Original Research Article

Role of agro forestry in rural development in India

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Abstract

All the developmental projects launched in India, forestry and linked programmes have received an important place and considerable attention. India has been ranked among the most forest deficient countries. The meager national forests of the country are also diminishing at an alarming rate and at present are under great stress due to indiscriminate cutting and falling of trees. In this situation, unfortunately farm forestry/agro forestry has come up as an alternate to meet the country's wood and timber needs. Farms of India afford a significant portion of food, fiber and fuel to meet the needs of an ever increasing population. Agro forestry along with other social, cultural, and ecological benefits has proved the greatest economic mean of development of the rural areas and the source of the economic uplift of the rural dwellers. It is established that agro forestry has the great prospective in reviving the rural economy. In this article, picture of rural India, an overview of dwindling forest assets, and the valuable role of agro forestry in the rural growth progression has been discussed. The article mainly highlights the positive role of Forest Resources in socio monetary improvements of rural communities.

Key Words: Agro forestry, Farmers, Rural Development, Economic Benefits, Forest Resources.

Access this article online

Quick Response Code:

Website: www.statperson.com

Accessed Date: 26 March 2018

INTRODUCTION

Farmers in India have been doing agroforestry since ages in the form of home garden where fruit trees and woody plants are grown collectively. The practice has seen a sharp decline in the past few decades, first and foremost because of strict laws and lack of incentives to small farmers. The policy will try to reverse this trend by relaxing laws and providing loans and insurances to farmers. Agroforestry is defined as a land use system which integrates trees and shrubs on farmlands and rural landscapes to improve output, productivity, diversity and flora and fauna sustainability. It is a dynamic, ecologically based, natural resource management system that, through amalgamation of woody perennials on farms and in the agricultural landscape, diversifies and sustains production and builds social institutions. Major policy initiatives, together with the National Forest Policy 1988, the National Agriculture Policy 2000, Planning Commission Task Force on Greening India 2001, National Bamboo Mission 2002, National Policy on Farmers, 2007 and Green India Mission 2010, emphasize the role of agroforestry for efficient nutrient cycling, organic matter addition for sustainable agriculture and for getting better vegetation cover. However, agroforestry has not gained the desired importance as a resource development tool due to various factors. A policy which deals with problems faced by agroforestry sector, including adverse policies, weak markets and a dearth of institutional finance was approved by the Cabinet in February 2014. India became the world's first country to adopt a comprehensive agroforestry policy. After becoming the first country in the world to frame an agroforestry policy, India has gone ahead and allocated Rs 444 crore to promote agro forestry in the country. The National Agroforestry Policy 2014, announced on February 10, has the potential to substantially reduce poverty in rural India and revive agroforestry industry. Agroforestry is a farming practice in which trees, crops and fodder are grown together on a farmland. Over 80 per cent farmers in India are small land-holders (owning less than two hectares). “Agroforestry will increase biodiversity in small farmlands, which will help mitigate

climate change and improve the quality of soil. Also, as land-holding size is shrinking, combining tree farming with agriculture is the only way to optimise farm productivity," says Ashish Mondol, a national advisory council member who steered the committee for drafting the agroforestry policy.

Agroforestry: concept and definitions: Agro forestry is not a new system or concept. The practice is very old, but the term is definitely new. Agro forestry means practice of agriculture and forestry on the same piece of land. Bene *et al*. (1977) defined agro forestry as a sustainable management system for land that increases overall production, combines agricultural crops and animals simultaneously. Nair (1979) defines agro forestry as a land use system that integrates trees, crops and animals in a way that is scientifically sound, ecologically desirable, practically feasible and socially acceptable to the farmers. Another widely used definition given by the International Centre for Research in Agro forestry (ICRAF) Nairobi, Kenya, that, "agro forestry is a collective name for all land use systems and practices where woody perennials are deliberately grown on the same land management unit as agricultural crops or animals in some form of spatial arrangement or temporal sequence" (Nair, 1983).

Agroforestry and rural development: Forests are a renewable resource and wood is a valuable and sustainably useable product that contributes to national economies. This value from the forests can be realised in harmony with the functions of forests in the global carbon cycle and as long-term carbon repositories as well as providing other environmental values. This important understanding is missed or ignored in many global forestry forums. After more than two decades of so-called 'pro-poor' forestry policies backed by large amounts of research preferentially targeted to advance non-timber forest products and payment for ecosystem services including Reducing Emissions from Deforestation and Forest Degradation, it is difficult to find evidence to back any contention that in any tropical region they have advanced the economic status of forest-dependent or rural communities enabling them to come out of poverty in an enduring way. It is argued here that the sustainable management of native and planted forests, including wood production and processing in rural regions, and greater use of wood products by all of us, can play a much greater role than has been recognised so far for dealing with two major interrelated global challenges. These are poverty reduction in rural forest landscapes, notably in the subtropics and tropics, and to make modest contributions to climate change mitigation globally, especially by recognising the roles of both forests and wood products in the carbon cycle. It is time for a revised narration in the global agenda to raise the potential role of forests as a sustainably manageable resource, free from overzealous calls for forest conservation, but with a more balanced and holistic recognition of the contributions that forests, forestry and the wood-products sector can make to economic and social development. This should be brought effectively into the deliberations of the forthcoming UN Sustainable Development Goals. This would require efforts by the UN and other bodies to bring the private and public sectors into symbiotic partnerships, not as opposing forces as has often been the case.

Beneficial effects of agroforestry: Higher yields of crops have been observed in forest-influenced soils than in ordinary soils. In the Tarai area of Uttar Pradesh, Taungya cultivators harvested higher yields of crops such as maize, wheat, pulses etc. without fertilizer. Approximately, 20% higher yields of grains and wood have been reported in agro forestry areas of Haryana and western Uttar Pradesh than from pure agriculture (Dwivedi and Sharma, 1989). Experiments conducted at IGFRI, Jhansi indicate that the total yield of fodder is more when fodder grasses are grown with fodder trees than pure fodder grass cultivation. Leucaena leucocephala intercropped with agricultural crops and fodder grasses increase the total yield of food grains, fodder and fuel (Pathak, 1989). Nitrogen fixing trees grown in the agro forestry systems are capable of fixing about 50 -100 Kg N/ha/year (Tewari, 1995). Experience in Punjab, Haryana, Uttar Pradesh, Gujarat and some parts of the southern states indicate that a tree and agriculture crop production system is more productive. The total production and value of fuel, fodder and small timber in degraded lands are reported to be many times more than the coarse grains usually produced on them (Gupta and Mohan, 1982). Sanchez (1987) stated that, "appropriate agro forestry systems improve soils physical properties, maintain soil organic matter and promote nutrient cycling". Nitrogen fixing trees are mentioned as one of the most promising component of agro forestry system. The leaf litter after decomposition forms humus, releases nutrients and improves various soil properties, it also reduces the fertilizer needs. Growing of trees and fodder crops (including fodder trees) is more economical, particularly on marginal lands. Observations taken in hot arid and semi-arid areas of Rajasthan indicate that marginal lands are incapable of sustaining stable and dynamic cultivation of agricultural crops. Silvipasture consisting of growing trees such as Prosopis, Albizia, Zizyphus and Acacia species may provide many times more returns per unit of land than agriculture under such conditions (Gupta and Mohan, 1982). Eucalyptus in agro forestry has been found to be more profitable than pure agriculture in Haryana. Populus deltoides increases the

farm return by 50% in Tarai region of Uttar Pradesh (Chaturvedi, 1981).

Social forestry: Social forestry is management and development of forest with afforestation on barren lands to achieve environmental benefit and rural development. The term was first used by National Commission on Agriculture, Government of India, in 1976. It was then that India embarked upon a social forestry project with the aim of taking the pressure off the forests and making use of all unused and fallow land. Government forest areas that are close to human settlement and have been degraded over the years due to human activities needed to be afforested. Trees were to be planted in and around agricultural fields. Plantation of trees along railway lines and roadsides, and river and canal banks were carried out. They were planted in village common land, Government wasteland and Panchayat.

Benefits of agroforestry systems

Environmental benefits

a. Reduction of pressure on natural forests.
b. More efficient recycling of nutrients by deep rooted trees on the site
c. Better protection of ecological systems
d. Reduction of surface run-off, nutrient leaching and soil erosion through impeding effect of tree roots and stems on these processes.
e. Improvement of microclimate, such as lowering of soil surface temperature and reduction of evaporation of soil moisture through a combination of mulching and shading.
f. Increment in soil nutrients through addition and decomposition of litter fall.
g. Improvement of soil structure through the constant addition of organic matter from decomposed litter.
h. It is also recognized that Agroforestry is perhaps the only alternative to meeting the target of increasing forest or tree cover to 33 per cent from the present level of less than 25 per cent, as envisaged in the National Forest Policy (1988).
i. Agroforestry is known to have the potential to mitigate the climate change effects through microclimate moderation and natural resources conservation in the short run and through carbon sequestration in the long run. Agroforestry species are known to sequester as much carbon in below ground biomass as the primary forests, and far greater than the crop and grass systems.
j. Economic benefits :
k. Increment in outputs of food, fuel wood, fodder, fertiliser and timber.
l. Reduction in incidence of total crop failure, which is common to single cropping or monoculture systems.
m. Increase in levels of farm income due to improved and sustained productivity.
n. Agroforestry has significant potential to provide employment to rural and urban population through production, industrial application and value addition ventures. Current estimates show that about 65 % of the country's timber requirement is met from the trees grown on farms. Agroforestry also generates significant employment opportunities.
o. Social benefits
p. Improvement in rural living standards from sustained employments and higher income.
q. Improvement in nutrition and health due to increased quality and diversity of food outputs.
r. Stabilization and improvement of communities through elimination of the need to shift sites of farm activities.

Types of agroforestry systems

1. Agrisilviculture system: It is a system of agroforestry in which tree species are grown and managed in the farmland along with agricultural crops. For example, poplar (Populus deltoids) and wheat (Triticum aestivum) or white teak (Gmelina abrorea) and paddy (Oryza sativa). This system can solve the problem of shortage of food, fuelwood, timber and conserve soil moisture contents and also ameliorate the harsh climatic condition.
2. Silvipastoral system: Under silvipastoral system of land management improved pasture species are grown alongwith tree species. For example, mulberry (Morus alba) and marvel grass (Dichanthium annulatum) or lebbeck (Albizia lebbeck) and Dinanath grass (Pennisetum pedicellatum). Here the selection of tree species could be either for timber alone or for dual purpose i.e. fuel cum fodder. Grasses or legumes mixtures are grown alongwith tree species simultaneously on the same unit of land. Combining of trees, grasses and legumes also helps to conserve soil moisture and improve the fertility status of soil. It has two sub-types: i) Silvipastoral system with control grazing ii) Silvipastoral system in which domesticated ruminants (herbivores) are not permitted for grazing.
3. **Agrisilvipastoral system:** Under this system the same unit of land is managed to get agricultural and forest crops where farmers can also rear

animals. For example wheat (Triticum aestivum), poplar (Populus deltoids) and marvel grass (Dichanthium annulatum).

4. **Agrihortisilviculture system:** It isintegrated system of land use in which agricultural crops, fruit trees and timber trees/fuel wood are grown together to fulfil the needs of food grains, fruits, timber and fuel wood. For instance wheat (Triticum aestivum),mulberry (Morus alba) and sissoo (Dalbergia sissoo).
5. **Silvihorticulture system:** It is a system of agroforestry in which timber trees are grown with fruit trees. For example, lebbeck (Albizia lebbeck) and mulberry (Morus alba). This system is extremely helpful in soil conservation.
6. **Agrihorticulture system:** This land management system aims at production of both agricultural crops and fruits. Therefore, crops and fruit trees are grown together. For example, apple (Malus pumilo)and wheat (Triticum aestivum).
7. **Hortisilvipastoral system:** It is integrated system of land management in which fruit trees, forest trees and pasture grasses are grown together. The three components fulfils the demand of fruit, fodder, fuel and timber. For example, mulberry (Morus alba), lebbeck (Albizia lebbeck) and marvel grass (Dichanthium annulatum).
8. **Hortipastoral system:** In this type of agroforestry system fruit trees are grown with pasture grasses for the fulfillment of need of fruits and fodder. For instance mulberry (Morus alba) and Dinanath grass (Pennisetum pedicellatum).
9. **Agripasture system:** In this system crops and pasture grasses are grown together to meet the need of food and fodder. For example, wheat (Triticum aestivum) and annual meadow grass (Poa annua).
10. **Silviapiculture system:** It is a system of bee rearing along with growing of trees on the agricultural land. For example, white teak (Gmelina arborea) and bee (Apis spp.).

National agriculture policy and agroforestry promotions

The National Agriculture Policy, (2000) clearly states, "Agriculture has become a relatively unrewarding profession due to generally unfavourable price regime and low value addition, causing abandoning of farming and increasing migration from rural areas." Hence the Policy stresses, "Farmers will be encouraged to take up farm/agro-forestry for higher income generation by evolving technology, extension and credit support packages and removing constraints to development of agro forestry". Rural people have been practicing tree planting in their farms and homesteads to meet household requirements of fuel, poles, timber and medicinal plants. With the advent of social forestry, diversification in agriculture was encouraged to generate high income and minimize risks in cropping enterprises.

- Planning Commission, GOI, 2001 for promoting agro forestry, has recommended the following: -
- Rather than having a uniform strategy for the whole country, commercial agro forestry should be adopted in irrigated districts of the country.
- A separate strategy should be developed for rain fed areas for environmental security, sustainable agriculture (production and economy) and food accessibility.
- Suitable species for commercial agro forestry may include Acacia nilotica, Bamboo species, Casuarina equisetifolia, Eucalyptus species, Populus deltoides and Prosopis cineraria for different climatic, edaphic and agricultural conditions.
- Specific institutes have been identified for tree improvement and development of clones of specified species.
- Corporate private sector may be encouraged to take up research and development in tree improvement, development of better clones and micro and macro propagation of quality planting material.
- About 100 NGOs may be identified to carry out clonal propagation of seedlings for distribution to farmers at appropriate price and carrying out extension work. Extension activities should include organizing farmers, providing them training in planting techniques, protection measures and other silvicultural operations.
- Technological development to diversify usage of agro forestry species will help to ensure a ready market; for example bamboo is getting rediscovered as a potential raw-material for the development of bamboo composites suitable for use in place of wood and wood composites.
- Bamboo technology mission should be started keeping in view the impending gregarious flowering, followed by mass mortality of bamboo, forest fire famine and insurgency. Circumstances warrant formulation of emergency plans for harvesting and processing of bamboo prior to their flowering.
- As more and more farmers are taking up agro forestry, export - import policies should be

modified to encourage agro forestry product marketing.

- A system of market regulation to be put in place, including a mechanism of periodic review in order to protect the interest of both producer and consumer of agro forestry produce.
- A suitable market information system needs to be introduced to inform farmers about major buyers, prevailing prices trends, procedure etc.
- All existing laws executive orders relating to tree felling transport, processing and sale should be amended to facilitate agro forestry.
- Commercial agro forestry may be planned in irrigated districts covering 10 m ha. On annual basis, one million ha should be brought under multipurpose tree species identified by the Task Force. The scheme of NABARD for farm/ agro forestry should be expanded and investment of Rs. 100 crore per year should be ensured.
- It is proposed to cover 18 million ha of rain fed areas on watershed basis under agro forestry for conservation of soil and water and plantation of hardy species such as Eucalyptus, Bamboo and Babul. On annual basis 1.8 million ha is proposed for afforestation under various schemes of Rural Development, NAEB and 'food for work' scheme. An investment of Rs. 2700 crore will be required on yearly basis.
- Major states may establish Agro forestry Cooperative Federation for increasing bargaining powers of farmers in marketing of agro forestry products.
- Wood based industries should continue supply of quality planting material to farmers and ensure suitable buy-back arrangement.

Impact of forest conservation and rural development – a case study: Forests play a crucial role in international development, serving as an environmental necessity and an economic resource around the world. Yet despite their blatant importance to our planet, forests continue to be destroyed at an alarming rate, creating a cascade of negative effects that are too palpable to ignore. Worldwide, over 32 million acres of forests are cleared each year, an area equal to the size of Nicaragua, with Africa's forests disappearing at a rate nearly three times the global average

1. The strain on the environment from deforestation has been particularly devastating for the most vulnerable populations in the developing world, often more impoverished and reliant on local natural resources to meet their daily needs than those in developed countries. The Issue In Kenya, a country with 80% of its population living on small-scare farming, over two-thirds of its landmass in arid or semi-arid climate zones, and a population growing at a rate of over a million per year, forest cover has experienced a sharp decline in recent decades
2. Illegal logging, charcoal production, forest encroachment, squatter settlement, fire, erosion, and unsustainable land use have been the primary sources of deforestation in Kenya, and the consequences have been drastic.
3. Streams, riverbeds, and watering holes have dried up, soil erosion has increased, hydrological patterns have been disrupted, crops have been destroyed, and wildlife populations have diminished. Rural communities in Kenya dependent upon subsistence agriculture have little opportunity beyond farming, and many times can only meet their daily needs at the expense of the environment. Kenya's burgeoning population is a stark contrast to its shrinking forests. Marginalized communities continue to cut down trees everyday for firewood and charcoal use, causing the forests cover to retreat further. In a study conducted among farmers living in Eastern Kenya, the reduction of forest cover had led to a variety of factors, with the most prominent indicators of increased vulnerability being decrease in crop yield, drying rivers, drying springs, increase in market prices, displacement or migration, and drought
4. However despite these challenges, Kenya are attempting to curb deforestation and establish sustainable solutions to meet both the long-term needs of the environment and the immediate needs of the people. Promising Solutions. While there is no single solution that simultaneous protects the environment and eradicates poverty, there are some many approaches to development that address development factors across the environmental, economic, and social spheres. The key to the success of these interdisciplinary approaches is widespread buy-in and commitment to the policies across a diverse range of stakeholders. In Kenya, the national government, local community, and international sector all play integral roles in the country's efforts to combat deforestation and promote rural development. Engaging the local government One of the most important players in environmental protection and economic development is a country's national government. Africa's long history of colonial rule and state-ruled land allocation has resulted in a large

portion of forest reserves being degraded through misallocation and misuse. Like many others, Kenya's government has struggled to balance the competing demands of population growth and forest conservation. During the rule of President Moi during the late 1980s and early 1990s, land was parcelled out through political favouritism and forest areas were cleared to serve as settlements for the misplaced. The Mau Forest in the Rift Valley is one such area, which was almost irreparably damaged after over 10,000 families were forced to resettle there. This area, once an important watershed for the country, "receives so little water now that it may well dry up completely within a decade or so.

5. The misguided policies that caused so much environmental degradation in Kenya prove the significant influence the national government can have on the implementation of sustainable solutions to forest conservation and rural development. Contrary to the bleak situation in the Mau Forest, Kenya's Aberdare Forest is being protected and restored under national policy, demonstrating a promising governmental intervention to protect forest reserves while allowing local communities to not only survive, but raise their standard of living. Governmental agencies such as the Kenya Wildlife Service carried out an initiative to protect the Aberdare forest, combat human-wildlife conflict, and provide local jobs, through the construction of a 2,000 kilometer-long electric fence. The fence has provided a multitude of benefits, most notably a reduction of illegal logging and deforestation, increased crop yield through reduced wildlife conflict, and increased average income in the local community. This type of initiative involving Kenya's local government agencies represents a holistic approach to environmental policy. **Engaging the local community:** In order for policies to be implemented in a sustainable manner that benefits the environment and local economies, communities must be willing to support and participate in the efforts. Fostering a sense of ownership among those most directly impacted by deforestation is a key driver of success. In fact, a study on Kenyans' willingness to pay for forest conservation produced interesting results, showing that those with lower education and income levels are willing to pay more for forest conservation than those with higher education and income levels. This is because "those with less income derive their utilities from the forest; hence they are more willing to conserve the forest" than those with higher incomes that are not as directly dependent on forest resources
6. This indicates that efforts to educate, engage, and empower people at all levels of society generate a collective effort, which transfers the burden from the poor to a broader range of stakeholders. One example of community engagement in Kenya relates back to the Aberdare electric fence initiative executed by the Kenya Wildlife Service. The government had to convince the communities that the electric fence would benefit them even though it would keep them out of the forest they are so dependent upon for daily resources. As the former Chairman of the Kenya Wildlife Service stated, "The support of the forest-edge farming communities has been the secret of this project's success.
7. The local communities have taken ownership in this initiative and have taken on roles in monitoring and managing the fence, reporting illegal activities, planting indigenous trees inside the fence, and developing sustainable farming techniques to reduce resource consumption. Engaging participation from the local community ensures that benefits accrue to the most direct stakeholders and efforts to preserve the environment are sustained. **Engaging the international sector** While national governments and local communities are essential players in any development strategy, the role of the international sector cannot be overlooked. Multinationals, NGOs, and civil society organizations all contribute vastly to international development, both through market-based approaches and philanthropic initiatives. Kenya's position as the leading East African economy and welcoming attitude towards foreigners has made it one of the foremost recipients of international aid in the region. Environmental conservation projects hosted by foreign companies and organizations are steadily increasing, and the focus on forest conservation is of particular importance in many of these efforts. An example of foreign public-private partners assisting in the conservation of Kenya's forests is between multinational Allianz Insurance Group and US-based nonprofits organization, Wildlife Works, which focuses on reforestation efforts in Kenya. Allianz and Wildlife Works partnered to form a sustainable model that addresses environmental, economic,

and social challenges. Allianz buys carbon credits from Wildlife Works' tree-planting projects, and the nonprofit uses this money to pay the local Kenyans for their work in raising, planting, and protecting the trees

8. One approach that has proven to be beneficial both to environmental protection and rural economic development is the United Nation's Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD). This program assigns a value to a living tree that is greater than the value that would be attained if the tree were to be cut down, thus promoting protection and stewardship over exploitation. Developed countries contribute to a general fund, which is then distributed to support forest conservation and reforestation activities in the developing world.
9. Through these models of reciprocation for conservation, community members are able to earn an income by protecting and planting trees, rather than continuing to rely on, and add to, the degradation of Kenya's forests. The study concluded that in many parts of the world, rural development is directly linked to forests, and in Kenya, this is true for the majority of the population. The constant struggle between long-term conservation and daily needs is an ongoing challenge that can only be resolved through collaborative action. By aligning the interests of all stakeholders involved, reforestation and forest conservation efforts can lead to rural economic development, raising the standards of living in developing countries and ensuring the preservation of the world's natural resources.

CONCLUSIONS

Forest resources directly contribute to the livelihood of 90% of the people living in extreme poverty. Local people apply on their indigenous knowledge for collection, processing, packing, drying, marketing and consumption of various forest resources products. The most important forest resources produced in India are honey, morels, fruits and nuts vegetables, condiments and spices, mazari-palm, silk cocoon, and many others. About 34% of local people are dependent on forest resources for income-generation. These products, after collection and processing, are sold to the middlemen who then sell into the main market due to unscientific processing. More than 65% of the product goes as wastage on the way to the main market poverty. Local people apply on their indigenous knowledge for collection, processing, packing, drying, marketing and consumption of various non-timber forest products. Local people apply on their indigenous knowledge for collection, processing, packing, drying, marketing and consumption of various non-timber forest products. The most important forest resources produced in India are honey, morels, fruits and nuts, vegetables, condiments and spices, mazri-palm, silk cocoon, and many others. About 34% of local people are dependent on forest resources for income generation. These product after collection and processing, are sold to middleman who then sell into the main market due to unscientific processing. More than 65% of the product goes as wastage on the way to the main market is of the view that problems like lack of awareness about collection and processing of various products, among local collectors are commonly noticed. Extensive research is needed to study market trends, reduce monopolies, and eliminate wastage during different steps of processing, as well as government attitude towards forest resources. They also suggest that more studies should be conducted, through bottom-up approach, for proper planning, better means of production, sustainable income through sustainable utilization, training and capacity building of related personnel as well as the community, for conservation of different forest resources. Forest resources are not only a source of income for rural people, but also for satisfying their domestic needs in the form of food, fodder, vegetables, etc. They can play a vital role in conservation of forest, biodiversity, watershed management and poverty alleviation. Most of these products are harvested by the local people, which pass through a chain of steps like drying, grading, storing, packing, transporting, trading and then consuming. Although some of rural communities are going for domestication of various species, like mazri palms, honey, morels, bamboo, silkworm rearing, etc., with better techniques of production, but collective efforts are needed to strengthen in situ cultivation of these species.

RECOMMENDATIONS

- As forest resources cover a wide range of products, they must be properly classified on the basis of economic, social and cultural importance.
- Community should encourage participate in the programme being launched to promote forest resources and agro forestry, by making various committees governed by the local people.
- To mobilize and educated the local people for sustainable use and proper management of different products, through proper awareness programs and project are needed.
- In order to have complete inventory of forest resources, the base line information on individual

products, through bottom-up approach needs to be collected.

- New Markets have to be created and discovered for various products collected from the communities' wild and cultivated, so that the communities really realize benefits.
- Incentives should be offered to the communities for the conservation and sustainable utilization of forest resource products.
- Various governmental institution and NGOs should explore, design and initiate new programs to ensure the continuous supply base with reasonable profits.

The scientists believe that medicinal herbs and spices can be successfully grown as crops, with high economic benefits to the farmers. Special dedicated efforts are needed for creating awareness and highlighting the economic benefits among farmers. A clear understanding of both the supply side issues and the factors driving the demand and size of the medicinal plant market is a vital step towards adequate planning to introduce medicinal herbs and spices as a crop. The above discussion leads to conclude that suitable combination of trees and crops in the farmers fields would enhance income levels, elevate living standards and generate additional incomes for the farmers. These are considered to be the development indicators. It is hoped that development in rural livelihoods is possible through the introduction and promotion of agro forestry on the country. There is need to design year around agro forestry system that is sustainable in its real sense to realise sustainable rural development.

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Source of Support: None Declared
Conflict of Interest: None Declared