

## PARADIGM AND PERSPECTIVE CHANGES IN INDIAN FORESTRY

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### Introduction

Forests are the natural heritage of mankind and forestry has to utilise sustainably and enrich this resource for the present and future security of the survival of mankind. Forests in the past spread over most of the country, when the original inhabitants lived mostly as denizens of forests (Anon., 1961). Some of the hostility to forests as natural environment, is perhaps instinctive to the human race. With the growth of civilisation, instinctive conception of abundant forest changed to forest scarcity syndrome. The reasons are many and varied in nature to explain this depletion and degradation of forests but the fact stands that our forests have degraded over the years. Before the advent of organised forestry, the understanding of the role of degradation of forests and consequent natural processes of flood, landslides, reduced fertility developed and history provided corroborating evidences of destruction of civilisations due to rapacious use of natural resources. This necessitated the urge for conservancy; and more than a hundred years ago, India started its forestry activity and forest organisation. Forestry as scientific discipline of knowledge was already prevalent in European countries. Organised human interventions to manage the forest wealth since the day of Brandis constituted scientific forestry in India. The scientific forestry consisted in exploration,

demarcation, settlement, working, planting and disposal of products. Forestry got transferred from the minds of naturalists to the hands of foresters. Fuelwood Gap theory of 1970s and onwards brought forestry nearer to the non-forest dwelling population in the form of Social Forestry. Further realisation of people's power and enunciation of 1988 National Forest Policy legitimised community involvement and thus forestry was promoted as a popular programme. Over this span of more than a century *The Indian Forester* has also been participating in Indian forest management through information dissemination and is a living account of scientific forestry in India.

It is gratifying to discuss briefly the changing forms and norms of Indian Forestry when *The Indian Forester* enters into its 125th year of service.

### Forests and Forestry

Topography, soil and climate were supposed to determine the type and quality of forests. Human interventions are so powerful and large today that forests have become an interactive product of topography, soil, climate and people of the given locality. An urbanising community is more destructive and consumptive. Growing poverty, shortage in satisfaction of forest-based needs and landlessness in the vicinity of forests cause destruction of forests. An

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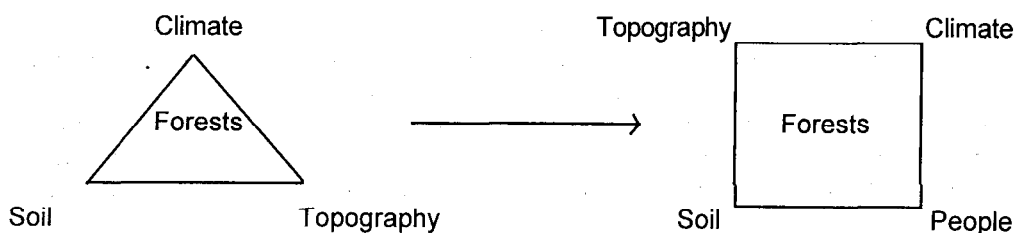
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environment-conscious culture of local population contributes to conservation of forests and wildlife. Man-made retrogression often decides the existing vegetation types. Thus forests are no longer absolute natural organic products of inorganic ingredients but its state and type are heavily influenced by the people and their socio-economic and cultural environment in the given locality. The concept of forest now evolves round the people.

No doubt forestry had never been totally oblivious of the local needs of forest products, it concentrated on the timber-oriented productivity. All our management prescriptions were primarily designed to facilitate growth of trees giving high market value timber. During seventies the fuelwood crisis was emphasised and Social Forestry started in a massive scale. Though debate on the contribution of woodfuel supply from forests is still not over, fuelwood production became the major object of Social Forestry. Forestry came out of the wooded area to the community lands and on the roads and the railway sides. Over the years our policy enunciation assigned different status to the forests. The natural resource was designated as national assets and now meeting the local needs of fuelwood, fodder, food etc. became the first charge on the forests. Of course, conservation remains the prime

objective of forest management as envisaged in the National Forest Policy 1988. The concept of sustained yield gave way to optimisation of productivity of our forest lands. Thus substitution of natural forest by plantation of fast growing and high biomass yielding species was taken up to get progressively sustained yield. Then came the era of biodiversity conservation and now monoculture is a despised venture. With enunciation of 1988 NFP, emphasis was laid on enlisting people's participation and involvement of local community in forest management. Joint Forest Management (JFM) programmes have been brought into play in most of the States. Minor Forest Produce is no longer 'minor' and has changed its face as well as value. It holds the key to sustenance of community involvement. Thus the changing scenario is not only in the perspective of the forest management but also in our paradigm of looking at the forests too. There is a changed definition and "Scientific" forestry should now mean that wild fruits, nuts, MFPs, grasses, leaves and twigs become the main intended products from forests and common lands, timber a by-product from large trees like tamarind, jack and Sal (Saxena, 1993). People are now more and more tree conscious. If a tree exists, society feels that a forester must be knowing about that tree. Its felling should cause pain to foresters' hearts. At the same time, people want to



contribute more to forests and tree planting. There is a renewed attraction towards nature. The need of the hour is to reach out to them and harness their motivation and support. In the following paragraphs, it is intended to recognise the requisite changes in technological, organisational, institutional and consequential aspects of our forestry system to help design the agenda of prospective forest management.

### Technology

Forestry is basically a land based activity and hence technology applied is mostly local and empirical. The research results are also not quickly available or tested in the field due to large gestation. The scene is changing today and forestry in future would have to quickly adapt to modern technology packages. Use of remote sensing and satellite imageries is opening new vistas for management of fire, identification and location of degraded area, designing and planning of Soil and Moisture Conservation works etc. Adequate silvicultural knowledge and planting techniques are available for timber yielding trees, however large information gap exists in the field of management of herbs, shrubs, microflora and Non-Wood Forest Produce (NWFP). Forestry technology has to look for mainly,

- (i) Reduction of cost and time of regeneration.
- (ii) Increase of productivity.
- (iii) Higher production of sustenance items like firewood, NTFP, medicine, food and fibre etc.

It is heartening to note the emphasis laid on improving seed quality and provenance, developing root-trainers and using clonal and vegetative propagation. In

the days of fast growing patent right and monopolisation, we should concentrate on identification, documentation and development of regeneration and processing technologies for indigenous medicinal herbs and shrubs.

Forests are now recognised as source of water. Concept of watershed-based planning and landscape treatment have come to stay. We may have to think in terms of having permanent or semi-permanent coupes based on the hydro-geographical features of the locality. It would provide an opportunity to interlink territorial forestry, Social Forestry and farmland treatment; and can solve the moisture stress and related problems of the area. With the withdrawal of donor agencies from the Social Forestry programmes, the investment in Social Forestry is decreasing. An extensive watershed-based activity would indirectly reinforce the availability of firewood, small timber and fodder outside demarcated forests. In fact, enlarging the boundary of demarcated forest is almost not possible and hence productivity enhancement of forest produce in consonance with food production is our necessity.

In the past, works have been done on the reclamation of salt-ridden and usar land. However certain adverse and hostile problem areas such as coastal lands did not receive adequate attention. It is high time that coastal belt treatment and mangrove plantations are brought into focus. They are the eco-systems of high biotic value and their interaction and role in the ecological balance needs deeper understanding. Similarly the contributions of vegetation in pollution control, environment amelioration and reduction of global warming are to be studied minutely and adequate management responses should be

developed. A wide field of Environmental Forestry awaits exploration and application.

With the pervasive entry of computers, Geographical Information System (GIS) and Management Information System (MIS) have come to our help. Despite their wide ranging efficacy and applicability, their use in forestry is still low and slow. Forestry has the traditions of elaborate data collection, book keeping and reporting. Somehow they have gone helter-skelter. The retrieval of information is so poor that same information sought twice from the same unit are different. At the same time information needed to be supplied to political bureaucracy or for replying to Legislative Assembly/Parliament Questions are seldom readily available. Large scale duplication, multi-layer compilation and divergent transmission of information are taking place. It is essential to evolve a suitable MIS from the primary data base with clearly defined levels of processing and storage. This MIS must take into account the inter-sectoral administrative requirements as well as availability of easily understandable output to people and political bureaucracy. In absence of a systematic MIS, prohibitive amount of men, material and money go in collection and processing of even temporary information.

Increasing plantation activities are hardly matched with elaborate site planning with regards to drainage treatment, slope manipulation, consideration for existing vegetation and soil conservation measures. Modern computer simulated GIS packages are capable enough to give proper site planning design and higher managerial interventions would be possible.

As mentioned earlier, forestry needs to concentrate on non-timber products. Grass

is one forest produce which is needed by a very large section of local population. Unregulated grazing is a great injury to the forests. Large scale grass production accompanied with 'cut and carry' system can reduce this danger. In all our plantation activity, we must emphasise good quality grass production. This would entail opportunity for multi-canopy plantations resulting into forests close to those of natural eco-system. The other potential field is that of medicinal plants. Entire Indian system of medicine, homeopathic formulations and modern phase of pharmacological use of herbs look to forests for basic raw material. It has the capacity to improve the economic plight of local populations. At the same time unregulated exploitation of herbs without proportionate regeneration would lead to extinction of the species. A careful progress in the field must be launched.

Monitoring is the concomitant route of improvement in any developmental activity. Monitoring in forestry sector has a significant role in guiding the quality of managerial interventions, but it is more or less used as vigilance action on post-mortem analysis of past activities. Monitoring system should be designed to take timely stock of various operations and processes in such a way that remedial measures can be introduced in the on-going activities. Monitoring should be a continuous process and eventually develop on the line of daily maintenance exercise in military services.

Wildlife management is a super specialised expertise of dealing with life forms other than human beings. While India has a spiritual consensus to look alike to all living creatures and a culture of preserving wild animals, Indian forestry does need a more mature scientific skill to deal with them. Vast amount of information regarding

their life cycle, reproduction, food, habitat, diseases and inter-organism dependence needs to be generated. Reduction in man-animal conflict and creation of conducive environment in the peripheral zones around the Protected Areas should be made an important component of wildlife management. More and more Eco-development projects should be formulated and implemented expeditiously.

### Organisational Needs

There is a substantial growth in forest organisation all over the country, however the organisational development has taken place mostly on ad hoc basis. Posts are created and jobs are not well defined. Nature and scope of duties and responsibilities are changing. Authority and executions are at times placed far apart. Expectations of society from Forest Department are now different from what used to be in the past. Organisational goal, individual role and interpersonal relationships are not always synchronised. In spite of these aberrations, the forest organisation is one of the most disciplined, effective and vibrant organisations of the Indian bureaucratic system. In absence of the intrinsic strength of the forest organisation, it was not possible to save the forests whatsoever we are left with. The forest organisation in the Country is built on a sound recruitment and training system and survives through rich work-oriented traditions. However in the recent years the changing role and responsibility of the forestry sector requires certain internal adjustment and external linkage in the forestry organisation.

The structure and size of any organisation are decided by the quantity and quality of the end-products it is supposed to deliver. Earlier the Forest Department

was supposed to protect the existing forest, supplement natural regeneration through seeding and planting, do logging and dispose forest produce. Now the scene is different. Many of the forest problems are arising outside the forests and for their solutions a forester has to look beyond the confines of forest and forestry. He is a generalist as well as a specialist. Inadequacies of Indian forestry organisation have surfaced in recent years prominently. A few sectors of urgent attention are touched below :

(1) *Rationalisation* : Rationalisation of operational areas at beat, range and division levels to provide sufficient scope of performance to each and every member of the organisation is the demand of the times. Though occurrence of forests does not always conform to the revenue divisions of the country, attempts must be made to streamline forest administration with district administrative set up of the locality. It would provide better opportunity for coordination, interdepartmental linkages, planning and area specific developmental activities.

(2) *Decentralisation and Delegation* : Indian polity is heading towards more and more decentralised structure, however working in Forest Department did not achieve the same pace of decentralisation. A Principal Chief Conservator of Forests, an executive Deputy Conservator of Forests or a Range Forest Officer in charge of a territorial range is comparatively more burdened than others. Authorities are also centralised. The cadre of Assistant Conservator of Forests works much below its potential. Hierarchy has now to give way to Networking. Decentralisation should not be misconstrued as too much compartmentalisation and linkages of activities of various wings are equally required at field levels. Too long

line of command and decision making stages causes enormous delay or improper execution. Level cutting, reduction in paper work, simplified disposal procedures for time bound actions and people related issues are to be expedited.

*(3) Job Definitions and Role Understanding :*

With expansion of work of the organisation, many posts are coming up at different levels, however the jobs are not always defined. Overlapping activities, idling of highly trained manpower and prevailing confusion about role and responsibility are taking heavy toll. Leg-pulling, deteriorating interpersonal relationship, rising litigation and inter-cadre rivalry are the clear outcome. At the same time, the tendency to acquire executive function at the direction and policy planning levels is rampant. Though a post is upgraded to impart higher level of managerial skill and quicker decision making process, it distorts the system to downgrading of level in absence of a clear job chart. Very subjective inferences are found in fixing responsibility. Failure of one plantation and a few tree cutting may be attributed to the failure of the DCFs and CFs and at the same time even for a large irregularity the lower functionaries may go scot-free. An objective standard in performance evaluation and responsibility fixation must be brought into operation as quickly as possible at all levels in the organisation.

*(4) Specialisation :* Growing amount of knowledge and skill requires more and more specialisation, however specialisation is not being respected in placements of officials. Specialisation has intrinsic relation with the aptitude of incumbency and can be more effective and result-oriented. Specialisation, particularly at field functionary levels matters most. In absence

of specialization, newly developed technological advancements can not be utilised. The same Range Forest Officer is supposed to build a good quality modern building and organise health care and husbandry development camps. Concentration of all kinds of activities and authorities in one incumbent disrupts regularity. Apart from identification of specialised activities, training and placement of specialised officials, it may be required to induct specialists from various other fields such as veterinary, anthropology engineering and medicine in the organisation. Along with specialisation, inter-sectoral linkages are equally desired at division-level. Presence of trained manpower from various fields in the organisation may lead to smooth inter-sectoral linkages.

Paper work in ranges and divisions has multiplied. Large amount of money is spent within short time. It is therefore necessary that personnel specialised in financial matters and accounts be posted in division offices.

*(5) Planning, Research and Extension :*

Postings to planning, research and extension activities are taken to be punishment postings or less important assignment. This is not only due to attitudinal problems of incumbents only, but the organisational culture has also given impetus to this highly unfortunate ramification. An organisation grows through imbibing modern methods of planning and updated study and research support. These segments of Forest Department have to be given a high status as also incentives. The role of planning and research must be internalised in decision making processes. True enthusiasm and reinforcement of this sector must be injected into the system.

(6) *Training and Motivation* : Changing patterns of duties of foresters and the expectations of society from them, *inter alia* other adjustments, require regular training and orientation programmes for newer skill development as well as personality and character grooming of foresters. One of the major crises faced by Indian bureaucracy is the crisis of character. It is essential that our training programme looks beyond the external personality effects and goes into the hearts of functionaries. Not only the pro-people attitude is required but an inner urge to offer opportunity for better quality of human life should be the dictum of governance. It is said that character communicates eloquently. A forester with sound character and values would be more effective. Of late various training programmes for IFS officers are held on regular intervals. But the same facility does not exist for other cadres of forest service. Majority of the training programmes run by State Forest Departments are project-linked. It should be made one of the regular activities of the Department. Apart from training of foresters, Forest Department needs to conduct training for people's institutions, policy planners and administrators too, so that forestry can truly be appreciated at these levels.

Restructuring of pre-service training modules and even refresher courses for various levels of entries is also required. New dimensions of working are added every year in the activities of Forest Department but the staff is not accordingly equipped. Tribal welfare has been in the curriculum since long, but extended role in rural development calls for a new set of skills and understanding. Forests of India would survive if forestry really becomes a people's programme. For this purpose, extension and motivation technique must be known

even to the lowest unit of Forest Department also. An RFO is trained in a such a way that he finds himself out of the system when posted as RFO (Motivation). The situation of Beat Guards and Foresters is still worse. Their training curricula have become largely obsolete. At times they are faced with hard core criminals involved in timber smuggling and poaching. When own safety becomes difficult for the feeble bodied protective staff, how can we expect them to protect forests! An elaborate consideration for training design and even protection mechanism and machinery will not be out of the place. Motivation of staff to take pride in their vocation must be internalised through some mechanism. Celebration of occasions such as World Forestry Day, World Environment Day, Wildlife Week, Martyrs Day and Vanmahotsav etc. provides ample scope for the purpose. These motivate people as well. Vanmahotsav and Wildlife week celebrations give occasions to reach out to people at large. Various target groups must be given the chance to know about forests and forestry organisations in detail during these forest festivals.

(7) *Gender Issues* : It is argued that women folk are the most affected group of local population by the degradation of forests. It is alleged also that male dominated Forest Department is not adequately sensitive to the gender issues of forestry. The blame may not be exact or sustainable, however a need to increase percentage of lady forest officials is felt. Forestry is a little difficult field job and officials are required to stay and work in inhospitable and adverse surroundings. Nonetheless we can not exclude half of the population from joining forest service. There is no problem for women in joining IFS but there are certain bottlenecks in recruitment rules for entry at subordinate officials level. If Indian Army

can open the door for women, why should Forest Department not do it! Programmes like mahila nursery (women's nursery) are capable of giving opportunity for income generation to women folk. A major portion (about 30%) of work force engaged in forestry operations are women. It is highly desirable that women organisations play a more intensive role to better organise them, co-ordinate with Forest Deptt. as well as help women to develop the saving habit, health and child-care, prohibition, sanitation and mass education activities.

### **Institutional Framework**

Forest was rendered as transferred subject through the Govt. of India Act 1935. Post-independence scene of Indian forestry was also not very inspiring. Forest clearance due to Grow More Food campaign; diversion of forest land for canals, dams, rehabilitation, roads etc. went unchecked. At the time of acquisition of private forests small princely states and jagirdars felled trees indiscriminately. Ultimately, GOI brought forests back on Concurrent List through 42nd Constitutional Amendment and Forest (Conservation) Act 1980 was passed. Forest and Environment found place among Fundamental Duties of the Indian citizen. During the struggle for independence, reserve forests were recognised as symbol of British ownership and Forest Satyagrah and burning of forests in protest were also observed. Enactment of Wildlife (Protection) Act 1972, Environmental (Conservation) Act 1984 and many State Government's Acts pertaining to MFP Nationalisation shows substantial shift in the legal institutions of forestry sector. Recently, the judiciary has signalled acute sensitivity to forest and environmental issues. Participatory approach of management finds certain laws draconian

and at the same time searches legal protections for JFM. Litigation related to forestry issues is piling up. Forestry though land based activity, has been classified as industrial venture. Cases under Labour laws have increased many fold. The scenario suggests a need for a more sound legal backing of forestry sector as well as corresponding strengthening needs of forest organisation.

Since the beginning the forestry sector dealt mainly with two institutions : Government and Contractors. Then came the institution of Forest Labour Cooperative Society, organised groups of timber merchants etc. National Commission on Agriculture (NCA) while deliberating over institutions opined that following three institutions would be of foremost importance in case of Social Forestry, namely:

- (i) Village Panchayat,
- (ii) Co-operatives,
- (iii) Schools.

Village Panchayat did participate in Social Forestry, its efficacy in collective participation has been questioned by several quarters, and thousands of Village Level Organisations (VLO) are now implementing JFM all over the country. Relationship of these VLOs Vs. Panchayat in the light of recent legislation as sequel to Bhuria Committee's recommendations, is presently the hottest discussion topic. Keeping aside the strengths and weaknesses of the arrangement, this would certainly change the forms of people's institution engaged in forestry.

After 1984 a massive plantation drive under Wasteland Development Programme was launched and Non-Governmental Organisations (NGOs) mushroomed in the



forestry sector. There are NGOs of proven track record, having skill and intention to work in this sector. Many others would not last long. A very conflicting situation prevails when Government Organisations and NGOs start working in the same field. Initially capitalising on each other weaknesses was observed. Gaining experiences direct both of them to work in coordination. They should build on each others strengths and respect differences. Interdependence is a higher value than independence. Forest related industries such as sawmills, paper mills, resin factories, veneer industries etc. were established in forest areas earlier for economic development of the forest rich tracts. Now forests have become the demand for these industries. NFP clearly says that industries should grow their own forest produce for using as raw material. Industries are also showing interest in forest land. How far the increased role of industrial institutions this sector can accept is debated far and wide.

Labour force in the forestry sector is mostly local and unorganised groups. Institutional arrangements to provide them better working conditions are necessary. Food and nutritional security as well as health-care for the forest labourers and forest-residing populations must be envisaged in forestry development programmes. World Food Programme, Grain Bank Scheme and Medical Camps are effective instruments in this field. Services of international organisations like FAO and WHO can be tapped in this regard.

Environmental Conservation to-day is an all-pervading consideration principle. This brings Forest Department in conflict with other departments of the same Government. More often we have different opinion than Road and Building

Department, Mining Department, Industry Department, Electricity Board, Telecommunication Department etc. Even the political bureaucracy of the state sometimes consider their own Forest Department closer to Government of India. Forest organisation must gear up to develop suitable institutional arrangement to deal with such conflicts.

Many activists, Action Research Groups, academic and social organisations are now working in the forestry and wildlife field. Forest Department is the nodal agency offorest and wildlife management and must accommodate interactions with these organisations through institutional mechanism. Thus a new set of institutional changes in forest sector is inevitable.

### Consequential Effects

The modern management paradigm begins with the end in mind. Aims and objectives that are to be achieved by the forestry sector must be fixed well in advance. *Frequent changes with the specific waves* corrupt the entire pursuit. We have experience, expertise and expectation to decide our goals. With goals in mind, proper pursuit and periodic review will certainly bear fruit. We must know whether we intend to protect forests, or regenerate degraded land or manage wildlife or produce forest based commodity or resist forests' enemies or appease influential individuals and groups with wrong interests etc. If they all constitute our objective package then what is the percentage of different components in our set of goals. Accordingly, Forest Department should apportion its effort.

If forestry intends to make a mark, it must look for creating positive changes in the living of people. While attempting to

sufficient production of forest and forest produce it must first attend to creation of forest conscious population and forest friendly environment. No amount of legislation and education can reach into the hearts of people as their own realisation. Nature Education Camps, Environment Awareness Programme, Forest treks, Farmer Camps etc. are instruments to bring conducive environment for better appreciation of forests. Eco-tourism is still an under exploited sector of forestry. It can add to the income generation of local population as well as bring people closer to the natural environment. Better appreciation of forests and blissful experiences of visitors are two most important results of eco-tourism. Concept of Van Chetana Kendra and Demonstration Centres are highly effective in extending mass communication and providing delivery-window for forestry awareness and extension packages. We must concentrate on these activities.

People are becoming partners in forest management. A long lasting partnership must stand on clear understanding of interest, mutual cooperation, transparent behaviour, and judicious benefit distribution. People must know the requirement and ramification of hard options or soft alternatives. It would make them ready for bigger sacrifices too.

Forestry to-day has to aim not only on fuelwood, but food security too. Agro-forestry has to be accorded a very big role. Agro-forestry brings about nitrogen fixation, soil moderation and saving of cow-dung. This would in turn improve food productivity and thus forestry would become a real foster mother to agriculture.

Sufficient increase in production base

of forestry sector (along with Social Forestry) have been aimed at. However the productivity increase is much below the desired. Production must mean production of total biomass. Too much mechanisation of forestry sector is not possible as it provides large scale employment opportunity for rural poor and forest dwelling community, as well as undulating topography may restrict the usability of machines. However increase in input, multi-layer plantation, use of improved variety of seeds and planting stock, better protection to existing forest, and participatory management would certainly enhance the productivity of our forests. Seed orchards, green houses, clonal technique and tissue culture are new tools for production enhancement. Such technological upgradation needs acceleration.

Not only the productivity enhancement but judicious composition of product basket is also required. Fuelwood shortage was taken to be main reason of forest degradation. Recent international studies prove otherwise. It is said that about 2/3 of wood fuel comes from non-forest source and fuelwood is not the main cause of forest degradation (Anon., 1997). However they accept the localised shortage. On the contrary firewood demands from forests has been found exceedingly higher than supply even in comparatively better forested tracts (Verma, 1998). Even the substitution of timber by steel or plastic etc., is easily affected than substitution of fuelwood by LPG, or other form of energy in forested patch. In fact demand-supply gap is met by conversion of potential timber into firewood. Hence firewood production would continue as major goal of forestry sector. This may require a new set of management options and harvesting regime. Bamboo, Grass and other NTFP production should also be

increased. Knowledge of increasing production of these commodities should be readily available to farmers as well, in the form of ready-made packages.

Role of NTFP in productivity enhancement as well as improvement of tribal economy is better realised to-day. Mostly State Forest Development Corporations (SFDCs) have been engaged in the collection (through primary collectors), transport and marketing of NTFP. Now in scheduled areas the ownership of NTFP vests with village panchayats and even sheer viability of many SFDCs has become perilous. It is high time that SFDCs find new assignments of processing and value addition of NTFP, in co-operation with local people.

Environmental conservation is the principal aim of our present forest policy. Soil and water conservation cast direct impact on agriculture production too. We must try to vegetate our denuded hills and slopes. Forests are the last resort of gene-pool conservation. India is a mega-biodiversity country and we can not afford to ignore the protection of existing natural eco-systems.

Environmental value of forests are much higher than tangible effects. However economics of intangibles is not easily quantifiable. Attempts should be made to develop objective technique of evaluation to

include economic value of moderation of climate due to forests, preservation of gene-pool, biodiversity and soil and moisture conservation effects in our regular accounting process. Natural Resource Accounting is an urgent need.

Anthropogenic problems of forests can be solved better if Forest Department show initiative to look after the well being of people living near forests. Forest Department alone can not perform this task, however Forest Department is the first victim of people's anger or deprivation. Forest Department should take up to lead in such area. Policy planners must give a sincere thought to assign a coordinating or nodal agency status to Forest Department for the overall development of villagers near forests. On the organisation side also more humane approach is desired to afford better work environment and risk reduction to the forest officials. Forestry is a high risk sector of occupation. Benevolent Funds at State-level or local funds (such as Gir Welfare Fund) for the families of ill, deceased or incapacitated officials must be established. Help may be extended at the time of serious loss of property also.

Society to-day has to make a tryst with forestry to perpetuate natural forests in good condition for its offspring. Let us hope and work together to achieve this goal of mankind.

## SUMMARY

**The pattern of Forest Management in India and perspective changes with technology, organizational model, institutional frame work and consequential effects have been discussed for sustainable management of the forests.**

**भारतीय वानिकी में परिवर्तन के पैराडिगम और परिदृश्य**

ए०पी० मिश्र व ए०के० वर्मा

**सारांश**

भारत में वनों की प्रबन्ध सज्जा तथा प्रौद्योगिकी, संगठननात्मक मॉडल, संस्थागत ढांचे में होने वाले परिदर्शित परिवर्तन और उनके परिणाम स्वरूप पड़े प्रभावों का वनों के दीर्घकालिक सुप्रबन्ध की दृष्टि से विवेचन किया गया है।

**References**

- Anon. (1961). *100 years of Indian Forestry* Vol. I & II. Forest Research Institute, Dehra Dun.
- Anon. (1997). Regional study on Wood Energy Today and Tomorrow in Asia. Regional Wood Energy Development Programme in Asia. *Field Document* No. 50. F.A.O. Rome.
- Saxena, N.C. (1993). Forestry Policy and Wood fuels in India Problems and Prospects. Regional Wood Energy Development Programme in Asia, *Field Document*. No. 37c.
- Verma, A.K. (1998). *Management Plan for Vyara Forest Division*, Gujarat Forest Department.
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