

# Sustaining Social Forestry for Sustainable Human Development

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## Abstract

Forests have been a most important basis for human sustenance and overall wellbeing since ancient times in many intrinsically and immensely important ways. However, with rapid increase in human populations and their expanding activities and excessive exploitation of forest resources, forests across many parts of our planet have faced serious damage, depletion, destruction, and degeneration in various manifestations leading to severe negative consequences threatening the lives and livelihoods of people especially in fragile ecosystems. Such anomalies chiefly prevail in developing and underdeveloped economies and their least developed pocket areas.

As an attempt to cope up with various forest resource related constraints, to fulfill resource requirements, and to render living conditions easier, improved, and advanced, human communities have domesticated many tree, shrub and herb species of special utilities and their own choices through different social mechanisms. This innovative approach human societies adopted in the course of their gradual advancement led to the emergence of the concept and practice of social forestry in varied forms and for multiple benefits. Owing to its multifarious positive properties contributing to social, economic, and environmental dimensions of human life, it is gaining increasing popularity and coverage across all communities in the world and has already generated lots of valuable impacts on the whole. However, its coverage and richness are still limited. Besides, it is beset with constraints and problems of diverse dimensions and high magnitude.

Finding and effectively executing ways to mitigate the constraints and problems is indeed the great need today for all those concerned with the growth and development of social forestry. Just as its types and benefits are diverse, the requirements for its rapid progress are large and comprehensive. Provided concerted sincere efforts come in a cohesive, concrete and cordial manner from all stakeholders at all levels and of all categories and capacities, social forestry can contribute impressively to the basic pillars of sustainable human development – society, economy, and the environment. Prevalence of ensured full-fledged good governance in all spheres would be key to substantive success in this regard.

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Keywords: Forest, forestry, social forestry, sustainable development, Nepal.

## A. Forests in Human Development Perspective

A forest is an overall community of various types of trees, shrubs, and herbs growing in a certain area of land. It naturally embraces various kinds of animals, insects, and microbes as well. In fact, a forest comprises not only the various forms of flora and fauna but even such waterbodies as ponds, lakes, springs, waterfalls as its integral parts to form a complete forest ecosystem of vital resources and ambience. Humans have depended heavily on forests in numerous important ways (e.g., food, shelter, fibre, fire, seclusion, safety, security) right from the days he emerged on earth. This dependence will remain forever albeit in varying degrees and forms depending upon his circumstances, choices, and needs. Plants (herbs, shrubs, trees) nourish and influence human life throughout from the latter's conception till the end of life and even thereafter in the case of some cultures (Ojha 2018).

Realizing the usefulness and importance of plants (Maiti et al. 2014; Ojha and Rijal 2014; Shrikanth et al. 2015), people of all cultures and faiths in the world have regarded plants as gods and their community (forest) as their abode (Ojha 2018; WWF 1999). For instance, Rig Veda – the oldest scripture believed to have been composed as early as 1700 BCE and written not later than 300 BCE deeply recognized and acknowledged the varied important properties and values of plant resources (Shrikanth et al. 2015). Similarly, the Rig Veda advocated the protection and conservation of plants (ऋग्वेद (३।१।६): इन्धनार्थ्यं शुष्काणां द्रुमाणामवपतनम्). It advocated the use of only dead or dry tree parts as fuels and considered using green plants for fuel as a sin (Ojha 2018).

Vriksha Ayurveda (Skt. Vriksha = plant, ayu = life, veda = knowledge) – the ancient science of plant life – written sometime around 300BC deals with various aspects of growing and using plants for human wellbeing. It considered trees as one of the most prolific and potent sources of human welfare. *Taru Mahima* (Skt., taru = plant, mahima = praise) described plants as an immensely important source of *ahara* (= food) and *aushadhi* (= medicine) highlighted the value of plants to such a height as: one pond is equal to ten wells, one lake is equal to ten ponds, one human offspring (human life) is equal to ten lakes, and one plant/tree is equal to ten human lives (Srikanth et al. 2015). In Hinduism, many plants are worshipped as are the sun, the moon, rivers, lakes, air and water. The plant species revered the most chiefly include pipal tree (*Ficus religiosa*), banyan tree (*F. bengalensis*), golden fig (*F. benjamina*), and sacred basil (*Ocimum sanctum*). *F. religiosa* is in fact regarded as *yriksha-raja* (Skt., king of trees) and deeply revered and regularly worshipped using the following mantra: मूले ब्रह्मा, त्वचे विष्णु शाखायां श्री महेश्वरः । पत्रे पत्रे स्थिता देवा; वृक्षराज नमस्तुते // [Skt., Prayers to Vriksha Raja (the king of trees) harboring Brahma in roots, Vishnu in bark, Maheshwar in branches, gods in each leaf!]

Leaves of many plant species, including pipal, and others such as mango (*Mangifera indica*), sacred basil are essential requirements in most rights and rituals (Ojha 2018). Logs of several species of trees are needed in certain major religious events to prepare chariots of deities, install merry-making swings, and perform *yajna* (sacrificial ritual fire), aesthetic, ecological/ environmental and socioeconomic benefits apart (OFRI 2018; Ojha 1980, 1985).

## B. Forest Resources and Their Importance

Forest resources include a variety of flora and fauna living in integration with one another in the forest ecosystems. Land, soil, and water are naturally the integral components of these ecosystems. The survival and prosperity of mankind is dependable and largely influenced by changes in these. A better understanding about their value is undoubtedly of great importance for all concerned with others' as well as their own wellbeing that relies in the proper management of the forest ecosystems in general and social forestry in particular. Therefore, hereunder the major benefit potentials of forest resources are summarized (e.g., Table 1), with focus on their economic potentials (especially in the Nepalese context). It may also be pertinent

at this juncture to describe their other services that do not directly appear to be of economic value, but can be accounted through specialized techniques of evaluation devised in recent years (e.g., the willingness to pay technique).

Table 1: Summary of the Major Beneficial Features of Forest Ecosystems

Letter	Attributes/representation
<b>F</b>	Food, fodder, fibre, firewood, furniture, fruits, fertilizer, fuel, friendship, fragrance, freshness, filtration, fulfilment, freshness, fortitude
<b>O</b>	Oxygen, oil, ointment, ornamentation, organic matter, oleoresin
<b>R</b>	Rain, rattan, resin, renaissance, rubber, recreation, roofing material, roughage
<b>E</b>	Ecosystem, energy, environment, employment, erosion control, entertainment, endurance
<b>S</b>	Shelter, soil nutrients, sap, sleeper, sericulture, shipbuilding, sports (goods), storage systems, scaffolding, stakes, sticks, stilt, serenity, scenery, sanctification, solitude, sanctuary, salvation, satisfaction
<b>T</b>	Timber, tourism, trade, tool handles, transportation, turpentine, thatch, treasury, tranquility.

Adapted from and expanded over: Ojha, 2003.

The fundamental services that forest ecosystems and resources offer to mankind can be very broadly categorized as their three major functions as mentioned below:

1. *Protective functions*

Protection of soil from runoff/erosion by wind and water, and from excessive solar radiation exposure;  
Conservation of soil moisture and water holding capacity of the soil;  
Protection of beneficial microbes and insects in the soil, thus facilitating the maintenance of better structure, texture and productivity of the soil.

2. *Regulatory functions*

Absorption, storage and release of carbon dioxide and oxygen gases and micro and macro mineral elements  
Absorption of aerosols and noise  
Storage and release of ground water  
Absorption and transformation of radiant and thermal energy.

3. *Production functions*

Storage of energy in the form of floral and faunal biomass.  
Production and regeneration of products such as leaves, wood, fruits, buds, flowers, bark, and roots.  
Production of large variety of chemical compounds such as resin, alkaloids, essential oils, latex, dyes, and pharmaceuticals.

The numerous beneficial services (direct/and indirect economic importance) of forest ecosystems and resources can be delineated perhaps more elaborately and clearly as follows:

1. *Ecological effects*

Catchment protection – runoff control, water supplies, irrigation, soil fertility, oxygen  
Carbon sequestration  
Ecology and wildlife conservation – recreation, tourism, national parks, protection of endangered species of flora and fauna  
Soil erosion control – windbreaks, shelter belts, dune fixation, eroded land reclamation

## 2. Indigenous consumption

Fuelwood and charcoal – cooking, heating, and other household uses  
Agricultural uses – shifting cultivation, forest grazing, nitrogen fixation, mulches, fruits and nuts  
Building poles – housing, building construction, fencing, furniture  
Pit-sawing and sawmilling – joinery, furniture construction, farm buildings  
Weaving materials – fibre, ropes, strings, baskets, furniture, furnishings  
Sericulture, apiculture, sericulture – silk, honey, wax, lac  
Special woods and ashes – carving, incense, chemicals, glassmaking  
Hunting for bush meat

## 3. Industrial uses

Gums, resins and oils  
Charcoal  
Poles, e.g., transmission poles  
Saw-logs – lumber, joinery, furniture, packing, shipbuilding, mining, construction, railway sleepers  
Veneer logs – plywood, veneer furniture, containers, construction  
Pulpwood – newsprint, paperboard, printing and writing papers, containers, packaging, dissolving pulp, distillates, textiles and clothing  
Residues – particle board, fibre board, wastepaper.  
Hides, bones, furs, wool from wildlife (Ojha 2003).

**Figures 1 and 2: Reflection of Multifarious Positive Properties, Products, and Services of Forests**



Source: Wikipedia, October 2018.

Forests are crucial determinants of the accumulation of greenhouse gases in our atmosphere. They absorb 2.6 billion tons of CO<sub>2</sub> (carbon-dioxide) each year, about one-third of the CO<sub>2</sub> carbon released from the burning of fossil-fuels. Clearly, therefore, destruction of forests has large negative impacts. Deforestation accounts for almost 20 percent of all greenhouse gas emissions — more than the world's whole transport sector. While being critical to slowing, lowering or even halting climate change, forests are important for reducing the present and future climate change impacts on people. For instance, forest products are more climate-resilient than traditional agricultural crops and when disasters hit and regular crops fail, forests act as safety nets to save communities from losing all sources of food and income (CIFOR 2018).

Forest lands provide a source of micronutrient rich food for millions of people around the world. These foods may be of great value to the dietary quality of people living in close proximity to forests – especially in communities with poor access to markets (Rowland et al. 2017). Clearly, therefore, we must devise and dispense better forest management mechanisms for increasing and improving forest cover in the world to check climate change and improve the overall environment and people's lives (CIFOR 2018).

### C. Forest Resources Status in Nepal

Nepal is one of the few countries of the world that depend extremely largely on forest resources for various production and productive purposes. More than 75 per cent of the country's energy requirement is fulfilled from fuel-wood that comes largely from forests, shrub lands, and the lands adjacent to farms. In rural areas, almost all households rely on forests for firewood for cooking and heating purposes. Similarly, 40 per cent of the livestock nutrition (fodder) is fulfilled from forests. Besides, nearly all the timber used comes from the forest. Forests maintained as national parks and wild life reserves serve as reservoirs of genetic resources and contribute to tourism. For example: the total revenue Nepal generated from its forests in the fiscal year 1996/97 was about Rs. 320 million, out of which approximately Rs. 268 million was from the sale of timber alone. Export of medicinal herbs exported in that year was worth more than Rs. 12 million and the handmade paper and its products worth as much as over 59 million rupees. The other major products exported included catechu, incense sticks, and wooden and bamboo goods.

The share of forestry in AGDP is about 10 per cent. If complete accounting of the multifarious services provided by forests could be made, such share would appear much higher indeed. Especially the hill farming system of Nepal depends highly on the forests for fuel, organic matter for crops, and animal feeding and bedding. Shepherd (1985) estimated that 3 hectares of forested land is needed to support 1 ha of cultivated land. Gilmour and Applegate (1986) however suggested that 6 hectares of forested land is required for each hectare of cultivated land in the hills (Ojha 2003). The total forest land covers about 5.83 million ha which is 39.6% of the total land of the country. This includes 29 percent with dense forest and remaining with shrubs (NK 2017).

Once known as the chief wealth of the country (covering nearly 70 per cent of its area until about 60 years ago), it has declined rapidly over the recent decades. Over a period of twelve years until the early 1990s, a total of 99,000 hectares of forests were lost, at a yearly rate of 1.3 per cent. In about two decades between 1978 and 1998, 1.3 million ha of forest was lost. That accounts to over 67 thousand ha of forest cover lost annually. The annual rate of loss for that period is thus about 1.26 per cent.

The worrisome rate of loss continues today, especially with regard to the crown cover, which in several ways is a most important aspect of the forest. As of recently, forests with 70-100 per cent crown cover comprised only about 15 per cent of the country's total forest areas.

Most of the forest depletion has taken place in Terai, and now only about 8 per cent of the country's natural forests remains in this zone. The large-scale depletion in the Terai and Doon valleys occurred during the mid-1950s. The main causes were settlements for political sufferers, victims of natural calamities, expatriate immigrants, and at a later stage, rapid migration from the hills as malaria was eradicated and new production frontiers opened in those lowlands. The loss has been less in mountains and hills compared with the Terai. However, in the middle hills, where the population density per unit of arable land is very high, the deterioration is much severe.

## D. Use Potential of Forest Resources

### *Product supply*

Major and minor products: timber from trees of varying usage and value); and non-timber forest products (NTFP) such as grasses, herbs, bark, bamboo, ropes, wildlife

### *Service benefits*

Water supply, recreation, climatic regulation, aesthetic importance

### *Income and employment generation*

Employment for skilled and unskilled workers

Rural households can derive a variety of products for consumption and sale

Processing of products to produce and sell high-value products

### *Contribution to other sectors*

Import substitution and local/national saving

Input/energy for various processing, curing industries

Input for agricultural production/productivity

Protection/regulation of water supply

Preservation of wildlife sector

Contribution to tourism, housing and construction

### *Contribution to the country's balance of payment situation*

Export of products for foreign currency earning and improving the balance of payment situation

### *Environmental contribution*

Conserving soil and water

Protecting floral and faunal wealth (parks, reserves)

Regulating/improving the hydrological situation/status (enriching the watersheds/catchment areas)

Carbon sequestration

Protection of man, animals and delicate plants from direct and intense solar radiation in high mountain areas

Protection from dust and wind blows and flood damage by creating shelterbelts and windbreaks

Controlling air, noise and water pollution to improve human and livestock health and the environmental situation

## E. Utilization of Forest Resources in Nepal

### *Production uses*

For construction purposes:

In absence of modern types of construction materials such as steel, iron, cement, and glass, timber, poles, bamboo, ropes and other materials from forests were extensively used and are being used substantially even now.

For consumption and commerce:

Numerous other plant-based and animal products were derived for household uses as well as for export and sale within the country. These basically comprised fuel, fodder, medicines, spices, gums, resins, animals and animal products (bush meat, hides, bones, and fur). Many of these are being extracted also these days.

For infrastructure building: for example, in roads, high-tension electrical transmission lines, irrigation canals.

For soil and water conservation (watershed protection): being practiced now and will/should continue in the future.

For hunting, recreation, and tourism purposes: some revenue from hunting fees seems to have been generated annually till fiscal year 1988/89.

#### *Some other production uses/misuses*

Rulers exploited forests recklessly for building their personal and family wealth and assets through export of valuable timber and fauna.

Some resources were misused by the followers/supporters of the rulers.

Sometimes such resources were used for meeting public expenditures, too, such as social and physical infrastructure building.

The Tarai and Doon valley forests were exploited severely by some government agencies and influential people, private logger/sawmill owners/timber traders, poachers, and smugglers (Ojha 2003). Such activities, besides the destruction of natural forests in the names of development and construction projects, continue to take place till the date unfortunately (Kantipur 2018; Ojha 2018).

#### *Use of the protective and regulative functions*

Conservation of watershed areas to maintain the sources of water and soil.

Protection/ornamentation of farmstead/house premises.

Protection of gullies and streams by planting trees, bamboo, agave.

Leaves as litter and manuring substance.

Transhumance process and the grazing of livestock.

Protection and ornamentation of canal and riverbanks is a rather new trend.

Preservation of the environment around sacred places, farmlands, and village/hamlet peripheries.

The above facts reflect precisely that forest resources can contribute greatly to the economy of the country in many different ways, besides offering various non-economic services. Owing to inadequate and some inappropriate forest management systems/arrangements, however, the economic and environmental potentials of forest resources have either been misused or underutilized in the country.

## **F. Forestry – Definition and Dimensions**

Forestry can be defined as the theory and practice constituting the creation, conservation and scientific management of forests and the utilization of their resources. It includes all thoughts and actions pertaining to creation and management of forests, including harvesting, marketing and utilization of all forest products and services. It not only encompasses the management of existing forests but also the creation of new forests. Based on the objectives for which forestry is practiced, it can be classified into protection forestry, production forestry, and social forestry as briefly described below.

*Protection forestry* entails the practices of managing the forests for their protection function. Clearly, its objective is to protect the site from instability of terrain, nature of soil, and geological formations, for instance. Forest areas whose manipulation is not desirable may be classed as protection forests. The forests located on higher hill slopes, national parks and sanctuaries, preservation plots, biosphere or nature reserves and wilderness areas may be included in this type of forestry. On the whole, it is the practice of forestry aimed at conserving flora, fauna, soil and water, increasing water yields, reducing floods and droughts, and amelioration of climatic conditions.

*Production forestry* is the system of forestry that has the prime objective of producing maximum quantity of timber, fuel wood and other forest produces. It can be further categorized into: commercial forestry (aiming, as an enterprise, at obtaining maximum production of timber, fuel wood and other forest products), and industrial forestry (meant for producing raw-materials required for use in an industry) (Wikipedia, 2015).

## G. Social Forestry – Basic Features and Benefits

It is a practice of forestry aimed at meeting the requirements of rural and urban population by meeting their basic plant resources based needs to ease and improve their living conditions chiefly through supply of the following goods and services of great value to local inhabitants and overall human life:

- i. Supply of fresh food, fruits, flowers, fiber, fuel-wood, fodder, pulp, oil-seeds, and timber at home or locally (Ojha 2003, 2018; Rowland et al. 2017; Jamnadass et al. 2015);
- ii. safety net for supply of cooking fuel in cases of cooking gas supply blockage or shortage;
- iii. protection of agricultural fields against heavy rains, wind, floods, erosion, and slides;
- iv. recreation, medication, seclusion/solitude, rejuvenation, sentimental gratification;
- v. parts of farm-tools and implements (e.g., handles), hooks, sticks, stakes, stilts;
- vi. increasing the self-sufficiency of local people for essential forest products;
- vii. leaves and litters as inputs for composting / farmyard manure;
- viii. conservation of soil moisture and plant nutrients;
- ix. absorption of CO<sub>2</sub> (carbon-dioxide) (CIFOR 2018; TEMPO 2016; Ojha 2003);
- x. reduction in pollution from dust, dirt and smoke, and noise;
- xi. increased possibilities for induced rainfall and balanced humidity and microclimate;
- xii. providing shelter for beneficial and beautiful fauna (e.g., birds, bats, butterflies);
- xiii. raising the level of underground water;
- xiv. reduction in the drudgery and time spent fetching drinking water from far;
- xv. raising momentum for collective work and self-help for mutual benefits;
- xvi. increased production and increasing farm returns (Dongre 2011; Ojha and Rijal 2014; Ojha 2018; Wikipedia 2015);
- xvii. forest land and resource use constraint related conflicts can be reduced (TR 2017);
- xviii. improving child nutrition through supply of nutritious forest produce (Ickowitz et al. 2016);
- xix. protection and productive use of fallow and wastelands around human settlements;
- xx. beautification and freshening of physical and social surroundings;
- xxi. support for various climbers of vegetables and fruits;
- xxii. supply of raw-materials for art and craft, thus contributing to economic and aesthetic advantages;
- xxiii. providing scope for physical exercise and mental gratification at home and around;
- xxiv. generation of employment opportunities at home and around locally;
- xxv. increased mass awareness about the benefits for forestry and skills in forestry;
- xxvi. enriched clean and fresh overall local environment in particular and global one in aggregate;
- xxvii. reduced pressure and people's excessive reliance on natural forests, reduction in their encroachment, excessive exploitation, destruction and depletion, thus eventually leading to their regeneration, recovery and enrichment for multiple overall economic and environmental benefits for all in various ways and extents.

As reflected at the outset above, social forestry is an ancient practice adopted by people as early as they started living in societies in close proximity to and integration with various types of plants and animals for multiple purposes. In the course of creating organized, clustered settlements or scattered dwellings to live in, people domesticated many useful plants and animals and made use of them in numerous beneficial ways. With diminishing access to and availability and constraints of natural forests owing to varied factors, people facing paucities of forest resources and benefits thereof created mechanisms to cope up with the situation and fulfill their specific requirements of forest resources and benefits. This gave rise to the various systems of social forestry.

Social forestry thus supplemented the supply of forest goods and services and filled up the resource availability and usage gaps and emerged in diverse forms and patterns depending upon people's specific needs, choices and circumstances. On the whole, taking the pressure off the natural depleting forest and making the best use of fallow and wastelands is the most common purpose of the practice of social forestry, although it goes much beyond this purpose.

Although sparingly and informally in practice for long, social forestry emerged – distinctly in the form of Community Forestry in late 1970s globally as well as in countries like Nepal. It gained popularity chiefly due to the failure of industrial development model to bring about people's socioeconomic development, and also due to the rising problems of severe deforestation and land degradation and consequences in many parts of the world. The community forestry concept and practice gained popularity especially after the FAO published its report entitled *Forestry for Local Community Development*. They got further consolidated thanks to the *Forestry for People* theme of the Eighth World Forestry Congress held Jakarta, Indonesia, in 1978 (Koirala et al. 2008).

In late 1990s, experts estimated that some 200 million hectares of new trees would have to be planted during ten years then if developing countries were to meet their people's needs for tree products. If those plantings were done on a commercial basis, the investment needed would be at least US\$100,000 million. Much of that investment would be needed in the countries least able to afford it. The governments of those countries would not be able to finance all, or even most, of the necessary work, even with foreign or international support. Thus, much of the tree planting would have to be done by the beneficiary communities themselves. Local community participation is vital in large-scale forestry.

New information and innovative approaches are essential to develop and dispense education and training for foresters and others who would need to stimulate and guide forest development by people through expanded social forestry measures (Gregersen et al. 1989). Production, distribution and use of such awareness, information, knowledge, skills and techniques have not been sufficiently and effectively disseminated to related individuals and institutions especially in countries and communities where they would be mot required and beneficial.

The most distinguishing characteristic of social forestry, in contrast to industrial and large-scale government forestry, is the involvement of local - generally rural - people in developing, maintaining and utilizing forests by, for and of themselves. Social forestry is usually difficult to identify, as it seldom involves large blocks of trees or 'forests.' Instead, it involves a few trees here and a few trees there, a small village woodlot, trees along the road or interspersed in the fields. However, in aggregate these small-scale activities by millions of planters across settlements of countries in the world can be significant (Gregersen et al. 1989). In that perspective, the sphere of the types of social forestry is naturally deeper and wider to encompass such interesting and important plant community management systems as urban forestry (e.g., parks, tree platforms, gardens, road- and street-side planting, roof-top forests/gardens, homestead forests), and special rural forestry (e.g., tree platforms, sacred sites/shrines, public gathering sites, orchards, homestead forests).

## H. The Major Types of Social Forestry

Social forestry can be broadly classified into the types each described below in brief:

### *Community forestry:*

It is the forestry done on lands outside conventional forest areas for the benefit of local communities of people. As indicated by its name, it involves the community people in its creation, management and utilization.

### *Farm forestry:*

It is the forestry practiced on agricultural farms of village lands and is generally integrated with other agricultural operations. In this system, individual farmers plant trees on their own farmland to meet the domestic needs of the household. Shade for certain shade-loving plants such as cardamom, creation of shelter belts and wind-breaks to reduce the flow of wind and sand and thus reduce soil erosion and conserve the land constitute most common practices in this system.

### *Extension forestry:*

It encompasses activities of raising trees on free spaces of farm lands, wastelands, barren lands, community forest areas, sides of trails, roads and railways, and banks of canals, rivers, ponds, lakes, office premises.

### *Agroforestry:*

It is a sustainable land management system that integrates the production of crops and forest plants and/or animals simultaneously or sequentially on the same unit of land and uses management practices compatible with the cultural practices of the local population and can substantially increase crop yields from the land used.

### *Recreation forestry:*

It is the forestry system adopted to develop and maintain forests of high aesthetic/ornamental/scenic value. This is mainly practiced in towns and cities and is of late catching increasing popularity. In this forestry system, flowering trees, shrubs, herbs and creepers in particular are planted and maintained in various ways to create a lively and lovely ambience of forest.

The other various types of social forests include homestead forest (maintained within private home premises), peripheral planting (done along the margins of a farm land), block farming (plantations done in small blocks / areas of land), riparian buffers (around water bodies such as a lake), shelter belts (plantations done to harbor specific beneficial insects and birds, and plants), wind breaks (trees grown perpendicular to the usual direction of wind to slow its velocity) (Jain 2015), plantations in institutional premises (e.g., academic institutions; libraries; playgrounds; hospitals; government, corporate and private offices).

## J. Select Examples of Large-scale Social Forestry

Nepal's forest categories in management perspective are broadly: Government managed forest (GMF, national forest), community forest (CF), leasehold forest (LF), religious forest (RF) and national parks and reserves (NPR, protection forest). Most Terai forests are categorized as GMF. Forests of Terai districts are chiefly considered as productive forests. Forests in hill districts are managed through the Community Forestry Program (CFP). Initiated in 1978, CFP is the highest priority program in the forestry sector of the country. Its objective is to manage all the accessible forests through active participation of the local communities (Wikipedia 2018).

A community forest (CF) in Nepal is defined as any national forest or part of the national forest that is handed over to a community forest users' group (CFUG) to develop, conserve and manage, extract, exploit, trade and/or distribute the forest products by fixing the prices independently, according to an approved operational plan. To form a CFUG, first a user group must be established and registered in the related District Forest Office (DFO) along with their constitution (Pathak et al. 2017).

CFP has become a most renowned participatory forest management scheme in Nepal. As of 2011, a total of 2.1 million households (about 40% of national total) through 17,685 Community Forest User Groups (CFUGs) were managing about 1.6 million ha (27.4% of national total) of national forests as community forests. Another form of participatory forest management system aimed at improving the livelihood of poor people is Pro-poor Leasehold Forestry. There are about 6,712 Leasehold Forest User Groups in the country and they cover about 62,735 households managing a total of 38,997 ha area of the national forest.

Collaborative Forest Management is another form of participatory forestry management scheme developed in Nepal aiming at managing forests in a collaborative manner approach jointly with key stakeholders (e.g., local forest users, local government and state forest authority). There are 15 such CFM in eight of the Terai districts which cover an area of 39,457 ha.

Recent studies on the 20 Terai districts by MFSC indicated the rate of forest cover increasing with an annual rate of 0.06% during 1990/91 to 2000/2001. Several, micro level studies and visual interpretations also have also shown that Nepal's forest cover and condition is significantly improving over the decades due to the Community Forestry intervention in particular. A study on seven hill districts showed that household incomes over the years 2003 and 2008 increased substantially amongst the community forest users.

Deforestation, degradation and fragmentation of wildlife habitat and biotic pressure in the remaining forests of the country continue to pose threat to effective biodiversity conservation. To address the problem, some protected areas have been maintained: 10 National Parks, 3 Wild Life Reserves, 6 Conservation Areas, 1 Hunting Reserve and 12 Buffer Zones in and around Parks/Reserves which cover an area of 34,185 sq.km (23.3% of total area of the country).

Whereas the Ministry of Forests and Soil Conservation (MFSC) is the lead government ministry for the planning and management of national forests in Nepal, other key stakeholders include civil society, NGOs, communities, private sector and donors (NK 2017).

Community-based forestry management in Nepal has yielded multiple positive results to a large extent: e.g., increased local jobs, improved farm productivity/production, rehabilitation of degraded forests and lands, increased supply of forest products, increased incomes from sale of forest products, protection of endangered species of flora and fauna, and overall improved welfare and wellbeing of the local communities (Pathank et al. 2017).

Community-based-forest-management mechanism has been an exemplary case of Nepal's advances in forest and biodiversity management and rural development. It is the second largest and mainstream forest management system after government-managed forestry. Nepalese local communities are now managing about one-third of the country's forests, and the area under their protection has tripled in the past two decades. Thanks to the community-based forest management forest the overall degradation and loss has declined significantly and even reversed at many areas, especially the mid-hills. The community forestry program has increased forest cover rapidly to help maintain the ecological balance in Nepal to a substantial extent. The program has also contributed to some reduction in poverty and improvements in social development activities. The community-based natural resource management system appeared relatively more resilient even during the political instability situation in the country.

When other institutions and processes faced crisis and failure, the community forest groups continued to protect their forests and other natural resources (RRN 2012).

In Table 2 below, a few exemplary cases of social forestry systems mainly across the various countries of Asia have been listed. A revisit to and updates on these would indeed generate a useful set of information on and insights into their successes or/and failures as fruitful lessons to make use of in future endeavors for social forestry development programs.

Table 2: Some of the Exemplary Large-scale Social Forestry Schemes (mainly from Asia)

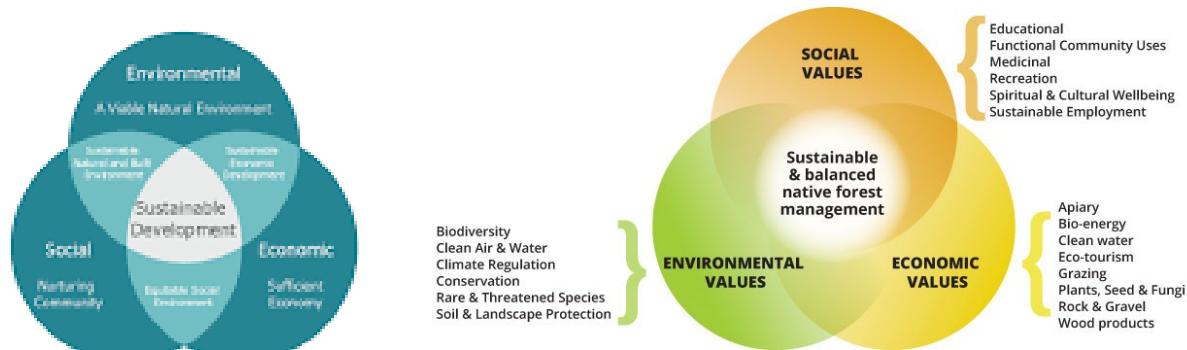
Scheme	Location
Community Forestry Program	Nepal: e.g., Mahalaxmi CF, Lalitpur, Nepal)
Social Forestry Program	Indonesia: Lampung, Kalimantan and Maluku
The Chipko Movement	India: Uttar Pradesh
Protected rainforests / sacred groves	Nigeria: Oshogbo
Community Fuelwood Programs ('Greening of Korea')	The Republic of Korea
Phewa Lake Watershed Improvement Program	Nepal: Pokhara
Upland Agriculture and Conservation Project	Indonesia: Java
Trees and Soil Fertility	Indonesia: Sitiung, West Sumatra
Using Trees to Control On-Farm Soil Erosion	Indonesia: Sikka district, Flores
Expansion of a Smallholder Tree-Farming Project	The Paper Industries Corporation (PICOP), and the Development Bank of the Philippines
Making Use of Marginal Lands ('four-side' or 'all around' planting program)	People's Republic of China
Communal Tree-Farm Program (CTF)	The Philippines
Integral Taungya and the Forest Village Approach	Thailand

Extracted from: Gregersen et al. (eds.) 1989.

## K. The Prime Issues and Problems of (Social) Forestry Management

Understanding the conclusive issues and overcoming the related problems are needed for proper management of forests in Nepal in particular and in some other Asian and African countries in general. This could be helpful in materializing the policies, strategies, techniques, rules, and regulations, that are already in place, for improvements in situations where degraded/degrading/depleting/degenerating forest resources/sector are prevailing. That would eventually contribute substantially to achieving the goals of sustainable human development, as both forests, including social forests, and sustainable development share the same major dimensions – economy, environment, and society, and aim at their most favorable condition and mutual integration.

Figure 3: Major Dimensions of Sustainable Development | Figure 4: Broad Contributions of Forests



Source: Wikipedia, October 2018.

In the case of the massive and the overall substantially successful and popular Community Forestry Programme, a variety of shortcomings have surfaced over the years and yet without any timely solutions received so far. Such flaws chiefly include: elite dominance over decision-making, management affairs and benefit sharing; low participation of and benefits to poor sections of the society; poor people's low or no access to subsidized forest products such as timber for lack of financial means; boundary conflicts; inadequate utilization of forest resources in absence of sufficient knowledge, skills, and techniques of forest product harvesting and protection; encroachment and damage of forest areas by influential people in the name of construction projects; neglect of environmental impact assessment (IEE, EIA) obligations in construction of infrastructure such as roads and new settlements (Pathak et al. 2017). To overcome these limitations, management not only of community forestry but also the adoption of various other forestry modalities and systems becomes crucial. Most important is to ensure the full-fledged good governance at all levels including strict observance of complete accountability, transparency, impartiality.

In the context of southeast Asia in general Carrasco et al. state the following observations:

- Lack of accessible ecosystem services (ES) evaluation techniques;
- Limited knowledge of the connections between forests, food security, and human well-being;
- Weak demand and political will for the integration of ES in economic activities and environmental regulation;
- A disconnect between decision-makers and ES evaluation mechanism;
- The lack of discussion platforms where stakeholders can work towards consensus on negotiated land-use management decisions; and
- Prevalence of corruption and power plays in land-use planning processes (Carrasco et al. 2016).

The above-stated observations apply largely also for countries like Nepal as evidenced by many cases including the recent ones related to the most controversial government plans to construct an international airport in the Bara district in the Terai and develop the Far-west Province capital and its infrastructure beside a most fragile Chure hills section of Kailali district by felling many thousands to millions of valuable trees from dense natural forest ecosystems instrumental in the management of local community livelihoods besides many other contributions they have had been making in the maintenance of overall ecosystems around them (Kantipur 2018; Ojha 2018).

Table 3: Forest Area (% of Total Land Area) by Select Asian Countries and the World

Country	Year		Country	Year	
	1990	2015		1990	2015
Bhutan	53.7	72.3	Nepal	33.7	25.4
China, PR	16.74	22.19	Philippines	22.0	27.0
India	21.5	23.8	South Korea	66.04	63.44
Indonesia	65.4	50.2	Sri Lanka	36.42	33.01
Japan	68.4	68.5	Thailand	27.41	32.10
Malaysia	68.11	67.55	Vietnam	28.77	47.64
Myanmar	60.0	44.5	<b>World</b>	<b>31.8</b>	<b>30.8</b>

Extracted from: WBG ([data.worldbank.org](http://data.worldbank.org)), 2018.

Drawing on and extensive review of socioeconomic assessments of forests and social forestry across many parts of the Asian region in general and Nepal in particular, the following comprehension emerges:

- Despite the growing awareness about the benefits of forests and the concerns (local, national, and international/global) to protect and enrich them, they are degrading, depleting and even being destroyed in many areas.
- In many areas, there are increasing incentives for exploitation of forest resources. Poaching, illegal logging, forest clearing for cultivation, unplanned or inappropriately planned large construction projects are some of the consequences/practices.
- In many parts, acute shortages of fuel-wood, fodder, timber, and other forest products are occurring.
- Forest fire and, to some extent, excessive exploitation, mismanagement, climate change effects and rising pollution are putting negative impacts on some forests, leading in some cases to their complete damage.
- Misuse of forest resources has significant social, economic, and environmental costs that have local and national implications.
- Local inhabitants of farming-dependent areas are forced to out-migrate due to emerging problems.
- Cultural diversity is threatened from depletion and eventual extinction of essential species.
- In settlements where people rely heavily on firewood for cooking and heating, and fodder for livestock rearing, the reduced supply of fuel-wood and fodder have made life harder especially for women and children who are the ones chiefly participating to gather such products. They also have to spend much time and effort in such common chores and loose potential opportunities for productive endeavors such as education and economic enterprises.
- In connection with the above section, there have also been encouraging signs especially of late where plantations for rich vegetation around settlements for various purposes such as beautification, conservation, climatically comfortable and safe conditions, pollution control, and domestic supply of some amounts of fresh fruits, flowers and vegetables have been strongly emphasized and recommended in sustainable integrated human settlement planning schemes (Ojha et al. 2018a, 2018b).
- Overall, ecosystem degradation (deforestation and desertification, biodiversity depletion, soil erosion and landslides, floods, drying of water resources, depleting soil nutrients, watershed degradation, declining farm productivity and production) leading to poverty and deprivation in many rural areas, and hence in urban too (congestion, scarcity, pollution, conflict, chaos).

Under such overall circumstances prevailing worldwide (Table 3 above), especially in economically poor and geologically fragile areas, expanded and invigorated development and management of social forestry could greatly contribute to ameliorating the adverse situation and rendering people's lives substantially comfortable, productive, progressive, prosperous and charming thus eventually leading to a situation that could make the onset of the process of sustainable human development possible. For instance, Kathmandu Metropolitan City in Nepal would be looking merely a concrete jungle of dwelling sans the impressively wide and dense coverage of forests surrounding the numerous temples in the city known also for a long time as the City of Temples.

Pashupatinath, Swayambhunath, Karya Vinayak, Soorya Vinayak, Jala Vinayak, Vajra Yogini, and Maha Lakshmi are some of the most prominent sites with lush green forests surviving and even thriving to some extent till date since ancient times thanks to the spiritual

sentiments and practices among people in the Valley towards these sacred seats and the vegetation around them. Similar social (religious) forests are to be found across many parts of the country from the plains to the high mountains (e.g., Muktinath, 3,710m above the mean sea level). These and many similar and varied social forestry systems do greatly contribute to the overall forest cover, quality and services in the country. A few cases of encroachments of some of such lands have also been reportedly occurring now and then however but to a little extent unlike for other community-managed or national forests and forest resources.

As such, social forestry does have substantially contributed already in the economic, social, and environmental wellbeing of people and places across the world. However, in areas where it is required most imminently it has not flourished sufficiently and is beset with a variety of constraints. Overcoming those limitations is the challenge we face today and exploration and execution of workable and efficient solutions to the problem constitute our imminent need and utmost obligation.

## **K. Core Requirements for Best Social Forestry Management**

### *Technical dimension*

Raising awareness among people (right from childhood) and institutions (right from their establishment) about the characteristics and benefits of forest resources

Imparting education to people (including children and elderly) on growing, protecting (e.g., creating and maintaining fire lines sufficiently and in time), utilizing (e.g., processing, packaging, selling) forest products

Various training packages for people, especially farmers, in such aspects as suitable species selection (e.g., avoiding growing tall and shallow-rooted trees along roads; preferring fast-growing/high-photosynthesis, multipurpose trees for afforestation and reforestation), cultivation, care, commercial use (e.g., craftsmanship and trade)

Large-scale production and distribution of clear and concise social forestry related publications in illustrative, simple style and local languages for various stakeholders in social forestry sector at all levels – local, regional, national; policy-makers, planners, administrators, foresters, farmers, teachers, students, housewives, civil society leaders, activists, environmentalists, conservationists, partner organizations, donors, non-governmental organizations.

### *Ethical/moral/cultural dimension*

Raising and enriching people's awareness and knowledge about the value of forest resources and sense of ethics, spiritual sense/sentiments and moral obligation/responsibility about the conservation of forest resources

### *Enterprise, entrepreneur, and entrepreneurship dimension*

Motivating, mobilizing, orienting potential entrepreneurs for their strengthened and successful entrepreneurship and enterprises based on social forestry resources production and use

### *Institutional dimension*

Creating and operating specialized Social Forestry Research and Development Departments at related agencies (e.g., government ministry) with specifically trained human resource devoted to the development of social forestry

Establishment and effective operation of specialized, strong, supportive and efficient Banks for Social Forestry (BSF) at suitable and sufficient number of locations

Provision for timely, adequate and suitable types and amounts of inputs (seeds, seedlings, fertilizers, irrigation facility, credit, protection measures – disease and pest control)

Observation/study/research on best social forestry practices/techniques/technology (success cases/ stories), and collection, compilation, and dissemination of advanced and appropriate information, technology and skills among large masses of people

Organizing regular observation trips (study tours) for students, farmers, forest officials to make them learn from successful social forestry sites (seeing is believing; learning by doing)  
Formulating and effectively executing flawless periodic/timely monitoring, evaluation, feedback and follow-up activities for social forestry projects  
Organizing competitions among social forestry entrepreneurs, enterprises and rewarding the best performers (farms/forests, farmers, foresters, institutions)

#### *Policy and planning dimension*

Periodic review and amendment/reform of rules and regulations encouraging, facilitating, guiding the creation, growth and improved management of social forestry (e.g., ensuring fair and full distribution of benefits to community forest user groups)

Proper planning and budgeting and effective implementation focused heavily on promoting social forestry and ensuring the maximum utilization of forestry resources and benefits

Regulating livestock rearing practices (e.g., stall-feeding instead of rampant stray)

Curbing corruption and ensuring the full functioning of good governance (rule of law) at all levels would be most crucial on top of, and driving, all the above.

Emerging, expanding, enriching, and invigorating momentum of concerted honest efforts from all influential sections of the civil society (activists, advisers, authors, scientists/scholars, and all other conscious, capable, caring individuals and institutions, including a capable, fair, fearless, frank, forward-looking media mechanism) would be most imperative in this regard.  
Pairing Social Forestry, and Sustainable Development in all developmental interventions – policies, planning, programming, project formulation and execution, monitoring and evaluation, feedback and follow-up.

Integrating local level institutions and initiatives with international and global level organizations and incentives, means and missions targeted for promoting social forestry and sustainable development. For instance, The Global Landscapes Forum - the world's largest science-led platform on sustainable land-use, connected with 3,000 organizations and 25,000 people through gatherings in Warsaw, Lima, London, Paris, Marrakech and Jakarta (Popescu 2018) – should and could carry out massive and most effective measures in this regard in close collaboration with such concerned and capable global agencies as CIFOR, EDI/WB, ICRAF, IDRC, IITA, UNDP, UNESCO, and WRI.

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## Annex

Table A.1: Specific Planning Recommendations for Forestry Especially in Nepal's Context  
(Sub-ecological zone specific)

Zone	Recommendation
High hills	Deciduous trees planting on ridge tops; multi-story cropping on slopes; rearing livestock at the main dwellings and seasonal huts; rotational grazing or shed rearing; fibre-yielding and soil-holding plants such as <i>Pollinidium angustifolia</i> and <i>Agave americana</i> in the eroded and slipped areas.
Middle hills	Planting fast-growing tree species or plantation crops on bare hillocks; emphasis on fruit cropping and vegetable growing.
Low hills	Planting multipurpose fast-growth tree species or plantation crops around the denuded hillocks; massive-scale hedgerows at the foothills; wasteland tree planting; field crop intensification.

Source: Ojha, E.R. 1999.

Table A.2: Proposed Major Forestry Actions and Expected Prime Results

### ACTIONS

Massive afforestation, especially in the hill tops, slopes and all bare, poorly vegetated or wasted lands.

Rehabilitation of abandoned terraces through orchard terracing and application of other technologies such as alley farming, multi-story cropping and the sloping agricultural land technology (SALT).

Improved preparation and use of farmyard manure and compost to enrich the terraces under field crop cultivation.

### RESULTS

Job creation; utilization of labour and other local resources; improved soil, land and terraces; balanced or stabilized ecology; increased productivity and income; enriched human resource.

### Improved Living Conditions

Source: Ojha, E.R. 1999.