

## **P Srinivas Memorial Lecture 12.09.2013**

### **Forests and forestry Sector- Issues and challenges.**

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Appropriate Salutation to all, Respected Director General of MCR Sri. Dr. Prasanta Mahapatra, IAS, Parents of P.SRINIVAS,

Distinguished Faculty Members, Seniors,

Dear Participants of Foundation course,

Distinguished Guests, Ladies and Gentlemen,

I feel greatly honored to have been invited to deliver Srinivas Memorial Lecture on this august occasion. I take this opportunity to salute to one of our greatest colleague (Late) Sh. P. Srinivas who laid down his life to the cause of protection of forests in fighting with one of the most notorious forest offenders of the country.

Pandilapalli Srinivas was born on 12<sup>th</sup> September 1954 at Rajahmundry, East Godavari District of Andhra Pradesh to Sri Ananta Rao and Smt. Jayalakshmi. After his schooling in Rajahmundry, he graduated in Masters in Life Sciences with a specialization in Cytogenetics from Andhra University in 1976 with a gold medal. He followed the principles of Mahatma Gandhi, Jayaprakash Narayan and Acharya Vinobha Bhave.

Shri P. Srinivas joined the Indian Forest Service in 1979 and was allotted Karnataka Cadre. During his training at the Indian Forest College, *He was popularly known as "Gandhi among his batch mates"*. After completion of training at the Academy, he was posted as Assistant Conservator of Forests in Chamaarajanagar of Mysore District and later Deputy Conservator of Forests - an area under influence of Veerappan in 1983. His way of working ultimately led to the arrest of Veerappan in 1986. He was subsequently transferred to Chickmangalur in 1987.

His belief in changing the hearts of criminals was so wrong that he engaged in his personal capacity and bailed out the surrendered gang members. He strongly believed that these gang members particularly Arjuna would lead him to Veerappan sooner or later. In July 1991, his tenure with STF expired but he continued to stay in the area expecting a date with the smuggler. Veerappan deceived Sh. P. Srinivas in believing that he will be surrendering and killed him and thus Srinivas made supreme sacrifice on 10<sup>th</sup> November, 1991. I take this opportunity to once again convey our heartfelt gratitude to this great forester son of India and reassure that forester community will continue to work to the best of its ability to protect precious natural heritage of the country and will not go his sacrifice in vain.

Now I come to the today's theme of discussion issues and challenges before forests and forestry sector. Forestry is the art and science of creating, using and conserving forests. Foresters were pioneer in developing techniques for sustainable management and later, techniques for the multiple uses of forests. In present day context, forests have assumed great significance as they

are integral to survival of humanity, especially in the light of large scale changes taking place all across the globe in demographic, social, economic, scientific and technological levels. The issues can be divided into two parts, one purely forestry issues and the other cross-sectoral issues which emerge due to interlinkages with other sectors' policies and action.

***Forestry Issues: the issues which are directly related to forests or forestry sector:***

1. *Conservation / protection of forests: forest area & cover, per capita forests area, demands/ pressure/ threats/ conflicts with other land use, forest productivity, forest protection, wildlife conservation etc.*
2. *Sustainable Forest Management, biodiversity conservation & access benefit sharing.*
3. *Scientific Research & development, Forest Financing.*
4. *Impact of forests on climate change and vice versa, change in species composition, biodiversity, capacity of forests to respond to climate change and resultant impact on goods and services, etc.*

***Cross-sectoral issues: The issues which have linkages with other sectors:***

1. *Sectors impacting forests such as Infrastructure Development, Water, Power, Mining, Industries, Transport, Agriculture etc.*
2. *Forest and food security, energy, water security and poverty reduction.*
3. *Trees outside forests including Agro forestry, Farm Forestry, Orchards etc.*
4. *Improving Livelihood of forest dependent communities- rural prosperity through forestry.*
5. *Forestry and Sustainable Cities- Urban greens conservation & management.*
6. *Forests and Climate Change, REDD+. Forests and Disaster Mitigation-Flood & Drought, etc.*
7. *Natural Capital Accounting, Green Economy, Creation of green jobs.*

**Why forests are important?** About 30% of the global land area is covered by forests. Forests provide multiple benefits to the society including important products such as timber, fuelwood, paper, pulp, fibres, food and fodder and large number of Non Timber forest Products (NTFPs), as well as, important ecosystem services like protection of soil and water, improving soil fertility, conservation of biological diversity, and carbon sequestration etc. Forests also support livelihoods of a large number of people. Globally around 160 million people depend on forests. In India, around 300 million rural people including 87 million tribals are forest dependent and derive substantial part of their livelihood from forests. Forests in India have been an integral part of the socio-economic, cultural life and religious practices of its people with a long history of traditional conservation and forest management practices.

**India's forests:** With about 2.5% of the world's geographical area and 1.8% of the forest area, India supports around 17% of the global human population and 18% of domestic cattle population. Recorded forest area in the country is 77.47 m ha, which is 23.57% of the country's GA). As per India State of Forest Report, 2011, Forests and Tree cover is 78.29 m ha, which is 23.81% of GA and includes 69.20 m ha of forests (21.05% GA) and 2.76% area under trees outside forests (ToF). In terms of density classes, area of Very Dense Forest is 83,471 km<sup>2</sup> (2.54% GA), Moderately Dense Forest 320,736 km<sup>2</sup> (9.76% GA) and Open Forest 287,820 km<sup>2</sup> (8.75%).

Total Growing stock of India's forests and ToF is estimated as 6,047.15 cum and the total carbon stock of the India's forest is estimated to be 6,663 m tonnes. Of the forest areas, 51.6% are notified Reserved Forests, 30.8% are notified Protected Forests and the remaining 17.6% are un-classed forests. Per capita forest land availability is 0.06 ha much below the global average.

**Scientific forest management in India** dates back to mid-1800s. India has comprehensive policy and legislative framework for guiding forest conservation and management. The forest and tree cover in India has over the years nearly stabilized. Forests are managed by forest departments of State/ Union Territory Governments based on sustained yield principle through the mechanism of working plans/schemes prepared by trained professional foresters. The Central Government through the Ministry of Environment & Forests provides policy directions and guidelines.

**Forest Governance, Policy and Legal Framework:** The National Forest Policy of 1988 (NFP), the Indian Forest Act, 1927, the Wild life (Protection) Act, 1972, the Forest (Conservation) Act, 1980 and various other State legislations on the matters pertaining to forests and wildlife provide for the guiding principles, and ways and procedures through which forests are to be utilised and administered. These legislations not only affect the way forest lands are to be utilised, but also have profound impact on the utilisation of non-forest lands as well. **The Forest Rights Act, 2006** recognises and vests forest rights of Scheduled Tribes and Other Traditional Forest Dwellers/ Communities whose rights could not be recorded earlier. The Act also empowers these local forest rights holders' and local communities to conserve, sustainably use and manage community forest resources.

**Forest and Biodiversity Conservation:** India has extraordinarily rich biodiversity and several environmentally sensitive and fragile zones. India is one of the twelve mega-biodiversity countries in the world, comprising over 91,000 animal and 45,500 plant species. Nearly 6,500 native plants are still used prominently in indigenous healthcare. Furthermore, India is recognized as one of the eight 'Vavilovian Centres of Origin and Diversity of Crop Plants', having more than 300 wild ancestors and close relatives of cultivated plants still growing and evolving under natural conditions. There are also *growing* risks to biodiversity with loss of species and threat to ecosystem services. India's Forests are home to around 70% of the terrestrial biodiversity. India has an elaborate Protected Area Network with 102 National Parks, 517 Wildlife Sanctuaries, 47 Conservation Reserves, 4 Biosphere Reserves etc. covering nearly 4 % of GA.

**Impact of Globalisation:** Every generation believes that it is experiencing unprecedented challenges that are unparallel in history. It is also true that the last two decades of high economic growth, coupled with scientific and technological advancement have effected large scale socio-economic changes. These changes have transformed human capacity to influence their surroundings including natural resources including forests on much wider scale. Global changes are occurring at such a vast scale and pace that we are unable to comprehend their impacts and implications on economy, technologies, social and human interrelationships, climate, natural ecosystems and resources. Forests will not remain unaffected from these changes. We need to understand the ways these changes particularly demographic, climatic and economic changes will affect forests and resultant new challenges and opportunities. Global population is increasing rapidly and expected to increase 3 billion in next three decades with consequent increase of 3 billion people in the middle class having more purchasing power and resultant greater demand for

products and services including those from forests. India is expected to become the world's most populous country in 2030. Most of these changes mean a tremendous increase in demand of forest products and agricultural output creating intense pressure on forest land and result in increasing scarcity and competition of natural resources. According to the Millennium Ecosystem Assessment, 2005, more than 60% of the World's major Ecosystems are now degraded or are used unsustainably. More than 50% of all types of forests, agriculture land and wetlands surrounding urban and semi urban areas have been lost through conversion of other landuses. In the last decade about 130 million hectares of forests including 40 m ha of primary forests were lost.

From Rio, 1992 to Rio+20 in 2012, the world economy has almost tripled, growing from USD 24 trillion to 70 trillion benefitting large section of human society coupled with far reaching impact and continuous unsustainable pressure on forests and other natural systems. Enhanced efforts are needed to achieve the **SFM**, afforestation, reforestation, restoration and reverse deforestation and forest degradation including promoting trade in legally harvested forest products. Forestry issues needs to be addressed in integrated and holistic manner.

### **Issues and challenges before the Forestry Sector:**

**1. Demarcation, consolidation of forests, mapping changes:** There have been lot of changes since most of the forests were surveyed, notified, consolidated and boundaries were demarcated. In view of increasing threats on forests due to various factors including approved diversions since FCA, 1980, it has become necessary to start an exercise for demarcation of forest boundaries, mapping, fixing of boundary pillars, wherever required with the aid of modern technologies like Remote Sensing, GIS, GPS etc. in a time bound manner. This will require large critical base of trained manpower, and support from revenue departments and other stakeholders.

**2. Improving quality of Forest cover:** There has been considerable progress in stabilizing and maintaining the overall forest cover at the country level, i.e., in checking deforestation. However, forest degradation due to various factors including dependency of local communities, is a formidable challenge to be addressed on priority. The problem becomes complicated as it is considerably difficult to measure and monitor forest degradation on continuous basis and take specific measures to reverse the process. Country's forests are under tremendous pressure for meeting demands of fuelwood, fodder, Non Timber Forest Products (NTFPs), etc. of the local communities dependent on forests for livelihood and sustenance. A cross sectoral approach would be better to deal with forest degradation and improving forest health, density, composition so that forests are able to play effective role in providing goods and optimising ecological and environmental services.

**3. Strengthening Forest Governance:** Strengthening forest governance with participatory approach and informed decision making with involvement of stakeholders is necessary to bring forestry into the mainstream of national development agenda. The **NFP** provided impetus to participatory forest management in the country in the form of **Joint Forest Management** based on the principle of care and share by involving local people in conservation and management of forests and in return providing them a predetermined share in the usufructs. JFM has expanded in the last two decades to over 1.10 lac JFM Committees managing around 22 m ha of forests in the

country. Still there are many shortcomings/ deficiencies and lot needs to be done for making JFM achieve its desired goals of participatory decision making, equitable sharing of benefits and improving forest health and productivity. Consequently, the issue of sustainable harvesting within the carrying capacity of forests has become very important.

**4. Addressing Forest Degradation and Protection mechanism:** Encroachment on forest land, unscientific extraction of forest products including fuelwood collection by people of adjoining areas, illegal mining of minerals etc. are among the major causes of forest degradation. Forests occupy valuable land, which often overlay rich mineral/ coal deposits required for industrialisation, power generation and other infrastructural needs. It is essential to balance development with sustainable development giving due emphasis on protecting our forests in holistic manner with the support of other concerned departments. Strengthening forest protection machinery with adequate resources and infrastructure is very important with support from Administration and communities. There are issues of delay in filling of vacant posts of frontline staff and lack of supporting infrastructure which makes it difficult to keep a watch on large forest area and taking timely action on forest offences. There is a need to reassess the requirement of trained manpower in forestry sector to deal with complex issues of protection including building capacity through training and use of modern technologies and communication network for meeting long term protection goals effectively.

**5. Meeting country's demand of forest products:** India is major wood and wood products importing country. Though there are a large no. of NTFPs which are used by large section of society, but their potential for economic transformation of rural people has not been fully explored. Considering the favourable agro- climatic and bio physiographic conditions and given proper direction, India can not only become self- reliant in wood and other forest products, but also can be an exporting country of specialised products. This calls for greater focus on agro/ farm forestry and trees outside forests and improving forest productivity.

**Promoting large scale Agro Forestry:** In order to address the huge gaps in demand and supply of various forest products in the country, it is necessary to cover as much area possible with tree cover outside natural forests. Agro/ Farm Forestry needs to be promoted on a large scale by making forestry/ tree plantations a viable economic activity. It needs up-scaling research and extension activities, developing good agro/ farm forestry models, creating linkages between nurseries growing certified quality planting materials and farmers, developing partnerships between farmers, industries, financial institutions and market, and most important of all certainty in long term policy environment. Foresters can play significant role in expansion of agro/ farm forestry which will not only reduce dependence on imports, but also create viable economic opportunities and livelihood to poor marginal farmers in the forestry sector.

**Improving Forest Productivity:** A large portion of the country's forest cover is under open to moderately dense category. Owing to various factors and drivers of degradation, these forests are not able to perform their ecological and environmental functions to optimum level. The productivity of forests is also low. One of the major challenges before forester community is how to enhance productivity of forests by scientific & technological interventions and building adequate capacities of forest managers and other stakeholders. This requires increased investment

in genetic improvement of forestry crops, use of modern irrigation techniques, improving soil and moisture regime and fertility. For meeting needs of Quality Planting Materials the 12<sup>th</sup> FYP proposes to establish forestry seed bank in forest circles and Model Nursery in every District by 2014.

**6. Forest, Biodiversity and Wildlife Conservation:** Due to growing population in India, the per capita availability of land has reduced from 0.89 Ha in 1995 to 0.27 Ha in 2008. It is estimated that by 2030, India will become the world's most populated country with 17.9% of total global population further reducing per capita land availability. There is a need to adopt comprehensive approach to protection of forests, Biodiversity including Wildlife. While areas such as National Parks, Biosphere Reserves etc. are more or less demarcated due to existing legal provisions, the "Eco Sensitive Zones" being identified around them are at present at the discretion of the agencies involved. It has to be ensured that reasonable extents of areas around the environmentally sensitive/fragile areas are demarcated and land use is planned properly for peaceful co-existence so as to avoid conflicts or negative environmental impacts. In the larger interest of wildlife and biodiversity conservation for preserving and maintaining vast genetic pool and preventing man- animal conflict, proper corridor connectivity needs to be ensured.

**7. Forests and Rural Livelihood:** Role of NTFPs as a source of economic basis of large number of rural communities has already been recognised. Forests and trees on farm (Orchards) also act as a vital source of food, fuel and nutrient supplement including providing insurance against bad crop seasons. The Ministry of Tribal Affairs has recently formulated a scheme to provide Minimum Support Price and processing and marketing facilities to some of important MFPs which is expected to benefit large number of primary collectors. However there is a need to invest in NTFP development on much larger scale for realising its full potential.

**8. Forest Financing:** Over the years financing in the forestry sector has stagnated or declined in real terms in view of various reasons and developmental priorities. In India Forestry sector receives funds below 1% of Annual Plan Outlays which is insufficient to manage forests sustainably. It is essential to broaden the financial basis for sustainable forest management. Increasing finances in the forestry projects through innovative mechanism is necessary including channelizing resources from various sectors including corporate as well as arrangements under UNCCD, UNFCCC, UNCBD and multilateral financial institutions like World Bank, JICA, REDD+ mechanism, etc. in afforestation, regeneration and conservation programmes. The forestry sector needs to be made attractive for financial investment from private sector.

**9. Restoration/ Rehabilitation of Degraded lands:** India faces severe problem of degradation of soils and land due to soil erosion and other degradation processes in many regions. As per available estimates (2010), total degraded land in the country is about 120.40 m Ha. Land degradation leads to decline in soil fertility, creates problems of alkalinity/salinity and water logging etc. The degraded soils are often used by marginal farmers and tribal population being low on productivity leading to their continuous impoverishment. According to studies, the economic losses of reduced productivity of these lands count for approx. Rs. 285,000 million, which is about 12% loss of total value of productivity of these lands. Restoration of these degraded lands through forestry interventions/ afforestation can help the situation.

**10. Forestry Sector and sustainable development:** Forestry sector has gradually emerged as a critical sector to sustainable development which includes economic development, social inclusion and environmental sustainability– the three pillars of sustainable development. Wide range of products and services encompassing economic, social, and environmental services that forests provide, create opportunities to address many of the most pressing sustainable development challenges like reduction of poverty and hunger, employment generation and most importantly improvement of environment and ecology, thus benefitting whole society. The demand and supply gap of various products from forests like fuelwood, fodder, timber, (NTFPs), among others, creates pressure and contributes to degradation of forests and ecosystems and thereby has negative impacts on productivity reducing the resilience of forest dependent communities. The Twelfth FY Plan of the Government has a vision for Managing Environment, Forests, Wildlife and challenges due to Climate Change for faster and equitable growth, where ecological security for sustainability and inclusiveness is restored, equity in access to all environmental goods and ecosystem services is assured through institutionalisation of people's participation. Some important targets that have been set for the Twelfth Plan to achieve above vision include:-

-Greening 5 million ha under Green India Mission including 1.5 m ha of degraded lands, afforestation and eco restoration of 0.9 m ha of ecologically sensitive areas, and

-Technology-based monitoring of forest cover, biodiversity and growing stock including change-monitoring on periodical basis and establishment of open web-based National Forestry and Environmental Information system for research and public accessibility by 2015.

These efforts need to be upscaled.

**13. Forest for sustainable future:** There are two extreme positions about how forests should be treated. One extreme goes to the extent of stopping any intervention i.e. practically every activity in the forests like no felling/ removal of trees or other forest produce by some section of activists. Another extreme is utilitarian approach that forests are infinite resources for use of humanity leading to highly unsustainable use, over exploitation, poor practices and negative impacts, often originating from factors outside forests. Sustainable forest management is synonymous with good, sensible and scientific forestry and underlines the concept that if forestry is to contribute effectively, it must continue to evolve. In India, great emphasis on conservation has often dampened the spirit of innovative approaches and participation of larger group of stakeholders. The idea should be to strengthen conservation regime by optimising potential of forests to provide sustained goods and services and support local, regional and national economy.

Forest products are essential for sustainable future. Wood and wood products can significantly contribute to livelihood and prosperity of forest dependent and rural communities and in actual transformation to greener economy. The use of wood products, from sustainably managed forests, being renewable, reusable and biodegradable will store carbon and offset some of the emissions from manufacturing, concrete, plastics and steel sectors. Wood products including furniture, panel products, large number of artefacts can revive traditional art and trade and help large number of artisans. The emphasis on right mix of fast growing trees on farm/ degraded lands with right kind

of inputs supported by scientific research, efficient processing techniques can revive commercial aspects of forestry. The demand for wood and wood products in construction of buildings and other infrastructure will create demand for more trees and forests and thus encourage private investment in tree plantation outside natural forests.

Forestry can assist in expanding economic growth in rural areas and increasing reliance on renewable resources. Forestry with agriculture can be a building block of environmentally and economically sustainable future strategies. Improving quality and quantity of forests by making appropriate investment in afforestation & strengthening conservation, promoting small and medium forest based enterprises, increasing long term values of various forest products by reusing and recycling, wood for energy is required for realising full potential of forestry sector to sustainable development.

**14. Forests and Water:** Role of forests in Watershed management is critically important. Forests help in recharging ground water, maintain optimum water flow in streams/ rivers. In view of pressure on lands, natural water bodies and drainage channels are being encroached upon, and diverted for other purposes. The groundwater recharge zones are often blocked. There is growing pollution of water sources, especially through industrial effluents, which is affecting the availability of safe water besides causing environmental and health hazards. In many parts of the country, large stretches of rivers are both heavily polluted and devoid of adequate flows to support self purification, aquatic ecology, cultural needs and aesthetics. The characteristics of catchment areas of streams, rivers and recharge zones of aquifers are changing as a consequence of land use and land cover changes thereby affecting water resource availability and quality. Forestry interventions in such areas are necessary to save fresh water sources.

**15. Forests and Climate Change:** The impacts of climate change are diverse and could be damaging to people across the world, particularly those in developing countries who are the most vulnerable. Many of the effects of climate change have negative economic consequences. The number of extreme weather events, such as heat waves, precipitation, floods, droughts, etc. is expected both to increase and intensify because of climate change. Climate change could magnify the cumulative impacts of other ecosystem stresses caused by human action. As forests can absorb and store carbon over an extended period of time, they are considered “carbon sinks”. Overall, the world’s forest ecosystems are estimated to store more carbon than in the entire atmosphere. One acre of forest can absorb six tons of carbon dioxide and produces four tons of oxygen. This is enough to meet the annual needs of eighteen people. Climate Change adds great uncertainties including how it is and will influence forest ecosystems and the extent to which forests can help in both mitigation and adaptation goals. Land use changes, such as conversion of forest lands to agriculture or industrial use can be a factor in increasing CO<sub>2</sub> atmospheric concentrations, thereby contributing to climate change. India has played a significant role in the development of a comprehensive REDD+ approach at the international level. India has initiated the National Mission for a Green India (GIM) under its National Action Plan on Climate Change (NAPCC). GIM aims at responding to climate change by a combination of adaptation and mitigation measures, which would help (1) enhance carbon sinks in sustainably managed forests and other ecosystems, (2) adaptation of vulnerable species/ecosystems to the changing climate, and (3) adaptation of forest dependent communities. Foresters have an important role in operationalisation of REDD+ in the country.



**16. Forests and Energy:** Renewable Biomass based energy including bio-fuels, most of which can be derived from forests & ToF, would be critical in future to meet our energy needs, which can be easily grown in India, given the favourable physico/ agro/ climatic conditions. There needs to be greater emphasis on R&D for making use of bio mass based energy/ bio fuels cost effective.

**17. Green Economy:** UN Conference on Sustainable Development held in Rio adopted guidelines on green economy policies, though having different approaches, visions, models and tools available to each country and in accordance to its national circumstances and priorities for achieving sustainable development. Green economy should contribute to eradicating poverty, sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all while maintain healthy functioning of the Earth's ecosystems. Though forestry is not directly mentioned in the context of green economy which refers natural resources of which forests are an important part. The outcome document of Rio+20 "The Future we want" contains numerous provisions on forests, its interlinkages with other sectors, sustainable development, conceptual policies issues and frameworks. Para 193-196 of the outcome document are specifically devoted to forests, highlighting the social, economic and environmental benefits to forests to the people. Natural Capital Accounting is also necessary to reflect true values of natural wealth in national economy.

**18. Importance of Scientific Research and technology in forest management:** Technology plays an important role for forest inventory, carbon stock estimation, bio-diversity, its evaluation and change monitoring of resources. India is one of the few countries of the world to have a robust and scientific system of periodic forest cover assessment carried out by Forest Survey of India biennially. However there is a need to periodically update the capacity with emerging technologies. Through geo-informatics and space technology, a 24X7 real time monitoring is possible, which improves the efficiency, transparency and accuracy. It also helps in time- line analysis, setting historical baseline for research and development. Remote Sensing, GIS, GPS and computer modelling and simulation techniques are now indispensable in decision making tools for policy formulation and programme implementation in forestry sector. The broad areas in forestry for which remote sensing techniques are used include, (i) mapping/statistics generation of forest cover, wood volume and biomass, forest fire, pest and disease induced losses, encroachment, (ii) change detection, (iii) modelling for resource management.

**19. Forests for sustainable Cities- Urban & Peri urban Forestry:** Globalization and consequent urbanization is an inevitable fall out of the social and economic development. The emergence of large cities as a preferred place of residence by an increasingly large proportion of human populations has profound ecological and environmental consequences. For instance while cities today account for just 3% of global terrestrial surface, they account for 78% of carbon emissions, 76% of residential water use and 60% of industrial wood. Major impacts on natural forests and biodiversity in remote natural areas also often emanate from pressures of demand in urban areas.

Urban population in India has increased from 17% in 1951 to 31% in 2011. According to the world population prospects by the United Nations, 55% population of India will be urban by the year 2050. The urban land is about 7.74 million hectares, which is only 2.35% of the country's total land area. Cities and towns are emerging as centers of domestic and international

investments where most of the commercial activities take place. However, cities are facing a number of environmental problems. More than 590 million people are expected to be living in Indian cities by the year 2040. Urban greens & forests improve life quality for city dwellers by providing recreational avenues, much needed public space for better social cohesion and significant health benefits. They also moderate microclimate, ground water recharge, provide shade and conserve valuable local biodiversity. The parks and gardens including residential greens can also greatly contribute to biodiversity enhancement. Integrative designs and development may significantly enhance the biodiversity value of a city without incurring significant costs. Urban forests like Ridge in Delhi not only act as green lungs of the city but also provide highly valuable ecological and environmental services.

There is a need for greater integration of urban forests in city development plans including revival of old cities. Though management of urban green spaces is largely a function of city administrations and municipal bodies, it is necessary to develop certain uniform standards for urban green spaces with a well defined structure of incentives and disincentives that encourages more emphasis on urban green spaces. In spite of pressure for development and land, the commendable example of Delhi, Hyderabad, Gandhi Nagar, Pune, Bangalore are before us. Ministry of Environment and Forests is initiating 'Green India Mission', as one of the eight missions to combat climate change in which a special place has been given to the protection and restoration of open spaces in urban and peri-urban areas. JNNURM programme can also be expanded to include development of green spaces within congested parts of the cities for holistic improvement in life quality.

**Building Effective Communication Strategies:** Forests sector need more effective communication and coordination across sectors to address the challenges it is facing. This calls for involving wider section of society and stakeholders. There is a need for more collaborative programmes to achieve wider recognition and acceptance of role of forests in building a sustainable development and future.

**Conclusion:** Forestry sector in India is facing enormous challenges owing to changes taking place in the demography, globalisation, social, economic, environmental, infrastructural development, scientific & technological spheres all around the country, which put tremendous pressure on forests and forestry sector. Solving these challenges will require ingenuity and creativity. For a forester, who is known to have a long range view of the things, these challenges are quite fascinating. They should be able to guide the society in effectively managing these resources. The approach should make better use of renewable resources, increase the resilience and diversity of production system.

I urge young officers who are entering into such distinguished services (IES, ISS, IFS and CCS), to break the barriers and build strong bonds and partnerships to work for a greener and sustainable future. I would like to quote J.F. Kennedy, Former President of USA. The quote begins "**Never pray for easy lives, pray for becoming a Stronger Man** (or person).

Thank you for kind attention.