term rights to land inhibits long-term investments including agroforestry. Further, forest regulations preclude tree growing on farms by restricting the harvesting, cutting or selling of tree products.

In absence of coordination between sectors, *viz.*, agriculture, forestry, livestock, rural development, environment, energy, health, water and commerce, agroforestry promotion suffers from policy conflicts and omissions, creating gaps or adverse incentives that work against its development. The various conflicting objectives within and between the different departments adversely affects agroforestry. It is high time a synergistic coordination is evolved between farmers, government,

non-government and corporate entities at local community level with market inter-linkages to sustain the interests of farmers as well as private enterprises. Providing tax incentives to private/corporate entity and easing harvest, transport and price policy at farmers level holds promise.

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