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KEYNOTE ADDRESS

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An Overview of the Emerging Policy Thrust Areas and Suggestions for New Policy Options for Ensuring Sustainable Forest Management in India

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1. INTRODUCTION

Sustainability of forest management is an essential component of the ecological and environmental conservation efforts and any degradation of forests will have an adverse impact on various life support systems such as water resources, agriculture, biodiversity, environment, climate and human health besides the subsistence living of tribals and other communities living in and around forest areas. In a developing country like India forests provide direct benefit to the people in terms of timber, pulp, bamboo, fuel, fodder, grass, medicinal plants, food, resins, dyes, tannins, and host of other materials for local and national needs. Moreover, the functions of forests with respect to conservation of soil, water and biodiversity are vital for the welfare of present and future generations.

India is the largest democracy in the world having the seventh biggest geographical area (328.72 million ha) and second largest population (+ 1000 million) There is much diversity in geographical features; towering Himalayas in the north; Thar desert, Aravalli hills and semi-arid plains in the west; Vindhya mountains in the centre; Deccan plateau in the south; Western and Eastern Ghats with coastal plains to the east and west and the north-east region with a large variety of ecosystems.

Forestry constitutes the second largest land use in India after agriculture, covering about 78.37 million hectare including Trees outside Forests (ToF), or 23.84% of the total land base (SFR, 2009). India is a mega diverse country and accounts for 7-8% of recorded plant and animal species of the world. India has four global biodiversity hotspots, ie., Eastern Himalayas, North East region, Sunderbans and Western Ghat. Total numbers of Protected Areas (PAs) in India is 661 encompassing 4.8% of the total geographic area of the country. Four biosphere reserves, viz Nilgiri, Nandadevi, Sunderbans and Gulf of Mannar, have been recognized by United Nations Educational, Scientific and Cultural Organization (UNESCO) under the world network of Biospheres. Presently 25 Indian wetlands have been designated as Ramsar sites in the country and six new sites are under consideration.

Having about 2.5% of world's geographic and 1.8% of forest area, India at present is supporting 16% of the planet's human population and 18% of domestic animal population (around 520 million] leading to very heavy withdrawal of biomass beyond the

carrying capacity of the forests. It is estimated that about 270 million tonnes of fuel wood, 280 million tonnes of fodder, over 12 million cubic metres of timber and countless non-timber forest products are removed from forests annually. Forests meet nearly 40% of the energy needs of the country, of which more than 80% is utilized in rural areas mainly through removal from forests by head load or otherwise. Nearly 27% of the total population of the country, comprising about 300 million rural people, depends on forests for livelihood. NTFP contributes to about 20% to 40% of the annual income of forest dwellers who are mostly disadvantaged and landless communities with a dominant population of tribal.

As such, a brief review of the present status of India's forest policy evolution since independence till date is necessary to assess the need for further policy evolution for ensuring sustainable management of forest as per agreed international norms for Sustainable Forest Management (SFM).

2. POLICY INITIATIVES SINCE INDEPENDENCE

2.1 Forest Policy of 1952: It was considered as the most comprehensive policy in the world at that time. It provided for intrinsic right on land for a minimum forest / tree cover and **recommended that 33% of the total land area of the country should be brought under forest or tree cover.** It also provided detailed guidelines for management and protection of forests and wildlife.

2.2 National Commission on Agriculture (1972): The commission in its report recommended that to meet the growing gap in timber and firewood requirement, rising of largescale plantations on degraded forest areas and through social forestry in community and private lands. It also suggested formation of Forest Corporations to use finances from banks such as National Bank for Agriculture and Rural Development (NABARD). Recommendation on social forestry led to initiation of largescale projects in 1980 to 1990 with international assistance and also as a part of the rural development programme.

2.3 42nd Amendment of the Constitution (1976): Through this amendment "Forest" was brought under

“concurrent list” followed by the enactment of the **Forest (Conservation) Act in 1980** (amended in 1988). This made it mandatory for the states to take approval of the Ministry of Environment and Forests in Government of India **before diversion of any forestland for non-forestry purpose**. This had a salutary effect as the diversion, which was on average level of 150,000 ha from 1950 to 1980 (4.5 million ha) and came down sharply and is now at around 15000 ha/yr level and with a provision for compensatory afforestation on preferably non-forest lands.

2.4 Creation of Ministry of Environment & Forests (MoEF) (1985): The subject of Forestry and Wildlife was shifted from Ministry of Agriculture to a new Ministry of MoEF to ensure a more focused attention to emerging forestry issues. An autonomous body, ‘**National Wasteland Board (NWDB)**’ was also set up in the MoEF in 1985 with a mandate to regenerate degraded forest as well as non-forest wastelands in the country with the active involvement of the people and the stakeholders. However, it was bifurcated in 1992 with MoEF retaining the mandate of regenerating forest areas under the **National Afforestation and Eco-development Board (NAEB)** and the NWDB was transferred to the newly created Ministry of Rural Development with the mandate of greening available non-forest wastelands in the country.

2.5 Forest Policy of 1988: New Forest Policy was adopted, which covers all the sustainable management approaches subsequently provided in the 1992 Rio adoption of the “Forest Principles”. This new policy had a few unique features in its main objectives i.e.

- i) Maintenance of environmental stability and restoration of ecological balance, soil and water conservation.
- ii) Meeting of fuel, grazing and fodder needs within the carrying capacity
- iii) Conservation of natural heritage and genetic resources.
- iv) Increasing substantially forest/tree cover (33% of land mass and 66% in hills)
- v) Increasing productivity of forest to meet first the local and then national needs
- vi) Creating massive peoples movement to increase and protect forest and tree cover to achieve the main objective to reduce pressure on existing forests and meeting people’s need sustainably.
- vii) Deriving economic benefit must be subordinated to these principal aims.
- viii) Natural forests serve as gene pool and maintain ecological balance. Well stocked forests will not be made available to industry for undertaking plantations.

2.6 New Approach of Participatory Management: For years some foresters, ecologists and social scientists had maintained that degraded natural forests in India could regenerate rapidly and experience significant increase in biomass and biodiversity if strategically protected. Communities living in or around natural forests could protect them if clearly authorized by the government and ensuring that the economic returns would compensate them for their lost opportunity costs. As such some

sporadic attempts were made in West Bengal (Arabari) Himachal Pradesh (Dhauladhar) Orissa [self help groups] and few other states in 1970s onwards to involve people in forest protection and management as well as sharing of forest produce with local stake holders. The first policy level decision was taken in the meeting of the XXII Central Board of Forestry (CBF) held in December 1987. The Prime Minister in his address stressed the need for effective people’s participation in forest protection and management. This was also reflected in the Resolution No. 25 which reads as under:- **“This meeting resolves that by 31.3.90 every village will have a plan for regeneration of forests and the restoration of ecological balance. This plan will be drawn up and implemented with full participation of village panchayats or other such bodies.”**

2.7 Joint Forest Management [JFM]: The policy guidelines of 1.6.1990 issued by the Ministry of Environment and Forests, Government of India clearly laid down the procedure for people’s involvement in forest conservation and management through establishment of appropriate village level organization and under a proper scheme. It also laid emphasis on the procedure of sharing of usufructs and a share of the net sale proceeds on the lines adopted in West Bengal.

All the states have now issued resolutions laying policy guidelines for placing degraded forest under JFM system with jointly made micro-plans for development and arrangement for sharing of usufructs and net sale proceeds between the forest department and the local people organized in the form of a village Forest Development Committee (FDC) or Forest Protection Committee (FPC) or Village Development Committee (VDC) etc as they are locally called.

It is reported that at present 100,000 such committees [13.8 million families] have been formed in these states covering 21.44 sq. km of degraded forestlands in the country (NAEB).

Moreover, the MoEF in view the recommendations of the “standing committee on JFM” issued a supporting circular on February 21, 2002 for strengthening the JFM programme in the country. The main features are:

- i) Providing legal status through registration of JFM committees under “Societies Registration Act of 1860.
- ii) Women should constitute 50% of the membership of the general body and atleast 33% of the JFM Executive committee. A woman must hold one post of President, vice-president or Secretary.
- iii) JFM may also now cover good forest area (40% crown density and up) up to 100 ha and within 2km of the village in each case.
- iv) The normal working plan should have a JFM overlapping working circle with flexible guidelines for preparation of JFM micro-plans covering both good and degraded forests.
- v) It provided for setting up of district level JFM conflict resolution working groups

2.8 National Forest Action Programme (NFAP): In 1996-1999, MoEF undertook the task of preparation of the NFAP for a period of 20 years (4 five-year plans from 10th Plan onwards) It recommends an annual need based **target of 3 million ha. a] rehabilitation by assisted natural regeneration of**

degraded forests [0.775 mha], b] plantations in open forests [0.775 mha], c] plantation on non forest lands [1.25 mha] and d] tree planting in agro-forestry [0.20 mha] , agro and social forestry programmes. However unfortunately even under the Xth plan the fund allocation was only sufficient for **covering only around 1.4 million ha per annum and in XI plan it started with achievement of covering 1.73 million ha but has fallen since then and in 2010-2011 achievement was only 0.57 million ha** through forestry and social forestry programmes. It was mainly due to progressively lower allocations to forestry sector of below 1% in previous plans to below 0.5. Substantial increase of resources will be needed under the XIIth plan [2012- 2017] to meet the NFAP goals.

2.9 Forest Development Agency (FDA): In the year 2000-2001, a new pilot scheme of undertaking the integrated village afforestation and eco-development under a new set up named **FDA, each covering a group of JFM committees in a forest division**, was initiated with the long range objective to cover, through forestry oriented development activities, in all available land areas in and around nearly 1.7 million villages, which are situated within or close to forests and where people are largely dependent on forest resources for sustenance. The basic objectives of the scheme, which will cover all the above villages in a phased manner are:

- i) Arrest and reverse the trend of forest degradation.
- ii) Provide sustainable, assured employment opportunities to tribals and other weaker section of the society through forestry oriented activities.
- iii) Create durable community assets for socio-economic development.
- iv) Involve the village community to participate in collaborative planning, execution, monitoring, maintenance and protection of all forestry development works.
- v) Create an effective mechanism in order to ensure that all government departments can reach the stakeholders and beneficiaries for integration of various development programmes through use of the medium of FDA.

This will ensure convergence and co-ordination amongst all development departments for an integrated planning and execution of projects, in these villages located in the eco-fragile areas, on the pattern of the District Rural Development Authority (DRDA)

3. THE EMERGING POLICY THRUST AREAS

The brief description of various stages of policy development, over the years since independence, given above indicates, following four broad periods and trends:-

A] Area Expansion, Consolidation and Centralization phase [1950 to 1970]: The 1952 policy provided the basis for consolidation of the forest resources by declaring the forest areas of ex-princely states, zamindari forests and the areas surrendered under the Land Ceiling Acts as Protected Forests under the 1927 Forest Act. Large number of paper mills were granted wood and

bamboo from forests at concessional rates for industrial growth. It aimed at controlled grazing and withdrawal of wood as well as non-wood forest products by local stakeholders and industry only with in the carrying capacity level. There was provision for ensuring 33% of land area to be brought under forest/tree cover and wildlife rich areas to be brought under proactive area network.

B] Production Forestry phase [1970 to 1988]: Due to the growing demand of forest produce for local and industrial use raising of large scale plantations was recommendations by the National Commission on Agriculture by linking the inter-relationship of the forest economy with rural economy specially the issues of employment, rights and needs of the stakeholders as well as industrial needs . As a result most of the states established Forest Corporations for raising industrial plantations in degraded forest areas and launched large scale social forestry programmes through international assisted projects for meeting the local needs for fuel, fodder, etc.

C] Proactive Conservation Phase [1988 to 2000]: The impact of the FC Act of 1980, the new 1988 Forest policy and various stakeholder as well as civil society movements resulted in a big swing for conservation of forests and biodiversity leading to even stoppage of green felling in many states, except for meeting of the right holder's requirement, irrespective of working plan provisions for harvesting and regeneration operations. However, it resulted in stoppage or reduced planting operations by the Forest Corporations. The focus shifted, since 1990, to regeneration of degraded forests through assisted natural regeneration through the JFM approach. It also ensured stoppage of wood supply at low rates to the industries and thus encouraged their involvement with the local tree growers.

D] Expansion, Strengthening and Financing of JFM [2000-2007]: The participatory management or JFM approach elevated the local stakeholder, from the receivers of some specified limited benefits from forest area, to the level of co-managers along with the local forest personnel. It also aimed at ensuring equitable benefit sharing of the usufruct as well as the financial returns from timber harvest. The formation of FDAs brought to focus the need for direct and adequate fund allotment to as per micro-plan and need of close links with the local elected bodies like Panchyats and DRDA authorities. Enactment of the "Scheduled Tribes and Other Traditional Forest Dwellers [recognition of forest rights] Act of 2006 provided for grant of legal status to grant of land *pattas* to those having cultivation and homestead on notified forest land since December 2006 for tribals and for three generations for non-tribals.

4 THE WAY AHEAD

Keeping in view the above local background and the emerging forestry issues in international forums like millennium development goals [1 & 8] and United Nations Forum On Forests [UNFF] deliberations, the desirable future policy options for sustainable forest management [SMF] for India are discussed ahead:

The ad-hoc expert group of the UNFF in its meeting in December 2006 agreed that “**SFM is the process of planning and implementing programmes and practices to provide for and to maintain the full range of social, economic and environmental functions of forests to meet need of the present and future generations**”. The meeting also finalized the seven thematic elements of SFM, which may serve as the global set of criteria.

As such it will be useful and more focused if the emerging policy options for India are discussed in context of each of the globally agreed elements given below:

- a] Extent of Forest Resources
- b] Forest Biological Diversity
- c] Forest Health and Vitality
- d] Productive and Protective functions of Forest Resources
- e] Socio-economic functions of Forests
- f] Legal, Policy and Institutional framework

As the XIIth plan is under formulation, it is the most opportune time to consider some much needed sectoral and holistic policy development options, within the broad framework of the 1988 policy and our international commitments. This is essential to meet the emerging issues and challenges and for ensuring inclusion of appropriate policy supported development programmes for achievement of SFM especially at the state level.

5. EXTENT OF FOREST RESOURCES

5.1 Situation Assessment

The 1952 as well as 1988 forest policies both aimed at having 33% geographical area of the country under forest/tree cover while at present India has only 23.68%. The present policy of providing very low and inadequate financial resources under the various national and state five-year plans was the main reason for non achievement of the set goals. Conservation and development of the forestry sector [including wildlife] never received its due share of political and financial support in the national development plans as is indicated in the data given as under:

Plan	Year	Allocations in Crores	% of the National Plan
6 th	1980-85	6,92.5 [centre + states]	0.07
7 th	1985-90	1,859	1.03
8 th	1992-97	4,910	1.13
9 th	1997-02	7,336	0.84
10 th	2002-07	14, 344	0.94 *
11 th	2007-11	10,000 [Only central sector]	

* For ensuring covering 33% area under forest & tree cover in 20 years The National Forestry Action Plan [NFAP] aiming at having 33% of land area under forest/tree cover in 20 years [adopted by MOEF in 1999] proposed the next plan i.e. 10th plan at Rs 27,256 crores [1997 cost base].

5.2 Policy options

(i) There is now an immediate need for the central and state governments and the Planning Commission to revisit current policies and programmes of forestry and wildlife conservation and development. New and bold initiatives and policy decisions are needed for ensuring that this sector, essential and vital for ensuring sustainable development of the country, gets its due top priority in the planning process. During formulation of the XII plan, specially in the development of the backward areas of our country, a policy decision at the highest level is essential for allocation of at least 2.5% of the total national plan budget [1% of central sector + 1.5% from state sector] to the forestry sector as also recommended by the National Forest Commission. Moreover, the working groups for forests and wildlife set up by the Planning Commission for formulation of proposals have also suggested allocation of Rs 51,500 crores and Rs 11,423 crores for the XII plan which amounts to around 2.5% of the National and state plans.

This will ensure, need based assisted regeneration of forests with low growing stock and reforestation of the degraded forests as well as improved livelihood opportunities for the local people as well as ecological restoration and biodiversity [including wildlife] conservation.

It should be implemented with a blending of the fruits of traditional knowledge, local skills, equity and research for latest technical innovations in the field of forestry and wild life conservation and SFM. This will ensure a step forward in **achievement of the policy goal of having 33% of land area under forest/tree cover within 20 years** as provided in the NFAP and also meet the two of the eight Millennium Development Goals i.e. No.1 Eradication of extreme poverty and hunger and No.8 Ensure environmental sustainability, as in both of these forestry development and SFM have a major role to play.

(ii) The baseline data, of forest type wise cover, species wise plantation areas, growing stock, encroachments, fire damage, etc., in forests and protected areas and tree cover outside forest in MIS and GIS format, is quite inadequate for ensuring preparation of technically sound and objective data based forest working plans, protected area management plans and JFM micro-plans.

As such an appropriate and immediate policy decision is essential for ensuring time bound development, in a mission mode, of authentic data based National Forest Management System within the next three years by providing need based budgetary support to the MOEF and the State Forest Departments as a vital step for achieving the goal of SFM.

(iii) The demand supply situation discussed earlier clearly indicates that India is facing growing raw material shortage for fast growing wood based industries in the country. The government forests are at present primarily meant for meeting the needs of the local stakeholders and as such there is an urgent need to increase the area under tree cover in non-forest, mostly private and community lands. Even at present this sector is providing the major share of local raw material and on an average nearly 0.4 million ha / year of tree cover is being raised by this sector.

An improvement of the rural natural resource base can be best achieved by a policy decision at the Planning Commission

level of specifically earmarking funds in the XII plan for an enhanced targets of 1.45 million ha/yr of tree planting [NFAP] under watershed development, agro-forestry, farm-forestry, silvi-pasture, and employment generation programmes of the Ministries of Agriculture, Tribal and Rural Development [DRDA] with research inputs from ICAR and ICFRE as well as administrative and technical support and collaboration of the state forest departments.

6 FOREST BIOLOGICAL DIVERSITY

6.1 Situation Analysis

The various representative eco-systems and forests areas rich in biodiversity are [15.7 million ha] presently protected under the Wild life Protection Act of 1972 [amended from time to time] in notified i) National Parks and ii) Sanctuaries. Some special projects were also launched to protect few flagship species like Tiger, Elephant, Asiatic Lions, one Horned Rhinos, etc. Recent amendment in 2006 created two new types of protected areas i) Conservation Reserves and ii) Community Reserves.

Keeping the 15.7 million ha of forest area, under protected areas network, out of the bio mass collection system without alternative arrangements would only generate opposition and negative impact from the local people. As such sustainable management and protection of the biodiversity-rich protected areas have to be ensured only through innovative policies and programmes. There are major problems in effective and sustainable management of these protected areas as more than 50% of these have (MoEF, 2000) human population in and around. Large human and livestock populations depend on fuel wood, fodder, grazing, non-wood forest products (fruits, roots, medicinal plant parts, gums, bamboo, cane, wild meat, honey, fish, etc.) from the areas declared as National Park or Sanctuary. Similarly, major development activities like construction of roads, dams, township, industries, canals, etc., have been prohibited specially in the core areas.

Realizing that many species of animals and plants have become endangered, a well-developed strategy was developed under the National Wild Life Action Plan of 1983. Keeping in view various complex issues it established following goals:

- i) Establishment of a representative network of protected areas,
- ii) Developing appropriate management system, with due regards to needs of local people and ensuring their involvement and support,
- iii) Protecting bio diversity within multiple use areas, and
- iv) Extending conservation efforts beyond protected areas.

A Biological Diversity Act (No. 18) was passed in February 2003. The main intent is to protect India's rich biodiversity and associated knowledge against their use by foreign individuals and foreign organizations without sharing the benefits arising out of such use and to check bio-piracy. Under this act, a National Biodiversity Authority has been set up in October 2003.

The policy guidelines issued in December 1991 aimed at development of a innovative package for **Eco development around national parks and sanctuaries**. The basic objective of this eco-development project is to remove man-animal

conflict through better management of the degraded forests and community wasteland in the buffer zones and fringe areas to meet the local needs for grass, fodder, fuel wood, etc., under a participatory management system. It has components of agro-forestry, improved agriculture horticulture as well as promotion of non-farm income generating activities including eco-tourism to improve household income and to provide alternatives, to the existing practice of largescale removal of fuel, fodder, non-wood products and grazing for local needs and economic gains.

6.2 Policy Options

(i) Total involvement and co-operation of local stakeholders in the management, protection and sustainable development of the protected areas and ecological corridors will be possible only through **full policy and budgetary support by allocation of at least 0.5% of the national and state plans** [protected areas cover nearly 5% of the land area of the country] for protection and eco-development activities, local job creation and voluntary re-settlement of villages from the core areas. This should be done on a mission mode.

(ii) The states should set **up a high powered project steering committee** and provide it with adequate funds and full powers of the government for clearing all financial and administrative issues to avoid procedural delays. Decentralization of powers should be done down to field and eco development committee level. It may also serve as the co-coordinating agency with other development departments to ensure eco-friendly development around the Protected Areas.

(iii) **A project implementation board should be established in the MoEF**, chaired by the Director General of Forest, for grant of central funds and to clear all technical issues e.g. shifting of budget allocation from one activity to another based on field situation, awarding of necessary research projects and consultancies for studies and periodical monitoring by an independent expert group.

(iv) Funds from central assistance or external assistance should flow directly from the project director in MOEF to the chief wildlife warden of each state [on the lines of FDA] and onwards to the park director and the local eco-development committees for implementation of activities under approved micro-plans.

(v) Micro plans should be prepared with active and effective co-operation of the local eco development committees. The satellite imagery acquired from National Remote Sensing Agency (NRSA) should be digitally interpreted for micro planning and then integrated with the GIS based maps and periodical monitoring of all eco development activities in and around (10 km) the protected areas. These local eco-committees may also be made the nodal units for implementing all village development works under DRDA and tribal development funds for ensuring an integrated need-based approach for development under a common micro plan.

(vi) All the biomass removed from the protected areas and as well as fringe areas on account of fire protection, removal of weeds, shrubs from grass land, thinning to open up congested areas, etc., should be equitably distributed to stakeholders. Moreover, an eco-development cess should be applied to all bills in hotels situated within 10 km of the park boundaries and the funds so generated may be split on 50 / 50 basis for park

development activities and local village development. This will ensure willing support of stakeholders for conservation efforts.

(vii) The MOEF and the Tourism ministries should join hands and develop an agreed eco-tourism policy to avoid conflicts at the field level, especially of over crowding and exposure which are detrimental for wild life habitat and to ensure involvement of the eco-committees for participatory environmental management and profit sharing.

(viii) As the field staff in the protected areas are normally posted in the interior and also face constant threat from the poachers, they should be provided with proper equipments, vehicles, arms, etc., and also be given similar facilities of special pay, group housing in park headquarters for families, free ration in field, etc., as given to para-military and police forces in the states.

(ix) The state level biodiversity boards should be chaired by the PCCF [wildlife] to ensure proper conservation oriented implementation of the provisions of the Biodiversity Act.

7 FOREST HEALTH AND VITALITY

7.1 Situation Analysis

Generally, forest is referred to an area covered by different kind of trees, shrubs, herbs, grasses, etc., and maintained for production of wood and non-wood products. In the Indian context and as per 1996 orders of the Hon. Supreme Court, all areas recorded in any government record as forest, with tree growth or not and irrespective of the ownership will be considered as 'forest' under the Forest[Protection Act] of 1980.

Modern scientific forest management and protection in India was initiated under the first Forest Act of 1865. Subsequently forest management was brought under working plans, which prescribed various silvicultural systems to ensure removal of only incremental yield followed by regeneration, and cultural operations for ensuring re-growth of forest and to maintain its vitality and good health by ensuring protection from fire, encroachment, over grazing, unauthorized removals, poaching, etc. Practically all forests in India have been brought under exploitation, mainly for commercial timber production, through various types of silvicultural management, regeneration operations and raising of plantations. Only few remaining virgin forests are now protected within the protected area network. Moreover, the incidence of over grazing has increased over the year.

However, starting with the "Chipko" movement in the mid -1970s, and followed by similar demands by many members of civil society for total stoppage of commercial felling, many states adopted a policy of stoppage of green fellings in government forests.

This, however, also led to stoppage of most of the silvicultural and follow-up maintenance operations in forests and thereby adversely effected regeneration, due to lack of overhead light, weed growth, continued unplanned removal of trees for local timber use and fuel-wood, lack of thinning in congested tree and bamboo clumps, fire hazard, non-removal of diseased trees, etc. It had an adverse impact on the health, growing stock and vitality in most of the forests as is apparent from the Forest Survey of India [FSI] report of 2009 indicating reduction of dense forest cover. Moreover, now that nearly 20 million ha have been brought under JFM, these will have to be sustainable managed and har-

vested for timber and non-timber forest products under micro-plans for local use and economic gains from the share of tree harvesting. Moreover, forest protection from illicit removal, fire, overgrazing, etc., have suffered due to lack of adequate field staff as even vacancies due to retirement have not been filled up for more than a decade.

7.2 Policy Options

(i) In view of the fact that India has only 0.064 ha of forest area per capita as against 0.64 ha of world average and the forest policy also aims at improved productivity to meet both local and national needs. **As such the ban on green felling by some states be immediately lifted for restoring the health and productive functions of forests. A national policy guideline needs to be issued by the MOEF to the states to ensure scientific working, under approved working plans, of all forests as per the well developed silviculture systems**, excluding the areas under protected areas or in eco-fragile zones, for optimum ecologically sound sustainable production.

(ii) As per the court directions, it is to be ensured, as a matter of national policy, that working plans are prepared in line with the provisions of the working plan code of 2004 with the use of latest technology of GIS for an objective analysis of areas under major tree species, density, assessment of growing stock, etc. Moreover, digitization of the legal and administrative forest boundaries will help in encroachments detection, location of areas approved for transfer under the F.C.Act, actual area planted under various schemes , damage due to fire etc in each year. The micro-plan in JFM areas should also aim at a multi product silvicultur to sustainably meet the local needs and some surplus for sale. Harvesting should be done only if assured funds are available for follow up regeneration and maintenance operations.

(iii) A policy directive needs to be issued to charge **the state forest corporations** with the responsibility to **reforest degraded forest areas** [India has 28.777 mha of open forest area (FSI, 2003)] with multi species tree cover **where JFM approach is not workable**. It should also be **the sole harvesting agency in government owned forests** and plantations to avoid the possibility of illicit fellings associated in sale of standing trees to contractors. The corporations should also provide marketing support to JFM.

(iv) In view of India's huge domestic animal population [520 million – large part unproductive], leading to over grazing in 78% of forest areas, there is an urgent need for **development of a composite grazing and fodder policy** to ensure prevention of heavy grazing, much beyond the carrying capacity of forest and grasslands, through drastic reduction in the number of free grazing animals [forest policy suggested imposition of grazing fee] even in the protected areas.

The policy development has to be done at the state level under **guidelines to be issued by the Planning Commission** after due deliberations with the concerned ministries of Forests, Agriculture, Tribal Development, and Rural Development

as all have a stake in ensuring sustainable supply of green fodder for better animal health and productivity as well as that of forests and grasslands.

(v) An immediate policy decision by states is essential for prompt filling up of all vacant posts from forest guards to rangers mainly through fresh recruitment as the average age of present staff is more than 40 years in most of the states. It should be made mandatory to assess the impending retirement in each cadre and ensure filling up within one month of creation of such vacancies. Moreover, the field staff should be well equipped to tackle the timber mafia and should be provided with the same facility as given to the police force in each state.

8 PRODUCTIVE AND PROTECTIVE FUNCTIONS OF FOREST RESOURCES

8.1 Situation Analysis

As indicated in para 2, India is facing a growing shortage of all types of forest products, e.g. fuel, fodder, construction timber, industrial wood due to lack of proper investments and policy support in forestry development and improvement in productive capacity through regeneration in high forests, reforestation and plantations in degraded forests. The productive capacity of Indian forests is only 0.7 cm per ha compared to 2.1 of world average. This is mainly due to lack of recycling of forest biomass in the soil on account of removal for use as fuel and manure as well as over grazing leading to compacting of soil leading to soil erosion and failure of regeneration, degradation of forest and its productivity. This also has an adverse impact on the various protective functions of forests, e.g. ecological functions, as a biodiversity reserve, in-situ rain water conservation, water flow regulator, soil conservation, rural livelihood provider, etc. The forest policy provides for “increasing the productivity of forests to meet local and essential national needs” and calls for substantial increase in forest/tree cover through a massive reforestation and social forestry programme. However, there is lack of political will for achieving this as is apparent from the low priority given to forestry in both national and state five-year development plans.

Moreover, in development of the non-forest lands through tree planting there is lack of committed policy support, through fixing of need-based targets along with dedicated funding, to make agro and social forestry as well as pasture development as an essential part of the agricultural production system and rural, tribal, watershed development etc projects. Tree planting in addition of the protective function of soil and water conservation, wind breaks etc will also serve as a major source of livelihood and economic gains through sale of, grass, fodder and fuel for local use as well as bamboo and wood to the industry and thereby reduce pressure on the natural forests.

8.2 Policy Options

(i) A policy decision required at the Planning Commission for adoption of a mission mode approach with necessary technical and research inputs and people’s participation along with adequate fund allocation to enhance the growing stock and productivity of Indian forests at least to the level of world average within the next ten years [0.775 m.ha/year[NFAP] starting with the XI plan. It will

also help in substantially meeting the local and national needs for forest products and will also go a long way in improving ecological security of the country.

(ii) A policy decision at the national level is necessary to re-establish the institution of the state silviculturist under a senior officer along with adequate technical staff and funds for ensuring close cooperation with the ICFRE for undertaking need based research and for adopting a lab to land approach.

This is essential for developing of multi product silviculture for the JFM areas as a replacement of the present timber oriented approach. Moreover, for improving productivity of forests and plantations this unit must set up seed orchards, seed certification process, and nurseries for production of genetically improved high quality plants, biological control of forest pests, research support to pasture and fodder development, etc., to the forest department, forest corporations, JFM units and to the development departments involved in tree planting and silvi-pasture development.

(iii) Non wood forest products [NWFP] serve as the main source of livelihood, health care, food, and various economic benefits, etc., for people, specially the tribals, living in around forests. The ownership of most of the NWFPs have been passed on to the local stake holders under the JFM approach, but there are problem of lack of scientific inputs in management, coordination and market information.

As such there is an urgent need for policy initiative by the state governments for formation of a “NWFP Trade and Development Cooperative Federation” [as established by Madhya Pradesh and Chhattishgarh] covering the JFMs for helping members with price support and in sustainable management, scientific harvesting, storage, local primary processing as well as timely marketing by developing linkages with the major buyers.

(iv) Due to rapid industrial growth in the country, the demand for wood as a raw material is rising rapidly leading to acute shortage in the country. Some of the large paper and panel wood industries have been interacting with private land owners for supply of wood by planting genetically improved high yielding saplings supplied by the industry. However, due to fragmented and small holdings and Land Ceiling Act, the scope of large increase in this sector is limited.

In view of this situation there is an urgent need for developing a new policy approach to involve the corporate sector in providing large investments and technical support for raising of large scale mixed plantations in degraded community lands, not fit for good agricultural production, by taking it on long lease.

However, for achieving this goal the states will have to amend their Land Ceiling Acts to exempt the forest plantations from the preview of land ceiling as is the case for tea, coffee, etc., plantations.

The possibility of a policy evolution, to encourage large scale corporate investments and technical support, for raising of mixed plantations in degraded forest lands in a tripartite partnership mode involving the JFM committees, the forest corporation and the wood consuming industry, needs to be considered urgently by the government.

9 SOCIO-ECONOMIC FUNCTIONS OF FORESTS

9.1 Situation Analysis

Till the mid 1980s, foresters had followed the traditional system of custodial management with little interaction with local people, (except meeting their recorded rights and involvement in fire fighting) and urban opinion makers. However, due to rapid rise in human and livestock population the demand for forest produce increased dramatically specially for fuel, fodder, non wood forest products, etc., which were not part of the old timber oriented management practice. It also resulted in excessive harvesting of fuel, fodder, grazing, etc., as people had to meet their sustenance and livelihood needs. It created conflict between people and the foresters following the old custodial approach. This was the main reason for the emphasis on forest management and development through people's participation in the 1988 policy. It provided for a reoriented role for the forest department of serving as facilitators rather than as the sole custodian and managers. It calls for development of a viable management partnership based on a solid understanding of local forest dependency as well as holistic balancing of economic and ecological objectives to ensure sustainable benefits for local stakeholders and the nation

Forest departments now have a challenge to reorient their perspectives, to shift from being forest managers to community facilitators. They will need to develop and effectively adopt more flexible planning processes, which are truly participatory and at the same time completely integrated into the overall working plan. Innovative silvicultural systems to maximize benefits from multiple uses, will need to be evolved with the input of traditional knowledge and increased understanding of the ecological and economic role of non-timber forest products.

As per provisions of various policy directives from the MOEF since 1990 all states have issued broad guidelines covering various social and human development aspects for strengthening of the JFM and FDA institutions.

9.2 Policy Options

(i) Empowerment of JFM institutions-

The JFM approach aims at improving the productive function of degraded forests through people's partnership. For achieving their full participation and commitment policy decision on empowerment of JFM committees is essential. As states have different criteria, it is imperative for the MOEF to lay down policy guidelines, for incorporation in the Memorandum of Understanding (MoUs), on following lines:

a] To ensure that the micro-plan had been prepared with full collaboration of all members of the JFM it must be submitted for approval to the competent authority along with a resolution of approval of the general house.

b] Allow them to develop, with the approval of the general house, and implement innovative methods and procedures for equitable distribution of usufructs [with each family taken as one unit] from the rehabilitated areas and regenerated forests, taking special care of women and the poor stakeholders.

c] Empower Executive Committee to ensure development of a community corpus fund, in their own bank account, from part of the sale proceeds, contribution by members, voluntary labour,

grants from other development organizations, etc., for future management and maintenance of the JFM area, and essential community works as well as empower them to grant micro-credit to local stake holders.

d] Empower the Executive Committee to approve works and expenditure on micro plan activities in advance for each month [to be made transparent by posting it on a board in a prominent place] for timely implementing the various work to achieve the targets approved in the micro plan.

e] Authorize the JFM committee to frame rules and collect membership fee from members and also collect reasonable collection fee for harvesting of NTFPs like bundles of grass, fuel-wood, honey, fruits, medicinal plants, etc., for even self use or sale. All such collections will create some equity amongst the small and large collectors of forest produce, development of corpus fund for future.

f] Empower JFM executive committee to impose and collect, fines as prescribed by the FD, for petty offences, e.g. unauthorized grazing, lopping for fodder or fuel wood, removal of NTFPs etc., and confiscate the product for sale for depositing the sums so collected in the corpus fund.

g] Empower the chairman and the secretary to jointly issue export pass for all NFTP sold by public auction, approved lease from the JFM area as well as timber from private areas to any market or collection depot of the buyer within the boundary of the forest division.

(ii) Responsibilities of JFM units –

Empowerment also brings in the concurrent responsibilities, of proper and objective management of funds and generated bio-resources, especially for the Executive Committee and also the general house of the JFM members. As such MoEF should lay down broad policy guidelines for states to develop detail guidelines on similar lines. Some suggestions are:

a] Taking active part in development of the micro-plan, entry point and development activities as well as protection of forests in collaboration with the forest field staff and local NGO. The participation of each family unit can be assessed from the proceedings of the various committee meetings, and it's follow up actions throughout the project period and beyond. Those units not taking any interest may be denied part of the benefits as decided by the general house.

b] Executive committee should ensure preparation of detail agenda by listing out the items to be discussed, financial implications, if any for the meetings of the general house and the executive committee and it's timely [at least on week] intimation to members. This should be followed by proper recording of the proceedings giving details of items discussed, and final decisions taken [specially on work component and financial matters] on each issue as well as the benefits accrued, e.g. job creation, usufruct collection, any revenue generated from sale, fees, etc.

c] An independent monitoring committee consisting of few members from the general house, including 50% ladies, should be nominated by the house to periodically check development works, records, fund utilization, assess the benefits accruing from the project, equity in distribution of usufructs, etc. The report of this committee should be discussed in the general house and recorded in the proceedings along with observations of the house.

d] In keeping with the court order, a new approach is also necessary for managing forests of community and clan ownership in North Eastern states, which also need to be managed under scientifically made micro-plans with provision for sustainable harvesting followed by regeneration operations.

e] The FDAs need to be decentralized and democratized by a policy decision by MOEF to provide for an elected chair person [by voting amongst the chairpersons of all JFM units with in the FDA] in place of DFO on the lines of the DRDA organization.

f] The FDAs should be empowered to interact with the elected bodies, the panchayats, Jila parishads, who have the necessary political base, for providing political support and social recognition to the JFM units.

10 LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

10.1 Situation Analysis

Most of the policy and institutional issues have already been discussed and policy options suggested. There are some legal issues which have considerable impact on sustainable forest management and need to be discussed for possible policy initiatives at the MOEF level. These are: a] Revision of the Indian Forest Act of 1927, b] Conservation and need based application of the provisions of PESA in forestry sector, and c] Proper implementation of the provisions of the Forest Rights Act of 2006.

10.2 Policy Options

(i) Enactment of A New Forest Act

The Indian Forest Act 1927, a pre-independence legislation which is still operative, laid emphasis on protection of forests primarily for use of the crown, has obviously lost its relevance in providing legal support to various policy decisions specially of the new approach of 1988 forest policy and subsequent developments of adoption of the JFM approach. Moreover, some separate laws were passed, e.g. Wildlife [Protection] Act of 1972, Forest [Protection] Act of 1980, Environment [Protection] Act of 1986 and the states also passed many amendments to the IFA 1927 from time to time. As such an early policy decision is needed, at the Government India level, as forests are now in the concurrent list, for revision of this Act to provide legal support to the present policy goals of people centric forest protection and sustainable management needs.

(ii) Holistic and GIS based identification of the Titles under Forest Right Act

The provisions of the “Scheduled Tribes & Other Traditional Forest Dwellers[Recognition of Forest Rights] Act, 2006 aims at addressing the long standing insecurity of the tenure in cultivated lands in forest area and legal right of the forest dwelling scheduled tribes and other traditional forest dwellers over NTFP in the forest areas with in the gram-sabha. This is a very valid claim, it should have been settled prior to the enactment of the Forest [Conservation] Act in 1980, during the land to landless drive under which 4.3 million ha of forest land was diverted for various non-forest uses including agriculture [net sown area rose from 118 m.ha in 1950 to 142 m.ha in 2004].

The 1988 Forest Policy aimed [as part of its objectives] at a people centric forest conservation and management to ensure environmental stability and maintenance of the ecological balance. Rights of the forest dependent people were to be protected and used only up to the carrying capacity of the forests to avoid degradation. For tribal populations, it had a separate section[4.6] with provisions for safeguarding their customary rights and for associating them with all forest, NWFP developments and employment generating activities for undertaking integrated area development and economic gains. Till now, the basic aim had been to manage forests for ecological stability, meeting local sustenance and livelihood needs of the local community and then the national needs. There is no concept of granting private ownership within the Government forests.

At this stage, it is essential that the Government of India appoint a high level expert group, preferably at the Planning Commission, to go in to the details of how to resolve the conflict of grant of individual tenural rights in essentially community forest assets. The relationship of the Gram Sabha with the established JFM and eco-development committees, etc., needs to be clearly laid down at the Government level

(iii) Re-establishment of the Apex Policy Making Institution

The Government of India **established the Central Board of Forestry on 19 June 1950 with the Minister of Agriculture & Forests as the Chairperson** and State forest ministers and few independent experts as members. The main objective was to ensure an all-India perspective for all forest policy decisions after due deliberations. It normally used to meet once a year under the chairmanship of the Hon. Prime Minister. The subject of forestry came in the concurrent list in 1976 and the board was reformed with the Prime Minister as the Chairperson. It took some very important decisions, e.g. approval of the Forest Policy of 1988, and people’s participation guidelines of 1990. However, after the XXII meeting of the board held in 1987, no further meeting was called nor was the CBF re-formed after completion of its two-year term by the Ministry of Environment and Forests in the Government of India [GOI]. This has resulted in decision making on ad-hoc basis both at the central and state level without formal national level deliberations on important forestry related issues like unilateral stoppage of green felling by many states, MOEF guidelines for stoppage of green fellings in hills over 1000 metre elevation, enactment of the recent tribal rights bill, etc.

In view of rapid industrial growth in the country the demand for forest land and products, mainly wood and NTFPs has increase greatly and so has the urgent need for ensuring that the ecological security of the country is safeguarded for sustainable development in all sectors. **In light of this situation the MOEF should request the Prime minister for a policy decision to re-establish the Central Board of Forestry with The Prime minister as its chairperson. It will ensure** that major forest related policy and development issues are periodically discussed in an open and transparent manner by involving states and other stakeholders, experts, etc., before the PM in an open forum.

11 CONCLUSION

India is on a high growth path of 9% GDP growth with agriculture, industry, energy, urban and infrastructure developments as the priority sectors for investment. Forestry sector is at cross-roads of either being ignored, as is the present situation, leading to irreparable long term damage or be considered as a priority area for adequate investment and policy support [some indicated above] under the XIth plan for ensuring ecological and environmental security as well as long term sustainable development of the country

We should follow our old traditions as embodied in **the hymn on earth in Ataharvaveda –“What of thee I dig out let that quickly grow over let me not hit thy vitals”**

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THEME 1

Forests in Society

Forests and Community – Forging Partnerships

Rajendra Singh

THE TRADITIONAL TRANSMISSION OF KNOWLEDGE IN INDIA

In Indian tradition, knowledge was transmitted through practical work under the direction of respected elders and gurus. Thus the people engaged in practical work were really the pupils of the indigenous knowledge system. The poor pupils, the prosperous pupils, and the State joined hands for the conservation of forests and the preservation of knowledge. The prosperous pupils provided help to the poorest who were working for forest conservation, and the State provided only the trees. It was a pupil-driven decentralized forest management, which is another name for community forest management.

This functional management of forests had wisdom of every tree in the forest. These trees were the life of the Indian pupil. This indigenous knowledge system respected the agro-ecological zone diversity, livelihoods system and had developed a specific science, a relevant engineering and a technology appropriate to each and every part of the country.

Traditionally, people who lived in and around the forest areas lived in complete harmony with the nature because their livelihoods system was directly dependent on the natural resources prevailing there and defined their day-to-day existence. Therefore they had great respect for the forests, and actively engaged both in the protection of the existing forests and also in their rejuvenation. Like normal agricultural operations, forest conservation was a routine, almost sub-conscious part of village life.

The local indigenous Knowledge in India has always developed practical ways for society to live in a sustainable manner with Nature, in full respect with the diversity of agro-ecological climatic zones, even those that seem the most difficult and inhospitable.

THE LOSS OF TRADITION, AND ITS CONSEQUENCES

The conservation of forest, water bodies and other natural resources in an extremely healthy state over the past thousands of years even under difficult climate and geographic conditions and with a growing population and demand, was essentially due to an extremely eco-friendly cultural traditions (*dharma/parampara*) of 'live within what Nature sustainably releases, don't be greedy'. The traditional knowledge and practices of every area imbibed a thorough understanding of ecological balances and technologies to harness natural resources in a sustainable and eco-friendly manner, through these had never been documented.

For centuries, the line of thinking that soil, water, forest,

wildlife and the whole environment is the common asset of the local people bestowed by the almighty to be managed as a 'trust' was the commonly accepted worldview.

This age-old balance has been disturbed at an accelerating pace in the last 200 years, and every revolution and counter-revolution has indeed increased the depth of the fall: the industrial revolution, the education revolution, the agricultural 'green' revolution, the 'development' revolution, and now the 'privatization' and 'information technology' revolutions.

The European colonizers brought the idea that Nature was to be 'exploited', and undermined the feeling of responsibility for Nature. The modern State (colonial or independent) dispossessed the rural communities of their rights and responsibilities, and rivers, either legally (tree felling licenses, water rights) or illegally (corruption). The education revolution convinced the people that traditions and oral knowledge were the causes of poverty, the 'development' and socialist 'welfare' post independence State promoted the illusion that everything has to be taken care of only by an all-powerful government, and now that the reality of its incompetence has become clear, the capitalistic empires. Multi-National Corporations (MNCs) and high-technologies (IT, GMO etc.) are called to the rescue, most likely to result in further and deeper degradation.

According to the villagers, reliance on Indian State for the management of natural resources eroded the sense of communal responsibility towards natural resources. The old systems of community forest protection/conservation/management fell into disuse.

To sum-up, the difficulties that we are facing can be categorized as such:

Paradigm change

Exploitation and disintegration has taken the place of 'feeling together' and integration.

State takeover community functions

The State has dispossessed the Communities of their traditional rights and responsibilities.

Syndrome of dependence

Wherever the State succeeded (even partially or for a short period) in implementing modern amenities like water supply, sewage or power, the communities have lost their initiative.

Neglect of traditional systems

Due to implementation or expectation of modern facilities, the traditional systems have been neglected.

Disintegration of community institutions

The modern education and hollow dreams of modernity have disintegrated the community Institutions.

Inability to cope with increasing human and livestock population

The general degradation of natural and social conditions has led to the inability of communities to face the problems created by a growing demand. The rural communities have lost their food and livelihood security, their living conditions have become more difficult, resulting in forced migration to big cities in search of survival in indecent and exploitative conditions.

RE-AWAKING THE INDIGENOUS KNOWLEDGE

Traditional Forest Management system in India

There are various types of methods of Forest Management in India. The main common features of all systems are:

- Use of local resources and technology
- Community based operation
- Community driven de-centralized forest management
- Sustainable conservation and use of natural resources

Revival of systems using indigenous knowledge

- Interventions understanding traditional systems and use of indigenous knowledge
- Mobilization of community around land, water and forest
- Participation in rejuvenating old systems and evolving of new systems.
- Creation of new village level and forest area institutions.

EXPERIENCE OF TARUN BHARAT SANGH (TBS)

In the experience of TBS water conservation and forest conservation went hand in hand. After the successful results from *johad* construction in Gopalpura village, the TBS undertook *padayatra* in 1986. It was an awareness campaign with a slogan '*johad banao, jungle bachao*'. During the *padayatra* the villagers of Bhaonta-Kolyala expressed desire to initiate water and forest conservation. After a series of discussions in the village, a decision was made by the people to collectively protect the forest and construct the *johads* with the help of TBS. By 1987, forest protection measures were in place and in 1988 *johad* construction work began.

A gram sabha was formed to facilitate collective decision making on forest protection and water harvesting. The gram sabha acts as the regulatory and coordinating unit. The village started forest protection measures by first admitting past mistakes and a commitment towards regulated forest use. The villagers used the old forest boundary from the jagirdari days to demarcate the area they could protect. The gram sabha evolved a pattern of regulations and penalties. These rules were formed keeping in mind the needs of the village community and sustainable use of the forest. Overgrazing and tree felling were perceived to be the prime reasons for degeneration of forest but grazing is an important activity and a total prohibition was impossible. Therefore, a mutual decision was taken to allow the grazing of village goats in the forest. Shepherds were asked not to cut any trees while their goats are grazing. The village community also

tried to reduce the number of goats in the village. Only wood that was dry or on the forest floor was allowed to be collected for fuel.

Simultaneously, along with forest protection efforts, *johad* construction work was happening in full swing. The first '*Johad*' took three years to build, in the fourth year TBS built 50 '*Johads*', in the fifth almost 100, in 2001 TBS built around 1,000 water structures and in total about 9,000 water harvesting structures have been built in more than 1,000 villages. When TBS started working, the area was classified by the government as 'dark zone', it means with severe water shortage and the water level had receded to difficult depths. The same area after 10 years was classified as 'white zone', which means underground water level are satisfactory and it does not need attention from the government.

No Engineer was called for consultation; we were guided entirely by the traditional wisdom of the people who have maintained the ecological balance for generations. These water structures were built with the active participation of the community in its construction from identification of the site to the designing of the structure and by contribution in the cost of its construction and latter in its maintenance, which ensured that all the structures were need based.

As a result, water became abundant; more water meant better crops, better conditions of soil, and time for the girls to go to schools, and rich community life. It helped forestation in the area and development of wildlife.

Constitution of gram sabha

The gram sabha has an open membership, with a quorum of 22 adults who by and large represent each hamlet in the two villages of Bhaonta and Kolyala. Women are usually in small numbers. The gram sabha meets once every month on the day of new moon and minutes of every meeting are recorded. Apart from the *adhyaksha*, it has no other office bearer. The office of the *adhyaksha* is informal and has no power. The *adhyaksha* is responsible for conducting the monthly gram sabha meetings. The gram sabha has the right to make changes in the regulations and enforce penalties. The body is however not recognized by the state and has no formal legal authority.

Gram Sabha Forest Regulations

- *No shepherd will go into the forest with an axe*
- *If a shepherd is caught cutting a tree he will be fined. Any person who having witnessed such an activity and fails to report it to the sabha will also be fined*
- *No man/woman shall use axe for fuel wood collection. They will only collect dry wood.*
- *If wood is required for building a house or for a wedding the person will collect it only with the permission of the gram sabha*
- *The gram sabha will meet every month on new moon day*
- *In the meetings any issue relevant to the village community will be discussed*

There were some early challenges where incidents of tree felling were reported, offenders refused to pay fine. But with peer pressure these issues were settled. There are also instances where outsiders started exploiting the forest resources of the villages and the villagers successfully resolved the problem. The villages have decided to take no contractual grazing of livestock or host grazers from other regions.

The forest restoration in these villages and surrounding areas

reached such commendable scale that, the area was declared in 1998 Bhairon Dev Lok Van Ahayaranya.

Shepherd and Women and their direct relation to Forests

Shepherds evolved an informal system of grazing rules and keeping vigil on forest offences. Before the forests were protected, the village had to send their livestock to other villages for grazing on contractual basis.

Fuel wood collection is largely done by the women. Though community forest regulations cause some inconvenience to the women, they have no complaints. However the participation of women in gram sabha meetings is faint. But it has been acknowledged that women pass on their opinions through their husbands. For instance the women wanted some concession in collecting head load of green fodder for younger goats and this issue was discussed by the male members present in the gram sabha meeting.

Gram sabha provided a great informal social network for women. As the village mobilized themselves to improve their quality of life by contributing in protecting forests, this participation of the people promoted the community to become self-reliant optimizing social cohesion and emotive bonding in the community. Since people realized that members were responsible not only for individual but also collective action, they became more aware of their rights taking on an activist stance to stop employment of children in the carpet industry and fought a legal battle up to the Supreme Court of India to stop indiscriminate mining on Forest Land.

An enlightened and active community also enforced self-discipline for the common good of the village. They strictly enforced their own rules to stop deforestation, hunting wildlife and consumption of liquor. The development of community participation through the “Gram Sabha” or Village Assembly, gave each and everyone an opportunity to freely discuss, decide and implement a common decision taken for the general benefit. This process also made them reflect on the problems of others in their community and helps each other in solving them. While the community became active in social and economic change, the crime rate dropped in the villages as economic conditions improved of the entire region.

This momentum in the community has encouraged the villagers to go further looking for innovative methods of Social Change. Now the greatest challenge before them is to sustain those traditional values that started this movement in the face of the transformation of the community due to progress and prosperity.

Impact of Gram Sabha

There are direct and indirect impacts of Gram Sabha. These can be categorized into three broad aspects namely, Physical, Economic, and Social. In category of Physical impact, it is mostly the protection of forest resources, increase in area under forest, improvement in the quality of forest resources and most important of all is physical community control over land, water, and forest resources.

Economic impact is largely manifested in improved access to fuelwood, grazing for livestock, change in agriculture patterns due to improved access to water resources in general and groundwater specifically. With the success of forest protection and improvement

in soil, villagers are thinking of ways to develop unutilized lands as alternative sources for fuel and fodder. Fodder security for the livestock has improved.

The social impact is quite significant as the gram sabha empowered people to fight for their claims over resources, question state bureaucracy of their programmes and plans, and better implementation of programmes at ground level. Further it also helps in drawing plans for future use of natural resources. It is particularly women who had no chance to put forward their views and opinion in any of the policy matters or activities in a village got a platform to represent their case.

Challenges faced by the Gram Sabha

- Intra-village dynamics
- Inter-village conflicts
- Relations with forest department
- Lack of legitimate status for gram sabha

WAY FORWARD

Understanding nature is the key and understanding it from the world view of the community is critical. Highlighting the inter-relationship between forest, water and agriculture helped greatly in mobilizing people around forest conservation. Forest protection has become a larger livelihood strategy in the villages and also an ethical and moral component.

Ownership of forest conservation efforts instilled a sense of pride in the community. It also resurrected the sense of collective and individual responsibility towards natural resources. Collective efforts also instilled confidence in the villagers to assert their rights and de-facto ownership over common property natural resources even though there is no statutory recognition of this.

The gram sabha brought people of different socio-economic groups on a single platform for a common cause.

Awareness in the Community

- Awareness of various aspects of forest management
- Respect for cultural, traditions and historical practices
- Will to work together for community’s common interest

Working Strategy

- Constitution of Village Councils. Monthly meetings of all grown ups
- Maximum possible use of traditional knowledge with advice from experts if needed
- All decisions including by Gram Sabha
- All decisions by consensus, and not majority
- Role of women in helping reach consensus

Operation and Maintenance

- Total responsibility assumed by the community

The model for conservation that has emerged from the efforts of Bhaonta-Kolyala indicates that conservation of natural resource need not be in opposition to the livelihood needs of the community. It holds promise as an alternative form of conservation, and is pragmatic in societies where the majority of the population is directly dependent on natural resources for their survival.

Forests and Land Use Policy....A perspective

Dr. Arvind Kumar Jha, IFS

INTRODUCTION

India has a geographical area of 3,07,713 sq. km which is 2.4 per cent of the world's area. The recorded forest is 7,65,210 sq. km and the forest cover 6,33,397 Sq.Km which is 1.8 per cent of the world's forests. India's livestock population is 47 crores which is 18 per cent of the world's livestock population, while the grazing land is 0.5 per cent of the world's grazing land. Approximately 27 crore livestock graze in the forests. Human population in India is 121 crores and its spatial distribution has changed considerably with urbanization and migration. The proportion of urban and rural population is 31:69 and all public lands including forest land is under pressure for variety of uses.

This paper focuses within a specific domain of understanding briefly the dynamics of evolution, implications, and the need of development of a firm forestry and land use policy in India. It also suggests certain measures for securing such development.

India has been in the forefront in the world in debating, drafting and approving new legislations that impact land uses. Today, it is essential that we are able to review these initiatives from within the domain area of forestry and forest management and determine as to how to strengthen our approaches and endeavours to ensure sustainable development, reduce emissions, preserve biodiversity, protect endangered species of flora and fauna and conserve fragile habitats and ecosystems.

The previous two decades of national initiatives in forestry and nature conservation have also been accompanied simultaneously with the increase in understanding of the institutions of democracy, governance and decentralization of functional authority to local self-governing institutions. Management of natural resources, forest wealth, common lands and wilderness areas are now not only increasingly being supported by governments at the Centre and at the State, but also being delegated to LSGs such as zilla parishads, panchayat raj institutions and municipal authorities. The 73rd and 74th amendments followed by state legislations and thereafter by the Forest Rights Act 2006 are land marks in this regard.

Land use is determined by the soil and topography, water table in general and availability of water in particular, production and productivity of land, and the parameters of socio-economic development. So far as forest lands are concerned the land use is determined and guided not only by natural parameters but by various legislations and management instruments too. To name the prominent ones, they are the National Forest Policy 1988, Indian Forest Act 1927, Wildlife Protection Act 1972, Forest Conservation Act 1980, Biodiversity Act, State-specific

Grazing policy and Grazing Rules, Working Plan prescriptions, and Microplans under Joint Forest Management programmes. Although Regional Planning Acts refer to forest and sanctuary as land use options, there are hardly any examples of their inclusion in and formation through any Regional Plan indicating clearly that there exists a hiatus between what is forest land use planning and regional as well as urban planning.

Again, various perspectives help us understand the attempts our nation's policy makers have made at developing approaches to fixation of land use through instruments like programmes and schemes pertaining to nature conservation, forestry and environmental management. Today, the nation is determined to establish the aspects of biodiversity conservation leading to ecological security and sustainable livelihood. The flagship programmes in rural development, tribal development and forest department considered together do indicate the priority accorded to such initiatives by the Government of India and thereby, by the State governments. These initiatives have been reflected in the setting up of National Wastelands Development Board in 1985, Integrated watershed Development Programme, Desert Development Programme, Joint Forest Management initiatives, PESA, FRA, Regional planning Boards, and NREGA to name a few.

LAND USE CHANGES

The proximate reasons for change in forest land use are agriculture, infrastructure development, diversion for developmental works, diversion for natural resource exploitation, fire, climate change, illegal felling, and alien invasive species while the indirect ones are demographic factors, poverty, inequity, imperfect markets and bad governance.

In India, in the non forest lands the land use changes within agricultural sector, apart from being economy driven, were also fuelled by availability of subsidized water from large dams, supply of subsidized fertilizers and power, and distribution of subsidized diesel pump-sets (that run on subsidized fuel). The Green Revolution replaced the indigenous agriculture with monocultures, chemical fertilizers took the place of organic ones, and irrigation displaced rain fed cropping in a big way. Due to market pressures and also due to no control on changes in land use in agriculture sector, drought-resistant local crop varieties got replaced with water-guzzling crops like sugar-cane. With time, however, in many areas, due to unsustainable practices, soil moisture droughts became recurrent as the water cycle was violated leading ultimately to forced changes in land use. The impact of changes in land use has been most prominent for rural poor and deprived masses. So far

as forest lands were concerned, the highly localized emergence of spirit of joint management of common resources in some parts of the country notwithstanding, the non-forest Government and public land including Panchayat lands have not had any strict caretaker. They, with time, have suffered the status of “free for all” and therefore are, more often than not, in a very bad shape – open to all sorts of abuse and misuse.

Considering all available lands, inappropriate land use has resulted in land degradation and, irrespective of the causal dynamics, resulted in more fragile ecosystems, shrinkage of the natural resource-base for farmers as well as non-farmers, and overall environmental degradation due to unsustainable practices. Land Degradation in terms of physical, chemical and biological parameters thus resulted in lowering down of productivity and erosion of sustainability. The major implications have been the lowering down of Gross National Product and standards of living of people, increase of poverty, and explosion of related social problems.

So far as specifically the forests are concerned, the pressures in terms of grazing and fuel-wood requirements have always loomed large. Deforestation, indiscriminate felling of trees, and removal of forest produce exposed lands, enhanced erosion, led to loss of soil, water and nutrients and also impacted adversely the privately owned lands and agriculture too. These triggered further changes in forest land use. In addition the pressures on land resource including natural resources for meeting development and energy needs of the country have made forest land most vulnerable to land use change. Further, the significant reduction in the availability of non-forest public lands coupled with the psyche of rural populations to not to part with their lands for developmental projects so vividly objectified in examples like Singur in West Bengal and Alibag in Maharashtra cast further pressure on the forest lands. The MoEF circular indicating requirement of no objection certificate from Gram Sabhas as a precondition for processing of forest land diversion cases under the Forest Conservation Act notwithstanding, today forest lands are often being seen as the easiest available land for development projects.

THE NEW PARADIGM

Land use policy of any country has to consider all types of land and any attempt to address land use issues just in terms of forests is going to be imperfect. The National Forest Policy requires that the tree cover in the state should be 33% of its geographic area. It is not clear as to at what levels this percentage is to be maintained, is it to be secured at taluka level, at district level, regional level, state level and with what criteria. Fixation of land use pattern once for all should be the first step towards ensuring optimized utilization of land resources on one hand and reduction of their vulnerability to diversions under pressures, political or otherwise described wastelands as “any land which is not producing green biomass consistent with the status of soil and water As per the National Remote Sensing Agency, the “Wasteland is defined as that land Forestry and land use policy need to evolve through an understanding of the imperatives of convergence of demands and requirements emerging from large nation-wide projects. The conflict or convergence areas between the forestry and other sectors need to be identified and understood. In contrast,

the watershed development programme is being implemented by the rural development departments under the ambit of the Ministry of Rural Areas and Employment. This programme focuses on strengthening local biomass productivity, enabling socially equitable understanding and ecological, environmental and water regime approaches. The approaches to wildlife conservation and management, traditional forestry management and joint forest management do not have wide-ranging inter-departmental criteria that allow for synergy. In contrast, the watershed development programme focuses on strengthening local biomass productivity, enabling socially equitable understanding and ecological, environmental and water regime approaches. Sustainable livelihood is required to be the mantra for sustainable forestry and land use approaches in India. Some inherent perspectives must include - (a) People will not protect if they will not profit. (b) People should profit without plunder. (c) Profit should be perpetual. (d) Perpetual profit should provide prosperity. (d) Productivity of resources should be protected for people and profitability. (e) Procedures and processes should provide for protection. (f) There should be in built checks and well-designed measures against people’s own profligacy.

The tragedy of the commons is paramount in India wherein state-level or governance-driven initiatives seem to favour the local community against the single individual, whereas it is actually corporate, mafia and illegal initiatives that seem to be more capable of subverting the processes more extensively. The Forest Rights Act 2006 attempted to do this but it has given rise to contradictions arising out of simultaneous application of PESA in scheduled areas. Forestry and land use approaches should ensure that opportunities for local communities exist at par with opportunities for single families or single individuals.

There are five main land-use categories and nine sub-classified land-use categories classified by the Directorate of Economics and Statistics of the Ministry of Agriculture. The sub-classified land-use categories are Forests, area put to non agricultural uses, barren and un-cultivable land, permanent pastures and other grazing lands, land under miscellaneous tree crops and groves, cultivable wasteland, fallow lands other than current fallows, current fallows and net areas sown.

The National Wasteland Development Board in 1985 which is presently lying unused or which is not being used to its optimum potential due to some constraints”(1985). Apart from the above the lands , in accordance with specific problems, are referred to as gully erosion, stream bank erosion affected lands, salinity and alkalinity affected lands, moisture stress inflicted lands, ravines, water logged and marshy lands, rain eroded lands, coastal eroded and salt effected lands.

Strategies need to be developed and implemented separately for wastelands. In addition, the private lands impacted by the ill-effects of abuse of public lands and vicissitudes of nature also need to be attended to. The actions required may include any one or combination of the activities like adopting appropriate Soil and Water conservation measures, providing vegetal cover through use of agro-forestry systems like agri-silviculture and agri-horticulture, adopting approved soil and crop management, and management of problem soils.

Considering the fact that the area under forests is only about 23%, the greening of wastelands has no alternative when it comes

to increasing the tree cover in the country. Apart from the basic concern about meeting the rural energy and economic needs, this requirement has also to be seen against the background of the need to combat increase of green house gases, global warming, ozone depletion, climate changes, loss of bio-diversity, and also the overall degradation of environment.

LAND-USE POLICY DEVELOPMENT STRATEGY

The development of appropriate strategies required for effectively tackling the issues of continuity as well as change in Land-use policy with the forestry as a core theme requires that cognizance of the seriousness as well as urgency of the above mentioned aspects be taken at policy making, institutional, technology development, as well as implementation levels. The key points behind such a strategy could be summarized as under:

1. Develop an appropriate policy level interventions using holistic point of view but with the central theme that challenges the poverty paradox of rural and tribal populations.
2. Introduce statutory interventions to help smooth and effective implementation of the forest land use policy guidelines.
3. Considering the variety of inputs and technologies required for addressing the issues, institutional structures of multi-disciplinary character be put in place.
4. Put in place a strong co-ordination amongst and active participation of various related departments, NGOs and various stakeholders.
5. At the implementation level, an inclusive and informed Landscape approach be adopted.

The Main Features that should determine the forest land use policy are:

Conceptual Aspects

1. Long term Sustainability of resources as well as livelihoods should be the first priority.
2. At present the land use and cropping patterns more often than not promote private gains at public cost and the immediate needs are placed above the long-term interests of the nation. This should be rationalized.
3. The policy should benefit the land-less also.
4. The policy must be operational irrespective of ownership of land.
5. Target the wastelands and prevent the degradation of cultivated lands into wastelands.

Statutory interventions

1. A rationalization of rules regarding planting, felling, and transit of produce be done for areas away from forest lands.
2. Following the principles of single window system, Gram Sabhas be authorized for facilitating planting as well as removal of trees from non-forest and private lands.
3. The National Bank for Agriculture and Rural Development Act, 1981 be amended to become National Bank for

Agriculture, Forestry and Rural Development Act and thereby bring on center stage forestry practices combining it with agriculture, horticulture, sericulture, apiculture etc., for facilitating management of the mosaic of land use.

4. Rural credit system and Micro-credit laws be revisited and rationalized to accommodate village level participatory management institutions for improving productivity of land within site specific parameters.
5. Panchayat Acts be amended to ensure compulsory investment of certain proportion (say 10%) of their revenue on appropriate and sustainable forest land use options.
6. Amendment be made in the related legislation so that a specific percentage of the 7% forest revenue presently being remitted by the Forest Department in the Zilla Parishad account be allowed to be utilized for investments as per forest land use policy guidelines.
7. Clear tenure-rights over resources with responsibility be ensured through harmonization of Forest Rights Act, PESA, and systems that provide rights and concessions to the local populations.

Institutional framework related interventions

1. A 'Forest Land-use Authority' be set up.
2. Put in place a programme for 'Non-Forest Wastelands Development through involvement of Private Sector' (NWDIPS).
3. FDAs are designated as the nodal and co-coordinating agency for implementation of the policy at the field level in the JFM/ Village Eco Development areas.
4. The working plan wing should be strengthened to ensure compliance of forest land use policy with special reference to the exercise of forest rights.

Market related interventions

1. Incentivize the private growers of non-horticultural tree species to optimize use of natural resources.
2. Forest based industries' capital be attracted for investing on public as well as private Wastelands.
3. Industries showing interest in energy sector (e.g. bio-diesel) be provided the opportunity to invest on forest lands on "Public Private Partnership" basis.
4. Minimum support prices be introduced for the site-appropriate crops (forestry as well as agricultural).
5. Subsidize the tackling of problematic lands.

Plan and Technology related interventions

1. Appropriate R&D facilities be set up/ integrated through networking with existing Research institutions for developing suitable and implementable technological options to match the appropriate land use while enhancing productivity.
2. Operational research related to forward linkages, market dynamics, community mobilization, and institution building aspects be carried out.

4. Plantations and Soil and Moisture Conservation works under MNREGA for development of wastelands (both public and private) be redesigned as integral package to be implemented on project basis.
5. Suitable schemes be devised and incentivized for a switch over from cultivation of steep slopes to the production of perennial tree and fodder crops.
6. Traditional and indigenous techniques of treatment need to be documented and formalized as per site-specificity.
7. Area specific models for agri-silvicultural, silvi-pastoral, agri-silvi-pastoral, agri-silvi-horticultural, agri-silvi-horti-pastoral etc., interventions be developed.
8. Use of latest technologies be introduced not only for determining the inherent potential of lands but also appropriate land use determination.
9. The interface between Silvicultural and Watershed approaches to land use be appropriately designed.

Implementation level interventions

1. Identification of viable units of treatable lands within the framework of landscape management be done. The areas could be shown on appropriate maps for planning purpose by using services of MRSAC or any other similar agency.
2. Utilize the strengths and capacities developed under

programmes like IWDP, JFM etc. as a part of convergence strategy.

3. Capacity building at all levels and for all stakeholders should precede field level implementation land use related investments.
4. The schemes of cultivation of forestry species and fodder on private Wastelands using MNREGA funds be expanded to include all aspects required to be tackled under the landscape approach used to implement land use policy.

SUMMING UP

A natural resources cum livelihood centric land use policy needs to be urgently put in place so that mankind can survive and sustain on our earth. Today Nature has to be helped to help sustain ourselves and in the process equity issues cannot be lost sight of. Introduction of the concepts of anticipatory afforestation rather than compensatory afforestation to mitigate forest land diversion issues, social security plantations as also trees as insurance for draught years may have no alternatives in near future. Special care, however, will have to be taken to ensure through the implementation of the policy that the mosaic of land uses and issues of ownerships are duly considered while addressing changes that are triggered as our society moves on.

Taking Forestry in India to a New Level

Dr. Bransdon S Corrie *

I. INTRODUCTION

We are at a defining moment in the history of humanity and forests occupy centre stage. As the world grapples for a consensus to address the threat to global warming there is a deep inner conviction rooted in citizens the world over that the time for action is now. Clearly this is nature's final call- maintain ecological integrity or perish.

Changes in global climate are already stressing forests through higher mean annual temperatures, altered precipitation patterns and more frequent and extreme weather events. At the same time, forests and the wood they produce trap and store carbon dioxide, playing a major role in mitigating climate change. And on the flip side of the coin, when destroyed or over-harvested and burned, forests can become sources of the greenhouse gas, carbon dioxide.

India with 8% of the world's biodiversity is one amongst the world's 12 mega biodiversity countries and hosts two of the world's biodiversity hot spots. It has the seventh largest area (328.73 m ha) and second largest population (over 1 billion). With 2.5 % of the world's geographical area, 1.8% of the world's forest area, the country is to meet the needs of 16% of the world's population and 18% of its domestic cattle (500 million). Livelihood issues of 7 crore tribals and 20 crore non tribal rural population is linked to forests. 4 crore people live in 1.73 lakh village in and around forests (GoI, 2006). As members of the Indian Forest Service, with decades of experience, exercising control over diverse ecosystems, in various capacities; we know the magnitude of the unparalleled challenge that forest professionals face and the imperative need for upgrading forestry practices. With a rapidly rising population, a steadily diminishing resource base and increasing levels of consumption, the task is daunting, more so with the meager resources available to the forest professional. A humanitarian dimension of the challenge is the fact that a large percentage of the population belonging to the very poor category is highly dependent on forests for their livelihood needs. The tremendous pressures under which these forests are managed accounts for the fact that two of the worlds biodiversity hotspots fall within India.

The National Forest Commission has opined that no governmental set up has such total, multiple and onerous responsibility over so vast an area as the forest personnel. Yet they are amongst the most neglected and distrusted. The forest personnel on their part also need to radically change their

mind set, vision and professionalism. Unless the forest service becomes more specialized and professional and receive political, infrastructural and financial support, they will neither be able to meet the needs of forests nor of civil society. This means that forest management in India must be taken to a new level.

II. MATERIALS AND METHODS

This paper presents a model to take forestry in India to a new level. It integrates the principles of managerial sciences and advances in technology with the science of ecosystem management. The Seven S framework is used as a tool to present the model. The 7S framework is a management tool designed to analyze and understand the key organizational structures in order to assess its potential for effective change. The model examines seven key areas of the organization and the relationships of each of these elements to each other. The elements are grouped into two sub-categories of 'hard elements' and 'soft elements'. The hard elements represent un-shifting organization traits, those which are relatively stable and simple to define such as strategy, structure and systems. The soft elements, on the other hand, represent more complex traits of the organization which are influenced by culture, environment and individuals. These are shared values, skills, style and staff. The 7S framework can help improve the organizational DNA which is the fundamental rules that determine how organizations behave-the policies and practices that have a tremendous impact on motivations, capabilities, and behavior. The promotion practices, leadership styles, planning processes, performance measures, reporting arrangements, formal and informal power structures, relationships between groups, how individuals are rewarded and core values. The 7S Framework is used as a basic tool by the global management consultancy McKinsey. The beauty of this tool is that it can be used in a variety of conditions – as a diagnostic tool for an ineffective organization, for an organization exploring change, an organization proposing performance improvement. In this paper the current scenario and the desired scenario as regards forest management practices is presented in the 7S framework.

This paper draws from the initiatives and experience of the author, a survey conducted by the author on forest management as practiced in various States, and a study of forest management as practiced by various agencies managing forests in the United States.

In Kerala Forest Department the author undertook several

initiatives utilizing managerial principles, adopting structured systems and protocols relating to ecosystem management and auditing and certification initiatives which included:

(i) The formulation of a HRD Plan with a Placement Policy - intended to provide for a systematic approach to capacity building and creation of an enabling environment for personnel.

(ii) Conduct of Motivational Programmes for various categories of staff with intent to improve staff morale and ignite the fire of passion.

(iii) Design and Maintenance of a Personal Action Journal- to provide personnel direction and focus to building capacity and improving performance.

(iv) Conduct of a Technical Audit of sanctuaries- with intent to create an institutional mechanism to raise and adhere to higher professional standards.

(v) Introduction of protocols for monitoring habitat and species with intent to manage forests based on an ecosystem approach.

A survey of forest management practices in various States was conducted through a structured questionnaire in conjunction with a telephone survey. The survey covered the following:

- (i) Vision of the State Forest Department.
- (ii) Organizational environment.
- (iii) Systems and protocols, and
- (iv) Technology use

During the year 2008 the author undertook a Fulbright Environmental Leadership Program in the US studying forest management as practiced by the different agencies managing forests. This included the US Forest Service, the US Fish and Wildlife Service, the US Geological Service, the National Park Service and the Department of Natural Resources, Minnesota and South Carolina. Forest ecosystem management, multi species inventory as practiced in the US Forest Service, the Adaptive Management approach as advocated by the Department of Interior, the Visitor Experience and Resource Protection (VERP) as adopted by the National Park Service, and the species monitoring as followed in the US Geological Service and the Department of Natural Resources and the Forest Certification Standards (SFI) as adopted by the DNR Minnesota are of relevance to this study. A workshop was hosted by the Concordia College of Business and Organizational Leadership with practitioners and international researchers engaged in wildlife conservation to develop a strategic model for conservation of tigers that integrates the principles of managerial sciences, ecosystem sciences (forest and wildlife included) and advances in technology. The model developed was presented to International tiger conservation agencies at the World Bank, Washington DC. The author has drawn heavily from these sources to evaluate current forestry management practices and suggest the way ahead.

III. RESULTS AND DISCUSSION

Foresters in India stand at a very important cross road today. The leadership are called upon to take a bold but difficult decision- heed the recommendation of the National Forest Commission- radically change mind set, vision and professionalism or continue on the downhill road we are now speeding on, that will surely

lead us to the destination that we are now heading to.

The Indian Forest Service has the best talent and experience in the world and if put to good use can produce the most remarkable results ever. The seven elements of the organization need to be aligned to take forestry in India to a new level. The current scenario and the desired scenario are elaborately analyzed and presented in Table I.

The seven elements are briefly discussed below:

1. Super ordinate goals: This includes the Vision, Mission, Goals, core values and the organization culture. All of this will determine the organization environment. A Vision Statement is about, 'what we want our reality to be', while a Mission Statement is, 'about what we do'. Vision Statements and Mission Statements are inspiring words chosen by successful leaders to clearly and concisely convey the direction of the organization. By crafting a clear mission statement and vision statement, the management can powerfully communicate its intentions and motivate the team to realize an attractive and inspiring common vision of the future. Unfortunately most Forest Departments do not have a Vision or Mission Statement as a result the individual efforts are not focused on a common goal. In contrast the US Forest Service has a clear Mission Statement- To sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations- with a compelling **motto: Caring for the Land and Serving People.**

The Vision Statement reads:

- We are recognized nationally and internationally as a leader in caring for the land and serving people.
- We are a multicultural and diverse organization.
- Employees work in a caring and nurturing environment where leadership is shared.
- All employees are respected, accepted, and appreciated for their unique and important contribution to the mission.
- The work is interesting, challenging, rewarding, and fun -- more than just a job!
- We are an efficient and productive organization that excels in achieving its mission.

Each State Forest Department must begin leveraging managerial principles by developing and sharing a Vision and Mission Statement.

The organizational environment includes the physical, social and cultural environment. The physical includes the office environment and its surroundings. The social environment includes the groups and interactions within and between groups and categories and the cultural environment includes the values, beliefs, underlying assumptions, attitudes, and behaviors. An organization's culture is made up of all of the life experiences each employee brings to the organization. Culture is especially influenced by the organization's founder, executives, and other managerial staff because of their role in decision making and strategic direction. Culture is represented in a group's:

- language,
- decision making,
- symbols,
- stories and legends, and
- daily work practices.

The physical work environment needs attention especially the immediate surroundings of an office. A government office must be pleasing to the eye.

The social environment requires attention there is a need to have improved understandings between the ministerial and field staff and also across the cadres. The informal grouping as 'insiders' versus 'outsiders' consequent to governments policy to allot officers from outside the State to the cadre needs to be addressed on priority with the onus on the top executive to remove this divide which can drastically vitiate the work environment. Another divide based on caste merits attention.

The cultural environment needs to be strengthened with good values- fairness in decision-making, magnanimity, trust, camaraderie, a positive attitude and genuine friendliness towards 'outsiders' and the removal of negative practices of rumour mongering, petition writing and the abhorrent practice of releasing reports to newspapers, filing cases in courts through PIL and embroiling fellow officers in vigilance cases.

In the United States the work environment is informal, fair and a fun place. The employee is proud to be a member of the service filled with a zeal that is worth emulating. This is largely due to fair systems in the work place. The employees adopt a Code of ethics laid down by government.

2. Strategy: The organization plan or route-map. It is the art and science of planning and marshalling resources for their most efficient and effective use. The strategy proposed is to integrate managerial principles, ecosystem management principles and current technology. Principles of sustainability and adaptive management form the foundation of the model. Action is based on development and implementation of Plans. Human skills are central to the model. Leadership is given prime focus. Sound systems and protocol are codified and institutionalized. Staff must be facilitated to work better by providing better facilities. A system of annual audit and certification for individuals and institutions ensures that change is institutionalized. Transformation must be fast. Launch must be bold and rapid.

3. Structure: the way the organization is structured and who reports to whom. It is proposed to lay down duties, responsibilities and deliverables for each post along with the annual targets and expectations. The posts of APCCF's are proposed to be delinked from the line hierarchy so that an extra step is avoided. The proliferation of posts disregarding work content will be addressed through a re-assignment of work in conformity with the new approach proposed. The APCCF's will undertake specialized functions such as Planning, HRD, Legal and Policy. One post of APCCF will be titled Professionalization and will be responsible for integrating managerial principles, ecosystem management and technology use in improved forest management practices. The officer will design and introduce protocols and systems for inventorying and monitoring habitat and species and codify and institutionalize all systems and protocols. The APCCF Vigilance will conduct the annual audit and certification of individuals and Institutions.

4. Systems: the daily activities and procedures that staff members engage in to get the job done. The various systems

and protocols proposed are discussed. The documentation/inventorying, reporting, controlling, monitoring, evaluating and planning systems along with the protocols will be laid down. Protocols for inventorying and monitoring habitat and species as adopted by the US Forests Service, reporting, evaluating, planning and certification are proposed. The audit as developed by the author for use in sanctuaries can be built upon. Improving visitor experience using the tool VERP developed by the NPS is suggested. Planning will be limited to the Division but will encompass various spatial scales- the State, Region and landscape. This will address interstate issues including monitoring of movement of wild animals like elephant herds.

5. Style: refers to the approach and style of leadership adopted. In my opinion the absence of this singular element is responsible for the failure of the India Forest Service to leverage the great talent and experience that is resident dormant in the service. It is a giant waiting to be awakened. The fundamental task of a leader is to prime a good feeling in those they lead. A leader creates a resonance of positivity that unleashes the best in people. A leader resonates with energy and enthusiasm. He gets the employees emotionally involved and derives the best results. (Goleman et al 2004). Visionary leadership will be developed in top management with a provision to groom the younger members. At every level leadership will have to play its role- at the beat, section, range, division, circle and state level. Leaders must guard against moving towards an autocratic style as this can stifle initiative, innovation and enthusiasm. Leaders would be responsible to make the work environment conducive for bringing out the best in the employees and empower his team to work to the highest professional standards.

6. Staff: the employees and their general capabilities. The human resources are the most important resource of an organization yet they are the most neglected. The personnel have the capability and the ability to deliver to high standards it is up to the effective manager to mine deep into this resource base and obtain the best results. To get the best from the staff an enabling environment based on fairness and equity with appropriate physical, social and cultural environment can help bring out the best from the staff. The Personal Action Journal is a good tool that enables an employee to align with the departments Vision and goals and allow for a focused development of career so that both the individual and the department grows. It provides for the blooming of the capabilities and abilities of the employee and is a tool easy to use with profound results. The hitherto practice of posting staff prior to training will be dispensed with. A Handbook detailing the tasks and the step by step procedure will be made available. E-learning opportunities will be developed so that staff may learn at their own pace too. A system of grooming the new entrant with a mentor to guide him as he climbs the hierarchical ladder is suggested.

7. Skills: This comprises the actual skills and competencies of the employees. Managers are to have four essential skills- technical, human, conceptual and design. Of the four human skills are highly relevant in the context of forest management as this is observed to be a limiting skill. Human skill is about the

ability to work with people obtain cooperation of the team. Good interpersonal skills can help create a compelling vision to inspire and challenge the team. It is about creating an environment where people feel secure and free to express their opinion. Unfortunately this skill is very hard to come by and the absence of this skill is a contributory factor of the failure of the department to leverage the rich talent and experience waiting to be harnessed. The other skills are no less important the technical skills- how to write a *mahazar*, how to build informant networks, how to conduct an inventory of biodiversity and monitor habitat and species, how to codify and institutionalize systems and protocols. The conceptual skills are about seeing both the woods and the trees, looking for patterns and relationships and seeing the 'big picture. The design skills are about solving problems not merely seeing the problems (Wehrich, 1994).

IV. CONCLUSION

The 7S framework is a useful tool to look at relationships, interconnections between the seven elements and see how best each can complement the other so that the final goal is achieved. With foresters asked to deliver more for less and with the heavy pressures that are placed on the top leadership it is time to institutionalize a system whereby forests are managed on principles of sustainability. As it can be said, the best time to have introduced this radical change of mind set, vision and professionalism was in 2006 when the Forestry Commission Report was released. The second best time is now. By taking forestry in India to a new level the top leadership can then truly say that we have left the resource in a better shape than when we had received it.

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TABLE – I – THE CURRENT AND FUTURE SCENARIO USING THE SEVEN S FRAMEWORK

No	Element	Characteristics of the Element	Current scenario	Future scenario
1	Super ordinate Goals	<p>Refers to the guiding principles of the organization. The Vision, mission, goals and core values.</p> <p>Do the personnel have a shared understanding of why the department exists?</p> <p>What is the Vision for the department? Do the personnel share the department's vision?</p> <p>What is the department's mission?</p> <p>Are the personnel aware of the department's mission?</p> <p>What are the department's goals?</p> <p>What are the department's core values?</p> <p>How do the personnel describe the ways in which the department is distinctive?</p> <p>What does organization measure and reward? Are they the same thing?</p> <p>What is the focus on- is it on quality, people, financial targets, etc?</p>	<p>No stated Vision, mission.</p> <p>No clarity on this.</p> <p>No stated Vision in most cases.</p> <p>No</p> <p>Not stated mission.</p> <p>No</p> <p>Stated in the State Forest Policy</p> <p>Discipline</p>	<p>Build a shared Vision for the department.</p> <p>Yes</p> <p>To be the leader in sustainable management of the States' forest resources.</p> <p>Yes</p> <p>To sustainably manage the States forest ecosystems and increase the green cover of the State.</p> <p>Yes</p> <p>To manage the forest ecosystem so that the ecosystem goods and services flow to society both now and in the future. To maintain the biodiversity of the State in its pristine condition and ensuring its survival over the long term. To increase the green cover of the State.</p> <p>Fairness, camaraderie, loyalty, discipline.</p>
2	Strategy	<p>Refers to the plan or route-map to achieve the goals. It is the art and science of planning and marshalling resources for their most efficient and effective use.</p> <p>Does the department have a plan for achieving its goals?</p> <p>Is there a Plan for getting the best from the employees?</p>	<p>Able to deliver more for less.</p> <p>Measures meeting financial targets. No formal rewards systems.</p> <p>Financial targets.</p>	<p>Professional, people friendly.</p> <p>Measure professional standards and rewards high performers.</p> <p>People, quality and targets in that order.</p> <p>The strategy proposed to take forestry to a new level is to leverage managerial principles, utilize advances in technology and adopt an ecosystem approach in forest management practices.</p> <p>A Department Plan to achieve its Goals will be prepared.</p> <p>Capacity Building Plans, Performance Management Plans, Cadre Management Plans and Career Development Plans and Personal Action Plans will be developed.</p> <p>Leadership Development Plans will be formulated and implemented. Nurturing leaders and creating the right leadership styles will be focused on.</p> <p>Sound systems and protocols developed for integrating managerial principles and ecosystem management in working.</p> <p>Yes</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		<p>Is there a plan for providing able leadership?</p> <p>Is there a plan for providing sound systems and protocols?</p> <p>Are there time frames for the plans?</p> <p>Are personnel assigned specific tasks in these plans?</p> <p>When was the last time the Departmental head looked at the various plans?</p> <p>What were the actions taken after looking at it?</p>	<p>No formal plan</p> <p>No</p>	<p>Yes</p> <p>Annual feature.</p> <p>Adaptive management approach will be adopted.</p> <p>Half yearly</p> <p>As the adaptive management approach is proposed in the event of any contingency detailed action steps as spelt out in the plan will be implemented.</p> <p>As adaptive management approach is proposed provision for meeting these eventualities will be spelt out in the plan.</p> <p>Strategic priorities include: creating an enabling environment for employees, providing visionary leadership, sound systems and protocols, citizen delight.</p> <p>As adaptive management is proposed dealing with changes in citizen expectations is provided for.</p>
		<p>When was the last time the plan was updated?</p> <p>How does the plan deal with arising challenges?</p> <p>What are the sources of sustainable competitive advantage such as cost, quality, service and technical leadership?</p>	<p>Leadership is not given much focus.</p>	<p>Provision for feedback survey from citizens will enable constant improvement in citizen services.</p> <p>The following is proposed:</p> <p>(A) Integrating principles of managerial sciences:</p> <p>(i) Providing an enabling work environment:</p> <p>(a) Improving the physical office environment: inside the office and its immediate surroundings.</p> <p>(b) Improving organizational culture: Creating a friendly work atmosphere that brings out the best performance. Adoption of a Code of ethics to provide for a conducive work atmosphere free of rumour mongering, petition writing, news leaks, groupism and caste based decision-making</p> <p>(c) Improving organization values: Adoption of fairness and equity in decision-making</p> <p>(ii) Improving Leadership: Providing Visionary/Affiliative/ Coaching/ Democratic leadership</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		<p>What are the key strategic priorities such as improved citizen services?</p> <p>How are changes in citizen expectations dealt with?</p> <p>How is greater value delivered to citizens?</p>	<p>No. Protocols limited for raising nurseries, plantations and civil works.</p> <p>Yes.</p> <p>No</p> <p>Not applicable</p>	<p>(iii) Codification and institutionalization of systems and protocols.</p> <p>(iv) Providing a system of annual auditing and certification of Individuals and Institutions.</p> <p>(v) Providing appropriate infrastructure/ facilities: Provide facilities for improved performance. Strengthen beat and stations and provide free rations with facilities for cooking. Allowances for equipment and its maintenance. Furnishings, housing and educational facilities for children.</p> <p>(B) Use of technology: Utilizing cutting edge technology to make working easier.</p> <p>(C) Use of ecosystem management practices</p> <p>(i) Codify and institutionalize systems and protocols for ecosystem management.</p>
3	Structure	<p>Refers to the framework in which the activities of the organization's members are coordinated. A key function of structure is to focus employees' attention on what needs to be got done by defining the work they do and whom they should be working with whom they report to. Are duties, responsibilities and deliverables with time frames spelt out? (Please note that deliverables are essential for example in case of beat staff- a well protected beat, a system for knowing what and who enters and leaves the beat, etc?)</p> <p>Field Staff</p>	<p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>The department follows a uniform system for structure. However due to the skewed intake of officers there has been a bunching of intake during certain years resulting in a proliferation of posts at certain levels to provide for promotion opportunities resulting in several problems including poor job content. The newly created posts of Addl PCCF need review as far as its position in the structure is concerned.</p>	<p>The APCCF's may be delinked from the normal line working thereby doing away with the extra step to smoothen functioning. APCCF may be entrusted specialized tasks. There may be a reassignment of duties and functions.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		<p>Forest watcher Beat Section Range Division Circle State Office staff Peons IB watcher Clerk Typist Head Accountant Office Manager Senior Superintendent How is the organizational structure designed right now? Name the posts and specify the span of control.</p> <p>How is the team divided?</p> <p>How do the team members organize and align themselves?</p> <p>Name the various wings and specify the sphere of activities.</p> <p>How does the department coordinate activities of the various wings?</p>	<p>Duties and functions are somewhat laid down for field staff and most office staff. The same has wide import with lack of objectivity. Deliverables and success indicators are not mentioned.</p> <p>In a hierarchical manner but there has been constant revisions without adopting a uniform approach.</p> <p>At the very top there is the Head of Forest Force. There are two PCCF rank officers- overseeing wildlife and Social Forestry. The APCCF's are assigned specific tasks- Development looking after budget and audit, Administration looking after recruitment, placement, performance management, disciplinary matters, Vigilance looking after monitoring and evaluation and vigilance, IHRD looking after training, Planning looking after Working Plan and Research, Protection looking after leases, grants and forestry related matters, the Regional North and South overseeing territorial matters and the Development and Projects overseeing FMIS and Tribal Rehabilitation and Tribal Welfare and Ecodevelopment.</p> <p>In the territorial, wildlife and social forestry some standards are maintained. In top posts created in recent years an adhoc approach is followed in determining the composition of the team.</p> <p>There is a haziness and lack of clarity.</p>	<p>Clear duties, responsibilities and deliverables for each post with an annual target of assigned works and measurable deliverables.</p> <p>A fair distribution of work to all so that adequate job content and job satisfaction is possible.</p> <p>A reassignment of duties. The APCCF IHRD to be responsible for recruitment, placement, capacity building, cadre management and career planning. The APCCF Administration to be responsible for administrative matters related to running the organization, maintaining discipline. The APCCF Planning for developing all Plans- State Plans, Landscape Plans, Working Plans, Management Plans. A separate APCCF for research who shall oversee all research activities and oversee the monitoring of habitat and species. The APCCF (D&P) to be re-designated as APCCF (Professionalization) to be responsible to utilize principles of managerial sciences, technological advances and principles of ecosystem management in working. To design systems and protocols. APCCF Vigilance to monitor and evaluate all activities, audit and certify all individuals and institutions..</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
			<p>Territorial dealing with territorial forests, Wildlife dealing protected areas, Social forestry dealing with non forest areas, Administration dealing with matters relating to recruitment, capacity building, placement, disciplinary and other administrative matters. Vigilance dealing with vigilance matters, Planning dealing with Working Plans and research, Tribal welfare and ecodevelopment dealing with tribal welfare and eco-development. Development dealing with budget and audit, Protection dealing with leases and agreements and law. IHRD dealing with training, D&P overseeing FMIS and Tribal Rehabilitation.</p> <p>There is lack of a structured system of coordination with a clear delineation of functioning and a coordination of the functioning to achieve the desired vision.</p> <p>Decision making is centralized with officers being provided little room for innovation and independent working.</p> <p>The lines of communication is up the hierarchy with the team with very little leeway for cross team communication. Short circuiting of hierarchy leads to conflicting signals and confusion and degeneration of discipline.</p> <p>Yes. There is an "in practice" hierarchy different from the stated hierarchy.</p>	<p>A streamlining and setting of standards where appropriate support staff is available for each post so that the officer can function to desired levels.</p> <p>Clear duties and responsibilities to be spelt out.</p>
				<p>A streamlining will be undertaken. The Head of Forest Force will be the head and have all officers' report to him. There will be three PCCF's- heading territorial, wildlife and social forestry. APCCF's will head the following:</p> <p>HRD- recruitment, placement, capacity building and Staffing.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		<p>Is decision making and controlling centralized or decentralized? Is this as it should be?</p>		<p>Development- budget and audit.</p> <p>Planning- Preparation of State Plans, Management Plans, Landscape Plans and Regional Plans. (Working Plans will be re-designated as Ecosystem Plans)</p> <p>Vigilance- Monitoring, evaluation and Vigilance.</p> <p>Administration- Administration of the Department- pay, leave, disciplinary matters.</p> <p>Policy and Legal- all matters relating to developing new policy and law.</p> <p>Professionalization- utilizing new technologies, integrating managerial principles, systems and protocols design and implementation.</p> <p>Projects- Developing new Projects.</p> <p>Tribal Welfare- all matters relating to tribal and forest dwellers.</p> <p>The Head of Forest Force will be the head to whom all personnel shall report. Each PCCF will coordinate and manage within his sphere of activities. The APCCF will work within his sphere interacting with and assisting the respective PCCF's when called upon to develop programmes undertake tasks within the assigned domain.</p> <p>Wide delegation of powers is suggested with greater decentralization o spur innovation and out of the box thinking.</p> <p>The communication channels to be streamlined with the line hierarchy strictly followed.</p> <p>The "in Practice" hierarchy and stated hierarchy will be one and the same. This will enable the organization to run on sound managerial principles and be geared to better deliver on mandate.</p>
		<p>What are the lines of communication?</p> <p>Is there a stated hierarchy and an "in-practice" hierarchy?</p> <p>Refers to the day-to-day processes and procedures. Having effective systems helps reduce redundancy and streamlines process.</p>		

No	Element	Characteristics of the Element	Current scenario	Future scenario
4	Systems	<p>What is the system for:</p> <p>(a) Documentation of</p> <p>(i) resources inventory?</p> <p>(ii) activities organized and undertaken?</p> <p>(iii) tasks completed?</p> <p>(b) Reporting?</p> <p>(c) Controlling?</p> <p>(d) Monitoring?</p> <p>(e) Evaluation?</p> <p>(f) Planning?</p> <p>Is there a State Plan?</p> <p>Is there a landscape plan to deal with Inter-state issues/ monitoring movement of wildlife across boundaries?</p> <p>Are there working plans for the territorial divisions?</p> <p>Are there Management Plans for protected areas?</p> <p>Are there plans that incorporate Principles of managerial sciences?</p> <p>Cadre Management Plans?</p> <p>Career development Plans?</p> <p>Capacity building Plans?</p> <p>Systems building Plans?</p> <p>How is information/intelligence gathered?</p>	<p>Nurseries, plantations, forest types, infrastructure, financial</p> <p>Schemes, projects and for allotted funds.</p> <p>Tours and inspections conducted.</p> <p>Funds utilized, progress of schemes/ projects.</p> <p>Inspections, reporting, meetings.</p> <p>Except for inspections, reports called for, no structured monitoring.</p> <p>No evaluation undertaken.</p> <p>Planning limited largely to Working Plan and Management Plans.</p> <p>No</p> <p>No</p> <p>Yes</p> <p>Yes</p>	<p>Habitat, species, plantations, nurseries, forest types, financial,</p> <p>Computerized</p> <p>Computerized</p> <p>Computerized</p> <p>Computerized</p> <p>Computerized</p> <p>Monitoring of habitat and species, performance of individuals and institutions.</p> <p>Certification of individuals and their institutions relative to duties, responsibilities, tasks assigned and deliverables.</p> <p>Development of State Plans, Landscape Plans, Regional Plans and Management Plans</p> <p>Yes</p> <p>Yes</p>
		Is there a unified database?		To be re-designated as Forest Ecosystem Plans.

No	Element	Characteristics of the Element	Current scenario	Future scenario
		Does the organization have the systems it needs to run the department such as monitoring for citizen satisfaction? Can a report be put together easily?	No	To be re-designated as Forest Ecosystem Plans.
		What happens if one of your staff leaves; will they take with them a key part of the information/intelligence?	No	A Professionalization Plan to be developed where managerial principles will be incorporated in working.
		What are the main systems that run the organization?		Will be developed
		Where are the controls and how are they monitored and evaluated?	No	
		What internal rules and processes does the team use to keep on track?	Recently undertaken	Will be developed on principles of fairness and equity.
			No	To be prepared
			Not in a structured professional manner.	Will be prepared
			No	Informant networks and intelligence gathering to be designed and standardized.
			No	To be developed
			No	To be developed
			No	Report Generation facility to be part of database
			No	Develop, codify and institutionalize Institutional memory
			Yes. The enthusiasm is also lost.	Professionalization, HRD, Planning, Legal and Policy, Vigilance,
			Administration, Development, Vigilance, Working Plan and Research.	Daily reporting, monthly reporting linked to salary disbursement and annual certification linked to the Annual Performance Appraisal.
			Inspections, reporting. No structured monitoring and evaluation.	Check list to be designed and introduced.
			No structured system	
		Refers to the leadership approach and the organizations overall operating approach. How would you describe your department?		

No	Element	Characteristics of the Element	Current scenario	Future scenario
5	Style		Autocratic, rigid not open to constructive suggestions, un-professional.	Democratic, open to constructive suggestions, professional, visionary, with an atmosphere of enthusiasm.
		<p>How would your employees describe your department?</p> <p>How would other department employees competitors describe your department?</p> <p>How would the citizens describe your department?</p> <p>If all would say the same thing then the department is on the right track; if they say different things then it could indicate a potential problem.</p> <p>Is this same style and culture going to carry the department through the next few years?</p> <p>What will have to change for the department to grow?</p> <p>How would you describe the style of leadership</p> <p>(a) of the HOFF?</p> <p>(b) top management?</p> <p>How participative is the management and leadership style?</p> <p>How effective is the leadership?</p> <p>How good is the leadership at making fair decisions?</p> <p>Where does the leadership focus most of its time and attention?</p> <p>On a ten point scale indicate the leadership at each of these levels-</p> <p>Beat?</p> <p>Section?</p> <p>Range?</p>	<p>Reasonably delivering on mandate.</p> <p>An okay department.</p> <p>Poor delivery systems.</p> <p>Public have a poor perception due to poor human skills of cutting edge staff and negative news reports engineered by staff to settle personal scores.</p> <p>Obviously no with the even greater challenges to be faced on the road ahead.</p> <p>Department will have to develop a shared Vision, change entrenched mind sets, provide an enabling environment and able leadership, and improve professional standards,</p> <p>Tending to autocratic</p> <p>Tending to autocratic.</p> <p>Not very participatory.</p> <p>Not very effective.</p>	<p>A good place to work with high professional standards.</p> <p>A professional department.</p> <p>An efficient department.</p> <p>Positive public image.</p> <p>New Vision, changed mind set, good organizational culture, high professional standards.</p> <p>As the adaptive management approach will be adopted the department will change to meet the new exigencies.</p> <p>Visionary.</p> <p>Visionary/democratic/ affiliative.</p> <p>Participative.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		Division? Circle? State? Are employees competitive/ cooperative?	Not very good.	Effective.
		Are there real teams functioning within the organization, or are they just nominal groups?	On micro managing	Great. Policy and large issues.
			4	10
			4	10
			5	10
			5	10
			6	10
			6	10
			Disinterested.	Cooperative.
			Just nominal groups. Placements are done without consulting team leaders	Real teams with every member filled with the fire of enthusiasm.
		Refers to the staff levels and how people are hired, developed, trained, socialized, integrated, and ultimately how their careers are managed.		
6	Staff	On a ten point scale indicate the rating of skills relating to the top leadership:	Vacancies are reported to the PSC. Recruitment is delayed. In case of IFS there has been a skewed intake due to the actions of vested interests.	A streamlined system to be in place with duties, responsibilities and accountability fixed for the secretarial staff at State and center.
		(a) Technical skills:		
		(b) Human skills:	9	
		(c) Conceptual skills:		10
		(d) Design skills:	3	
		On a ten point scale indicate the rating of skills relating to the middle leadership:		10
		(a) Technical skills:	6	
		(b) Human skills:		10

No	Element	Characteristics of the Element	Current scenario	Future scenario
		(c) Conceptual skills: (d) Design skills: Is the department adequately staffed to deliver on its mandate satisfactorily? Will the addition or deletion of staff members change anything?	6 8	10
		How are employees trained and mentored? Are the training methods effective? Are the staff members trained to do their jobs? Can they be given any other skills or resources to do their job better? What's holding them back from contributing their services more efficiently for the department? Are they "bought in" to seeing how their efforts contribute to achieving the department's goals?	4 4 4 4 No at the protective staff level. Beats are understaffed. Training is unscientific with no focus on skills development and attitude orientation. Training Institutes are dumping grounds for staff that need to be sidelined. There is no concept of mentoring. Not very. Most are not trained. Those trained are not trained to handle all jobs that they are expected to undertake.	10 10 10 10 Will be addressed by buttressing efforts at beat level by engaging forest protectors from local community to assist beat staff. Will ease pressures. Training will be re-oriented to impart knowledge, skills and attitude orientation. An institutional mechanism for mentoring and bringing up junior members will be developed. Will be made effective through monitoring and feedback.

No	Element	Characteristics of the Element	Current scenario	Future scenario
		What positions or specializations are represented within the team?		Duties, responsibilities and deliverables will be specified for each post, standards will be laid down, handbooks will be developed and staff will be trained to deliver on job specifications and standards set.
		<p>What positions need to be filled?</p> <p>Are there gaps in required competencies?</p>	<p>At present some sketchy attempts made depending on the interest shown by the officer who heads the training efforts.</p> <p>Lack of an enabling environment, an atmosphere vitiating by favouritism, nepotism, dis-trust, negative mind sets, lack of visionary leadership, poor professional functioning.</p> <p>No.</p> <p>Individual specialization is not utilized. However forest plantation raising is primarily represented.</p> <p>Protection staff and visionary leadership.</p> <p>Yes.</p>	<p>Yes. Focus on human skills, conceptual skills, design skills, technical skills and communication skills.</p> <p>Providing an enabling environment of fairness, equity, trust, positive mind set, visionary leadership and high professional standards. Adoption of a Code of ethics.</p> <p>Staff will be educated on their important role in the team as the strength of the chain is dependent on its weakest link. The department Vision, mission and challenges will be shared so that they are 'bought in'.</p> <p>Specialization will be developed in ecosystem management, human resource management, systems development, technology applications.</p> <p>Protection staff and visionary leadership.</p> <p>This will be addressed. Ability to provide visionary magnanimous leadership, ability to comprehend the big picture, ability to conceptualize solutions, ability to articulate viewpoints, ability to work with teams/stakeholders and address conflicting demands without compromising on sound science.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
7	Skills	<p>Refers to the distinctive competencies of people within the organization. What skills has the department been hiring for?</p> <p>What skills does the department have/need at each of these levels- Beat? :</p>	Hiring is based on qualifications.	The staff will be geared to handle the following skills;
		Section?	<p>Not all staff are trained prior to posting. Training does not focus on developing skills. It is more about imparting knowledge. Skills are largely related to undertaking silvicultural operations.</p>	<p>All staff will be trained prior to posting. Training will be designed to impart knowledge, skills and attitude. Handbooks will be developed and made available. Focus will be on Information gathering, developing informant networks, writing mahazars, professionally booking offences, inventorying and monitoring habitat and species, undertaking silvicultural operations,</p> <p>Supervising works, supervising teams</p> <p>All staff will be trained prior to posting. Training will be designed to impart knowledge, skills and attitude. Handbooks will be developed and made available. Developing Informant networks, writing mahazars, professionally booking offences, inventorying and monitoring habitat and species, leading teams, providing technical leadership, maintaining records, reporting.</p> <p>Training will be designed to impart knowledge, skills and attitude. Handbooks will be developed and made available. Developing Informant networks, writing mahazars, professionally booking offences, inventorying and monitoring habitat and species, leading teams, providing technical leadership, maintaining records, reporting. Providing leadership to range team, ability to mobilize labour for undertaking departmental works, working within constraints and adhering to time frames and standards.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
				<p>Training will be designed to impart knowledge, skills and attitude. Handbooks will be developed and made available. Developing Informant networks, writing mahazars, professionally booking offences, inventorying and monitoring habitat and species, leading teams, providing technical leadership, maintaining records, reporting. Providing leadership to division team, maintaining technical standards, managing resources on sustainable principles, ability to prioritize actions, ability to handle pressures, ability to deliver within constraints.</p>
		Range?	<p>Not all staff are trained prior to posting. Training does not focus on developing skills. It is more about imparting knowledge. Skills are largely related to undertaking silvicultural operations.</p>	<p>Training prior to promotion with focus on imparting knowledge, skills and attitude to shoulder the higher responsibilities. Provide leadership to circle team. Ability to bring up junior officers, ability to conceptualize programmes and visualize and address arising challenges</p> <p>Training prior to promotion with focus on imparting knowledge, skills and attitude to shoulder the higher responsibilities. Provide visionary leadership, ability to see the larger picture, provide technical expertise, work with top leadership of adjoining States.</p> <p>All staff will be trained prior to posting. Training will be designed to impart knowledge, skills and attitude. Handbooks will be developed and made available. Ability to comprehend issues, put up relevant notes, crisp drafts, short hand and typing skills, use of computers, technical matters, positive leadership, team working, Vision, mission and goals of department.</p> <p>Will be addressed consequent to adaptive management approach.</p> <p>Will be addressed in the leadership grooming programme where future leaders will be mentored and equipped to take on new roles and responsibilities.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		Division?	Training does not focus on developing skills. It is more about imparting knowledge. Skills are largely related to undertaking silvicultural operations.	<p>Leaders of tomorrow will be expected to deal with greater pressures, more transparency and conflicting demands. The ability to think out of the box, conceptualize new approaches, articulate appropriate solutions and have the ability to encourage 'buy in' stakeholders.</p> <p>It is proposed to developing leadership skills, with ability to see the larger picture, conceptualize solutions, articulate stated position, convince and create 'buy in' of all stakeholders, work closely with citizens.</p> <p>Will be addressed through experiential learning trainings.</p> <p>To work professionally with a clear vision and positive mind set.</p>
		<p>Circle? State?</p> <p>Office staff?</p> <p>Ability of department to address requirement of skills need in 1 or 2 years from now?</p> <p>Does someone in the department have those skills and are they being groomed for an important role in the next 1 or 2 years?</p> <p>What skills will the leadership need to possess in two years that are different than the skills they possess today?</p>	<p>Training is focused on imparting knowledge. Over 30 odd subjects are covered.</p> <p>Annual in-service training is conducted but there is no focus it is more about visiting various places.</p> <p>Annual in-service and promotion linked training is conducted but there is no focus it is more about visiting various places/ imparting knowledge.</p> <p>No training prior to first posting. Limited in service and promotion linked training to staff . Focus is on imparting knowledge.</p>	<p>Will be equipped through training with necessary skills, vision and mind set.</p> <p>A scientific, objective assessment and development of skills will be introduced.</p>

No	Element	Characteristics of the Element	Current scenario	Future scenario
		<p>What are the strongest skills represented within the team?</p> <p>Are there any skills gaps?</p> <p>What is the team known for doing well?</p> <p>Do the current employees have the ability to do the job?</p> <p>How are skills monitored and assessed?</p>	<p>Not planned for at present.</p> <p>Not addressed at present.</p> <p>Not addressed now.</p> <p>To deliver at least cost against all odds. However, the department is witnessing a deterioration of standards.</p> <p>Skill gaps are there at various levels as discussed above.</p> <p>To deliver within constraints at least cost.</p> <p>No. Development of skills, mind set and vision is required.</p> <p>Limited to the Annual Performance Appraisal which is not conducted for all staff and is largely subjective and un-professionally executed with acute personal bias.</p>	

Need for a Separate Policy and Institutional Framework for Production Forestry on Non-Forest Areas

RC Dhiman *

INTRODUCTION

Forest plantations on non-forest land especially on farm land now constitute an important wood resource which has significantly increased the wood availability for the industry and local people. Paper and pulp industry - the main wood based industry (WBI) in India, which was largely dependent for its raw material procurement on government forests till recently, is now largely dependent on farm sector for its wood requirement. ITC (PSPD) has procured 99.41% of its wood requirement from farm forestry during 2009-10 (ITC 2011). Wimco's match, veneer, plywood, and many other wood based industries which were once dependent on the government supplies are also fully supported with raw material from farm grown trees. Wood availability in Kerala mainly comes from private land. Home gardens contributed 83.1% of wood, estates 8.2% and imports 2.8%. In case of the industrial wood, home garden provided 47%, estates 29.7%, imports 13.7% and government forests only 8.7% (Saxena 1998). According to FSI (2009), 5508.456 M numbers of trees exist outside forests (ToFs) holding 1599.57 Mm³ wood volume as against 11909.8379 M number of trees with 4498.66 Mm³ wood volume in forest land. It is evident from these figures that the ToFs hold around one third of the total wood volume held in trees inside forests. Most of ToFs planted on farm land are fast grown and are harvested at young stage and therefore their potential and contribution in providing valuable wood is much high than those trees grown on forest land. According to an estimate ToFs are meeting over 93% of requirement of the industrial wood and almost major part of domestic wood requirement. Besides these developments, wood requirement is fast increasing and the country is likely to face the problem of chronic wood shortage for the want of assured sources of wood availability. The present and future wood requirements will increase significantly than its domestic production and availability. The acute shortage of the wood in the country and its likely availability has been compiled from the existing sources and is illustrated below.

CHRONICLE SHORTAGE OF WOOD

Wood supplies from government forests have sharply declined during the last two decades. WBI and even government projects, which were heavily dependent on wood have now gradually

shifted their strategy to meet this challenge of reduced wood availability. The government sector now discourages use of timber even in the construction industry and is substituting it with other alternatives like steel, aluminum etc. WBI is worst hit due to this change. The gap between demand and supply is widening and the scenario is fast changing with increased wood requirement and reduced supply from the existing sources. Table-I summarizes the consumption of wood and its products for a decade period from 1999 to 2009 (FAO's reports - The state of World's Forests). Maximum increase is seen in the consumption of wood based panels, and pulp for paper during this period.

According to the National Forestry Action Program, a negative wood balance of 599.6 Mm³ by 2015 will exist in the country (Table-II). Other estimates also reveal a similar trend. Rai and Chakrabarti (1996) reported timber production of 43 Mm³ (12 Mm³ from forests and 31 Mm³ from farm land) and 199 Mt firewood (101 Mt from forests and 98 Mt from farm land). Total wood production from the government forests of 23 states and UTs is reported as 1.873 Mm³ roundwood and 2.094 Mm³ firewood (ICFRE 2003). The annual official timber/log trade through forest corporations is estimated to be 0.6 to 1.0 Mm³ Behera (2005). This is against a fuelwood consumption of 306.352 Mm³, industrial wood as 27.231 Mm³, sawn wood as 14.943 Mm³, wood based panels as 2.758 Mm³, pulp and paper as 4.550 Mt and paper and paper board as 5.301 Mt (FAO 2009).

Table-I: Consumption of wood and wood related products in India.

Report (Year)	Firewood (000 m ³)	Industrial Wood (000 m ³)	Sawn Timber (000 m ³)	Wood Based Panels (000 m ³)	Pulp for (000 t)	Paper & Paper Board (000 t)
2009	306332	27231	14943	2758	4550	5301
2007	303839	21069	17534	2448	3781	4795
2005	300564	21298	7922	700	2775	4492
2003	287390	3804	16297	429	2732	4248
2001	274334	26840	17462	419	2580	3934
1999	279343	25302	17450	348	2132	3369

(Source: FAO online reports on the World's forests)

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Wood imports are now on the rise for meeting the raw material needs of the WBI. Timber (in log or sawn form) and pulp have been placed under Open General License (OGL). Imports are in the form of logs, chips, wood pulp, waste paper and other wood related products. Import of unfinished timber is encouraged and there are higher tariff rates on finished and semi-finished value added wood products. Presently, the imported wood is comparatively cheaper than locally grown timber and is being imported from numerous countries around the world.

Table-II: Estimate of wood production (Mm³).

		Year		
No.	Name of item	1994	2000	2015
1	Commercial wood production	25.72	26.73	54.7
2	Sawn wood	3.74	6.00	20.5
3	Panel Products	12.33	11.89	20.5
4	Pulp and Paper	11.88	14.84	41.0
5	Sub total	53.67	59.46	136.7
6	Supplies	12.00	13.00	15.4
7	Commercial wood balance	-41.67	-46.46	-121.3
8	Fuelwood demand	250.00	285.00	356.57
9	Fuelwood supply	54.00	60.00	70.00
10	Fuelwood balance	-297.74	-331.52	-478.08

(source: MoEF 1999)

Import of wood and wood related articles, in quantity and value terms, are available in the official website of Ministry of Commerce, GoI. (MoC n.s.). The wood and wood articles are grouped under four HS codes viz., HS Code 44 (Wood and articles of wood, wood charcoal), 45 (Cork and articles of cork), 47 (Pulp of wood or of other fibrous cellulosic material) and 48 (Paper and paper board, articles of paper pulp, of paper or of paperboard). Data (Table-III) show an increase of 685%, 89%, 172% and 167% for HS code number 44, 45, 47 and 48 respectively. On biannual basis, the total imports have shown increase of 26.20%, 37.77%, 19.88%, 12.77% and 19.47%. respectively during the biannual period ending 2002, 2004, 2006, 2008, 2010 respectively. The decade witnessed an overall increase of 181 % in imports (total quantity). In value terms (Table-IV), imports have witnessed the similar trend. An increase of 242%, 97%, 224% and 237% has been recorded for HS code No. 44, 45, 47 and 48 respectively. Biannual increase in value terms was 22.61%, 19.40%, 45.41% and 34.88% for the biannual period ending 2002, 2004, 2006, 2008 and 2010 with decadal increase of 237.36%.

The data compiled from FAO reports further show that the imports of all the wood and wood articles except firewood are increasing at a fast rate (Table-V). Maximum increase is seen in import of industrial wood and paper products. Kandla port in Gujarat, the main port for import of wood, is presently receives

around 0.1Mm³ wood each month out of which radiate pine alone constitutes around 75% (of the imported wood) mainly from New Zealand and Australia.

Table-III: Per cent increase in import of wood and wood articles (volume basis).

HS Code	Item/Year	Biannual period ending					Decadal Change (2001-10)
		2002	2004	2006	2008	2010	
44	Wood and articles of wood, wood charcoal	-19.29	61.55	109.26	47.94	15.68	685.44
45	Cork and articles of cork	-18.93	30.24	12.67	15.29	5.13	89.24
47	Pulp of wood or of other fibrous cellulosic material	4.26	-2.98	70.31	6.89	19.01	171.52
48	Paper & paper board, articles of paperpulp, of paper or of paperboard	-99.07	51.80	12.12	31.52	18.53	167.35
Total		26.20	37.77	19.98	12.77	19.47	181.06

(Source : MoC n.s.)

Growing of plantations by the growers are not uniformly distributed in India, neither are they developed around all the wood based industrial units. Wood based industry developed from assured wood supplies around government forests from where these units used to get the wood raw material are now finding difficult to sustain their product manufacturing due to shortage of wood. Of recent, the WBI developed and expanded in clusters in many locations on increased availability of wood resources from non-forest land. For example, Yamunanagar in Haryana and Udham Singh Nagar in Uttarakhand have now developed large clusters for panel industry. These clusters not only receive wood from other locations within the states but are surviving on the wood receipts from the adjoining states. Escalating wood prices across the country and the state initiatives to develop their own WBI are encouraging states to create barriers for movement of the wood to other states. There is increased demand from the local WBI for low cost wood. Presently, Haryana and Uttarakhand WBI cannot survive on the wood resources available within these states and their survival will be seriously affected if the inter-state movement of the wood is affected.

Table-IV: Per cent increase in import of wood and wood articles(value basis).

HS Code	Item/Year	Biannual period ending					Decadal Change (2001-10)
		2002	2004	2006	2008	2010	
44	Wood and articles of wood, Wood charcoal	35.25	9.15	56.15	26.77	32.47	242.71
45	Cork and articles of cork	-7.34	9.67	24.67	37.88	20.88	97.48
47	Pulp of wood or of other fibrous cellulosic material	28.48	31.43	33.73	27.2	30.86	223.97
48	Paper & paper board, articles of Paper pulp, of paper or of paperboard	7.6	23.69	42.38	49.19	37.18	240.26
	Total	22.61	19.4	45.41	34.88	33.96	237.36

(Source: MoC n.s.)

Table-V: Import of wood and wood related products in India.

Report (Year)	Firewood (000 m ³)	Industrial Wood (000 m ³)	Sawn Timber (000 m ³)	Wood Based Panels (000 m ³)	Pulp for (000 t)	Paper & Paper Board (000 t)
2009	79	4043	173	277	507	1427
2007	0	1933	54	194	370	944
2005	0	1998	30	67	198	620
2003	10	2232	9	86	145	647
2001	0	1684	16	82	259	674
1999	0	336	17	20	265	350

(Source: FAO online reports on the World's forests)

NEED FOR A SEPARATE POLICY AND INSTITUTIONAL FRAMEWORK FOR PRODUCTION FORESTRY

The above facts clearly indicate some significant changes viz., clear shift in production forestry from government forests to non-forest areas, increased contribution of farming community in wood production, increased realization of maintaining productivity of farm land through integrating tree components in the arable land use, tree culture taking shape of cash crops, facilitation of marketing and trading of wood in local markets and wood based

industries, development of non-traditional marketing channels suiting the local wood trading needs, advent of market economies, increased recognition of government forests for environmental services, reduction in risks through multi-cropping on arable land use, reduction in harvested age of trees grown on farms, surging private sector in R&D and promotion of forestry, development of better synergy between private sector and the farming community for tree culture and wood buy back arrangements etc. are happening in the forestry sector. Tree culture on non-forest land now complements and supplements other land use options of associated sectors like agriculture, horticulture, animal husbandry.

The present day policies and programs fall short in addressing the urgent issues related to production forestry on non-forest land. Production forestry on this land use needs a clear and focused vision on number of issues like land and labor reforms, contradictions in policies of forestry and agricultural establishments, practicality of integrated tree-crop models on the same land, contradictions on goods and services from production forestry, organizational structure to implement programs envisaged, human resource for addressing matching R&D demanding solutions for surging discipline; reforms in marketing structure & information systems including pricing mechanisms; inventorisation; linkages with financial, insurance and rural development sectors; forest certification, carbon sequestration etc. Some of these critical issues are briefly discussed in support for a separate policy and institutional framework for production forestry on non-forest areas

FOCUSED POLICY INITIATIVES

Indian forest Policy and laws recognize the practice of forestry on most existing land-use forms. This recognition is mainly for conserving the forest resources existing thereon and lack full appreciation for the ingredients from production forestry perspectives. The main land resource presently used for production forestry is farm land of farming community. Both the National Forest Policy, 1988, and National Agricultural Policy, 2000, support integrating trees on farm land. The practice in addition to generate wood for domestic and industrial requirements also supports farmers with remunerative returns and helps in increasing the forest cover to the national target of 33%. The main thrust of National Agricultural Policy 2000 is to develop agriculture for producing food grains for the people. It stresses on not diverting agricultural land for non agricultural purposes and therefore has contradictions with the National Forest Policy. An ideal land use could be an integrated cultivation practice of tree and agricrop components in appropriate proportions to sustain the productive potential of the land. Punjab and Haryana states have already advocated the promotion of agroforestry for diversifying the harmful wheat-paddy rotation. Integration of both the agriculture and forestry on the same land is required for the long term productivity of land resources and is in the interest of farmers, WBI, country and the environment. This therefore needs policy corrections to define such an integration that has certain percentage of trees grown with other agricrops for complementary and supplementary synergies. Putting exclusive land for production forestry is not a viable proposition now and the integrated land use is the only practical option for multiple cropping. Yield of major food crops per unit area has already stagnated due to deteriorating soil site conditions by the use of

excessive fertilizers and chemicals. This conflicting view on this land-use needs to adopt a balanced view for long term sustainable production of both food and wood resources in an integrated farm practice.

India is one of the most densely populated (both human and cattle) countries in the world. The average arable (irrigated land) under the present ceiling limits is dismally low and varies from around 4.0 ha to 7-8 ha throughout India. In general, private individuals, industries and foreign investors do not find the existing policy environment conducive for plantation development (Pande and Pandey 2004). The land ceiling laws for production forestry need to be relaxed to bring them to better than or at least at par with other plantation crops like tea, coffee, rubber etc. Private sector needs to be allowed to enter into long-term lease agreements, free of land ceiling restrictions with farmers, to raise commercial tree plantations.

Table 2: Distribution of operational landholdings in India (1990/1991)

Category of holdings	No. of holdings (million) (%)	Area (million ha)	Average size (ha)
Marginal (< 1 ha)	63.4 (59.4%)	24.9 (15%)	0.39
Small (1-2 ha)	20.1 (18.8%)	28.8 (17.4%)	1.43
Semi-medium (2-4 ha)	13.9 (13.1%)	38.4 (23.2%)	2.76
Medium (4-10 ha)	7.6 (7.1%)	44.7 (27.0%)	5.90
Large (> 10 ha)	1.7 (1.6%)	28.7 (17.4%)	17.33
Total	106.7 (100%)	165.5 (100%)	1.57

Source: Anon (2000)

Forestry is in the concurrent list. State governments make rules within the ambit of national acts and rules. Transit and felling restrictions are considered as revenue generation in many states and are adversely affecting promotion of production forestry. This is a state matter and some state governments have relaxed felling and transit regulations on selected tree species grown by the farmers, whereas, many states continue with the old rules and restrictions. In some other states even semi-finished products like veneers are charged with increased values for transit permits.

Forestry operations are of casual nature for which labor is engaged on seasonal basis for a couple of weeks. The stringent labour laws ensures following of complex formalities in relation to engaging labor through contractors for such petty works scattered in remote village locations where such contractors are hardly available. Further implementation of provident fund, social security and regulations for casual jobs of this nature makes hiring of labour extremely difficult. It would be in the interest of labour and the programs, if they are paid in cash even the social security and provident fund contributions to make the operations practically feasible. A solution to this effect could be to allow the labour engaging agencies in getting these works executed from the Panchayat Raj Institutions through government initiated MNREGA program. The work amount, provident fund and social

security costs can be deposited to the PRIs, which in turn can get this work done.

Private companies having in-house forestry research need to be encouraged and supported in developing high-yielding, disease-resistant planting stock and improved management practices. One possible approach would be tax exemptions on investments made in research and R&D initiatives. The private sector is now playing a significant role in production forestry. Wimco and ITC-PSPD have already demonstrated strengths of their R&D in not only developing new clones of fast grown tree species but also their better integration with field operations. An ideal R&D program on tree species, besides a talented human resource also need adequate land resources for conducting long term research trials. R&D in corporate houses is seriously affected for the want of adequate land resources. Premature release of tissue cultured poplar during 1990's, without proper field testing, performed much below the traditionally propagated poplar (Dhiman and Gandhi 2010, Pande and Dhiman 2010) and its culture has already caused loss of around Rs. 3000 crores to the growers. This could have been avoided provided adequate land resources for their testing were available with the pilot plant facilities on tissue culture in the country.

Afforestation and Reforestation (A&R) projects under Clean Development Mechanism (CDM) and Forest Stewardship Council (FSC) are two developing forestry related concepts in many countries including India. There is certainly some movement on these two issues in India but they have a limited scope due to widely scattered plantation activities on farm fields. A&R projects need land resources to grow forest plantations and conserve the carbon in wood and soil. Unfortunately these procedures developed for land surplus countries have limited scope in India since land for this purpose is hardly available. India would be at a disadvantage to keep its carbon emission reductions under check as per the international commitments once the rural population a major user of firewood, starts using energy efficient fossil fuels following an improvement in their living standards with improved economic conditions. The present annual consumption of firewood is 302 M tonnes/annum in India. Firewood accounts from 20-30% of all the energy used in India and 90% of which is in the domestic sector.

Wood import and export of many farm grown trees are considered as agriculture produce and is not readily allowed. The prices of wood have already recorded all time high rates in all the local wood markets. Recently, some industrial units closed down their operation since high costs of locally available wood were making their business uncompetitive and unsustainable. The free trade of farm grown wood similar to other tree species could have allowed the industry to get import of low value wood. Plantation activity was very low during 2003-2005 and farmers were not getting its prices even at par with that from agricultural crops. Export of its wood during that period could have made farmers to realize better value for their tree produce and to keep them tempted to remain in its culture. The present crisis of non-availability of its wood as a result of very low planting during 2003-2006 could have been avoided. The policy on import and export of farm grown timbers thus needs to be revisited periodically on the pattern of agricultural produce to balance and readjust the gap between demand and supply of wood.

Shifting of WBI is taking place among different locations in India. One such shift was recorded when the panel industry post Supreme Court judgment of Godavarman V/s Union of India moved from Eastern India to the poplar growing region (Dhiman 2004). This shift has though provided good opportunity for these new locations to develop plantations and panel industry base, it uprooted most of the WBI operating in northeastern states. Northeastern region has good rainfall and deep soil conditions with excellent tree growing conditions. The WBI could have developed raw material for their industrial units in those locations rather than getting uprooted and shifting their manufacturing facility elsewhere. Poor wood raw material availability and its ever escalating costs in north India are now making this industry unviable in domestic and international trade. Imported wood, semi-finished and finished wood products are already reaching the panel manufacturing base in north-western India. A similar migration/shift in panel industry is presently taking place towards port sites since low cost imported wood is encouraging such a change. Availability of wood for such an industry even at port locations could be affected in the future based on environmental regulations for cutting trees getting an upper hand in countries exporting the wood. It is in the interest of WBI to draw a long term strategy for their operations and businesses.

MATCHING ORGANIZATIONAL STRUCTURE

Production forestry, unlike traditional forestry on non-forest area, is supported by numerous farmers and players from the private sector. These new foresters are significant stakeholders in production forestry, yet do not find adequate space and support in the present policy initiatives on forestry and agriculture sectors. Farmers see forestry activity as an opportunity of diversifying their portfolio on farm land and grow trees as cash crops to improve their earnings. This diversification also provides them a security against failures of their annual crops. The private sector recognizes it as the only mean for survival of their business since they now do not get wood supplies from government forests. Their inability to hold land above meager ceiling limits has forced this sector to develop partnerships with the farming community to grow wood raw material. The private sector is therefore engaging in indirect activity of promoting plantations by producing quality planting stock, developing new clones through tree improvement programs, providing technical knowhow to grow good plantations in association with agricultural crops wherever possible and by ensuring markets for the purchase of the wood grown. A major share of the planting stock of poplar, eucalypts and a few other species planted by farmers and even a little by the government institutes is now being made available by the private sector. The unorganized sector which includes individuals separate from plantation companies, farmers and even small private companies have now started making significant contribution in planting stock production and their supply to the tree growers. Many of them started this activity as a business opportunity for them in remote villages where employment opportunities are very limited. Government sector including state forest departments, state agriculture departments, state agricultural universities and forest research institutes hardly grow poplar nurseries for their supply to

the farmers and these collectively have insignificant contribution in the total production and supply of poplar saplings to the tree growers. Some private sector players now employ dedicated human resources for providing extension support system to farmers and for focused R&D and nursery stock production of suitable tree species. The farmers and the private sector are contributing to the maximum of production forestry need to be engaged in any meaning full organizational structure.

COMMITTED INSTITUTIONAL RESOURCE

Plantation forestry on non-forest land especially on farm land is now redefining the productivity parameters both in term of quantity and quality of the wood produce. Some tree species like *Leucaena leucocephala* are being harvested at a very short rotation of two years for pulp wood, whereas, some others like *Populus deltoides* at less than 4 years for timber production in some locations. Some tree species like poplar, kadam (*Anthocephalus kadamba*), drek (*Melia azedrach*), etc are being better produced on agricultural holdings than that on forest land. Cultural operations in agricultural crops help these trees grow very fast. It is possible to harvest very high wood yields on good soil sites with better drainage and frequent earth working. The maximum wood production that has ever been recorded in India has been reported from the farm grown poplar, eucalypts, *Leucaena*, *Casuarina* etc. Eucalypts in the Terai Region of Uttarakhand has been reported to yield true volume upto 66.75 m³/ha/year at 10 years rotation when grown on farm land, whereas, poplar under similar conditions in Punjab has been reported to yield timber upto 58.39 m³/ha/year at 5 years rotation (291.98 m³ or 248.324 t/ha in five years) (Dhiman 2011). Poplar and eucalypts planted in agroforestry are producing around 20-30 m³timber/ha/year on farm lands, which is very high productivity in comparison to 0.5 m³/ha/yr from the government forests. The very high productivity of agroforestry plantations is a motivating factor for making it economical remunerative to its growers. The above productivity figures are from the production forestry being practiced by the farming community on farm land and are the direct output of farmer's initiatives and private sector innovations. Institutional framework for production forestry on non-forest land needs to be looked at beyond the existing infrastructure in forestry and agricultural sectors.

Tree culture on farm land differs from that on forest land. The productivity of trees is much higher on farm land in association with agriculture crops than their growth on forest land. Even planting of some trees like eucalyptus by the growers is staggered during the greater period of the year. The inventory of trees on the farmland and wood availability is thus changing on day-to-day basis. Wood harvests are decided on the financial needs of growers than sound forestry principals. Some unusual happening sometimes significantly disturbs this continuum of wood production and harvest. A dedicated and committed institute needs to be in place for further excelling in this sector. The present government system of documenting the inventory of trees on farm land is inadequate. There appears to be a lot of overlapping of trees documented between government and non-government land because of the methodologies adopted in monitoring the tree inventory.

EVOLVING INTEGRATED LAND USE

The role of non-forest area in production forestry is widely recognized and appreciated. Integrated land use encompassing components and practices from agriculture, horticulture, forestry and animal husbandry on the same piece of land is gaining recognition in many parts of the country. The introduction of tree components on farm land even in the most agriculturally productive belt of north western Indian states has been accepted as a widely followed practice. Public private partnership (PPP) in forestry activity is also finding operational feasibility (Deshpande 2005). It involves private sector, farmers and the financial institutions and the role of each stakeholder is well defined. This mode of wood production through farmers has been reasonably successful for both the WBI and growers with some exceptions. WBI is now completely relying on the farming community for providing wood from their farm land.

Farmers only grow trees on their farm land, if market conditions favor remunerative returns- at least better than that from the traditional agricultural crops. The present level of farm land use favors tree culture because of very good market prices of wood produced. Better appreciation in returns associated with agricultural crops on developing scarcity of food or on introduction of high value crops or decline on wood prices lead to decline in tree culture. This affects wood availability and directly impact functioning of WBI. The present low cost of imported wood in comparison to locally grown wood, and also that of finished and semi-finished wood products could also affect the present activity of wood production leading to long term negative impact on WBI.

OTHER ISSUES

The mechanism of registering new WBI is completely changed post the judgment of Hon'ble Supreme Court on Godvarman V/s Union of India matter. Central Empowered Committee (CEC) under the supervision of the Hon'ble Supreme Court of India now closely monitors the registration of new wood based industry which is only allowed once the additional availability of wood is ensured in that state. An undertaking is also taken from the new units that they will make their own arrangement of wood of selected tree species for their product manufacturing and will not demand any wood from the state governments. This is a highly conservative approach wherein new WBI will be allowed, provided the additional availability of wood is proven from the production forestry. However, the reverse is not true in case the growers could have grown enough wood on their farms and there is no market for their produce.

Forest tree species failed to attract the attention of the Plant Variety Authority for registration of tree cultivars as a result, some cultivars developed by the tree breeders are not getting recognition. Whereas, such a mechanism is already in place for agri-crops whose varieties are registered under the Plant Variety and Farmers Right Act (2005). It is the need of the day when numerous spurious nursery growers fleece the tree growers on the name of hybrid, tissue cultured plants.

CONCLUSION

Production forestry has now shifted from government forests to non-forest land where the farming community with the help of the private sector grows productive plantations. The traditional role of forests as a revenue generation land resource for the respective states through sale of wood is now marginalized. Maintaining acceleration in this surging sector is a tedious job in view of complexities of market economies, demographic nature of Indian population largely depending on agriculture food production and many aspects related therewith. This sector therefore needs focus at all levels from planning, policy, organizational, institutional and operational levels for sustaining and improving this activity. India is heading towards chronic shortage of wood for domestic and industrial needs and it will be an uphill task to minimize the presently existing gap between demand and supply, if due focus is not given to this sector.

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Assessment of Tree Health Along Trevor Road, New Forest, Dehradun: A Case Study

Kavita and N. S. K. Harsh *

INTRODUCTION

By the year 2020 more than half of the planets' inhabitants are expected to be living in urban areas and the trend of urbanization will be more dramatic in developing world. This unprecedented increase in the pace of urban development has significantly affected man's relationship with trees and forests. In this changing scenario urban forestry remains the sole connection between the man and trees. In the wider sense urban forests include any kind of woody plant vegetation growing in and around the human settlements viz. parks, gardens, avenues, roadside plantations, etc. Among these, roadside plantations grow in more stressed conditions, viz. compact soil, soil mounding, extensive grade changes and cuts within the drip line of trees, wire girdling, trenching, mechanical bruising and wounding during construction activities which serve as entry points for many pathogens and affect the tree health. Consequently healthy looking trees turn into hazards instead of supporting the life in urban environment as they become more prone to high velocity winds and storms. Same is the case with plantations along various roads of Forest Research Institute (FRI), Dehradun, in New Forest Estate. Because of their age, continuous exposure to the stresses and also absence of proper care and maintenance, they are not completely serving their purpose of existence. Because of the defects and diseases they are not beautifying the area, although they are contributing in improving the environmental conditions but they pose serious threat to the life and property. The study includes the detailed surveying of one of the most used roads of FRI, New Forest campus, Trevor Road, with respect to the defects and diseases observed in the trees and also the suggestive measures for improvement.

MATERIAL & METHODS

The study was made at Trevor Road, FRI, Dehradun, after dividing the area into three parts. Starting from the main Trevor Gate towards north up to the crossing of Wilmot Road covers the first part i.e. Section "A" in which *Grevillea robusta* is the major tree species. Then from Wilmot Road crossing to Hart Road crossing is the second part, Section "B" which is dominated by *Chorisia speciosa* and Eucalypts. Last part is from this crossing to the Hill Road, Section "C" in which *Lagerstroemia flos-reginae* is interplanted with *Syzygium cuminii*. The trees were numbered

from Trevor Gate towards Hill Road (left and right side separately). On 19th April, 2010, a storm affected the area and observations were also taken after the storm.

Total 226 trees and 48 poles on both sides of the road were analyzed on the basis of 25 parameters under three major factors viz. types of defects, human interference and soil conditions. Study factor type of defects include 7 sub factors which were dead tree/branches, diseased tree, root problems, cracks, weak branch union, poor architecture and epiphytes. Human interference had been divided into 4 sub factors which are foot/vehicular trampling, electricity wiring or nails around the branches/trunk, domestic waste within the protected root zone and pole and trenches within the protected root zone. Soil grade and compactness was studied under soil conditions. Various signs and symptoms were noted for diseased tree. Signs include sporophores, epichormic branches, termite mound and exudation whereas symptoms include canker, gall, witches broom and decay.

After observing all these factors, total 226 trees were placed into three hazard categories i.e. high moderate and low hazard categories, according to the number of problems and the intensity of defects. Height and girth of the trees were also measured with the help of Ravi Altimeter and Measuring tape respectively.

Maps were made by using GIS software ERDAS to locate the study area and trees of various hazard categories.

RESULTS AND DISCUSSIONS

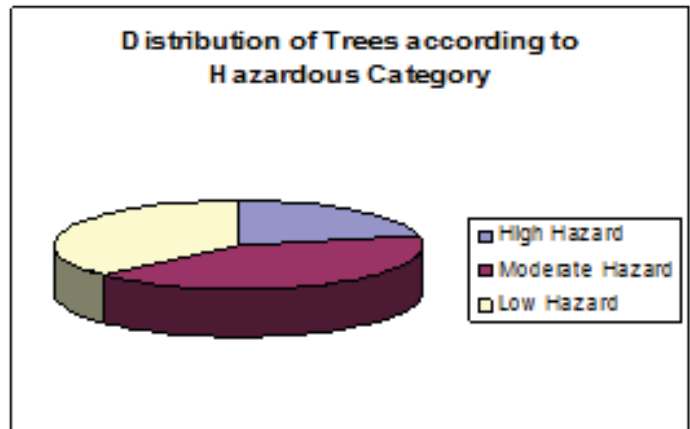
Results of Section "A" Trevor Road

Tree species and their numbers

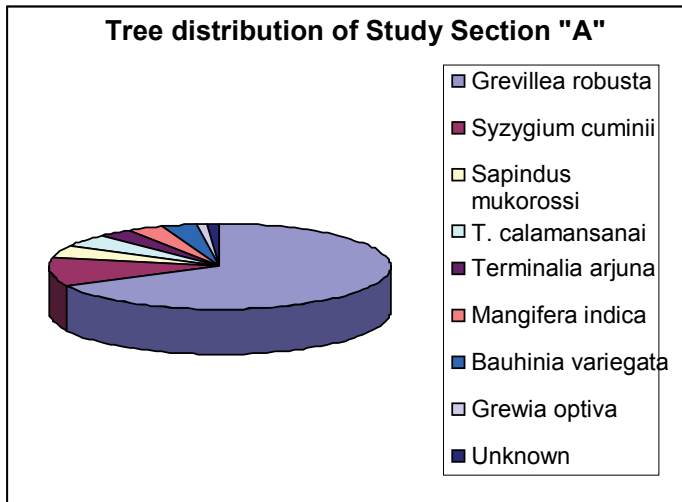
Name of tree species	Number of trees
<i>Grevillea robusta</i>	59
<i>Syzygium cuminii</i>	10
<i>Sapindus mukorossi</i>	4
<i>Bauhinia variegata</i>	4
<i>Terminalia arjuna</i>	2
<i>Mangifera indica</i>	3
<i>Terminalia calamansanai</i>	3
<i>Grewia optiva</i>	1
<i>Terminalia tomentosa</i>	1
Unknown	1

Distribution of decaying fungi in Section "A"

Name of Tree species	Name of Sporophore	No of Trees
<i>Grevillea robusta</i>	<i>Hexagonia tenuis</i>	25
<i>Grevillea robusta</i>	<i>Phellinus durissimus</i>	1
<i>Syzygium cuminii</i>	<i>Phellinus caryophylli</i>	5
<i>Sapindus mukorossi</i>	<i>Hexagonia tenuis</i>	1
<i>Grewia optiva</i>	Unknown	1
<i>Delonix regia</i>	Unknown	1



Tree distribution of Study Section "A"



Trees in different hazard categories in Section "A"

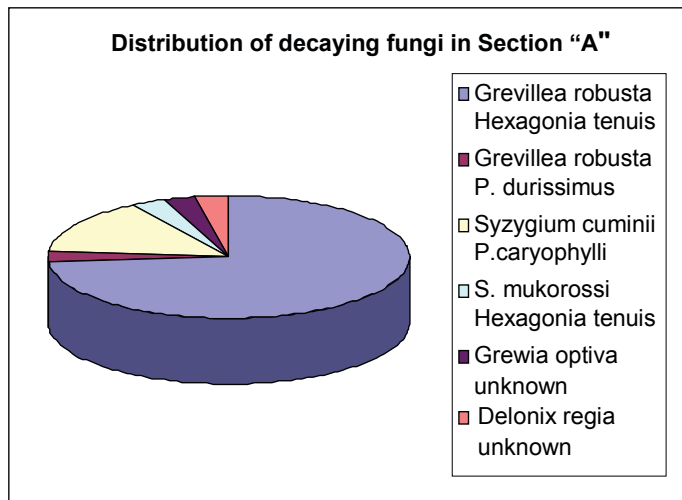
Category	Tree no. (RHS)	Tree no. (LHS)
High Hazard "1"	23,25,26,34,35,37,40,46	2,5,11,14,19,20,22,29,30,38,43
Moderate Hazard "2"	1,2,3,4,6,9,14,15,17,20,24,27,30,31,36,38,39,42,43,44,45	7,16,18,21,23,26,27,28,31,32,33,35,36,37,41,42
Low Hazard "3"	5,7,8,10,11,12,13,16,18,19,21,22,28,29,32,33,41	1,3,4,6,8,9,10,12,13,15,17,24,25,34,39,40

Relationship from the Height-Girth Ratio and Hazard Category:

Height: Girth ratio range	Hazard category
6 – 11	'1' or '2'
11 – 14	'2' or '3'
> 14	'3'

Correlation Coefficient of height girth ratio and category no. = 0.4

Distribution of decaying fungi in Section "A"



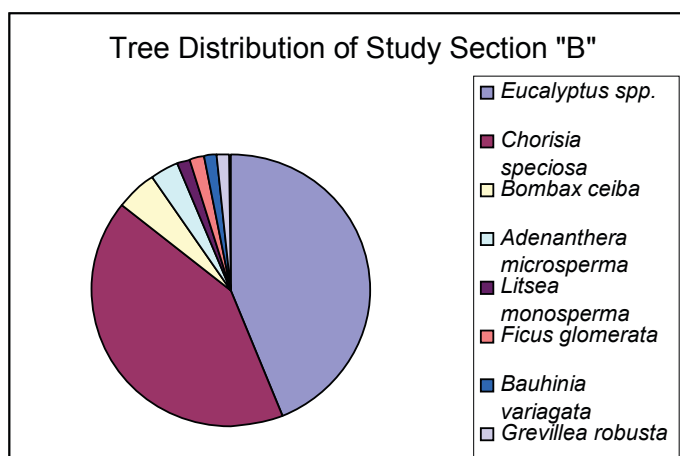
RESULTS OF SECTION "B" TREVOR ROAD

Tree species and their numbers

Tree Species	Number of Trees
<i>Eucalyptus</i> spp.	28
<i>Chorisia speciosa</i>	27
<i>Bombax ceiba</i>	3
<i>Adenanthera microsperma</i>	2
<i>Litsea monosperma</i>	1
<i>icus glomerata</i>	1
<i>uhinia variegata</i>	1
<i>Grevillea robusta</i>	1

Hazard category wise distribution of trees

Category	No. of Trees
High Hazard	19
Moderate Hazard	37
Low Hazard	33



Trees in different hazard categories in Section "B"

Category	Tree no. (RHS)	Tree no. (LHS)
High Hazard "1"	47,50,51,52,53,54,56,58,59,62,64,66,67,74,76,79,80,81	52,53,55,58,61,62,64
Moderate Hazard "2"	49,55,60,61,63,65,70,71,72	44,45,46,47,48,49,50,51,54,56,59,60,68,70
Low Hazard "3"	48,57,68,69,73,75,77,78,82	57,63,65,66,67,69,71

Relationship from the Height-Girth Ratio and Hazard Category:

Height: Girth ratio range	Hazard category
6 – 11	'1', '2' or '3'
11 – 14	'1' or '2'
> 14	'2'

Correlation Coefficient of height girth ratio and category no. = 0.04

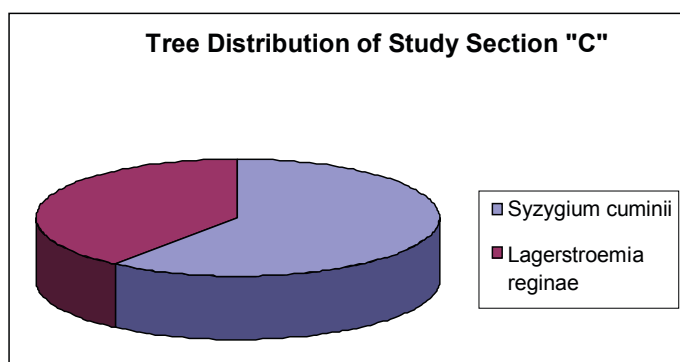
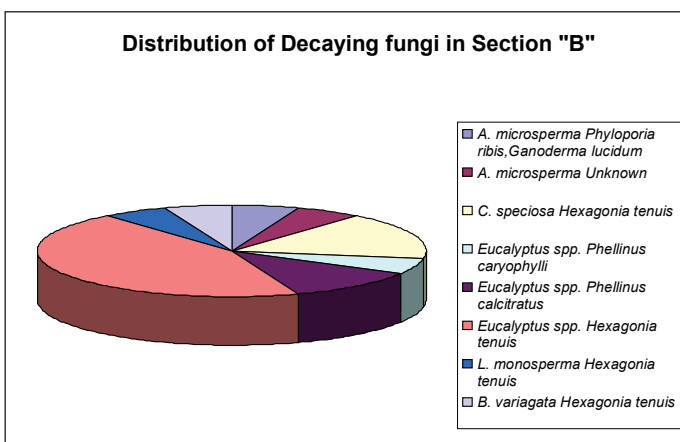
Distribution of decay fungi in Section "B"

Name of Tree species	Name of Sporophore	No of Trees
<i>Adenanthera microsperma</i>	<i>Phyloporia ribis</i> , <i>Ganoderma lucidum</i>	1
<i>Adenanthera microsperma</i>	Unknown	1
<i>Chorisia speciosa</i>	<i>Hexagonia tenuis</i>	3
<i>Eucalyptus sp.</i>	<i>Phellinus caryophylli</i>	1
<i>Eucalyptus sp.</i>	<i>Phellinus calcitratus</i>	2
<i>Eucalyptus sp.</i>	<i>Hexagonia tenuis</i>	8
<i>Litsea monosperma</i>	<i>Hexagonia tenuis</i>	1
<i>Bauhinia variagata</i>	<i>Hexagonia tenuis</i>	1

RESULTS OF SECTION "C" TREVOR ROAD

Tree species and their numbers

Tree species	Number of Trees
<i>Syzygium cuminii</i>	44
<i>Lagerstroemia flos-reginae</i>	29

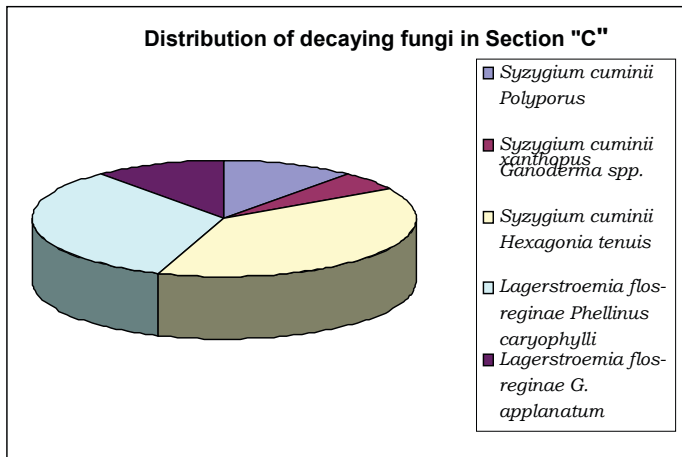


Distribution of decay fungi in Section "C"

Name of Tree species	Name of Sporophore	No of Trees
<i>Syzygium cuminii</i>	<i>Polyporus xanthopus</i>	2
<i>Syzygium cuminii</i>	<i>Ganoderma spp.</i>	1
<i>Syzygium cuminii</i>	<i>Hexagonia tenuis</i>	7
<i>Lagerstroemia flos-reginae</i>	<i>Phellinus caryophylli</i>	6
<i>Lagerstroemia flos-reginae</i>	<i>Ganoderma applanatum</i>	2

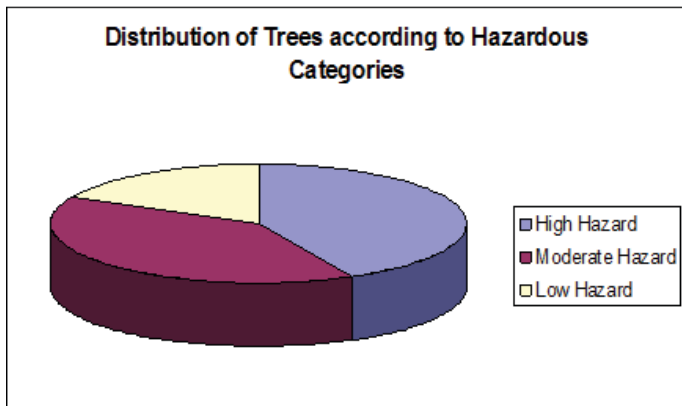
Hazard category wise distribution of trees

Category	No. of Trees
High Hazard	25
Moderate Hazard	23
Low Hazard	16



Hazard category wise distribution of trees

Category	Number of Trees
High Hazard	31
Moderate Hazard	29
Low Hazard	13



Tree in different hazard categories in Section "C"

Category	Tree no. (RHS)	Tree no. (LHS)
High Hazard "1"	86,87,88,90,92,94,97,100,103,104,106,108,110,114,116	73,75,81,82,83,91,94,96,98,100,102,104,106,108,110
Moderate Hazard "2"	83,84,89,95,96,98,99,101,102,107,111,112,113	72,76,78,79,80,84,88,89,90,92,97,99,101,103,105,109
Low Hazard "3"	85,91,93,105,109,115	74,77,86,87,93,95,107

Relationship from the Height-Girth Ratio and Hazard Category:

Height: Girth ratio range	Hazard category
3 – 9	'1'
9 – 15	'2' or '3'
> 15	'3'

Only 3 trees out of 73 are with height- girth ratio greater than 15.

Correlation Coefficient of height girth ratio and category no. = 0.4

On the basis of studies made, following problems of the trees along Trevor Road have been observed:

1. Section "A" from main Trevor Gate now Shatabdi Dwar (Centenary Gate) to the crossing of Wilmot Road

- All the trees of *Grevillea robusta* were noticed suffering from soil mounding problem. Because of raised grade the roots get suffocated from the added soil which buried the active roots in deeper layers and also due to increased moisture content during rains. Consequently, in some trees root girdling has started as the roots have come on the surface in search of oxygen as well as new root growth from increased soil line. Common indicator of root stress is top dying which has been observed in some trees.

- Second problem related to physiological stress was exudation in *G. robusta* trees. Out of 59 trees, 27 exhibited oozing of gum like substance from the cracks in the bark indicating severe physiological stress. Boron deficiency has been reported to cause bark cracking and exudation of gum in *G. robusta*.

- Decay symptoms like forking, cavities, swellings, branch stubs, broken branch injuries and wounds were common in 45 out of 59 trees of *G. robusta*.

- On the right hand side of the Trevor Road (facing Shatabdi Dwar), cable TV wires are supported on the branches of 18 to 20 trees which are showing girdling by this wire. Some of the branches are already broken and become dead (tree no.14, 16) because of girdling.

- Ficus religiosa* was growing as epiphyte on *Grevillea robusta* trees had started strangulating the main tree. Decay on the opposite side of the portion at which the roots of *Ficus* are attached to the tree, was continuously increasing. In most of the cases epiphyte growth was noticed associated with the cavity in the trees. In the trees where epiphyte was small the cavity was also small but where epiphyte was large cavity size was comparatively large. Tree no. 16, 21, 23,36,39,41, 43 of right hand side and 13,18,21,35 of left hand side of Trevor Road were the trees with epiphytic *Ficus religiosa* on tree no.43 *Lantana camara* was also seen growing as epiphyte.

- Injury with sharp edges like sickle and swords was observed in some trees near the butt region, this might have occurred during the grass cutting by the laborers in cleaning and by ladies who collect grass for their cattle.

- The trees which are very near to the entrance of houses and drains have suffered more because of more compact soil in the protected root zone by regular movement of vehicles and human beings.

- In *Grevillea robusta* epicormic branches were observed in most of the trees i.e. more than one branch arising from a single node and that too almost at the same height, within the range of 1.5-2 m. It may be conjectured that at some time the trees might have faced some kind of natural disturbance like frost.

- In some trees of *Grevillea* upright branches are also observed that form a weak union with the branches on which

they are growing and are more hazardous.

- In case of *Syzygium cuminii*, 5 trees out of 10, were suffering from heart rot caused by the fungus, *Phellinus caryophylli*. External indicators of heart rot were also visible like swollen bole, hollow sound and presence of sporophores.

- Canopy of *S. cuminii* was observed in disproportionate branching pattern, as some branches were very large and entangled with the canopy of near by trees, due to lack of pruning at proper time and lack of proper spacing between the trees.

- Forking was noticed in nearly half of the trees of *S. cuminii*, which indicated the heart rot disease, as bad forks not only indicated the poor union but also increased decay in the tree due to the accumulation of moisture during rains, which invites various heart rot pathogens.

- *Terminalia calamansanai* and *T. arjuna* were found growing well but forking and top dying were frequently observed indicating that their roots were in stress. Tree no.5 of *T. calamansanai* on left hand side of Trevor Road was completely strangulated by *Ficus religiosa*.

- *Sapindus mukorossi* trees were observed with cankers, cavities and dead and decaying branches with presence of sporophores of fungi. The possible reason for this could be decreasing vigour with age as no significant wound or injury was noticed. However, presence of large stones over the roots contributed to the root stress.

- *Grewia optiva*, tree no. 43 of left hand side of Trevor Road was found completely strangulated by *Ficus benjamina* and also with large cavity in a branch which was decaying as fruiting bodies of unknown fungus was present in the cavity.

- The correlation coefficient between the height-girth ratio and hazard category was calculated as 0.405. This value is positive which shows that both height-girth ratio and category are moving in the same direction i.e. if ratio increases no. of hazard category also increases. This suggests that with the increase in height-girth ratio the corresponding tree shows fewer hazards. As the value is 0.405 that means there is medium correlation between height – girth ratio and hazard category in Section “A”.

2. Section “B” from Wilmot Road crossing to Hart road crossing

- Main species growing in this Section are Eucalypts and *Chorisia speciosa*.

- According to the records [working plan (2000-2010) by R.K. Singh] eucalyptus plantation is around 37 years old which is very long duration for eucalyptus as its rotation age is not more than 10-15 years. Because of this long period of standing and that too with no proper management specially pruning, the trees have developed large disproportionate branches. These branches have entangled within the canopy and in some cases with the canopy of nearby trees. Broken branch injuries, many dead branches, canker, exudation of gum, fusion of branches and blazing were the common problems in eucalyptus trees in Section “B”.

- A new fungal species causing heart and butt rot *Phellinus calcitratus* has been collected and being reported from Eucalyptus tree no. 53 and 64 on left hand side of Trevor Road.

- *Chorisia speciosa* trees of this Section were noticed to be suffering from heart rot as in most of the trees swollen bole with hollow sound has been observed which are common indicators of

heart rot disease in trees. Blazing was observed in all the trees of *Chorisia* and in some cases this blazing was seen associated with swelling of the bole which indicated that the decay in the tree started from the point of blazing.

- Crooked appearance along with forking of branches and weak branch union in trees has made them more prone to high velocity winds as was noticed by breaking of branches during the recent storm.

- A tree of *Adenantha microsperma* (no. 47) on right hand side of Trevor Road was suffering from *Ganoderma lucidum* root rot and also attacked by other pathogen *Phylloporia ribis*. Top dying, canker and cavities were also observed in this tree. Another tree on left hand side (tree no.44), was also noticed attacked by one wood decaying fungus (unidentified), but its condition was better than former.

- In one *Bombax ceiba* (tree no.68) on right hand side three large iron rods were seen protruding from the stem causing internal injury. On tree no. 63 on left hand side epiphyte was growing.

- The correlation coefficient between the height-girth ratio and hazard category was calculated as 0.040. This value is positive which shows that both height-girth ratio and category are moving in the same direction since this value is too small it is difficult to say that there is any correlation between the two. This small value may be because in case of *Chorisia* trees, due to blazing, decay started in early ages and their growth had been inhibited. Owing to their crooked appearance their actual height has also affected.

3. Section “C” from Hart Road crossing to Hill Road crossing

- In Section “C” only two species are present one is *Syzygium cuminii* and second is *Lagerstroemia flos-reginae*.

- All the *Lagerstroemia* trees of Section “C” were suffering from decay problems viz. swellings, knots, hollowness, broken branch injuries, wounds with callus, epicormic branches and also severe attack by termites.

- On right hand side tree no.87 of *Syzygium* was with large cavity with white rot as caused by *Ganoderma lucidum*, because of this heavy decay it has been put in hazard category no.1.

- Tree no.89, 98, 99, 102 and 107 were with forking branches, while on tree no. 107 epiphyte was also growing and its root were seen penetrating inside the fork. In tree no. 91 epicormic branches were present, forking constituted the weak union.

- In *Syzygium*, tree no.82, main trunk was broken and decaying and new branches coming from the side of the top.

- Trees on the left hand side were facing severe root stress because of drain on one side and hard floor, electricity poles and wiring near Hari Singh auditorium.

- After IGNFA, New Hostel, human interference near the trees was much more as people residing in the Section keep cattle and cut grass which caused injuries to the base of trees during grass cutting.

- The correlation coefficient between the height-girth ratio and hazard category was calculated as 0.591. This value is positive which shows that both height-girth ratio and category are moving in the same direction i.e. if ratio increases no. of hazard category also increases. This suggests that with the increase in height-girth

ratio the corresponding tree shows fewer hazards. As the value is 0.591 that means there is large correlation between height – girth ratio and hazard category in Section “C”.

4. Young Trees in the Entire Study Area:

- Young trees (2006 plantation) of *Grevillea robusta* were found suffering from the problems of physiological stress as from most of them gum is oozing out with bark cracking.
- Improper pruning and girdling by wires had badly affected the plants as two plants have their top broken because of wires only.
- Termite attack was also a serious problem in Section “A” as mounding was observed in some plants.
- *Syzygium* trees were growing well but in two trees some cottony dots were observed which may be due to some insect attack.

5. Trees affected in the Storm of 19 April, 2010

- Breakage in the trees after the storm was caused mainly because of three reasons:
 - Weak forks
 - Decay
 - Canopy interruption or poor architecture

PREVENTIVE AND REMEDIAL MEASURES

As all the trees whether they are in hazard category 1, 2 or 3 are potential hazards for the life and property and the only way to completely eliminate a tree hazard is its removal. Complete removal of all the trees is not acceptable; moreover it is also not suggested. However, trees of hazard category “1” should be replaced immediately as they are the trees facing maximum number of problems with severe decay and for hazard category “2” and “3”, regular inspection and appropriate action is the best way to make the trees at low risk. All preventive and remedial measures need to be applied immediately as any delay would worsen the tree conditions.

Preventive measures

During construction of roads, walls, trenches for cabling and drains near the trees they are commonly exposed to following injuries:

- Stem wounds: Equipment, tools and vehicles hit the trees causing wounds on the bark and stem. Sometimes the trees are used to hold tools, to tie cables, etc. Similarly grass cutting near the trees also damages them. The wounds caused create infection cuts and weaken the trees.
- Root wounds: Excavation for trenches and drainage too close to the tree in the protected root zone severs and damages major roots, reducing tolerance to stress and creating infection courts for root-rot fungi.
- Fill: After road construction and sometimes to follow the design of the site, soil fill is often placed over the soil and even up against the base of the tree, which buries the active roots and cause suffocation.

To avoid all these problems, design and construction should be carefully planned to avoid tree damage. Soil mounding around the tree bases should be leveled. Grass cutting near the tree bases need to be done carefully.

Remedial measures

- Policy decision for removal of trees in hazard category ‘1’ and/or their treatment should be worked out. New plantation needs to be done with proper planning, spacing and suitable species as replacement. Take people into confidence for removal of trees and branches to avoid queries, petitions and explanations.
- Proper pruning followed by wound dressing can take care of large dead branches and tops of the trees which have poor architecture because of large branches. Canopy reduction is also advisable for the trees affected by root diseases and stresses. This will maintain the balance of the canopy and the roots.
- Instead of blazing, for tree numbering and naming, small stainless steel nails should be used for numbering or naming the trees (Bakshi *et al.* 1963).
- For cavity treatment, first decayed wood should be removed and then cavity should be filled with inert material like polyurethane/ polystyrene foam after surface treatment with fungicides like Tridemefon.
- Epiphytes such as *Ficus* spp. which are in their young age and phanerogamic plant parasites such as *Loranthus* spp. should be removed from the trees. Epiphytes at later stages may completely strangulate the tree and phanerogamic plant parasites reduce the vigour of the trees.
- Remove wires attached to the trees/ branches and in future avoid wiring the branches as they cause girdling.
- Dead and decaying branches should be removed before seasons of storms and rains by regular examination of trees.
- Forks should be examined and one of the branches should be removed to create balance followed by treatment of cut ends.
- Remove sporophores (fruit bodies) of fungi from the trees and burn them as they produce innumerable spores spreading the infection to neighbouring and other trees.

CONCLUSION

The health status and condition of trees growing along Trevor Road in New Forest campus, Dehradun have been assessed and it was found that the trees are showing different hazard categories, as many as 75 trees are falling in hazard category “1” and 90 trees are in category “2”. Various biotic and abiotic stresses have been attributed to the condition of trees. Preventive and remedial measures have been recommended which need to be applied immediately to check for the deterioration of the condition of trees.

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Forest Governance and Institutional Reforms in India: Urgent and Now

Sanjay Upadhyay *

INTRODUCTION: GOVERNANCE GENERALLY AND GOOD FOREST GOVERNANCE – SOME CONCEPTS

To understand forest governance and institutional reforms that are required in India, it is imperative that the terms that constitute them are also easily and well understood. So what does the term governance mean? There are at least three major elements of governance. First, the laws and the norms that provide a framework for enforcement and compliance; second, the institutions of delivery with both human and financial resources and the leadership that is provided to such institutions which impact decision making; and third, perhaps the most important aspect, the processes of decision making and how it is implemented.

So what is good governance and what are the parameters for good governance. Classically, transparency, effectiveness, efficiency, rule of law, accountability, equity, participation and societal engagement has been considered to be the elements of good governance. However, over the years, access to justice, access to basic information, coordination, convergence, measures against corruption and responsiveness are also considered as essential criteria for providing a framework for good governance. In this backdrop what could be good forest governance? In addition to the above, perhaps, the two essential pillars of good forest governance are sustainable resource and sustainable livelihoods. Further, equitable distribution of forest resources, rights with responsibilities in accessing and using such forest resources, clear norms with robust institutions and good processes would all constitute good forest governance.

INSTITUTIONS OF FOREST GOVERNANCE: THE MAZE AND THE COMPLEXITY AT VARIOUS LEVELS

There are at least three sets of institutions that impact forest governance in a democratic setup. The legislature, the executive and of course, an important third institutional influence is the judiciary. What is alarming over the years is the increasing overlaps amongst the above three institutions. There is by and large a presumption and assumption of doubt, attempt to control and mistrust. Add to it the federal and the state divide where

again there are presumptions and assumptions of doubt, control and visible mistrust due to the concurrent nature of the forest subject itself. If one has to see the larger canvas within which the forest governance especially the institutional arrangements play out, it is clear that there are conflicting mandates of various ministries which have surfaced far more in the recent past. The conflicting voices emerging from the Coal Ministry, the Tribal Ministry, the Power Ministry including renewable energy and the Mining Ministry are well documented.

The other obvious scenario that has emerged is the overlapping mandate which impact forest governance. The Ministry of Tribal Affairs or the Panchayati Raj or Ministry of Rural Development, Ministry of Science and Technology- they all overlap and have an impact on forest governance.

FOREST GOVERNANCE AND PARTICIPATORY INSTITUTIONS

Apart from the above, in larger macro picture perhaps what impacts forest governance most at the cutting edge level are the participating institutions especially those that have been created under the Panchayati Raj institutions, Joint Forest Management, institutions under scheduled areas and the most recent one under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forests Rights) Act, 2006 (FRA). Clearly, there are institutional overlaps and conflicts between these participatory institutions. The differences between the Ministry of Panchayati Raj and Ministry of Environment and Forests on who should control Joint Forest Management Fund whether they should be the PRIs or the JFMCs are well known². Similarly, institutions empowered under Provisions of Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA) and JFM have potential conflicts within them. The connect between executive initiative JFMCs and the statutory provisions of village forest under the Indian Forest Act are classical debates on forestry institutions at the local level. Add to it, the committees that are to be formed under the recently enforced Forests Rights Act and its linkage or rather the lack of it with the Joint Forest Management Committees which have existed thus far. Similarly, the traditional institutions managing community forest resources, and the more modern institution such as the Joint Forest Management Committees or the Eco-development Committees

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and their relationships are still not well defined. Last but not the least, the sixth schedule areas pose their own uniqueness in terms of autonomous institutions versus executive initiative institutions from the central and state government perspective as well as the constitutional and the policy led institutions. Let us understand each of these in a little more detail.

2 See letter No. No.22-8/2000-JFM (FPD) dated 24th December, 2002, Ministry of Environment and Forests, Government of India

PRIs and JFM

Between these two institutions there is this classical constitutionality vs. legality question that have been raised in the past. This has become slightly more complex with joint forest management taking legal roots in some states such as Uttar Pradesh, Uttarakhand, J&K, Himachal Pradesh and Karnataka where specific provisions of the Indian Forest Act especially Section 28 and Section 80 have been used to give them legal sanctity. What is important to understand is that 17 out of the 29 functions that are mandated under the Panchayati Raj framework, which is a constitutional mandate, actually relates to Joint Forest Management or Participatory Forest Management type of activities. Some states, therefore, have attempted to link the PRI structure with the JFM institutions. Thus, for example, Himachal Pradesh has tried to introduce Gram panchayat, in Madhya Pradesh the JFM meeting is supposed to be conducted by the Gram Sabha. In Uttar Pradesh, the Gram Pradhan is the Ex-Officio Chairperson of JFMCs and are there similar examples in Rajasthan, Andhra Pradesh, Orissa, Gujarat, Maharashtra and Bihar.

PESA and JFM

Under the Tribal Self Rule law or PESA the critical question relates to the ownership on minor forest produce and the obvious conflict is between the institutions that have been created by the state under the control of the forest department to manage MFP on one hand and the attempt of laws such as PESA to grant ownership and therefore transfer the complete control of such resource to empower Gram Sabha to strengthen them with such livelihood security, on the other. The debate continues and has in fact increased due to the passage of the Forest Rights Act. However, there are some critical questions that need answers and that have only been partially answered as of now. Thus, for example, under PESA the definition of Minor Forest Produce is not clear which has been partially corrected in the recent enactment of the Forest Rights Act. Further, the uniqueness of scheduled areas in the constitutional context certainly cannot be ignored and therefore, the JFM has to align around the constitutional mandate in scheduled areas as well as now under the Forest Rights Act. The experience and the analysis thus far, of the state responses to PESA have not been encouraging. There is a lot of reluctance of not only acknowledging these ownership rights but in fact an attempt to discourage any such conference of ownership to the Gram Sabha or forest dwelling communities at large. The Gadhchiroli Experience of Maharashtra or the Chief Minister of Chhattisgarh's letter to the Prime Minister on the relevance of Federation of MFP are classic examples of the simmering conflicts. The other important question that got partially addressed is the issue of jurisdiction. Where does and to what extent the right to such resources especially the NTFP

exists. The PESA was not clear and had left it to the jurisdiction and discretion of the state government. Whether such rights extends to National Parks, Sanctuaries, Reserve Forests, Protected Forests, Village Forests, Forest village, or whether it is limited to the Panchayat Forests was not clear in the past. Various terms have been used in state amendment to PESA. However, that distinction and lack of clarity has now been partially addressed by the passage of Forests Right Act which now extends it to the entire definition of forest land which has been defined quite broadly taking a cue from the definition of forest by the Supreme Court itself on December 12, 1996³. 3. See CWP No. 202 of 1995 in TN Godavarman vs. Union of India in the Supreme Court.

Joint Forest Management and the Indian Forest Act

By and large most of the Joint Forest Management orders around the country have no link or very little link to the Indian Forest Act or the State Forest Acts as applicable in the state. However some states, as stated earlier, do use Section 28 (the provision on village forest) or Section 80 and 81 relating to joint property management of forest areas and attempt to give legal sanctity. In the rest of the country the JFM instrument is a creation of policy and hence not enforceable. This has to be seen afresh in light of the FRA along with financial investment and human capital. The other drawback especially when compared with the IPA is that even the institutions created under the JFM framework i.e. Joint Forest Management Committees known by various names lacks legal strength. Some states due to guidelines by the central government register them under the Societies Act which by and large is a charitable institutional model. This is fundamentally at variance with the incentive based model that JFM propagates and therefore the Societies Act is not an appropriate instrument. Instead it should graduate and evolve to more entrepreneurial institutional arrangements and use far more sophisticated instruments such as the Companies Act and more specifically the producer company model. Then there is a legality of MoU itself. In most cases these are plain papers where Memorandum of Understanding is just an understanding and not enforceable in any Court of Law. In case of any variance to the MOU the recourse available is only financial or outright rebellion. There is no adjudication process which has a binding effect on parties to any dispute that may arise. There have been many occasions in the past where disputes relating to benefit sharing, duties, responsibilities and also jurisdiction have been raised. But in the absence of any clear grievance redressal mechanism such MoUs are inadequate from the legal stand point. The other interesting development is the planning process itself and the legality that it has assumed especially in view of Supreme Court orders. It is well known that the working plan, supposedly the "Bible of the Forester" is now a legally mandated document owing to the order dated 12.12.1996 of the Supreme Court in the Godavarman case⁴. However, the micro plans which are the essential planning tools of JFM, in most states do not get linked to the larger working plan of the Forest Department. This becomes problematic especially because any harvesting regime or protocol that may be carried out under the JFM agreement which itself is not legally binding has the potential of running contrary to the Forest Conservation Act if it is not linked to the working plan which, as stated earlier, is now a legal requirement. 4. C.W.P. No 202 of 1995

Community Forest Resource and Rights and JFM

Further the advent of the Forest Rights Act has thrown new challenges for forestry institutions at the local level. There is now a requirement of delineating community forest resource where community had traditional access and the right to such community forest resource is now a right recognized and vested in the Forest Dwelling Scheduled Tribes as well as the Other Traditional Forest Dwellers. But the linkage of such traditional access and management systems and the Joint Forest Management Institutions are still not clear. This needs urgent attention for avoiding any type of conflict especially because the nodal departments of these two legislations differ and often contradict each other on the ground. The institutional arrangement envisaged under the Forest Rights Act is the creation of Committees for forest and wildlife protection as per Rule 4(e) and this is also linked to the empowered duties under Section 5 of the Forest Rights Act. What is not clear is the linkage between exercise of these empowered duties, the institutional arrangement and the existing JFM institutions. This needs urgent clarity both at the policy level as well as the operational level.

VIth Schedule Areas, Special states and Joint Forest Management

North-eastern states (4 out of the 8 states have scheduled areas which are in the VIth schedule of the Constitution). These pose a different set of challenges as far as participatory institutions on forest management are concerned. Scheduled states have scheduled districts and have their own autonomous institutional arrangements which are constitutionally sanctioned. As a result the loose JFM institutional arrangement becomes quite out of place in the north eastern context and often is used only as a vehicle for fund transfer rather than any robustness of the institutions themselves. As a result, it becomes yet another centrally sponsored scheme with no real ownership of the local community who are far more accountable and responsible to the autonomous institutions and especially the village councils which have far more legal sanctity and social acceptance. Then there are special states where the Constitution has bestowed customary law supremacy in such states which are often ignored by externally driven JFM type of institutional arrangements. The states of Nagaland, Arunachal, Sikkim and Manipur in the North Eastern part of India are good examples of that. The Nagaland state, for example, under Article 371 A of the Constitution clearly notes that the customary laws have precedence or any more modern management system and this invariably and implicitly gives precedence to the customary institutions as well. It is therefore important to link participatory institutions of forest management with the existing customary institutions for better implementation and more effectiveness in terms of forest management.

Some opportunities missed and some past corrections required

One of the most surprising opportunities that has been missed and which is perhaps the central reason of local people alienation and indifference on forest management impacting forest governance is the lack of use of provisions relating to village forests. The village forest was a classic example of a reality or a realization

that local communities exist and reside in rich forest areas and therefore eliciting their participation and their involvement in day to day management of forests is inevitable. The village forest did provide a framework under the Indian Forest Act and in most state Forest Acts. However, this opportunity was completely missed. The assignment of management, responsibilities to local communities and the freedom to formulate rules of engagement has not been seen in majority states of the country. A few attempts such as in Uttarakhand under the Van Panchayat regime or under the Village Forest Rules of 1980 in Orissa have neither yielded enough results to be reflected nor provided guidance to the entire country. Instead anomalies such as forest villages which have been held to be unconstitutional, forest colonies, forest settlements have been created on a temporary basis more as a labour camps in the past than any constitutionally sanctioned or legally sanctioned institutions which could be used for posterity for forest management and forest governance. Clearly, the relevance in the modern arrangement needs to be looked afresh urgently and immediate corrective measures be put in place.

NEW AND EMERGING INSTITUTIONS ON FOREST GOVERNANCE

The emergence of new institutions is a good indicator of the manner in which the forest bureaucracy in general, and also some external triggers shape the institutional reforms in the country. These include both developments at the central government level as well as some states which take their own initiatives. A combative institution that has been witnessed in Assam for example, the Assam Forest Protection Force which has been created with new commando training colleges and almost has created a war like situation to prevent poaching of the endangered rhino and tiger. While there have been mixed results, on prevention of poaching it is an open and wide question whether this is the way forward for sensitive borders such as Assam where poachers are organized with automatic weapons and whether the state should respond in equal measure or there are some other methods to tackle the menace of poaching for profit. The other development is the diversion of the forest resource itself and the lack of an institutional frame to oversee its monitoring especially the manner in which the conditions of the clearance are monitored. The Supreme Court after long and detailed discussions hinted at creating an authority to monitor the areas that have been diverted for diversion of forest areas for non-forestry purposes. The compensatory afforestation management and planning authority which controls a huge purse of almost twenty thousand crores of what many term as blood money is yet another institution that has emerged over the years. The other huge area which lacks any institutional arrangement and where some non governments as well as government initiatives are at a nascent stage is the area of certification of forest products. The recent attempt by the central government to create an independent agency for forest certification will open new doors for institutional reforms for making forest based products legally certified and therefore more competitive in the global market. The amendment to the Lacey Act in the United States and the enforcement of the FLEGT framework in the European market would necessitate institutional reforms on forest certification, if India has to compete globally on forest

based products especially in the artisan sector. Then there are attempts to merge the concepts of biodiversity and rural livelihood improvement and there have been pilot studies on creating institutional arrangements under the biodiversity conservation and rural livelihood and rural improvement project supported by the World Bank. Such landscape level institutions are perhaps the institutions of the future where contiguous zones which address both biodiversity and rural livelihood concerns are necessary as an integrated whole rather than a compartmentalized approach where only conservation based institutions are created. This would be particularly useful in and around protected areas (PAs).

5. FORESTRY INSTITUTIONS AND THE NATIONAL FORESTRY COMMISSION

Another significant attempt, was the formation of the National Forestry Commission established under the chairmanship of the then Chief Justice which came up with reams of volumes on the kind of institutional reforms that are required in the forestry sector; whether it is the IGNEA with its curriculum and capacity of staff that needs to be improved; or whether they are the SFS training colleges under the Directorate of the Forest Research and Education and how their curriculum and capacity needs to be enhanced; or whether it's the ICFRE itself; or the Indian Institute of Forest Management or Indian Plywood Industries research and Training Institute Bangalore; the Wildlife Institute of India; the Forest Survey of India; the numerous forest development corporations at the state level as well as the State Forest Research Institutes. There have been numerous recommendations on and it's perhaps time to take a hard look at those recommendations and see what is possible in the short, medium and long term.

INSTITUTIONAL ARRANGEMENTS ON FOREST GOVERNANCE – SOME STRENGTHS AND WEAKNESSES

There are numerous statutory institutions that have been created as well as some quasi administrative and some informal institutions that have been created in the past and it would be useful to assess their strength and weaknesses to seek a way forward. Thus, for example, around the National Parks and Sanctuaries many states created ecodevelopment committees. It is well known that such EDCs were informal without any legal basis and by and large weak institutional mechanism around PAs to elicit people's involvement. Clearly, there is a need to look at it afresh. Perhaps one of the most significant statutory institutions of late is the National Board of Wildlife and the standing committee under it which is a creation of the amendments to the Wildlife Protection Act and which has gained more prominence due to the strict supervision of the Supreme Court. Every project in and around PAs now require the approval and the permission of the National Board of Wildlife apart from various Supreme Court orders and this pre-requisite has made the Standing Committee and thus the National Board of Wildlife a very prominent institution in forests and wildlife conservation. Recent criticism on the functioning

of the Board and the hurried manner in which due processes have been bypassed and projects have been cleared are certainly a cause of concern. It is, therefore, important to set up a more robust process, provide adequate information and ideally do ground truthing of the potential impacts of projects and co opt experts and members who are more familiar with the specific sector in which such infrastructure development or projects are coming up to take a judicious and pragmatic view of such projects in ecologically sensitive areas such as Protected Areas. The State Board of Wildlife a similar institution at the state level is now a statutory institution under the Wildlife Act. They again face a similar challenge and they are yet to emerge as a strong institution with binding mandate. They need to follow similar processes as the NBWL which are robust, transparent, based on good scientific knowledge, social parameters and ecological conscience which should be paramount in clearing or rejecting projects in such sensitive areas. Then there are statutory institutions created with new Protected Areas category which are yet to emerge in the country. These include the Conservation Reserve Management Committee, the Community Reserve Management Committee and also the provision for advisory committee under the Wildlife Act. There have been very weak responses to these statutory mandates so far. Some of the institutions such as the National Board of Wildlife or the Forest Advisory Committee created for clearance under Forest Conservation Act have become a mere clearing house and therefore, they have huge impact on conservation.

The current experience has been of a weak regulatory arrangement with too much executive discretion. This needs to be founded on pragmatic, scientific and more importantly within the rule of law framework for allowing or disallowing infrastructure projects in sensitive forest and wildlife areas. The other institutional arrangements such as the self initiated institutions for forest protection or traditional and community initiatives including informal institutions that have been created suo moto, lack legal recognition. The Forest Rights Act, perhaps partially addresses that question but not yet totally. Clearly, such self initiated institutions and traditional and community initiatives need full support of the governmental agency in recognizing their role in forest conservation and sustainable forest management. In the same light the Autonomous Hill Councils and the regional councils in North Eastern states especially under the VIth schedule areas need special emphasis and they need to be capacitated and engaged in forestry based activities.

Some other institutional arrangements such as the National Biodiversity Authority, the State Biodiversity Board and the Biodiversity Management Committees at the local level are less explored options for conservation. There is very little evidence to show coordinated functioning of these three working at the central, state and the local level. This perhaps requires innovative rule making processes (Nagaland Biodiversity Rules which are proposed is perhaps one direction) wherein this linkage of the third party, the authority, the board and the BMC needs to be coordinated. Similarly, traditional knowledge based institutions or traditional village institutions need more formal recognition for good forest governance.

FOREST RIGHTS ACT- THERE A NEED TO RESTRUCTURE THE INSTITUTIONS AT THE CUTTING EDGE LEVEL POST THE CLAIMS

The advent of the Forest Rights Act has now made it necessary that institutions on forestry and various nodal line agencies at the cutting edge needs to converge for a well thought out post claim strategy at the cutting edge level. This is necessary, as a mere title or assertion of right is only a first step towards securing livelihood for the forest dwelling scheduled tribes or the other traditional forest areas. It is also mandatory to wean the title holders from exploiting village forest resources through value additions and inputs in the recognized forest land where they exist. Some examples are trickling in from states such as Madhya Pradesh where such strategies are being thought through. It is also clear that synergy in various institutions on forest governance is now a key requirement. What is important is livelihood support through forest based enterprises and engagement in sustainable forestry at the cutting edge level. The real challenge however is to evolve institutional models with holistic approaches where both rights and resources coexist under one frame. There could be two possibilities. First, through a series of amendments, in various laws to link different statutory institutions for the environment, this obviously could be a cumbersome and time conserving process.

Instead, there is a second easier option. There is an urgent need to rejuvenate the thematic focus of the conservation regime and address simultaneously both aspects of livelihood and conservation. It is thus important to make the Gram Sabha as the basic unit and then integrate it with the mandate of other statutory institutions. This could also be weaved into the rules of engagements under the Forest Rights Act. It is important to identify themes and then strengthen the institutions around them. Thus for example conservation of wildlife resources would require using the strength of multiple institutions such as the State Board of Wildlife, the Conservation Reserve Management Committee, the Eco development Committee, the Biodiversity Committee and innovative practices such as sharing the compounding fees which has been done for example in Andhra Pradesh. Similarly, for conservation of biodiversity, the strength of both the Biodiversity Act and Wildlife Act has to be used simultaneously. Collection of minor forest produce, its conservation and sustainable use

including their marketing is another key area of work. Involving MFP federations, learning from their skills on various aspects of marketing and pricing is necessary to integrate with the ownership mandate which is now conferred by two laws namely PESA and FRA.

It is also important to conserve, manage and regulate and regenerate forests by not reinventing the rule but by drawing strengths from past practices such as in management experiments like JFM and community forest management processes of the past to ensure robust planning processes for the future. Clearly, for all the above, a sound capacity building and enhancement of the human resource skills for conservation activities would be essential pre-requisites. There are other key issues that may enable conservation through the recently enacted Forest Rights Act. First there are institutional arrangements for monitoring of diversion of forest land. The letter of MoEF in October 2009 is a good example. The Gram Sabha along with other support agencies could perhaps be the best agencies for housing such institutional arrangement for monitoring of diverted forest land. Similarly, linking with traditional institutions especially for conservation could also be the innovative strategy for the future. Last but not the least, securing financial support for micro and macro financial institution and arranging resources for both conservation livelihood could be key through both the Ministries for MoTA and MoEF and they need to do this through clear instructions.

CONCLUDING REMARKS

To conclude, it is sufficient to say that a root cause analysis of dismal performance of a variety of institutions is necessary before building new institutions for improving forest governance. It is also clear that the emergence of new institutions and their capacity to meet new challenges have to be thought through. The re-organizing and strengthening of the nodal ministries on forest governance itself i.e. the Ministry of Environment and Forests, the Ministry of Tribal Affairs, the Ministry of Panchayati Raj, the Ministry of Rural Development would go a long way in building synergies on forest governance. Last but not the least, the thematic delineation of functions of the grass roots institutions with requisite support from line agencies and building on strength of other functions, functionaries with requisite financial support is a key to long-term good forest governance.

Interpreting Medicinal Plants in Indian Traditions for Setting Conservation Priorities

D.K. Ved *

India's rich medical heritage is one of the oldest living health traditions in the world which is more than 3000 years old. This rich medical heritage is very intricately linked with the related knowledge base as well as the plants and other resources used for health related practices. The knowledge base of these health traditions consists of two streams. One stream consists of the codified systems of medical knowledge available in written form and handed down through the generations in the form of manuscripts and their interpretations. These codified systems of Indian medicine are Ayurveda, Siddha, Unani and Sowa-Rigpa. The other stream consists of non-written traditions which have been handed down the generations via oral communications. These oral health traditions embody a very high diversity of knowledge and practices which have flourished across more than 4000 different communities of India. Only a very small part of these practices have been documented and published in the form of ethno-botanical studies. As per the computerized database of Indian medicinal plants, being developed at FRLHT over the last 15 years, more than 6200 plant species have so far been documented in medicinal use in Indian traditions. A proper understanding of the status of these plant resources, mostly occurring wild in India, is an essential first step to guide appropriate management interventions for their long term survival and continued availability for health care use.

The electronic database on Indian Medicinal plants at FRLHT currently incorporates more than 8300 botanical names (6248 species) correlated to more than 1, 80,000 vernacular names in 30 Indian languages. Each of these plant entities carries one or more medicinal tag referring to its recorded use in one or more codified systems and/or in folk practices. A number of these medicinal plant species carry more than one medicinal tag on account of their usage across different Indian systems of medicine. Tabulated below is the count of species recorded in each of these systems and their overlap across other systems of medicine. Even Chinese system of medicine (TCM) has also been included for the purpose of comparison.

Interpretation of this datable reveals that out of 1539 plant species include in the materia medica of Ayurveda, 758 are also used in Siddha and 496 are also included in the materia medica of Unani system. It also shows that the number of species with Folk tag is highest at 4765.

Most of these medicinal plant species occur naturally across

Cross tabulation of number of Medicinal Plants Used across different Medical Systems

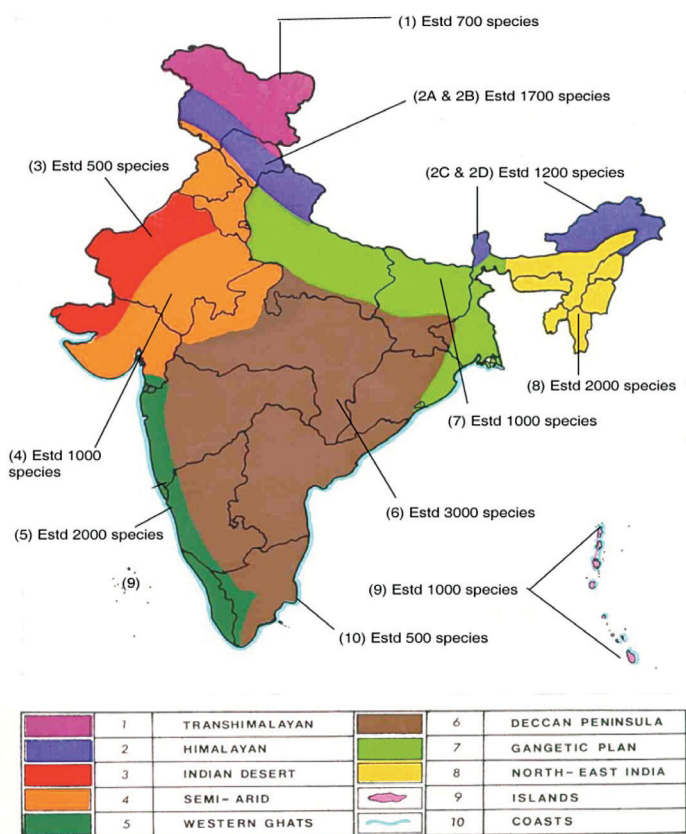
	AYURVEDA	FOLK	SIDDHA	TCM	SOWA-RIGPA	UNANI
AYURVEDA	1539	776	758	359	248	429
FOLK	776	4765	773	673	187	332
SIDDHA	758	773	1152	289	211	337
TCM	359	673	289	881	109	206
SOWA-RIGPA	248	187	211	109	252	179
UNANI	429	332	337	206	179	496

Total species: 6248

different bio-geographic zones of our country and an estimate of their number, bio-geographic zone wise, has been attempted based on analysis of distribution and distribution pattern of these.

This brings out the fact that the bio-diversity hot spots in North East India and Western Ghats are also the repositories of high number of wild medicinal plant species and even the bio-geographic zone "Indian Desert" also harbors around 500 medicinal plant species and a number of these are likely to be confirmed to the unique habitat. This analysis also highlights the need for appropriate conservation action and resource augmentation efforts for specific species in the appropriate regions.

To develop sharper focus on species which are currently under sizable commercial exploitation it is important to analysis the pattern and quantum of consumption of medicinal plant materials by the herbal sector. The industrial demand for the medicinal plant resources has been on the rise due to the worldwide buoyancy in the herbal sector engaged in production of herbal health care formulations; herbal based cosmetic products and herbal nutritional supplements. In India, nearly 9,500 registered herbal industries and a multitude of unregistered cottage-level herbal units depend upon the continuous supply of medicinal plants for manufacture of herbal medical formulations based on Indian Systems of Medicine. In addition to the industrial consumption, significant quantities of medicinal plant resources are consumed in the country under its traditional health care practices at the



household level, by traditional healers and by practitioners of Indian Systems of Medicine. Whereas, more than 6,000 plant species are being used in the codified and folk healthcare traditions in the country, the quantum of their consumption has remained a matter of guesstimate. The fallout of the lack of reliable species-wise demand estimates - so very important for sustainable management of medicinal plant resources - has been an inadequate focus on the management of medicinal plants in the country. In fact, wild populations of many a medicinal plant species, forming the major resource base for the herbal industry, are reported to be facing a serious threat of extinction on account of indiscriminate harvesting coupled with rapid habitat degradation and loss

It is in this context that the National Medicinal Plants Board (NMPB), Department of AYUSH, Government of India, supported a nationwide study to assess the demand and supply of medicinal plants in India. This study was undertaken by FRLHT during 2006-07. The results of this study brought out several important features of trade in medicinal plants and their implications on related plant resources. It is worthwhile to review some of the highlights of this study which are reproduced below:

Some of the highlights of this study are reproduced below:

(a) The annual demand of botanical raw drugs in the country has been estimated at 3, 19,500 MT for the year 2005-06. This estimate reflects synthesis of data related to consumption of botanicals by the domestic herbal industry, the rural households as well as the exports.

(b) A list of 960 medicinal plant species forming source of 1289 botanical raw drugs in trade in the country has been worked out.

(c) Of the 960 traded medicinal plant species, 178 have been identified to be in high consumption exceeding 100 MT per year (dry weight) each, with their consolidated consumption accounting for nearly 80% of the total industrial demand of all botanicals in the country. Analysis of these 178 species, by their major sources of supply, reveals that 21 species (12%) are obtained from temperate forests, 70 species (40%) are obtained from tropical forests, 36 species (20%) are obtained largely or wholly from cultivations/plantations, 46 species (25%) are obtained largely from road sides and other degraded land use elements and the remaining 5 species (3%) are imported from other countries

(d) 91 medicinal plants species in high trade are currently being obtained largely or entirely from the forests. Two more forest species, namely guggul (*Commiphora wightii*) and Agar (*Aquilaria malaccensis*), occurring wild in India are, however, largely imported on account of inadequate availability within the country.

These 93 wild medicinal plant species being consumed in large quantities and largely obtained from the forests need to be assessed in detail regarding their extent of occurrence, status of their wild populations as well as the specific plant parts and products being harvested. Based on a comprehensive assessment of these factors appropriate management interventions need to be worked out according high priority to *in situ* conservation as well as their sustainable harvesting and management.

Seasonal Abundance of Insect Pests Associated with Babchi, *Psoralea Corylifolia* Linnaeus in Uttarakhand

Arvind Kumar *

INTRODUCTION

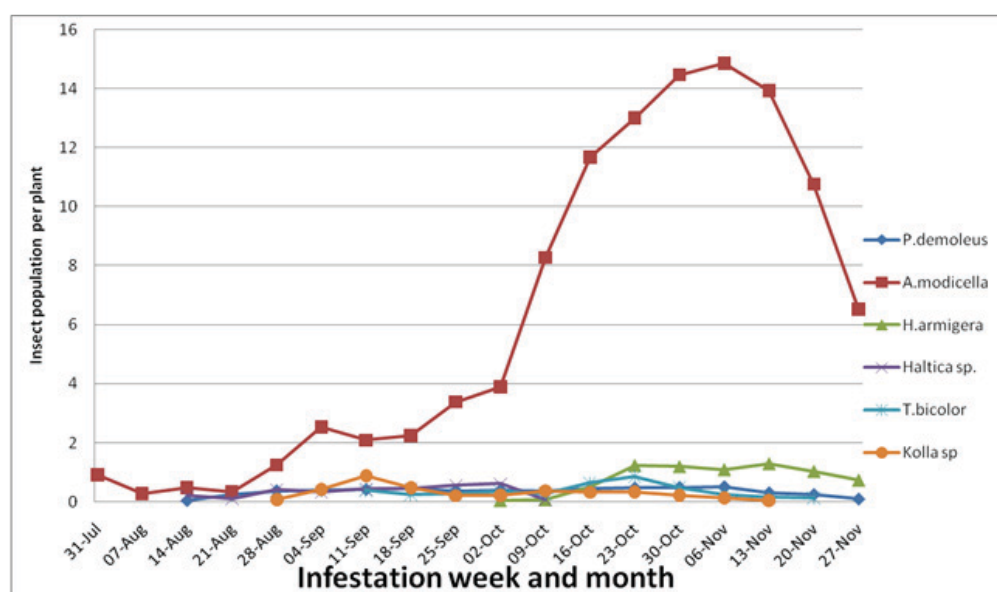
Babchi, *Psoralea corylifolia* Linn. (Family: Fabaceae) is a valuable herb used for many Ayurvedic preparations. It is native to tropical Asia extending from Arabia to Pakistan, India, Sri Lanka, Bangladesh, Burma and China. In India, it is a weed of roadside, cultivated fields and waste places. It is grown in plenty in forests of eastern Uttar Pradesh in the month of rainy season for the seed purpose (Chakraborti *et al.*; 1998) it is used in indigenous medicine particularly for treatment of Leucoderma, Leprosy, Psoriasis, Asthma, Dysturia, Anaemia, and Inflammatory skin diseases (Krishnamurthi, 1969; Cho Hyun *et al.* 2001). But due to various plant health stresses and other concerned persons are unable to get the maximum biological yield. Out of these stresses, insect pest are major one. The leaf miner, *Aproaerema modicella* (Deventer) (Lepidoptera: Gelechiidae) is a serious pest of Soybean which also attacks on Babchi, *Psoralea corylifolia* in Madhya Pradesh (Singh and Singh, 1989). Its larval stages mine the leaf and feed inside the leaf membrane by making galleries and pupate inside the galleries. Gupta (2000) reported that the *Papilio demoleus* is a serious citrus pest in India where it is distributed countrywide. It has also been

found on *Psoralea corylifolia*. Manoharan and Chandramohan (1986) observed that *P. corylifolia* grown in between groundnut crops acts as alternative food plants for the Gelechiid, *A. modicella* in Tamil Nadu, India. Joshi *et al.* (1992) were observed; Babchi, *Psoralea corylifolia* as a new host of *Aproaerema modicella* and *Papilio demoleus*. *Helicoverpa armigera* is a widely distributed polyphagous pest in India, it has been recorded from 182 plant species belong to 45 families (Pawar *et al.*, 1986). The economic importance of the crop and their insect pests, the development of the control measure should be priority footstep. While to make any strategy of controlling the insect pest, the knowledge of their seasonal abundance is must. Kipping above facts in mind the present study was undertaken to know the insect pest of babchi in Uttarakhand and their population dynamics.

MATERIALS AND METHODS

The field experiment conducted at Medicinal Plant Research and Development Center, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand during *Kharif* season. The standard agronomic practices pertaining to nursery raising,

Figure 1: Population of insect pest of Babchi per plant



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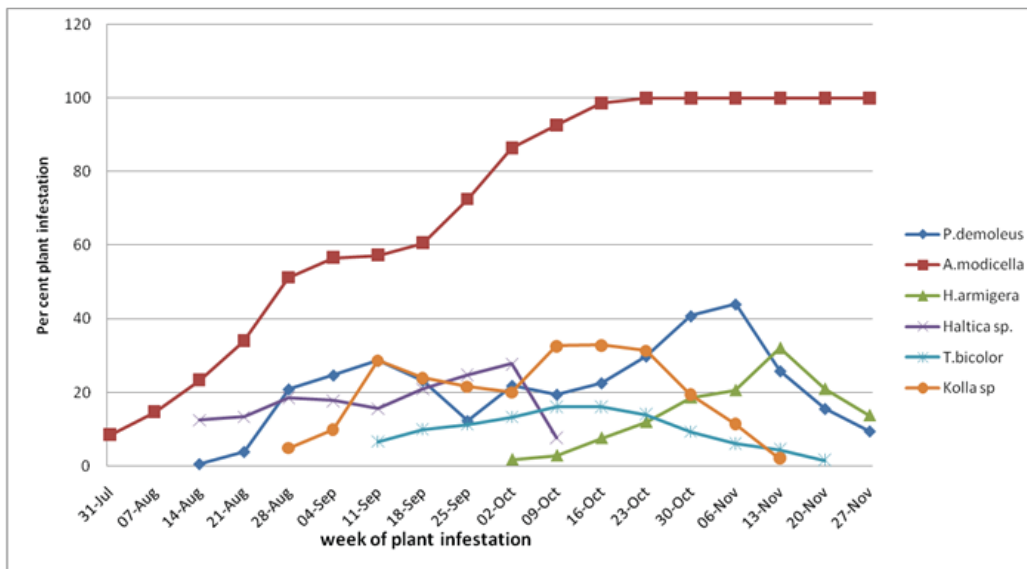


Figure 2: Per cent plant infestation of Babchi by insect

transplanting, and crop management techniques were followed to raise the healthy crop.

The experiment was conducted in five replications, each having measurement of 8 m². Row to row 75 cm and plant to plant 50 cm spacing maintained. Twenty-one-day-old seedlings were transplanted on 23 July. Randomly five spots having six plants each were selected and tagged in each replication. The observations were taken at weekly interval from last week of July (1 WAT) to last week of November (18 WAT) for number of infested plants and number of insects per plant.

RESULT AND DISCUSSION

Fig 1 revealed that six insect pests attacks on Babchi viz. *Papilio demoleus*, *Approaerema modicella*, *Helicoverpa armigera*, *Tricentrus bicolor*, *Haltica* sp. and *Kolla* sp. The population of *P. demoleus* larvae initially (0.05 per plant) observed in 14th August (3 WAT) and it was reached to its peak (0.51 per plant) in 6th November (15 WAT) then the population declined gradually. Population of *P. demoleus* was ranged between of 0.05 to 0.51 per plant. The population of *A. modicella* observed from 31st July to 27th of November, initially (0.91 per plant) observed in 31st July (1 WAT) and it was increased gradually and reached to its peak (14.86 per plant) in 6th November (15 WAT) after that population declined. Range of population recorded between of 0.27 to 14.86 per plant during the crop period. Population of *H. armigera* observed from 2nd October to 27th November (10 to 18 WAT) in which initial (0.05 larvae per plant) observed its peak population 1.30 larvae per plant observed in 13th of November (16 WAT). Beetles, *Haltica* sp. observed from 14th of August (3 WAT) and its peak (0.61 per plant) in 2nd October then population declined. The population was ranged between 0.12 to 0.61 beetles per plant. The *T. bicolor* appeared from 11th of September (7 WAT) and the initial population (0.38 per plant) and it was reached to its peak (0.86 per plant) in 23rd October (13 WAT). Population of *T. bicolor* was observed (0.12 to 0.86 per plant) from 11th of September to 20th

of November (7 to 17 WAT). *Kolla* sp. leaf hopper also observed attacking (0.05 to 0.89 per plant) on babchi from 28th of August to 13th of November (16 WAT). The peak population (0.89 per plant observed) in 11th September (7 WAT).

Fig 2 revealed that Babchi crop was get infested by *P. demoleus* in 14th August (3 WAT) and it was upto 27th of November (18 WAT). Initially infestation was very low (0.48%) it was reached to its peak (44.0%) in 6th of November (15 WAT). Infestation by *A. modicella* was observed from 31st July to 27th November (1 to 18 WAT). Its initial infestation was only 8.40 per cent and it was reached to its peak (100%) from 23rd October to 27th of November (13 to 18 WAT). Infestation with *H. armigera* to Babchi was started from 2nd of October to 27th of November (10 to 18 WAT). Initially it was observed (1.77%) in 2nd October (10 WAT) and peak infestation observed (32.14 %) in 13th November (16 WAT). Babchi crop get infested with *Haltica* sp. in 14th August (3 WAT) and infestation was 12.52 per cent. It was reached to its peak 27.80 per cent in 2nd October (10 WAT). The infestation of *T. bicolor* started (6.62%) in 11th September (7 WAT) and it was reached to its peak (16.10%) in 16th of October (12 WAT). Crop was also observed infested with *kolla* sp. leaf hopper and infestation was ranged between 2.00 to 32.88 per cent. Initially (4.80%) infestation observed in 28th August (5 WAT) and it was reached to its peak (32.88%) in 16th October (12 WAT).

Joshi et al. (1992) recorded *Papilio demoleus* as a new pest it denude the leaves from July to September of *P. corylifolia* and incidence of *Approaerema modicella* varies from 0 to 70 per cent during September-October.

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