Javier Arevalo & Liisa Tahvanainen (EDS)
Forestry Expertise Beyond Borders
Reflections of the Indo-Finnish Cooperation in Forestry Capacity Building
FORESTRY EXPERTISE BEYOND BORDERS

REFLECTIONS OF THE INDO-FINNISH COOPERATION IN FORESTRY CAPACITY BUILDING

Through the co-organisation of the Foreign Module of the Indian Forest Service Mid-Career Training

Co-organising institutions:

University of Eastern Finland
TERI University, India
Forestry Development Centre TAPIO, Finland
Saint Petersburg State Forest Technical Academy, Russia

in collaboration with the
Indira Gandhi National Forest Academy, India

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PREFACE

The training of forestry professionals outside their country of origin is not a common occurrence. The high costs usually involved, language barriers, and the sense of national pride that presumes local specialists to be more knowledgeable than foreign ones, are only some of the reasons preventing such events. Yet, in the Indian Government’s vision, professional training plays a key role in the constant updating of their Forest Officers, identifying a need for a greater international exposure and cooperation within their training. Following this vision, a joint proposal led by TERI University (India) and the University of Eastern Finland was selected by the Indian Government for the inclusion of a 2-week foreign module, and as a part of the 7-week Mid-Career Training programme for Indian Forest Service Officers.

This publication provides background information, views and discussions on this remarkable project of cooperative learning, where knowledge and skills were not just passed from one side to the other but truly shared. As exemplified by the Alumni Seminar and by some of the articles included here, the training module constituted not just an intensive exposure experience but the beginning of deeper cooperation among all involved parties. During the courses, many innovative ideas for forest management development in India were introduced by the Officers. We hope that, with the sharing of these experiences, readers will benefit from the ideas presented here.

We are extremely thankful to our main partners: in India, TERI University and Indira Gandhi National Forest Academy; in Finland, Forestry Development Centre TAPIO; and to our Russian partner the Saint Petersburg State Forest Technical Academy, for the effort placed in this initiative. Thanks also to the large number of organisations and individuals who were involved in the modules, and whose names can be found throughout these pages. We specially wish to thank the IFS Officers for their friendly and enthusiastic attitude, which did not decrease even in the coldest days of the Finnish winter. Their professionalism and insight into the subjects was truly exemplifying, and they are the main responsible of the great success of this project.

Javier Arevalo and Liisa Tahvanainen
Editors
IFS Officer Gobind Sagar Bhardwaj, a re-known wildlife expert, at Koli National Park.
TABLE OF CONTENTS:

EXPANDING INTERNATIONAL COOPERATION IN FORESTRY

TOWARDS GREATER COOPERATION BETWEEN FINLAND AND INDIA
H.E. T. Hakala, Ambassador of Finland in New Delhi…………1

THE ROLE OF TERI UNIV. IN FORESTRY CAPACITY BUILDING
U. Gulla, TERI University…………………………………………………3

FRUITFUL COLLABORATION BETWEEN INDIA AND FINLAND FOR SUSTAINABLE FORESTRY
R. Toivonen, FDC TAPIO………………………………………………5

TRENDS IN INTERNATIONAL FORESTRY EDUCATION
J. Arevalo, L. Tahvanainen & P. Pelkonen, UEF…………………7

CURRENT FORESTRY ISSUES

EXPECTED STRONG INFLUENCE OF CLIMATE CHANGE ON THE FOREST MANAGEMENT IN FINLAND
J. Parviainen, Finnish Forest Research Institute…………………9

HARNESSING BIOENERGY IN JAMMU & KASHMIR
M. A. Tak, IFS, & L. Tahvanainen, UEF……………………………13

EARNING CARBON CREDITS THROUGH FALLOW MANAGEMENT ON LANDS AFFECTED BY SHIFTING CULTIVATION IN NORTH-EAST INDIA
I. Ao, IFS………………………………………………………………………16

FORWARD TRADING EXCHANGE FOR FOREST CROPS
B. Kumar, IFS………………………………………………………………23

LEARNING’S FROM FINNISH FORESTRY FOR INDIA
M. Srinivasa Rao, IFS…………………………………………………………26
THE IFS-MCT FOREIGN MODULE

MODULE STRUCTURE..........................................................31
CO-ORGANISING INSTITUTIONS..........................................34
ONLINE AND ICT RESOURCES.............................................37

NETWORKING

ALUMNI NETWORK............................................................38

AFTERWORD

A PARTICIPANT’S EXPERIENCE
   M. A. Tak, IFS.................................................................43

PICTURES.............................................................................44
EXPANDING INTERNATIONAL COOPERATION IN FORESTRY

Towards greater cooperation between Finland and India

H.E. MS. TERHI HAKALA
Ambassador, Embassy of Finland in New Delhi

Bilateral relations between Finland and India are excellent and developing in all walks of life. This has manifested itself in the active exchange of political level visits between our two countries in the last few years. Taking into account the omnipresent dynamism in India I can only predict that the Indo-Finnish relationship is on a steep progressive curve.

Trade between Finland and India has shown a rapid rise in the last ten years. India is currently our fourth largest trading partner in Asia after China, Japan and South Korea. After a slowdown during 2009 due to the global economic crisis the Indo-Finnish trade is on the increase again but lagging behind its potential. There are more than 90 Finnish companies that have established their presence in the Indian market, and another hundred or so that trade with Indian companies. There is an increasing number of Indian companies operating in Finland which is a true sign of this two-way business street between our two countries. Finpro, the Finnish trade promotion agency, has offices in New Delhi, Chennai and Mumbai, and FinNode, the Finnish Innovation Centre, started its operations in New Delhi in February this year. There is a lot of drive in the air!

Foreign and security policy dialogue between Finland and India on issues of common interest and concern is deepening. India has always been an important actor in South Asia, and her growing role as a regional as well as global political and economic powerhouse makes India a very important and respected partner in various multilateral forums, as well.

Relations between countries and Governments are finally relations between nations and people. It has been delightful to notice the increase in contacts between Finns and Indians, be it in the field of business, science and research, education or tourism. Indeed, there is growing interest in Finland towards India, and it is reciprocated with an expanding Indian interest towards Finland. Direct flights between Finland and India by Finnair, our national carrier, have certainly contributed to this positive development.
I together with my colleagues at the Embassy of Finland in New Delhi are happy to play a role in encouraging these people-to-people contacts between our two countries to grow. In this spirit, I am glad to have been associated with the Mid Career Training Programme for Indian Forest Service Officers in Finland and Russia during 2010. Especially, I enjoyed hosting a pre-course reception for the 2010 last batch of trainees last December - an occasion of talk, laughter and pre-travel anticipation of the wonders of Finnish winter!

In conclusion, as one of the co-organisers of the Indo-Finnish Forestry Seminar and IFS-MCT Alumni Networking Event on 16 May 2011, I would like to thank our Indian partners for their collaboration. As we know, Finland is a land of forests, we Finns love them, and forestry has always been a stronghold of the development of the Finnish economy. From this foundation, we Finns are happy to share our knowledge and experience with our Indian partners. I hope that this cooperative partnership paves the way for further educational, scientific and commercial Indo-Finnish cooperation in forestry.
The role of TERI University in forestry capacity building

DR. UMESH GULLA
IFS-MCT Phase IV Programme Director, TERI University

A brief background of TERI University
The genesis of TERI University is rooted in the comprehensive research, consultancy and outreach activities of TERI, which has set up its reputation as an institution engaged in global research in sustainable development. Since its inception, the University offers not just world-class education, but also an environment that enables its researchers and students to develop fresh perspectives on their subjects of study. The University undertakes teaching, research and capacity building in different disciplines in environment, energy, climate change, sustainable development and public policy. The relationship with TERI has propelled and influenced the evolution of the University’s academic units. This relationship is enshrined in a memorandum of understanding between the University and TERI, wherein the two have agreed on collaborative research and programmes, joint studies and mutual support for seminars, symposia and conferences.

Giving an importance to international perspectives in its programmes, TERI University has entered into memorandums of understanding with several international universities aimed at facilitating mutually beneficial exchange of students, faculty, knowledge, resources and ideas. In 2007, the University launched an academic exchange programme with Yale University (School of Forestry and Environmental Studies) with support from the V K Rasmussen Foundation. Subsequently, in 2008, the University launched another academic exchange programme with Freie University of Berlin, Germany, with support from DAAD (the German Academic Exchange Service). Besides, the University have agreements of cooperation with other universities and institutions on specific areas of collaboration.

The Forestry and Biodiversity area is an important area of research at TERI. We have been making important attempts to support these research goals through a mix of research, training, and dissemination activities targeted at policy-makers, implementers, and local communities. Our institution has over 15 years of practical experience in relevant areas, and comprises professionals with expertise in technical and social forestry, biodiversity, economics and social sciences, environmental sciences, Climate change and forestry, forest ecology and capacity building and outreach. It is for this reason that the University has an extremely beneficial
agreement with University of University of Eastern Finland wherein the TERI University is utilizing the expertise of University of Eastern Finland in capacity building in forest management.

**TERI University as the lead partner of IFS Mid-Career Training**

In recognition to the capabilities of TERI University, TERI University consortium has been awarded by the Government of India the contract to conduct Mid-Career Training (MCT) of Indian Forest Service (IFS) officers, Phase – IV. This is a prestigious training programme attended by senior officers of Forest department of the country. The consortium has TERI University as coordinator (lead partner) and IIM, Lucknow, Yale University and University of Eastern Finland, Joensuu as national (management school) and international partners respectively.

Our partnership with University of Finland has been highly beneficial. The professors/trainers from University of Eastern Finland have imparted the latest and best practices in forestry. The training programme at Finland has been designed meticulously considering the requirements of foresters. There is an appropriate blend of theoretical sessions and the demonstrations and field visits. The participants have appreciated the demonstration of forest equipments during the course of the training. Further the inputs on explaining the role of different stakeholders as politicians, citizens, trade associations, and forest department employees has been dealt very effectively by the trainers during the programme. In this regard, the sessions by politicians and the village headman have been highly liked by the participants. Overall the participants have found the sessions very useful and they have started practicing the learning in their respective forest areas. The University of Finland has been able to give a wider exposure to the participants by taking the participants to Russia and also giving them a wider European perspective to forest management.

We are also thankful to our partner- University of Finland in providing an excellent hospitality to the participants. The participants have been impressed with the treatment given by Prof. Paavo, Prof. Liisa and Mr. Javier. Apart from being experts in their areas, they have facilitated excellent interaction of participants with the Finnish citizens, foresters, farmers, village headman, and policy makers during their stay. The officers from all previous batches have carried fond memories about the training programme. I on behalf of TERI University and the Participants from previous batches thank the University of Eastern Finland for providing the excellent contribution towards the training programme. I look forward to continued cooperation and collaboration with the University in future and in more areas of research.
Fruitful collaboration between India and Finland for sustainable forestry

DR. RITVA TOIVONEN
Director General Forestry Development Centre
TAPIO, Finland

It has been a great pleasure and honour to collaborate with Indian forestry administration and the University of Eastern Finland for the enhancement of multipurpose and sustainable forestry in India. Forestry Development Centre TAPIO is an expert organization specialised in forestry management and bio-energy policies, practices and markets in private and public context. The role of TAPIO in the education programme for Indian Forest Service (IFS) is to bring light on the history and current state of forestry in Finland and Europe, and to provide food for thought for innovative development of Indian forestry among the participants of the programme.

In particular, TAPIO has considered important to provide views and discussions related to sustainable forestry in the context of small-scale and private forest tenure, and insights to this through lessons learned in Finland during the last hundred years. Visits to meet forestry practitioners, small-scale landowners and guided visits to Finnish forests have drawn particular positive attention among the attending Indian Forest Officers. We have very positive learning experiences from the co-operation of IFS and TERI University, and we are looking forward to continue this and to start potential other partnership programmes. For us, it is most important to build-up our international activities with such good partners as the University of Eastern Finland, the IFS Officers, and TERI University. This is a good starting point for further co-operation in forestry, climate and water issues and bio-energy.

The growth of Finland’s forests has about doubled during the last fifty years. Simultaneously, harvests have increased but the growing stock of forests has also increased considerably. This is thanks to active forest policy and its successful implementation: forests have become interesting for private land-owners and for industrial companies as long-term investments targets. Finland has also recognized the importance of nature conservation and ecosystem services of forests, even though the employment and economic benefits have traditionally been a strong motivation to develop forestry by the government. Our sincere aim is to continuously develop Finland as a strong country of multipurpose sustainable forestry, which is reached by successfully combining high-level research, education
and development, employment of modern technology, and good practical knowledge.

Our experience is that IFS-officers visiting Finland have been truly interested about the Finnish model of sustainable forestry, which is based on private small-scale ownership and management of forests in combination of strong legislation and its enforcement and information steering. Over 70% of the area of Finland is forested, and about two-thirds of forests are privately owned (the average size of the holding is about 30 ha), the government owning about a quarter of the national forest area. Currently, several governments all around the world are interested about shifting tenure rights to forests to private families and communities, based on the good experiences that are available in terms of sustainable management and the role of forests in reducing poverty. TAPIO is interested and willing to share our experiences for supporting developing sustainable forestry also with regard to these aspects.

The joint programme has already been a very valuable experience for TAPIO and the University of Eastern Finland, and for Finland. We wish to continue the programme in the spirit of enthusiasm and innovation, and are looking forward to widen the co-operation. In future, Finland is aiming to further develop our forestry to provide the benefits that we already receive from forests, but stronger emphasis is on producing increasingly also biomass for energy and fuels, wood for wood-based buildings, and clean water. These areas are examples of topics for the future co-operation between India and Finland.
Expanding international cooperation in forestry

Trends in international forestry education

JAVIER AREVALO, PROF. LIISA TAHVANAINEN, & PROF. PAAVO PELKONEN
Univ. of Eastern Finland

Forestry is currently facing numerous challenges. These challenges include the need to adapt to the changing societal demands with respect to forests (e.g. emphasis on recreation, conservation, biodiversity, multifunctional management, social and spiritual values), the need for expertise in emerging areas (e.g. carbon sequestration, bioenergy or forest ethics), and the rapidly evolving technological advances that can be applied to the field (e.g. remote sensing-based mensuration).

At the same time, forestry institutions and companies, understanding the multiple benefits of cooperation and exchange, are increasingly operating in an international context. International conventions and agreements dealing with the forest-based sector are increasingly influencing the national forest practices and policies in every country. Due to various cooperative actions of governments, also forest specialists and other citizens in forested regions, everywhere in the world, are more and more inter-connected. In the globalised world, it is important for every nation to take an active part in international cooperation, partnerships, and in the preparation and implementation of international forest-related actions and policies. The United Nations Forum on Forests, United Nations Framework Convention on Climate Change, implementation of the forest work programme of the Convention on Biological Diversity, follow-up of the Ministerial Conferences on the Protection of Forests in Europe, and many other international processes are joint efforts of people who are working for forests in our global village. For instance, Finland is a party to more than a hundred international forest-related agreements and processes. They cover a great number of various forest-related topics, such as the climate, flora and fauna, and cultural and natural heritage. Active participation in the processing of initiatives concerning the forest sector of the European Union is a high priority for the forest-based sector in Finland, and Finland is one of the leading and most active countries in the field of forestry in the EU.

We are used to speak about heterosis in tree breeding when, due to flow of genetic material from far, we meet a clear increment in growth. A similar outcome is possible in the development of human resources. India is greatly different from Finland and North Karelia is, with respect to every dimension, not similar at all with typical Indian regions. The additive value of our differing backgrounds, various experiences, will offer good opportunities for new and innovative solutions. We are speaking similar “language of forestry” which provides us with preconditions for trust and confidence, needed in an open and fruitful process of
human capacity building. Many challenging topics are under intensive discussion and debate in the forest based sector in North Karelia. The change of the sector has been surprisingly fast and need radical actions. Among the challenging topics are, for instance, the public-private partnership and the role of government, environmental governance, economic basis of modern forestry, science and education driven innovativeness, and cross-border partnership. These basic issues with various nuances are relevant everywhere in the forested world.

Forestry education needs to respond to the challenges faced by the forestry sector by incorporating new skills and areas of knowledge by offering modern, integral, transdisciplinary, and internationally-oriented modules that provide engaging learning experiences, use the latest instructional innovations, and transmit attitudes and skills for continuing collaboration and life-long learning. While no single institution can offer the knowledge and skills needed for the life-time career of a forestry professional, international collaboration in forestry education and programmes of continuing education are certainly key in this respect. Only in this manner, foresters can continue to be qualified, versatile and prestigious professionals that are able to make an impact towards a greener and more sustainable society. Within the last 2 decades, the mobility of university students (including those studying forestry) have rapidly increased a consequence of the greater internationalisation of higher forestry education institutions, with some universities offering even international joint degrees across countries. However, not so much attention, especially at universities, has been yet put to the continuing education of professionals. In this sense, the vision of the Government of India, of incorporating training programmes for their forestry professionals, and particularly the introduction of a foreign module in such training, can be seen as an innovative and promising measure that will surely yield countless benefits.

For us, it is a great challenge to try to offer a European perspective and a new partnership for the Indian Forest Service in sharing information and knowledge for better understanding the inter-connectedness between global and local aspects. We respect diversity of societies and at the same time we promote an open dialogue related to forests through international cooperation. We need every piece of wisdom in international cooperation for carrying out responsible actions at local level, for serving ordinary rural people who are greatly dependent on the sustainable development of forest ecosystems.
CURRENT FORESTRY ISSUES

Expected strong influence of climate change on the forest management in Finland

DR. JARI PARVIAINEN
Director Eastern Unit, Finnish Forest Research Institute-METLA

Demanding goals for forestry

Last century experienced the strongest warming trend of the last millennium with average temperatures rising by about 0.6°C. Latest climate change scenario projections for Europe suggest that by 2100 temperatures will increase e.g. by about 3°C in central Europe (Christensen et al. 2007). This development will affect forest ecosystems as a substantial fraction of the existing forests will experience climatic conditions under which they do not currently exist. The many benefits that society and environment gain from forests, e.g. wood, non-wood forest products, soil protection, water regulation, conservation of natural habitats and biodiversity, recreational functions might be seriously jeopardized (Karjalainen et al. 2009).

The goal of EU climate policy is to curtail global warming so that the average increase in global temperature does not exceed 20th century levels by more than 2°C. This threshold would mean that the level of carbon dioxide in the atmosphere should stay below 450 ppm. **EU targets (20/20/20) in addition to those set under the Kyoto Protocol by 2020 are:** greenhouse gas emissions should be reduced by 20% compared to 1990 levels, the share of renewable energies should be increased to 20% of the EU’s final energy consumption; energy efficiency should be increased by 20%; and the share of biofuels should be increased to 10% of transport fuels (Kallio & Parviainen 2009).

In order to achieve these targets European Parliament decided on 17th December 2008 over the climate and energy package. This includes several new legislative decisions such as amendments the EU emissions trading directive (applies to emissions trading for the 2013-2020 period), burden-sharing to reduce the emissions of sectors outside of the emissions trading system (including transport, agriculture, waste treatment, construction), renewable energies directive with a view to increasing use of renewable energies (RES directive), directive on carbon capture and storage (CCS directive), and regulation on reducing carbon emissions from cars. As member country, Finland has to follow those targets set by EU. For the implementation a national strategy has been created for adaptation to climate change and especially to achieve the targets of renewable energy. The forest
bioenergy plays in Finland a crucial role as a mean to increase the share of renewable energy. The use of biomass should be increased in Finland from present use of about 4 mill. m³ until to 17 mill. m³ in 2020. The wooden biomass is used for generation of heat, electricity and liquid biofuels for transport.

![Figure 1](image.png)

**Figure 1.** Carbon balance between emissions of fossil carbon dioxide (1923–2004) and net changes in sequestration of carbon dioxide by wooden biomass, dead organic matter and soil organic matter (1990–2005) in Finland. [Source: Parviainen, Västilä, & Suominen, 2007].

**Research results are frequently asked for implementation**

There is a strong need to gather the research results on the relation between expected climate change and forests and to help decision makers and forest managers in their definition of strategies toward a reduction of forest losses, an increase of forest gains, and an adoption of mitigation and adaptation measures. Therefore at European level a COST\(^1\) Action on “Expected Climate Change and Options for European Silviculture (ECHOES)” was initiated in 2008. Some 100 researchers and experts from 28 European countries focus on following issues: impacts on forests with adaptation to and mitigation of climate change; climatic trends with extreme events; natural sciences with social sciences; research with actual policy and management; ecosystems with products and services; the main components of forest multifunctionality (ECHOES 2010).

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\(^1\) European Cooperation in Science and Technology
A major output of the COST Action ECHOES are the country reports giving a concise account on the state-of-the-art of climate change issues related to member country’s forests. The reports compile the latest scientific information, research results as well as practical measures and actions regarding impacts and adaptation of forests to changing climate and the role of forests in mitigating climate change. Research on the relation between climate change and forests has a long tradition in Finland. Since the first large scale research programme SILMU (Finnish Research Programme for Climate Change, 1990–1995), numerous climate change programmes and research projects funded. Furthermore Finland was the first country in the world to publish a National Adaptation Strategy to climate change in 2004. The Finnish COST ECHOES country report was published in 2009 including key findings serving public audiences and top-level decision makers. In following some of the key findings of the Finnish ECHOES country report are summarized.

**Expected climate change impacts on Finland’s forests**
The annual mean temperature is predicted to increase by 2–6 degrees by the end of 2100; increase in winter months (3–9 degrees) and summer months (1–5 degrees). Scientifically sound data of climate change effects on forest growth is obtained from phenological observations. Expected impacts of climate change are: a) longer growing season having a positive effect on forest growth in particularly in northern Finland and on peatland forests (forest growth increase up to 20–50% depending of species); b) increasing risk of wind damages especially in older Norway spruce stands; c) increasing risks of biotic damages due to forest pathogens (*Heterobasidion*) and pest insects (i.e. *Ips typographus*) and spread of new invading species from the South; d) the northern timberline is assumed to shift northwards in the long run.

**Adaptive silvicultural measures are needed**
Good and timely forest management is the main way of improving the ability of forests to adapt to climate change. Following silvicultural measures are recommended:

a) timely recognition and removal of dying trees and keeping material that could cause forest fires or insect pests down to a minimum are part of forest management;

b) favoring native tree species for forest regeneration as they are better suited to adapting to local climate change because of their genetic make-up;

c) favoring natural regeneration if the soil and site conditions are suitable for that;

d) favoring mixed forests as the presence of various types of trees with different characteristics reduces the risks to forests;

e) developing forest management contingency plans with funding options for covering any damage and operational models for wood working industry in order to prepared for the detrimental effects of sudden and extreme weather conditions caused by climate change.
Due to the expansion in the use of wooden biomass especially, new information is required on the environmental and biodiversity effects caused by biomass extraction from the site. This is one of the most important new orientation of forest research at present.

**Contribution of forests to mitigation**

Finland’s forests (including peatlands) sequestered in 2008 35 million tons of CO$_2$. Finland’s forests will remain a clear carbon sink during the next 30 years if annual cuttings do not exceed 50–60% of annual increment. According to the model estimations the increase of overall use of wood-based energy and the volume of forest chips used for energy production to 8–12 million m$^3$ per year will diminish the carbon sink of forests less than 10%. In 2008 renewable energy sources provided 28% (387 PJ) of Finland’s total energy consumption of which wood-based fuels accounted for 21% of which 49% was covered by waste liquors from the forest industries and 51% by solid wood fuels, mainly heat and power plants and the use of firewood in small-sized dwellings. Harvested wood products make up a considerable carbon store that has gradually increased since the 1990s, thus making up a carbon sink. Recycling of solid wood products is important from the CO$_2$ emission point of view. Finland produces approximately 2 m$^3$ of wood products (mostly long term carbon storage), and approximately 5 tons of pulp and paper products (mostly short time carbon storage) per capita per year. The Finnish Government has promoted both domestic use and export on timber products, and timber construction through various campaigns and programmes over the last 20 years. The implementation of the governmental programmes have provided several imposing examples of timber construction (such as Sibelius Hall in Lahti, Metla House in Joensuu) and several multi storey residential house timber frame construction projects.

**References:**


Harnessing bioenergy in Jammu & Kashmir, India

M.A. TAK,
*Indian Forest Service, Conservator of Forests, South Kashmir, J&K*

&

PROF. LIISA TAHVANAINEN
*University of Eastern Finland*

Power is a critical infrastructure on which the socio-economic development of a country depends. It is estimated that the total primary energy consumption per capita would increase in India from 2006 to 2030 by more than 70%, when at the same time the growth in OECD countries would be 0.5% (www.eea.europa.eu). The growth of the economy hinges on the availability of quality power at competitive rates. Therefore, it is imperative that energy is available for growth of infrastructure, economy and overall better quality of life of the people. To meet the challenges of economic growth and growing energy demand in India, the dependency on oil imports is forecasted to increase from 70% up to 94% by 2030. As such shift to next generation fuels and increased utilization of renewable sources is a paramount focus of the Union and the States in India at present.

In India, many initiatives have been taken to enhance the production and use of renewable energy. The Government of India (Committee on Biofuels, Planning Commission) in its 2003 report recommended the use of bio-ethanol (sugarcane) for blending with petrol and biodiesel (Jatropha curcas) for blending with high speed diesel. Various efforts are being made to develop liquid fuels and to harness wind and solar energy. The State of Jammu and Kashmir is the northern most State of India and there is huge gap between the demand and the production of energy in this part of the country. The requirement of energy for heating especially with respect to winter zones of the State, upcoming industrial and infrastructural growth and increasing population factors if taken into account, the peak power demand in no case is less than 8800 MW, whence the peak met in 2010 is 1557 MW. As such it has been essentially felt that the energy production in its all forms needs to be harnessed for the socio-economic growth of the State however, the capital cost is a limiting factor.

Table 1. Figures regarding the State of Jammu and Kashmir.

<table>
<thead>
<tr>
<th>Geographical Area (under Adm control)</th>
<th>Forest Area</th>
<th>Production Area</th>
<th>Forest Growing Stock (million cubic meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sq km</td>
<td>ha</td>
<td>ha</td>
<td>Deodar</td>
</tr>
<tr>
<td>101,387</td>
<td>2,023,000</td>
<td>643,402</td>
<td>18.57</td>
</tr>
</tbody>
</table>
The growing stock in the forests of J&K State is 132.92 million cubic meters and
the average annual yield is 780,000 cubic meters. The 227,000 standing volume of
annual cut fetches about 115,000 cubic meters of hard wood which is consumed
locally for constructional purposes. The import of hard wood in the State has
recently reached to about 120,000 cubic meters annually. As per the Forest Survey
of India study 2010, the total estimated growing stock (volume) of wood outside
Forests in the State has been found 30.21 million cum with an estimated stem
number of 86.48 millions. This stock of short rotation crops adds an average annual
cut of almost 2.2 -2.5 million cubic meters under this sector. In addition to this a
good quantum of tree pruning, twigs, stumps, wood manufacturing byproducts,
leaves etc are also available in the urban as well rural areas which are either being
not used at all or if used then vainly.

The State of Jammu and Kashmir, with large areas
of forests and good
potential for producing
wood for energy
production could serve as
one of the pilot areas
shifting the trend towards
renewable energy use and
less dependency on
imported energy by using
biomass for energy. At the
same time the State of
Jammu and Kashmir could enjoy increased energy security, which is extremely
important during the severe winters. This would lead to decreased CO₂ emissions
and the possibility to generate employment for the inhabitants as well. Although,
this State is very good in terms of energy wood stocks and wood by products but
this resource is being used in its crude form alone which does not contribute
productively in energy generations as being done in Europe and other cold areas
of the globe. Northern Countries in Europe, which experiences more severe cold
winters are the countries where reverse is the truth.

Keeping the global climate and Energy Strategy in view, it is estimated that the
primary use of wood-based fuels shall increase manifolds in the world in the
coming years. In European Union, according to the EU Climate and Energy Policy,
renewable energy target is to increase these energy sources to 20% of total energy
consumption by the year 2020 and EU countries have already taken up many steps
to increase its production. A good example is Finland, where the wood-based fuels
contribute more than one fifth (82 TWh) of the total energy consumption, and is the
second most important source of energy after oil. This makes Finland one of the
leading countries in the World, when it comes to utilizing wood for energy
generation. Accordingly it is thought to be vitally important that a supportive
Current forestry issues

Partnership is build up with Finland whereby the efficacy of bioenergy production is learnt and utilized for the betterment of the State of Jammu and Kashmir. Cooperation in terms of research, technological and other support is envisaged from Finland. The focus of the cooperation is envisioned, keeping the following interface issues in view:

1) A complete inventory of potential bioenergy raw material to be built up, taking into account especially wood based raw materials both in the forest and elsewhere such as residues from wood based industry etc (JKFD, UEF/WENET).
2) The actual assessment for energy production/demand especially with respect to heating to be determined (JKFD/JKDST, WENET).
3) Implementation of a pilot Project for establishment of suitable bio-energy plants from household scale to small scale district and to large scale energy-plants requires to be developed with feasibility study on the subject (JKFD/JKDST, WENET).
4) Training for energy wood production, developing sustainable forest management systems, Indoor Nursery techniques, loggings and logistics to be developed and establishment of demonstrative energy forest areas are envisaged. (JKFD together with TAPIO/UEF).
5) Piloting phase to be carried out by all the partners under the leadership of JKFD in the State of Jammu and Kashmir.
6) Dissemination of the results – aiming for replication and enlargement of demonstration areas and pilot project at a large scale.

Partners: Ministry of Environment and Forests, Jammu and Kashmir Forest Department, Ministry of Non conventional Energy Sources; University of Eastern Finland; TAPIO Forestry Development Centre; Finnish Energy Technology Cluster Programme and WENET Network in Eastern Finland.

Co-operation: The project intends to agree on the co-operation with TERI, and different companies producing technology for bioenergy production, but also organisations interested in estimating/evaluating the effects of the project and in acting towards minimising effects on CO$_2$ emissions and maximizing CO$_2$ sequestration.
Earning carbon credits through fallow management on lands affected by shifting cultivation in North-East India

IMTIENLA AO,
Indian Forest Service, Conservator of Forests,
Rain Forest Research Institute, Assam

The seven states of the North Eastern India occupying only 7.7% of the country’s total geographical area comprises of just about 4.5% of India’s population. The region is predominantly mountainous interspersed with valleys and river plains with an altitudinal variation ranging from the flood plains of Brahmaputra to high Himalayan peaks. In general, the region may be characterized by heavy precipitation, rich forest cover and biodiversity, fragile mountain ecosystems, high seismicity, a drainage pattern marked by valleys dissected by three major rivers viz., Brahmaputra, Teesta and Barak and their tributaries. Being home to hundreds of indigenous communities with a rich natural and cultural heritage it has high ethnic diversity and is a reservoir of indigenous knowledge systems.

The locational and topographical disadvantage of the region, intra and interstate border disputes, continuing protests and insurgency movements seeking self determination and independent state structures leading to militarization of many parts of the region, demographic changes due to illegal immigration and the lack of infrastructure and employment opportunities have interrupted the region’s progress. The ambiguous land tenure and property rights regimes, illegal trade in flora and fauna, excessive demand of timber from outside the region along with the phenomenal rise of the “timber-mafia” further added pressure on the resources of the region making natural resource based planning and development a challenging and complex issue. The major advantage the region has, is that the land is under the ownership and control of the community and the existence of well established traditional institutions that govern the community through customary laws that has stood the test of time. Guided in the right direction these institutions have the potential of becoming the key actors in the development of the region. The existence of cohesive tribal societies with minimum divisions along class and caste lines, age old customs and tradition on the use and regulation of natural resources, the high rate of literacy, a low population density, statutory constitutional safeguards and good natural regeneration status of forestland are the other strong points of the region. These positive factors could be judiciously brought into play into the arena of sustainable resource management and in expediting the developmental process.
Current forestry issues

Shifting Cultivation in the region
Shifting cultivation, popularly known in the region as jhumming or jhum cultivation is a purely subsistence level of production characterized by cutting and burning of plots to be cultivated, rotation of fields rather than the crops, use of primitive tools and implements and absence of draught animals and machinery, minimum tillage, low level of chemical inputs and cultivation of local varieties for a short period of occupancy alternating with a longer fallow period that allows the rejuvenation of the land and recycling of nutrients. In North East India where shifting cultivation is pre-dominantly practiced, forestlands and agricultural lands cannot be categorically differentiated, as forests would comprise of primary forests as well as secondary jhum re-growths in various stages depending on the jhum cycle, and the current agricultural land would again develop into forests in subsequent years. Hence the land use pattern in the region exhibits an alternation between agriculture and forestry with a longer forestry phase interrupted by a shorter agricultural phase of usually one to three years.

While some view shifting cultivation as an inefficient form of agriculture, an impediment to the progress of forestry and an agent of biodiversity destruction others consider it as a diversified system well adapted to local conditions and less destructive than forest exploitation for timber. Amidst such contrasting views it is important to recognize that for the ethnic communities of the region Jhum plays an important cultural role in local customs, traditions, and practices, besides offering economic security to farmers. However with no single clear cut approach in sight to manage this complex issue a multi-pronged strategy needs to be adopted that supports decentralized, participatory, multi-stakeholder, interdisciplinary and adaptive management approaches that respect human and cultural diversity, gender equity, livelihood security and environment stability where traditional knowledge and scientific information are both valued and build upon.

Shifting cultivation areas of the North East exhibits one of the best examples of community controlled and managed common property resources in the country that ensures equitable tenurial access to production resources for all community members irrespective of the ownership of land. Farming and forestry as practiced in jhum cultivation are strongly based on customary Common Property Regimes, a wealth of indigenous and ecological knowledge systems and the existing customary institutions. Changes to any one of these components would affect the other components as well. The main areas of concern being tenure regime transformation from the present Common Property Regime (CPR) to Private Property Regime (PPR) with access restrictions leading to disparity in asset creation and wealth generation opportunities, rapid erosion of self-sufficiency of the poor leading to their marginalization and the erosion of the powers and control of the Traditional Institutions. The Constitutional provisions like the Article 371(a), 371 (g), the Sixth schedule and other legislations in the states have given due recognition to these Traditional bodies in the form of Village Councils, Autonomous Councils etc that
can plan, formulate and execute their own developmental plans specially in the management of land and its resources.

**Climate Change and the North East**

Climate Change has emerged as one of the most serious environmental and socio-economic concerns of our times. It is a global phenomenon with diverse local impacts likely to alter the distribution and quality of our natural resources and adversely affect the livelihood of the people specially the poor and marginalized communities. A latecomer to the nation’s development process and with a per capita Green House Gas emission barely a fraction of the national average and an order of magnitude much below that of other industrialized states of the country, the region’s economy is closely linked to its natural resource base and climate-sensitive sectors such as agriculture and forestry, hence faces an increased risk of the negative impacts of climate change. The region would therefore need to adopt a climate friendly, equity based and sustainable developmental path taking into account our “common but differentiated responsibilities and respective capabilities”, and our regional development priorities, objectives and circumstances. Besides mitigation and adaptation measures, the region could actively pursue the creation of carbon sinks and bringing them into the carbon market domain through Afforestation/Reforestation Clean Development Mechanism (A/R CDM) projects under the Kyoto Protocol, enhancing the carbon sequestration capacity of existing forests to enable carbon trading in the Voluntary Carbon Market through Verified Emission Reductions (VERs) and through conservation and management measures in order to take advantage of REDD+ as and when it is operationalised.

That the jhumming communities in the North East aware of and affected by the phenomenon of climate change has clearly emerged during the survey of 40 villages in Assam and Nagaland, wherein more than 90% on both sites had noticed changes in the climate. Most of the respondents, 48.5% in Karbi and over 72% in Mokokchung, felt it was warmer, and around 40% at both sites, had noticed that there was less rainfall and this was associated with a reduction in water resources.

The Kyoto Protocol provides for three mechanisms that enable developed countries with quantified emission limitation and reduction commitments to acquire greenhouse gas reduction credits. These mechanisms are Joint Implementation (JI) for the creation of Emission Reduction Units (ERUs), International Emission Trading (IET) and the Clean Development Mechanism (CDM) for the creation of Certified Emission Reductions (CERs). While the first two mechanisms are relevant only for developed countries, under CDM, a project proponent from a developing country can take up a greenhouse gas reduction project and the CERs traded to developed countries thus serving the dual objectives of enabling compliance by the developed country of their emission reduction commitments and of the developing countries to move towards their sustainable development goals. While CDM projects could be designed for a host of activities, right from the energy and transport sector to solid waste management projects, for the lands in the North East
affected by shifting cultivation, emission reduction and sink enhancement through Afforestation and Reforestation activities remains the ideal choice for designing a CDM project. The exact area of jhumlands available for designing CDM projects are not available as data with regard to the extent of area under jhumming is inconsistent, though the Forest Survey of India based on an assessment between 1987-1997 puts the cumulative area under shifting cultivation at 1.73 Million Hectares. Other estimates include 7.4 M ha by FAO in 1975, 2.8 M ha by the North Eastern Council in the same year and 3.8 M ha by the Task Force on shifting cultivation in 1983 (MoEF, 2003; Darlong et al, 2008). The highest jhum intensity is in Nagaland, with as much as 33.2% of lands affected by this practice while in Arunachal Pradesh it is only 2.5% (Darlong, 2004). However, the lands under shifting cultivation eligible for CDM projects in the North East region has been estimated at 0.6 million hectares (Kant & Katwal, 2003).

The survey of 40 villages in Assam and Nagaland shows that proportion of the village areas sown was greater in Nagaland (2.4 % in Karbi and 5.6% in Mokokchung), as was the proportion of settled land (2.9% and 4.1% respectively). Forests covered 80% of the Mokokchung villages, and 84% of those in Karbi. The proportion of land in fallow was similar in both districts i.e 2.94% in Karbi, and 2.77% in Mokokchung. However the point worth noting here is that the term fallow land has been used only for the current fallow i.e jhumland in its first year of fallow having recently abandoned after one to two years of cropping. Hence the area shown as forest would mean not only primary forests but also secondary jhum fallsows in various stages of regrowth depending on the existing jhum cycle. Hence, given a jhum cycle of 12 years the percentage of actual fallow lands would be 29.4% and 27.7% in Assam and Nagaland respectively and land affected by jhumming at 31.77% in Assam and 33.3% in Nagaland, almost the same as the state percentage of 33.2%. Since fallow lands are abandoned and left unmanaged for the entire period of fallowing, any interventions in the form of afforestation and/or reforestation would undoubtedly be in addition to the “business as usual” scenario in a shifting cultivation landscape, thereby fulfilling the “Additionality” criterion of the approved methodologies for CDM projects.

Leakage in a CDM project indicates the Green House Gas (GHG) effects outside of the project boundaries that can be directly attributed to the CDM activities. Lands reforested under the CDM project would no longer be available for activities grazing and if due to this the grazing of livestock is shifted to another forest area, this negative GHG effects would have to be accounted for as “leakage” from the CDM project. Due to the absence of ploughing and use of draught animals in jhumming, the leakage due to grazing would be almost non existent and leakage due to food production insignificant; for the reason that after the cropping period of two years the food production activities would in any case shift to another jhum block, irrespective of whether a CDM project comes in or not. Fuel also will not cause any significant leakage because the normal practice is to collect fuelwood from shifting cultivation lands in the first year at the time of forest clearance before
the fields are readied and burned for cultivating food crops. Therefore the traditional practice of shifting cultivation inadvertently seems to fit in perfectly into the CDM scheme of things as far as the additionality and prevention of leakage are concerned.

Eligibility of jhumlands for implementation of an A/R CDM project would also need to be clearly demonstrated. Demonstration of the land as non forested area at the moment of starting of the project activity would be simple as shifting cultivation lands are first cleared and burnt for agriculture with very few trees left well spread out in the area to avoid shade effect to the crops. Hence vegetation on any current jhum field would be below the forest threshold of 15%. Shifting cultivation is being practiced since time immemorial by most of the traditional communities of the region, the fact would clearly emerge that current jhum lands are not temporarily unstocked either due to harvesting of forests or natural causes but has been cleared for raising shifting cultivation crop which would form the baseline activity in the area. However, the lack of Government land records for jhumlands coupled with the complexities involved in the procurement of high-quality satellite imageries of the area, the evidence for showing the lands as non forest on 31.12.1989 becomes extremely limited. However under a stabilized shifting cultivation system with fixed jhum blocks and a strong land use regulatory mechanism by the traditional village institutions, reliable information on the land use pattern going back to even more than 100 years can be obtained through PRA or existing village records.

**Emerging trends in shifting cultivation**

There is a widespread assumption that jhum was a sustainable practice in the past with long fallow period and that due to the population pressure the jhum cycle has drastically decreased making it inefficient and unsustainable. The evidence in support of this is weak and there doesn’t seem to be a direct relationship between population increase and ensuing decrease in jhum cycle. In fact among many communities practicing jhum in a stabilized jhumming regime, the situation seems to be just the reverse. Rapid modernization with better education and employment opportunities outside the village has led to a steady decline in the number of families practicing jhum. Shifting cultivation is almost solely dependant on the family’s own labour force and hence the migration of the younger generation to urban areas leads to an acute shortage of labour for jhumming. With this, the demand of lands for shifting cultivation as well as the food production has come down, so much so that the jhumming communities cannot sustain on their produce for than 9 to 10 months in a year. The practice of shifting cultivation today has been stressed both by external and internal forces and it is imperative that an enabling environment is created in order to address the urgent livelihood needs and ecological concerns arising out of rapid transformations driven by development and other externalities including market forces.

Eradication of jhum through various schemes to “wean away” jhumias from this “primitive and destructive system of agriculture” and leading them towards more
sustainable and productive sedentary farming systems was the general policy trend in the country till a couple of decades back. However, the numerous programmes and packages of the government to eradicate jhumming in the past having met with little success, the recent trends have shifted towards fallow management and enhancement of productivity rather than the eradication of the practice itself. The Government sponsored Joint Forest Management programme activities through afforestation and reforestation activities are now being integrated into the jhum fallow management efforts with many governmental and non governmental initiatives giving the desired results. Given the right technical support and adequate financial assistance there is ample scope to bring in forestry activities on fallow lands into the Carbon market domain for earning tradable CERs for additional economic benefit of the jhumming communities.

The jhumming communities are now more than ever willing to explore other alternative options like plantation (both forest and horticulture), biofuels, NTFPs etc to supplement their livelihood needs. Though these communities have vast tracts of land under the ownership and control of the communities, (more than 90% in Meghalaya and > 80% in Nagaland), it is safe to say that they are “Resource Rich but Cash Poor”. With the advent of globalization and a market driven economy, the jhumming communities are likely to become increasingly marginalized unless innovative and lucrative livelihood options are made available to them. It is imperative that these options are socially and economically acceptable the communities, are implementable in the field and strongly based on the concept of sustainable development. The ecological significance and fragility of these areas of high biodiversity values coupled with the poor economic status of the people necessitates an integrated approach in order to address both these drawbacks. The aforementioned survey in Assam and Nagaland mentioned has clearly indicated that the jhumming communities do feel the need to diversify their livelihood activities and that their top three choices for diversification are land and forestry based. These plantation based activities are their own options and dovetailing an A/R CDM project would only form a natural extension of the same activity with tangible benefits flowing to the communities.

Conclusions
Against this backdrop, where thousands of hectares of good productive land goes into fallow every year and with hundreds of underprivileged jhumming communities in transition ready to seek livelihood opportunities outside of the age old practice of shifting cultivation, this seems to be an appropriate time to move towards an arrangement, which recognizes the conservation needs as well as the social and economic needs of these communities living in tradition bound societies while also addressing the larger issue of global warming and climate change. This can be achieved by adopting a more integrated form of management that focuses on the interface between the concerned Government agencies, communities and other stakeholders and the role that external agencies like NGOs can play in brokering appropriate institutional arrangements. The project designing, verification and the
registration process being a long drawn out process requiring considerable amount of finance and technical expertise way beyond the means of the jhumming communities, it would necessitate the conscious and decisive support from concerned external agencies. Alternatively, forest and wood based industries could invest in the A/R programmes of fallow lands through plantations of fast growing species with an appropriate rotation period corresponding to the fixed jhum cycle. This would result in the production of additional harvesting of tree crop without disturbing the agricultural pattern of the jhumias, as a community with a 10 year jhum cycle can harvest the tree crop in the 10th year, supply the timber and bole crops to the industries and would still have sufficient biomass for supporting the two years of cropping phase.

Afforestation activities could again be taken up simultaneously with the agricultural crops which the farmers could tend to without any extra efforts during the two cropping period. The introduction of this “shifting forestry” concept to the existing system of shifting cultivation would not only ensure a sustained supply of raw materials to wood based industries without pressure on natural forests but also put hard cash, a commodity in extremely short supply, in the hands of the jhumias and serve the dual purpose of conservation and climate change mitigation as well. Given the exceptionally good regeneration status of the region, a fallow land well managed with suitable tree crops is also likely to give substantial yield of wood and sequester a considerable amount of carbon, which at present has never been taken into account. This is where an appropriate framework of investment and benefit sharing mechanism would have to be brokered between the concerned parties be it the government, communities, industries or other institutions. As elaborated above, the system of shifting cultivation as traditionally practiced has by default created an enabling environment conducive to the implementation of small scale A/R CDM projects. With meticulous planning and proper implementation, this model could prove to be a win-win situation that addresses the pressing issues of poverty alleviation, sustainable development and climate change.
Current forestry issues

Forward trading exchange for forest crops

BRIJESH KUMAR,
Indian Forest Service, Conservator of Forests, Karnataka

Introduction
This is an attempt to introduce the concept of ‘Forward Market’ of forest crop (mainly timber and firewood). It is presumed here that such market shall be with reference to the forest crops of Finland. Even though there exist a forward markets for certain agricultural commodities, petroleum oil and metals and minerals, such markets for forestry crop have not been developed yet. ‘Forward Market’ is a win-win concept for both the producers as well as the consumers of forest crop. The producer stands benefited owing to a wider exposure of his produce. The consumer on the other hand, gets an assured supply at future date, at known costs. Thus the consumer can make his business plans, much in advance.

Scope
Finland has been kept in mind for the purpose of this ‘Concept Note’. In Finnish forestry, the principal species are less than a dozen. Further the main consumers of the crop are forest based industries. Since industries typically plan for a number of years in advance, a ‘forward market’, if developed, can be of great advantage to the forest based industries. It shall also impact beneficially on their competitiveness. This note does not address the similar crops of India, largely because of relatively un-organised consumers in India. Additionally under socio-economic situation prevailing in India, a significant fraction of the forest produce is consumed either locally or by the relatively un-organised and non-industrial users, often for their basic livelihood needs.

Further in India, the forest crops are fairly un-evenly distributed. In some regions, there is a relative abundance of forest produce, whereas certain other regions are not so blessed. Since transportation costs are significant vis a vis the cost of the crops, the forward market may not be successful, if applied with reference to India. Additionally forest crops in India have a larger number of variety and grading. A large number of varieties (species) along with variation in grading of the crop make it difficult to develop such market for India.

Basic elements
It is proposed that the crop shall be traded on a computer server based system. All the data shall reside on this server. Clients shall be able to see and interact with the data (sale, purchase etc) through their computers on internet.
- Tradable Units: Typically single stand of crop shall constitute the one tradable unit in this market. As far as possible, area occupied by the stand should be uniform area for each unit. If the stand is large, the same can be divided in more than one convenient unit. Care should, however be taken to include the entire stand, in case of small growers.

- Trading in Futures: A unit of crop, that is likely to be mature in future, shall also be tradable in this market. Typically this period could be one-tenth of the rotation of the crops. In addition to the final harvest, even the thinning crops should also be allowed to be traded in this market.

- Restrictions on Trading: A unit may be allowed to be traded unlimited number of times, until a specified closing date. These closing dates could be spread over the entire working season, so as to make the produce available uniformly over the entire harvest period.

- Crop Grading: Since it may not be possible for every purchaser to inspect all the units, an effective system of grading of forest crop shall have to be devised. The grading should be allowed to be done by independent ‘Graders’. Each allocated grade should depict the species, age, yield, basic quality and the ease of extraction of the crop. The purchasers should be able to take an investment decision, largely on the basis of the assigned grade of the crop.

- Role for speculators and traders: Not only the consumers, but even the traders should also be allowed to participate in the trading of the units. The active presence of these intermediaries and speculators shall even out the short-term wobbling of the market. At the end of stipulated period, however, it shall be obligatory for the final purchaser to harvest and clear the land. A scheme may also be devised to enable the final purchaser to defer the final harvest, to a limited period, after paying an additional fee to the grower.

- Crop Insurance: It shall also become necessary that the crop should be insured, before it is allowed to be traded in the market. Insurance shall protect the interest of the grower as well as the purchaser. In addition, it shall also positively impact the insurance industry.

Pre-requisites
Like other similar markets, the trading exchange shall be a ‘Server Computer’ based one. Parallel examples shall be drawn from stock market. Still closer example is that of Petroleum Oil trading exchange.

- Legal framework: Before any forward trading is taken up, it is essential that the proper legal framework be in place. There may be a need for a dedicated legislation. Government has to step in to fill this essential gap. A dedicated statute and an
independent regulator are some of the requirements before trading can actually be taken up.

-Depository: Since trading has to take place in secured manner, there has to be a legal custodian of the crop as long as the trading is continued. Typically the owner shall be allowed to upload the relevant details of the crop through the authorized broker. It could even be the respective FMA. After uploading, the crop shall be deemed to be owned by the Depository till the maturity.

**Beneficiaries**

-Producers: Forest crops are typically long rotation crops. There are, of course some intermittent returns in terms of thinning outputs, but even these are far apart with long periods of relatively no returns. Thus for practical purposes, the forest crops are largely illiquid assets, till the year of maturity. Forward markets, if implemented are an attempt to enhance liquidity of the forest assets. Further the producers also stand to fetch a fair price of their crop, as the same is exposed to a larger number of prospective buyers through this ‘Market’.

-Consumers: The main consumers are large industries involved in manufacture of pulp wood and industrial timber. These corporate entities typically plan for a number of years in advance. In order to plan in advance, these consumers appreciate an assured supply of their raw material (forest crop) at a future date at a known cost. When forward trading is implemented, these consumers shall be able to purchase the crop for future years in advance. Thus these consumers shall be better able to plan in advance their future operations. This is likely to add to their competitiveness.

-Economy: Since the trading shall be in transparent and simultaneous manner, the ultimate grower shall stand benefited because he/she shall be able to expose his crop to a relatively large number of prospective buyers. As a result, it is expected that he shall be able to fetch a better price as compared to the existing system of disposal. As mentioned earlier, the final consumer also stands benefited. Hence the economy, as a whole stands benefited. By permitting the sale and re-sale of crops (up-till maturity), the tax collection shall be higher to the exchequer, since the same can be levied on each such transaction. Further since all the transactions are deemed to take place at the Exchange, the ease of payment of taxes (and ease of collecting the same) should also be an advantage to the tax collector as well as tax payer. Since it is also proposed that the crop, to be traded, must be insured, the synergic effect on insurance economy shall also be significant.
Learning's from Finnish forestry for India

M. SRINIVASA RAO
Indian Forest Service, Joint Secretary and Project Manager, Maharashtra

Introduction
As a forester and a forestry undergrad, I was trained in Indian Forestry Management (at the Indira Gandhi National Forest Academy, Dehradun) and also heard and learnt through my undergrad professors in the Forestry College at Bangalore on American forestry management. Regarding European forestry, we were taught the famous shelterwood system of forest management. However I had no idea what the Finnish forestry management would be like. Hence I opted to visit Finland as a part of Mid-Career training programme sponsored by the Ministry of Environment and Forests. We had a nice reception and good interaction with the Finnish forestry sector experts, scientists, academicians, entrepreneurs, private forest owners, executives from the industry and many others. Though our visit was for two weeks, but these two weeks were more enriching not only in terms of the knowledge and the skills which we were exposed but also we came to know the culture and the traditions of the Finnish people very closely.

I have personally gained a lot, and would like to pursue further, especially in the following sectors: (1) use of bioenergy in India; (2) private forest associations; and (3) paper and paper board industry in India. Let me explain how the learning’s are applicable in the Indian scenario for the above mentioned sectors.

Use of bioenergy
In the Finnish Scenario, bioenergy accounts for 20% of primary energy consumption in Finland and 10% of electricity demand. These figures are already the highest for any industrialized country, but more opportunities have been identified to increase the use of bioenergy by 35% over the next decade. Bioenergy accounts for 85% of Finland’s renewable energy production. Biomass-based fuels have traditionally included residues from the chemical and mechanical forest industry, and firewood used to heat homes. Over the last decade, these fuels have been complemented by forest chips from logging residues, biogas, biodegradable fractions of recycled waste, straw, and perennial energy crops such as reed canary grass [Source: http://www.ymparisto.fi/default.asp?contentid=172109&lan=en].

In the Indian scenario, renewable energy sources have the potential to generate 68,000 MW of green power costing under Rupees.6 (€0.098) per unit, according to a report by The World Bank, entitled Potential of Renewable Energy in India. With
a population of about 1.2 billion growing at about 1.5% annually, India’s economy has been recording growth of over 9% p.a. and over 6% even at the time of global recession. In concurrence with Gross Domestic Product (GDP) growth, India’s energy demand is also rising rapidly. India’s energy demand is expected to be more than three to four times the current level in another 25 years. Per capita energy consumption in India has risen by 42.1% in the last two decades (1990-2008), compared to the world average of 9.5%. Yet, in comparison to world average Total Primary Energy Supply (TPES of 1.83 toe/capita), India still lags behind at only 0.54 toe/capita in 2008.

Table 1. Sector-wise usage of combustible and renewable energy in India.
[Source: http://pubs.iied.org/pdfs/G02989.pdf]

<table>
<thead>
<tr>
<th>Breakup of sector-wise usage of combustible &amp; renewable in India- Sector</th>
<th>Usage pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>78.7%</td>
</tr>
<tr>
<td>Industry</td>
<td>17.4%</td>
</tr>
<tr>
<td>Others</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

Nearly 77.6% of India’s 159 million rural households used firewood/chips while 9.1% used LPG. Traditionally, use of biomass as energy in India is characterized by low efficiency and environmental degradation.

Table 2. Bioenergy potential and performance in India.

<table>
<thead>
<tr>
<th>Bioenergy potential &amp; performance in India S.No.</th>
<th>Source/system</th>
<th>Estimated potential</th>
<th>Achieved as on 31st March 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Grid Interactive renewable power</td>
<td>(MW)</td>
<td>(MW)</td>
</tr>
<tr>
<td>1</td>
<td>Bio power (agro residues and plantations)</td>
<td>16881</td>
<td>861.00</td>
</tr>
<tr>
<td>2</td>
<td>Bagasse cogeneration</td>
<td>5000</td>
<td>1338.30</td>
</tr>
<tr>
<td>B</td>
<td>Captive/combined heat and power /distributed renewable power</td>
<td>-</td>
<td>232.17</td>
</tr>
<tr>
<td>1</td>
<td>Biomass/cogeneration (non bagasse)</td>
<td>-</td>
<td>122.14</td>
</tr>
<tr>
<td>2</td>
<td>Biomass gasifier</td>
<td>-</td>
<td>122.14</td>
</tr>
<tr>
<td>3</td>
<td>Family type biogas plants</td>
<td>120 lakh</td>
<td>41.85 lakh</td>
</tr>
</tbody>
</table>

In conclusion, modern bioenergy technologies such as biomass combustion and gasification for power, production of bio-diesel and ethanol as liquid fuels and
biogas as gaseous fuel provide opportunities for meeting energy needs in a sustainable manner, improving quality of life and protecting environment, including addressing climate change. It is expected that cleaner sources of bioenergy will contribute to the sustainable development of the rural areas through rural electrification, provision of cleaner cooking fuels, employment generation and opportunities for small entrepreneurial activities, etc. It can be said that due to availability of raw material, the potential and the shortage of energy will help in undertaking bioenergy projects in India on a large scale similar to that in Finland.

Table 3. Classification of biomass yield through three main sources. [Source: Biomass Atlas of India, Version 2.0]

<table>
<thead>
<tr>
<th>Potential of biomass yield by type of resource</th>
<th>Area (kha)</th>
<th>Biomass generation (kt/yr)</th>
<th>Biomass surplus (kt/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agri-residue</td>
<td>16,423</td>
<td>95,512</td>
<td>43,162</td>
</tr>
<tr>
<td>Forestland</td>
<td>64,570</td>
<td>89,119</td>
<td>59,678</td>
</tr>
<tr>
<td>Wasteland</td>
<td>54,253</td>
<td>66,355</td>
<td>44,369</td>
</tr>
<tr>
<td>Total</td>
<td>135,246</td>
<td>250,986</td>
<td>147,210</td>
</tr>
</tbody>
</table>

**Forest Management Associations**

Forestry in Finland is based on family ownership. There are over 920,000 private forest owners in Finland owning 60% of the total forest area, 67% of the growing stock and 68% of the annual increment. The average size of these family forest holdings is less than 30 hectares. In the past, most forest owners were farmers. Now most of them, around 80%, are wage earners, pensioners and entrepreneurs. About 80% of the domestic wood purchased by the industry comes from family forests. Forest owners make about 100,000 – 150,000 wood sale transactions every year. The average private forest owner makes a transaction in 3 – 4 year intervals, the average size of a sale being 400 m³. The Act on Forest Management Associations (FMA) was passed in 1950. In 1999 the legislation was brought up to date. In the amendment the task of Forest Management Associations (FMAs) is set out as follows: The Forest Management Association is a forest owners' body, the purpose of which is to promote profitability of forestry practiced by forest owners and the realization of the other goals they have set for forestry, and to advance the economically, ecologically, and socially sustainable management and utilization of forests [Source: Forest Management Association Act, part 1].

The concept of FMA can be very well adopted in India owing to large number of farmers interested in tree growing. There are voluntary organizations that have formed tree growing associations like National Dairy Development Board (NDDB) and Bhartiya Agro Industry Foundation (BAIF). But these are limited to few pockets of India only. In order to increase our tree cover on non forest lands, quality and technical information needs to be provided to the tree growers. The FMAs can act as one umbrella organization wherein technical information like planting to harvesting can be provided to users. Whenever any information on planting,
harvesting, marketing, storage etc is required, it is not available at one single place. As the cooperative sector in agricultural and allied sector is working very well, same can be adopted for tree growing on agricultural lands based on the lines of Forest Management Association as seen in Finland.

**Paper and paper board industry**

Table 4 summarizes the forecasts for the Finnish forestry industry production and wood consumption for 2015 and 2020. The pulp and paper industry production has been forecasted to decrease by up to a third and the wood processing production by just a fifth from 2007 to 2020. The declining trend is mainly due to the weakening of Finland’s main exports markets and also the weakening competitiveness of the Finnish production relative to major competing countries e.g. in West Europe, Asia and Sweden. The weakening of export markets are basically a result of three factors. First, the global economic slump affecting negatively the demand and prices of the pulp and paper products. Secondly, the structural change in the communication paper (printing and writing papers and newsprint) markets is continuing. The paper companies are no more competing only against the other paper companies, but also against the electronic media companies. As a result, the pricing power of paper companies is weakened. It is anticipated that the economic slump is likely to speed up this structural change. Thirdly, the increasing competition and supply of paper products from Asia (particularly China) to Western markets increases the competition in export markets.

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<tbody>
<tr>
<td>Paper and paperboard</td>
<td>14.3</td>
<td>10.8</td>
<td>9.4</td>
<td>4.9</td>
</tr>
<tr>
<td>Pulp</td>
<td>12.9</td>
<td>9.0</td>
<td>7.5</td>
<td>5.4</td>
</tr>
<tr>
<td>Wood Products</td>
<td>14.3</td>
<td>11.8</td>
<td>11.9</td>
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The paper and paper products industry has numerous market segments ranging from facial tissue to the paperboard packaging segment. Indian paper industry is poised to grow and touch 11.5 million tonnes from 9.18 million tonnes to 2011-12 from 2009-10 at the rate of 8% per annum, according to The Associated Chambers of Commerce and Industry of India (ASSOCHAM). The ASSOCHAM paper on “Growth of Paper Industry in India“, indicated that per capita paper consumption increased to 9.18 kg on 2009-10 as compared to 8.3 kg during 2008-09. Still, the figure is low (9.2 kg) compared to 42 kg in China and 350 kg in developed countries. India has emerged as the fastest growing market when it comes to consumption, posting 10.6% growth in per capita consumption of paper in 2009-10. Major issues confronting India’s pulp and paper industry are high cost of
production caused by inadequate availability and high cost of raw materials, power cost and concentration of mills in one particular area, non-availability of good-quality fibre, uneconomical plant size, technological obsolescence and environmental challenges, highlighted the ASSOCHAM paper.

While issues related to technology, capacity and environment come directly under the purview of companies, raw material shortage is a disadvantage affecting all domestic companies. There are not many mills that have integrated wet-end systems in the overall control strategy. The paper mill, is the formative stage in a paper making process and any forward control strategy results in impressive gains in terms of quality. Likewise, energy, being the significant portion of production cost, is getting less attention in terms of monitoring the overall consumption of power across various sections of the plant. Essentially, there is a huge potential for automation and system integrators to work collaboratively with India’s pulp and paper companies and help them acquire the competitive edge. With the country’s economy growing robustly, the paper consumption in India is bound to expand, and the existing gap is a good indicator of the industry’s growth potential [Source: http://www.assocham.org/prels/shownews.php?id=2460].

**Conclusions**

It can be concluded that the paper industry can be developed provided raw materials are provided at competitive rates. And sufficient energy is also supplied to the industry. This can be achieved by involving the interested farmers owning large tracts of land, assisting them in growing trees through organizations like Forest Management Association and using these trees for bioenergy and paper production.
THE IFS MCT FOREIGN MODULE

Module structure

The 2-week intensive training course organised in Finland and Russia follows a structure of 4 different modules, which are briefly described below.

Module 1: Internet-based introduction to the topic

The aim of the module is to offer an orientation and background to the course prior to the arrival of the IFS Officers to the country. Through internet-based learning, the participants are explained the basic principles of sustainable forest management and policy in Finland and Europe. An additional aim of this module is to encourage participants to utilise ICT-methods for improving their dialogue competence in an international and multi-cultural learning environment. At the same time, IFS Officers will acquire the basic understanding which allows for a higher level of interaction and exchange of views upon their arrival to Finland.

This module includes an introduction to the changes related to systemic innovations of forest policy and governance relevant to a post-modern society, and to the role of forest certification in sustainable forest management and the opportunities of ecosystem services in forestry. The various stakeholders with a role in the management of forest lands, such as NGOs, local, regional and national authorities, as well as industries, are described and analysed.

Module 2: From timber production to multi-functional, sustainable management and governance of forests

The aim of the module is to provide the participants with additional professional competencies related to generic and subject specific skills on core factors of forest sector development, including innovative forest policy and governance for sustainable forest management in private and public lands in the European and Nordic countries, and particularly in Finland. Problem oriented approach is applied with a strong linkage between theoretical and practical elements.

In this module, all aspects of private and public forestry are thoroughly covered. The importance of forestry for rural development and related economic activities is demonstrated on the basis of development theories and practical examples in the field. The role of investments, entrepreneurship and job opportunities is analysed, as well as the connections between international, national and local decision making. The difference between legislation-based norm guidance and knowledge-based development is discussed, and a comparative analysis of forestry in Nordic and European countries is carried out. Introduction to causes of forest conflicts and possible management tools and new opportunities such as eco-tourism and
bioenergy production and utilisation are discussed in the classroom and in field excursions.

The module includes field visits, assignments, team work and oral presentations. Some of the sessions held in connection with this module are:

- Finland’s forest policy, Ministry of Agriculture and Forestry
- Forestry and forest sector in Europe and global trends, Director General Ritva Toivonen, FDC TAPIO
- Private forestry, biodiversity & certification, Klaus Yrjönen, FDC TAPIO
- Forest inventory and management planning in private forestry, FDC TAPIO
- Presentation of Metsähallitus (enterprise administering state-owned forests)
- Governance and management of forests in changing societies, Prof. Olli Saastamoinen, School of Forest Sciences, University of Eastern Finland
- The challenges of economic, environmental and labour policies in Finland, Dr. Tarja Cronberg, Former Minister of Labour
- Biodiversity and ecology of boreal forests, Prof. Jari Kouki, School of Forest Sciences, University of Eastern Finland
- Hunting & forestry, Kaarlo Nygrén, Game & Fisheries Research Institute
- Forests in European and Finnish climate policy, Dr. Jari Parviainen, Finnish Forest Research Institute
- Economic evaluation of forest products & services & financing sustainable forest management, Dr. Jukka Matero, School of Forest Sciences, University of Eastern Finland
- An internet-based decision support application (Mesta) for participatory strategic-level natural resources planning, Prof. Mikko Kurttila, Finnish Forest Research Institute
- Visit to pulp and paper industries
- Visit to Koli National Park
- Visit to Jakokoski village (rural development issues)
- Visit to the North Karelian Forestry Centre
- Visit to private owner’s forest and firewood enterprise

Module 3: Science & education-based innovative sustainable management

Throughout this part of the course, the role of international, national and regional innovation strategies for training and education of forest professionals for the national and international labour market are discussed. Another aim is to increase awareness related to concepts such as UNEP’s Biosphere Programme for sustainable development of rural regions, as well as national and European trends and challenges facing forest research and education.
The module deals with education and research related policies, practices, and future challenges facing the forest sector, as well as institutional development and human capacity building, and new challenges and solutions for the globalised forest sector. The module includes field visits, assignments, team work and oral presentations. Some of the sessions held in connection with this module are:

- Introduction to the Finnish innovation policy: a special emphasis to forest sector, Dr. Tarja Cronberg, Former Minister of Labour
- Sustainable development and new innovations, Dr. Timo Hokkanen, North-Karelia Biosphere Reserve
- Bioenergy – a new challenge for forestry, Prof. Lauri Sikanen, School of Forest Sciences, University of Eastern Finland
- Presentation by Arbonaut Ltd: GIS forestry inventory solutions
- Visit to the Finnish Forest Research Institute
- Visit to the European Forest Institute
- Visit the North Karelian Forest Owners´ Association
- Visit to mechanised forest harvesting/logging operations
- Panel discussion

Module 4: Cross-border analysis of forest sector

The aim of the module is to offer knowledge and understanding dealing with nearby and cross-border forestry and industrial activities in Finland and Russia. In addition, participants are provided with practical tools to analyse and synthesise forest management and forest sector in countries with different socio-politic development. The module involves stakeholder meetings that provide a historical perspective and illustrate the benefits of cross-border cooperation, and introduces the various forest sector practices and the perspectives of industries and institutions in Finland and in Russia. The module includes field visits, assignments, team work and oral presentations. Some of the sessions held in connection with this module are:

- Finnish-Russian history: Russian Empire, Grand Duchy of Finland and history of St. Petersburg, Dr. Jeremy Smith, Karelian Institute, University of Eastern Finland
- Introduction to Russian forestry and Finnish-Russian forestry cooperation, Elina Valkky, Finnish Forest Research Institute
- Russian forestry & forestry sector, forest resources & management practices, forest policy, recreational uses. Prof. Eugene Kuznetsov & Dr Olga Shaytarova, St. Petersburg State Forest Technical Academy
- Visit to Lindulovskaya larch forest founded by Peter the Great (UNESCO heritage site)
- Other visits related to forest management & aspects of Russian forestry
Co-organising institutions

University of Eastern Finland

With approximately 13,000 students and 3,000 staff members, the University of Eastern Finland is one of the largest universities in Finland. The university has campuses in Joensuu, Kuopio and Savonlinna.

The operations of the university underscore multidisciplinarity. The four faculties of the University of Eastern Finland, i.e. the Philosophical Faculty, the Faculty of Science and Forestry, the Faculty of Health Sciences, and the Faculty of Social Sciences and Business Studies, offer teaching in more than 100 major subjects.

International University HUB: New Partnership for Education, Training and Research

International University HUB offers facilities and services to academic institutions in order to provide education and professional training in other countries and an easy access to European markets. The HUB is an open window to European markets. The member institutions share the facilities, and benefit from the excellent working environment, creating innovative ideas together – while still maintaining their full autonomy according to their national rules and regulations. Furthermore the HUB provides enterprises and organisations with tailor-made training and education, from short training courses to full academic B.Sc., M.Sc., and doctoral degree courses.

The School of Forest Sciences

The School of Forest Sciences is an international research and educational unit. Scientific research creates the background for education which gives students high level of professional competence and capability for working as an expert in the forestry and environment sector.

Forestry research and education are multidisciplinary, offering students many possible options for specialising in different questions relating to forestry. The main research fields of the School of Forest Sciences are forest ecology and protection, bioenergy, forest mensuration and planning, forest economy and policy, and forest and wood technology.

www.uef.fi
www.uef.fi/hub
www.uef.fi/metsa
TERI University

TERI University provides world-class facilities and resources to its students and faculty so as to usher in innovative and multidisciplinary research. It commits itself to academic excellence and provides an environment that will encourage both personal and intellectual growth through teaching, creating and sharing knowledge.

TERI University aspires to contribute globally by serving society as a seat of advanced learning and to promote learning through teaching and through creating and sharing knowledge. The University commits itself to academic excellence and an environment which would encourage personal and intellectual growth. Apart from doctoral research, TERI University provides opportunities for M.Sc. degree programmes in various fields and subjects like Environmental Studies, Natural Resources Management, Environmental & Resource Economics, Water Resources Management, Geoinformatics, Climate Science & Policy and Plant Biotechnology.

The University uses modern pedagogical tools for teaching which are richly supplemented by field visits, live industry projects and hands-on applications. The University provides the very best in equipment and instruments, including state-of-the art computer hardware and software, well-equipped laboratories, video-conferencing facilities and South Asia’s most comprehensive library on energy and environment.

www.teriuniversity.ac.in

Forestry Development Centre TAPIO

FDC TAPIO offers a wide range of services and products to companies and organisations for the sustainable management and use of forests. A century of experience and thousands of projects in experience record places TAPIO in the forefront of forestry development worldwide. TAPIO’s main task is to serve the Forestry Centres in Finland with systems for managing private forestry. International development projects have mainly been focused towards Russia and the EU countries but lately also to South-East Asia and Africa.

FDC TAPIO works in close collaboration with research and development organisations in the forest sector, including the Finnish Forest Research Institute. Its objective is to provide new and relevant information to forestry professionals and forest owners. Thanks to TAPIO’s extensive network of subcontractors, its customers have the best possible expertise at their disposal.

www.tapio.fi
Co-organising institutions

**Indira Gandhi National Forest Academy**

Indira Gandhi National Forest Academy (IGNFA) was constituted in the year 1987 by renaming the erstwhile Indian Forest College, which was originally established in 1938 for training senior forest officers. It is situated in the New Forest campus of Forest Research Institute (FRI) on Chakrata Road (NH-72), five kilometres from Dehradun town.

IGNFA is currently functioning as a Staff College for the officers of the Indian Forest Service (IFS). The primary mandate of the Academy is to impart knowledge and skills to the professional foresters and help them to develop competence for managing the country’s forest and wildlife resources on a sustainable basis. In the Academy, training is provided at different levels of seniority in the Indian Forest Service besides training the new entrants to the service.

The **Indian Forest Service** (IFS) is one of the three All India Services, the other two being the Indian Administrative Service and the Indian Police Service. IFS was created in 1966 under the All India Services Act of 1951. However, this was only a revival of a well organised Indian Forest Service which existed during the British Raj from 1865 to 1935.

www.ignfa.gov.in

**Saint Petersburg State Forest Technical Academy**

The St. Petersburg State Forest Technical Academy was founded in 1803 by the decree of Emperor Alexander the First and it was the first forest educational institution in Russia.

Today St. Petersburg State Forest Technical Academy has eight faculties and more than 8,000 students are attending the Academy. Studying process is provided by 524 teachers, 26 members and associate members of Russian Academy of Natural Sciences, 73 professors and 245 assistant professors. 30 teachers are honoured men of science and techniques, honoured higher school workers of the Russian Federation.

http://www.ftacademy.ru/eng
Online and ICT resources

Video-conferences have been an integral part of the delivery of the module, proving to be an excellent tool for organising pre- and post- module sessions.

All course material can be consulted online constituting a database for the IFS Officers. This material includes copies of the presentations, daily programme, photos and others information, and is available at: http://www.uef.fi/hub/courses
NETWORKING

Alumni Network

Our Alumni Network facilitates contact between participating IFS Officers, the teaching staff and collaborators of the co-organising institutions, and other interested parties. All IFS participant Officers in the Mid-Career Training Module in Finland are automatically signed up for the Network.

A first Alumni event, combined with a joint Indian-Finnish forestry seminar, took place on 16\textsuperscript{th} May 2011 in New Delhi (India) at TERI University and at the Embassy of Finland. The Embassy of Finland in New Delhi, led by Her Excellency Ms. Terhi Hakala, is providing key support in this project.

The IFS MCT Honorary Alumni Members are:

Dr. R. K. Pachauri, 
Director-General. TERI Univ

Mrs. Sirkka-Liisa Anttila, 
Minister of Agric. & Forestry

Chairman, IPCC.

The Alumni Network also includes all 113 IFS Officers who took part in the following training modules during 2010:

- Indian Forest Service Officers Mid-Career Training March 21st - April 4th
- Indian Forest Service Officers Mid-Career Training June 20th - July 4th
- Indian Forest Service Officers Mid-Career Training October 3rd - 17th
- Indian Forest Service Officers Mid-Career Training December 5th - 19th
Indian Forest Service Officers Mid-Career Training
Foreign Module, March 21st - April 4th 2010, Joensuu, Finland

Organisers:
Indian Forest Service Officers Mid-Career Training
Foreign Module, June 20th - July 4th 2010, Joensuu, Finland

Organisers: [Logos]
Indian Forest Service Officers Mid-Career Training
Foreign Module, October 3rd - 17th 2010, Joensuu, Finland

Organisers:
AFTERWORD

A participant’s experience

Manzoor A. Tak
IFS, participant of IFS-MCT Foregin Module in Finland

I had privilege to visit Finland as part of the foreign module of MCT for IFS Officers Phase IV in December 2010. The visit provided opportunities of interactions and learning which not only included information with respect to forestry in Finland and Europe, challenges to forestry sector at global level, and climate change scenario, but were specially endowed with understandings of the socio-political issues of Finland, overseas employment opportunities and other European challenges. Knowing about the broader spectrum of activities of the University of Eastern Finland and its opening gates at international level, the challenges of the Finnish forest industry especially with regards to sustainable energy solutions, bioenergy, gasification, global timber trade, were only some of the key focal points.

The travel and visit to Finland was not only a fantastic experience with respect to learning attributes but the care and personal human touch intoxicated the memories, which shall always remain as a valuable treasure. The silken welcome by Her Excellency Ambassador of Finland to India at the start opened the gate for this outlook at Delhi, which was well sugared with the creamy comprehensions of Ms Sanna Selin, First Secretary and Mr Juha Pyykkö, Counsellor. I am also indebted to H.E. Shri Aladiyan Manickam, Ambassador of India to Finland, as well as to Mr Jouko Parviainen from WENET and Mr Dominik Röser from METLA. Each of the resource persons, Dr Jukka Matero, Prof Lauri Sikanen, Prof Olli Saastamoinen, Prof Jari Kouki, Dr Timo J. Hokkanen, Dr Jari Parviainen, (METLA), Dr Kaarlo Nygrén, Dr Tuomo Kauranne (Arbonaut Ltd.), Mr Klaus Yrjönen (FDC TAPIO), Dr Tarja Cronberg, was a delight to listen. They are not only academicians with lot of understanding about their fields but personalities whose approach to dissemination of knowledge was incredible. This wonderful human embodiment of knowledge has comprehensive concrete formulae of human development which are relevant globally. I wish their contributions in the field of human resource development shape up Europe practically.

Mr Javier Arevalo, Prof Paavo Pelkonen and Prof Liisa Tahvanainen (Director of International relations at UEF), are the personalities who chalked the programme, its modalities with precisions and meticulousness. Their thoroughness in the field of forestry and their global perceptions have given us enough opportunities to have a deeper insight that provided a platform to interact with the diversity of European experts of the sector. Their personal touch to the programme along with their hospitality, generosity and warmth shall always be remembered.
Field session in the Joensuu region, Finland, March 2010

Prof. Liisa Tahvanainen (centre) and participants during a field session, June 2010
Technical visit to Koli National Park, Finland, October 2010

Visit to the Finnish Forest Research Institute, Joensuu, Finland, December 2010
This publication provides general as well as technical information related to various initiatives for cooperation between India and Finland in the field of forestry.

Such initiatives originate in the collaboration established between Finnish and Indian forestry institutions and individuals, through a joint capacity building project in which Indian Forest Service Officers attend in Finland the foreign module of their Mid-Career Training. This publication as well as the Alumni events, constitute additional steps towards a greater cooperation among the involved parties.