

**Orissa Forest Sector Support Project**

**Trees Outside Forest**  
**Executive Summary Report**

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# TREES OUTSIDE FORESTS

## 1. Introduction

The huge tribal population in Orissa and other weaker sections of society depend on trees and forests for their subsistence livelihood. It is estimated that up to 50% of household income of the people living in and around forests is derived from forest based activities, including NTFPs. The number of such forest fringe villages is 30,000 –being among the largest in a State.

Forests and trees are important for Orissa's primarily agricultural economy owing to their contribution to water and soil conservation and related farm productivity. Conservation of forests in the catchment area is critical for protecting the valuable multipurpose river dams from siltation.

Exploitation of forests to meet fuelwood requirement has resulted in the denudation of forests, particularly the ones located close to the villages. Rampant grazing well beyond the carrying capacity has exacerbated the situation, adversely impacting the natural regeneration. Encroachment and shifting cultivation are other causes of prevailing forest degradation.

Yet, the attempt to augment forest growth with plantations in forest areas has been sporadic. Likewise, there has been insufficient effort for planting trees outside forests.

## 2. Rationale

Despite the large recorded forest area in Orissa -constituting 37.33% of the State's total geographical area, forests are unable to meet the wood and wood products demand of the State, more so in the face of the surging industrialization and urbanization. Orissa Forest Development Corporation last year harvested only 15,000 cu.m of wood from the State forests. It is estimated that even if all the Working Plans in the State are sanctioned, the total harvest that might be available would be about 200,000 cu.m.

There is a big gap between demand and supply of forest produce. Estimates indicate the demand for fuelwood is more than 14 million MT while the recorded supply is 135 thousand MT; and timber availability is 100 thousand cu. m. against the demand of 367 thousand cu. m.

The status of wood based industries in the State is not encouraging. Most of the saw mills have been sealed and the only plywood unit does not function. There are two paper mills, which meet most of their requirements by importing raw material from adjoining states. In the absence of any significant planting programme outside forests, these units have started their own novel methods, e.g., supplying seedlings to the farmers with buy back arrangements, or leasing land from farmers for trees. Such attempts indicate the potential for planting trees outside forests.

The State's forests are unable to meet the domestic demand for fuelwood and timber, let alone that of wood based units. A well-worked programme of Trees outside Forests (ToF) is required urgently, not only for bridging the growing gap between demand and supply, but primarily to promote pro-poor growth, including gainful employment and appropriate industrialization. Also to combat illegal logging –thriving due to the supply shortage, but which erodes the sustainability of the natural forest cover so critical for local livelihoods, land productivity, water supply, and related ecological, environmental and socio-economic reasons.

## 3. Current Scenario

Planting trees outside forests requires the participation of diverse stakeholders, particularly the village communities. The SIDA supported Social Forestry Project (SFP) was a vehicle for disseminating necessary techniques and know-how to enable people to undertake plantations themselves. The wholehearted participation of people is a prerequisite to ensure the sustainable production and protection of plantations. At the start of the SFP, villagers participated well and the response was encouraging. Raising successful plantation on open access land is not easy; with the

waning of social forestry and the passage of time the interest of the community gradually faded and it could not be sustained. The protection and productivity of the plantations has been the first casualty. In most of the plantations which were harvested, bulk of the timber and firewood was consumed for local domestic purpose. Rest was sold. The sale proceeds were utilized for community work overlooking the initial commitment to plough back part of the proceeds for replanting. In the end the land largely remains fallow and degraded as before.

Obviously suitable support was required even after the closure of the SFP. For example, VFCs need to be provided adequate capacity building and technical support from the OFD. It has to act as a facilitator. Non-availability of seedlings and technical know how is one reason for not replanting. Another is the lack of awareness about tree planting potential and its economics. Seedlings for planting on private land are not available within reasonable distance and people generally have little access to the market and or knowledge of market and price of wood.

Moreover, there is a general perception that getting permission for felling is a complicated process. Majority of the people including general public as well as forest officials are of the view that existing transit rules are cumbersome, lead to unavoidable harassment, and that the procedure needs to be simplified. The rules and regulations seem to have created disincentive and dissuaded potential tree growers. Protecting trees through such restrictive regulations has exposed the weakness of the conservation strategy and that they need to be rectified. The procedure is so time consuming that instead of facing the harassment, the common man prefers to sell the produce at throw away price through the middlemen and then forget the trees.

Yet there is a wind of change. Under the Joint Forest Management (JFM) programme, more than 7,000 Vana Samrakshyana Samitis (VSS) have been constituted in the state. It can be a major avenue for planting trees on degraded lands in the immediate future, also through appropriately adjusted means and mechanisms for removing hurdles to and promoting ToF.

#### **4. Land Tenure & Ownership**

Pattas, land tenure and ownership issues are often fraught with public sentiment, and frequently a source of confusion and dispute, acting as a disincentive for investment in raising trees as an asset. And overlapping property/tenure and traditional customary user arrangements can add to the complexity of ToF ownership. That is notwithstanding the prospect that private, local community and industrial ownership and tenure could contribute towards the increased production and expansion of forest and tree resources.

A shift towards private and communal ownership/tenure appears to be in the offing. Tenure to private communities has increased in part due to the creation of designated forest areas where tribal people and local communities are legally entitled to manage and utilize forest resources and to practise their traditional knowledge, buttressed by the tribal rights bill now on the table. Yet, in several states, private, farmer and industrial large scale ownership continues to grow due to expansion of the ToF and plantation forestry. This trend towards Public-Panchayat-People partnership and privatization underlines a move towards efficiency of resource utilization and market orientation, which in turn has created a drive towards decentralized and privatized plantations and ownership.

This is a challenge to be considered in Orissa forest sector policy, for both private lands and ToF and for the State forest estate, especially degraded forests. Lessons learned indicate that pattas and ownership rights must be clear and secure such that rights and responsibilities are clearly defined, duration of tenure documented, and that there are legal and institutional mechanisms for enforcement and dispute resolution. The shift in forest stewardship and ownership structure would also have direct implications on markets, as an increasing share of tree and forest products from private lands and plantations. Well-functioning markets would be critical towards ensuring that the rural poor are able

to derive income from trees and innovative mechanisms would be needed to facilitate the entry of small scale producers in the market.

## **5. Nature and scope for Trees outside Forest**

The national Forest Commission (2006) has recommended that the “needs of timber, fuelwood, fodder, industrial wood and medicinal plants must mainly be met with plantation forestry and through agro-forestry” and the “focus of agro-forestry must filter down to the tehsil / block levels.” National Agriculture Policy, 2000, stresses that “farmers will be encouraged to take up farm /agro-forestry for higher extension and credit support packages”. With the advent of social forestry, diversification in agriculture was encouraged to generate income by evolving support packages and removing constraints to agro-forestry. There is need and scope to intensify remunerative agro-forestry through ToF programmes.

ToF in Orissa is a pragmatic alternative to narrow down the gap between demand and supply of wood while increasing productivity of wastelands, besides ameliorating the livelihoods and micro-climate for local communities. The land available for ToF fall into broad categories of (i) village forests, (ii) govt./institutional and panchayat/community lands, (iii) strips of land along roads and canals, and (iv) private land, including farmlands and homesteads. According to existing legal provisions each village should have ten percent of total area earmarked for village forests. The Village Forests Committees (VSF) can be constituted as per policy for village forests, and available surplus land, say 50 per cent, can be allocated to willing poor households for growing trees. The lease period should be equal to two rotation period of tree crop, or more.

Linear strip plantations along roads and canals have been raised successfully under the SFP. Panchayat land, school compounds, office premises and other community land can be brought under tree planting. The residents and their associations, committees and corporations should be motivated for planting trees in their premises, work places, parks and factories. Trees are useful in urban and peri-urban areas, especially to counter the increasing pollution and to reduce the energy requirement - say for cooling/heating.

There is enormous potential for farm forestry in the State. People are willing to adopt TOF practice -as a commercial venture for the farmers. Planting along agricultural field boundaries will help meet the shortage of fuelwood and timber, and provide income to the rural people. The profitability of tree farming should be increased through better quality of seedlings, marketing facilities and suitable policy decisions.

## **6. Choice of Species**

There is a wide choice of species available for planting outside forests depending upon edaphic and climatic factors and objective of raising plantations. The people’s choice of species vary from fruit trees like mango and jack fruit to high value timber species like teak, acacia, cassia, eucalypts and bamboo. Acacia species are generally preferred for meeting fuel wood requirement. The preference for teak is because of its non-browsable characteristics and good economic return. However the hard fact is that adequate number and choice of seedlings are not available to the people.

Land earmarked for village forests and panchayat land plantations of mixed species meet the local requirement of fuel, fodder, fruits and timber. Acacias (e.g., *Acacia auriculiformis*), Cassia, Eucalypts, Subabool, Bamboo, and Casuarina (in coastal areas) are among suitable species which can be harvested at short rotation. Trees with NTFP value like tamarind and mahua should also be planted. In institutional land, ornamental and shady trees can be planted and retained till physical rotation. In case of strip forests (along roads / canals), shady / ornamental species like neem, cassia eucalypts and casuarina are appropriate. Choices of species for farm-forestry are short rotation

eucalypts and casuarinas for quick return. In homesteads, fruit trees, and if adequate land is available, commercial trees like teak could be planted.

There is a need to arrange readily available quality seedlings. The supply from Seed Production Areas (SPAs) and Seed Orchards of priority species is inadequate. There is also lack of development of new clones, hybrids and varieties of tree crops. Introduction of high yielding varieties is warranted to promote TOF as a remunerative programme. The cloning of superior genotypes is a viable option with advantages including uniformity of plants and higher yields. Eucalypt hybrid clones elsewhere have harnessed the productivity of 40-50 cum per ha per year. Another arena about the choice of species is Agro-mediculture. There is a growing demand of medicinal plants for crude drug, health products and cosmetics. International market of medicinal plants is growing at a rate of seven percent. Planting medicinal tree species, besides bringing health and happiness to the people, will generate employment and income.

## **7. Constraints & Opportunities**

### **7.1 Policy**

Planting trees outside forests so far has received low or no priority with the GoO. There is a general lack of policy, related strategy and schemes, and funding for promoting ToF. And there is no nodal agency for this programme. These issues could be addressed at OFD leadership level, which appears to be determined to make a difference and manage change for pro-poor growth -and rightly so, *inter-alia*, through well designed and effective ToF programme.

### **7.2 Laws, rules and regulations**

There is a plethora of forest and related laws, regulations, rules, codes of practice and programmes with their own pros and cons, complementarities and conflicts. These need to be examined, updated and consolidated for developing convergent cross-sectoral policy and regulatory framework, taking due note of IPR and other progressive measures in the offing. Some specific ones of immediate pertinence to ToF include the transit and sawmilling rules.

#### **7.2.1 Transit Rules**

Restrictions on the harvesting and transportation of timber are a severe disincentive for growing trees outside forests by people. Even though this is essentially a problem of perception, it is effective in practice due to governance flaws and policy vacuum. The impact of such perception and practices is particularly hard on small land owners and farmers who have no or limited access to bureaucratic system for obtaining permits without going through a cumbersome process and sharing their income with oversight staff and middlemen -who are unduly empowered by applying the restrictive system.

The currently important relevant rules are the Orissa Timber and other Forest Produce Transit Rules 1980, and The Village Forest Rules, 1985. Any forest produce to be transported need 'Transit Permit' to be issued by the Forest Department under the 1980 Timber Transit Rules. Certain tree species have however been since exempted from time to time from the application of these TT Rules in order to help the individuals to harvest and sell the trees grown in their land without any restriction. The Village Forest Rules, 1985, applicable to village forests, is redeemingly progressive. Under its Section 8, permit for felling, conversion, collection or removal of forest produce can be issued by two members of the VFC and countersigned by a Forester. Under Section 14 of the Village Forest Rules, the 1980 TT rules shall not apply in cases of forest produce from a village forest and a permit issued under Rule 8 shall be deemed to be a transit permit for the purpose of these rules.

The species exempted from the purview of TT rules are quite wide-ranging and include various species of Acacia, neem, mahaneem, bamboos, palas (*Butea monosperma*), Casuarina, karanja, Erythrina, subabool, arjuna, eucalypts, *Cassia siamea*, and silver oak. This is a commendable

step and should have eased the situation, but not much in practice due to lack of awareness. Furthermore, there is scope to think the other way round and remove restriction for all or most other species. In spite of the restrictive rules it has not been possible to protect forests to the desired extent. OFD could control illegal felling at source, rather than putting restrictions to harass tree growers during transit of their forest produce. Attention is invited in this context to recently enacted regulations in Kerala and elsewhere, where almost all species are exempt from restrictions for cultivation on lands outside forests, including teak, as in AP.

### **7.2.2 Sawmill Rules**

As per Orissa Saw Mill and Saw Pit Rules, no saw mill can be established within Reserved and Protected Forests, or any other forest area, or within ten kilometers from the forest. The distribution of forests in the State is such that this regulation has restricted the establishment of saw mills and wood based units, which are required for the promotion of TOF programme. The provision needs to be amended as soon as possible and is being thought of seriously.

### **7.3 Availability of Seedlings**

There is a huge demand of tree seedlings among farmers but the required number of quality seedlings is not available to them. Quality seedlings of desired species need to be made available within reasonable distance from the village. This is feasible through OFD support.

### **7.4 Extension Programme**

There is lack of awareness among the people, particularly small land owners and farmers, about the prospects for and economics of growing trees. They need to be informed and educated. There is a need for training them about choice of species and plantation techniques, and the links between trees, forests and people. Women and children should be involved in tree planting and their maintenance. It will help their households and in behaving as a responsible citizen.

### **7.5 Marketing and Trade**

Marketing of wood and other forest products has not developed in the State. Information about the timber markets is not available to tree growers, local communities and farmers. They suffer due to lack of market intelligence and timely delivery of information. For instance, farmers need to be provided information about the markets where they can sell their farm-grown timber and about the seasonal fluctuations of rates of farm-grown timber. An information network of main markets of wood and other forest products could be created with easy access to all the stakeholders. The tree growers and farmers are not getting proper prices due to under developed wood market. It is necessary to protect the interests of the tree growers, say in a similar manner as State Agriculture Marketing Boards do for agricultural crops.

### **7.6 Appropriate agro-forestry models**

Various technical aspects are involved in farm-forestry, such as the selection of appropriate species/clones for a given site and land-use system, which should interfere least with agriculture. The farm-forestry models should be developed for different agro-ecological regions. The matching of species/clones to the site is necessary through multi-location trials, testing and demonstration as well as monitoring and evaluation of impact on farm incomes, farming practices and traditional knowledge about land use and species.

## 8. Conclusions

A properly planned ToF program shall contribute to pro-poor growth and appropriate industrialization. It is necessary to promote trees on all types of non-forest land in order to meet the fuelwood, fodder and timber requirements of rural people, to reduce pressure on State forests, preserve climatic conditions, and to supply material for housing and wood based industries. In spite of large forest area and insignificant wood based industry in Orissa, much of the demand for timber is met by imports from adjoining States. The only way to bridge the supply-demand gap and to safeguard forests from further degradation due to unrecorded over-cutting for fuel and timber is to create an enabling environment for people to plant trees outside the forests (ToF).

There is a vast ToF potential in the State. The farmers are enthusiastic. But there are constraints of availability of quality seedlings of desired species, access to the market, and awareness about the means and modus operandi for growing ToF without hurdles.

Restrictions imposed under Timber Transit Rules, 1980 are perceived as a major constraint, despite (little known) notifications about several species that can be planted free of restrictions outside the forest. Restrictions and problems, however, continue regarding high value timber species, distinction between legal and illegal timber, and the ownership of the produce. This is one of the largest dissuading factors. It has led to harassment of tree growers and induction of middlemen, resulting into un-remunerative returns to tree planters. Under the Village Forest Rules, 1985, the timber from the village forests can be removed relatively easily and TT Rules are not applicable.

Two progressive steps stated above have been taken to promote the cause of TOF. One is the exemption of a number of tree species from the purview of TT rules. The other is section 8 of village forest rules. The situation will ease out further if this provision in some appropriate form could be extended to trees planted on private land as well. And why not?.

The tree patta system introduced under the FFRP component of Social Forestry Project was apparently a good initiative. Yet, its limited performance can be judged from the fact that only 25 per cent of the applicants were actually issued pattas. The main bottleneck relates to inadequate mechanism of recording rights to tree cover and that the TT Rules are also applicable to trees raised under SFP. This and other examples indicate that there are challenging opportunities for ToF, if pursued stoically and seriously even under prevailing rules, but which warrant further relaxation as an imperative incentive for a self-reliant ToF programme. That could be part of a policy for promoting tree planting. It should *inter-alia* envision and enable leveraging public-private-panchayat partnerships for delivering MDGs, the State's human resource potential, role and rights of common people, employment guarantee scheme and the key content of tribal rights bill -with due institutional, technical and financial support of GoO and its partners, to begin with, as an innovative ToF programme is put in place.

## 9. Recommendations

- Formulate policy on ToF (and related programmes, including JFM) for promoting pro-poor growth, rehabilitating degraded lands, bridging the growing gap between demand and supply of wood and wood products, and related industrialization.
- Meanwhile, prepare a ToF Strategic Framework and implement an Action Plan to bring at least ten per cent of village area under trees, as per existing provisions.
- Make arrangement without delay for subsidized sale and distribution of seedlings and saplings for planting on private land, and for increasing nurseries in neighbourhoods for easy access to farmers, agro-foresters and other people and planters.

- Tree seedlings be raised locally by VFCs under technical guidance of OFD. One time grant be given to VFCs, or else micro-credit made available, and a system of revolving fund established for long term self-financing. Seeds should be provided by OFD with due quality assurance.
- A clonal quality improvement project be implemented, a quick draft for which is attached in Annex 1. Financing and technical assistance for such a project be arranged multilaterally, such as through ADB, FAO, IBRD, ITTO, and UNDP and/or through bilateral development agencies, if and as deemed fit.
- Launch a well targeted communication campaign, focusing on raising awareness about the scope, nature and potential benefits of ToF to people, households, farmers, local communities and small and medium entrepreneurs. Negative perception about TT rules -which have already exempted a fairly large number of suitable tree species from its purview, be removed *ab-initio* by the campaign.
- Consider lifting ban on the choice of species for ToF almost altogether (say on Kerala pattern, as indicated in Annex 4).
- If it is decided to continue with limited restriction, instead of identifying the trees to be exempted from the purview of TT rules, the few restricted tree species that are required to be protected and conserved be specified (e.g., rosewood and may be teak). All other species be exempted from provisions of TT rules.
- If it is decided to continue with rigorous restriction on the choice of species for ToF to those not normally found in natural forest, choice be made after examining the properties of various species and their suitability as per the list prepared in Annex 3. In other cases, too, the succinct analysis recorded in the said Annex be used as a guideline for cultivating seedlings and trees in various districts of the State.
- TT Rules further need to be relaxed with regard to the transport of valuable timber species grown on private land. A quick draft amendment is suggested in Annex 2.
- Sawmilling regulations be amended for the unscathed functioning of a larger number of saw mills as well as for other wood based industries to draw upon the ToF ( in specified and safe areas, such as industrial estates, municipal areas, and specially created zones for the purpose, e.g., SEZs near urban, industrial and intensive ToF areas).
- Permission for harvesting, transportation and sale of trees raised under Forest Farming for Rural Poor (FFRP) programme be governed by the same rules and procedure as provided under Section 8 of the Village Forest Rules, 1985. FFRP be exempted from application of TT Rules.
- A 'Tree Pass Book System' be introduced. Initial entry can be made at the time of planting trees indicating details of land and trees planted. The Pass Book can be updated every three years indicating survival and growth of trees and be used to grant un-hurdled access to timber transportation and marketing channels.
- Eliminate the exploitation of tree growers by middlemen, contractors and commission agents. Tree Growers Societies and/or Cooperatives be established and encouraged to increase benefit sharing and bargaining power of tree growers and farmers. Aim at free market access and establishing transparent links between individual tree and owners, farmers, retailers, consumers and industries for mutual benefit of ensuring the sustainable supply of raw material and an assured economic return to the tree owners and farm foresters.

- Plantation forest certification and chain of custody mechanism may be introduced to not only distinguish between ToF and other timber and processed products, but also to promote branding and marketing of Orissa ToF products and for ensuring appropriate law enforcement, transparency in transaction and avoiding exploitation of tree growers. Annex 5 provides a short brief on the certification and CoC process, which will be an innovative approach also to remove TT and related hurdles and to put the Orissa ToF handicrafts and other products on elite sales and retailer chains -domestically and globally- with highly remunerative prices and assured markets.
- Mechanism be put in place to provide periodic but timely information about markets to stakeholders (including ToF owners, VFC and JFM Committees, local communities, farmers and foresters) *inter-alia* about plantation and farm grown timber demand and supply situation, hubs for sale, seasonal fluctuation of rates, and prospective prices and demand scenarios for various species and types of processed and semi-processed ToF products.
- Establish four pilot testing, demonstration, monitoring and evaluation sites either according to the 4 land categories available for ToF or phytogeographic areas in the State or a combination thereof. Use the sites as centres of training and community capacity building.
- Undertake national and international study tours for developing an in-depth understanding of the nature, scope and potential for ToF at policy, strategic and legislative levels and for knowledge networking and information sharing, especially regarding (i) forest law, certification and CoC, (ii) clonal tree species, and (iii) value addition, timber trade and marketing.
- Organize multi-stakeholder workshops for promoting ToF and a seminar for finalizing the ToF policy and strategic framework.

**ToF Executive Summary**  
**Annex 1: Clonal Plantation Project**

**Annex 1: Clonal Plantation Project**  
**DRAFT PROJECT PROPOSAL**

TITLE	:	PRODUCTIVITY ENHANCEMENT OF <i>ToF Programme in Orissa</i> USING CLONAL TECHNOLOGY
EXECUTING AGENCY	:	OFD/RPRC
DURATION	:	<b>36 MONTHS</b>

**SUMMARY**

The productivity of Orissa trees is very low (around 0.70 m<sup>3</sup>/ha/yr) as compared to world average of 2.1 m<sup>3</sup>/ha/yr and the potential for multifold increment. Demand for forest products is far in excess of the producing capacity of the forestry sector. Hence it is imperative to increase trees outside forests and their productivity commensurate with the increasing demand and for better returns to tree growers with impact on pro-poor growth and livelihoods of poor farmers and small land owners. Increase in productivity and returns to tree growers as an incentive requires superior technology inputs. Cloning of important timber species with superior genotypes is a feasible and viable option. Some selected species, to begin with, may be considered for this project, such as *Acacias (A.auriculiforis & A. mangium), Azadirachta indica, Cassia siamea, Casuaranas (C.cunningham & C. equistifolia), Dalbergia paniculata, Eucalyptus hybrid, Prosopis juliflora, and Dendrocalamus strictus and Bambusa nutans* species of Orissa bamboo.

The specific objectives of the project are: 1) Creating a base of quality planting material and its regular supply; 2) Identifying region specific suitability of clones in the State; and 3) Providing technical guidance and training.

APPROXIMATE STARTING DATE                      ASAP

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US\$ or equivalent
	<b>FAO/ ITTO/UNDP.....</b>	<b>579,416</b>
	Govt. of Orissa	355,017
	<b>TOTAL</b>	<b>934,433</b>

### Abbreviations used

CD	Compact Disc
CMA	Clonal Multiplication Area
CPC	Candidate Plus Clump
CPT	Candidate Plus Tree
CSO	Clonal Seed Orchard
CTA	Clonal Testing Area
GoO	Government of Orissa
JRF	Junior Research Fellow
POL	Petrol, Oil & lubricants
QPM	Quality Planting Material
RPRC	Regional Plant Resources Centre, Bhubaneswar
SRF	Senior Research Fellow

## PART-I: CONTEXT

### 1. Origin

#### 1.1 The State

Orissa is one of the poorest State of India, with large number of tribal and forest dependent communities. It has among the largest number of forest fringe villages -30,000 and the Government is focusing attention on their pro-poor growth with ToF as a means of livelihood.

#### 1.2 Forest Resource:

Orissa has about 37 percent of its land area under forests, either of low productivity or largely degraded or even denuded. Bamboo is an important resource, but again in need of improved productivity and sustainable management.

### 2. Sectoral Policies

India's National Forest Policy 1988 has given emphasis on forestry research to meet national needs. The policy seeks to address the management of state forests under section 4.3.3 includes by indicating the necessity " to enhance forest cover and productivity of the forests through the application of scientific and technical inputs. Production forestry programmes, while aiming at enhancing the forest cover in the country and meeting national needs should also be oriented to narrowing the increasing gap between demand and supply", as is indeed the case in Orissa.

Some broad priority areas of research and development needing special attention are

- i) Increase in the productivity of wood and other forest produce per unit of area and per unit time by the application of modern scientific and technological methods, and
- ii) Re-vegetation of barren /marginal / waste / mined lands and watershed areas.

### 3. Programmes and operational Activities

The operational activities of the project shall mainly cover the following aspects:

- (i) Creating a base for mass multiplication and sustainable supply of quality planting material (QPM)
- (ii) Establishment of clonal multiplication areas (CMA's) of high timber yielding clones for further multiplication and planting in different agroclimatic zones. Regular supply of genetically improved quality seeds through clonal seed orchards (CSO's).
- (iii) Provide technical guidance and training to stakeholders.

## PART-II - THE PROJECT

### 1. Project objectives

#### 1.1 Development objective

The project aims at improved sustainability of the forests of Orissa state as a result of genetically improved quality planting material used for raising trees and plantations outside the forest areas as well as in the agro-forestry sector.

#### 1.2 Specific objectives:

1.2.1 Creating a base of quality planting material (QPM) and its regular supply.

1.2.2 Identifying region specific suitability of clones.

1.2.3 Provide technical guidance and training.

### 2. Justification

#### 2.1 Problems to be addressed:

GoO expresses concern for increasing the productivity of forests to meet essential national needs. Currently, the productivity is very low ( $0.7 \text{ m}^3/\text{ha}/\text{yr}$ ) as compared to world average of  $2.1 \text{ m}^3/\text{ha}/\text{yr}$ . The demand for forest products is far in excess of the production capacity of the forestry sector. Wide gap between demand and supply has created numerous socio-economic and environmental problems. Hence it becomes imperative to increase forest productivity commensurate with the increasing demand. Increase in productivity decidedly require the application of modern technology inputs. Cloning and planting of important timber species with superior genotypes is a viable option. The selected tree species in this project are those which are generally used in and suitable for planting programmes of the state and do not exist in the reserved forest areas. In addition, bamboo species are included in the project, being the best and cheap substitute of timber used in thatching and housing. It is also used as construction pole, handicrafts, plywood and paper and pulp industry. The socio-economic status of tribal living in and around the forest is highly dependent on this species.

## 2.2 PROBLEM TREE



### **2.3 Intended situation after Project Completion:**

With the implementation of the project, following achievements or outputs can be expected:

- 2.3.1 A large number of CPTs of identified timber species and CPCs of bamboo species will be available in different agro-climatic zones. This will enable continuous supply of quality seed and other propagating material.
- 2.3.2 By the establishment of CMAs, a large number of high yielding site and end use specific clonal plants of selected timber species will be available in continuous supply to various stakeholders.
- 2.3.3 Regular supply of genetically improved quality seed of different identified timber species through established CSOs of tested clones.
- 2.3.4 Overseas trained key staff will provide technical guidance and training to foresters and farmers regularly at RPRC, Bhubaneswar, Orissa, India. That will be an asset for making strategies beyond the project period.
- 2.3.5 The productivity of trees, plantations and forests of Orissa state will be enhanced considerably with improved socio-economic conditions for sustainable forest management.

### **2.4 Project Strategy:**

Basic idea of the project is to enhance productivity of trees and forests with development of suitable high yielding clones of tree species along with production of genetically improved quality seeds. There is a serious lack of information about the suitability of different clones of these species for planting in major timber growing parts of the State. Hence, following strategy / steps would be involved to cover different aspects of the project:

#### **2.4.1 Creating a base of Quality planting material:**

This part of the project shall include identification of phenotypically superior, CPTs on the basis of their growth, tree form, bole straightness and resistance to disease and insects / pests. In case of bamboo species appropriate CPCs will be selected in different agro-climatic zones of the state. The quality seed and other vegetative cloning material will be collected from these CPTs and CPCs for further multiplication and standardization of technique under protected environmental conditions at nursery stage.

#### **2.4.2 Identifying region specific suitability of clones:**

The selected clones on the basis of growth characters will be tested at different sites to determine clone x site (genotype x environment) interaction since physio-chemical attributes of the soil also influences the clonal development and wood properties. Suitability of clones will be established by planting such clones in different agro-climatic zone. Only the best clones will be selected and planted in CMAs.

#### **2.4.3 Clonal multiplication and establishment of CSO's:**

In CMA's the selected trees will be cut periodically to allow sprouting of coppice shoots. These sprouts are the vegetative material used to produce rooted cuttings which is known as clonal plants. Some special treatment like fertilization, weed control, pruning etc. often give excellent growth of clonal plants. Selected CMAs will be converted in to CSOs for regular supply of genetically improved quality seeds.

## 2.5 Target beneficiaries:

Among other groups, departments and organizations that will be the beneficiaries of the project:

2.5.1 Foresters, Farmers, Scientists and field staff at grass-root level.

2.5.2 Individuals, tribal groups, villagers, local communities, organizations and entities, panchayats and other stakeholders.

## 2.6 Technical and scientific aspects:

### Clonal Technology:

Trees being very large in size and with long rotation, it is difficult and time consuming to bring about genetical improvement through traditional breeding methodologies. Clonal technology though not mutually exclusive but is supplementary to the traditional breeding methodology and is comparatively less time taking. This technology can be utilized mainly for ToF and related production forestry with certain limitation to check the narrowing of genetic base.

Through clonal technology plants are produced vegetatively from a phenotypically / genetically selected superior plus tree (CPT) of high timber yield. The members of a clone multiplied through this technology shall have the same genetic constitution as found in the mother tree. It is one of the quick method for producing large number of high yielding plants within short time.

With the use of clonal technology, more timber will be produced for the given time of rotation. Conversely same amount of timber will be produced with lesser time taken, thereby reducing the rotation age. The time gain can be further used for raising another crop of clonal plants. The clonal plants can safely enhance the productivity to the tune of 150-200% and more. The enhanced productivity will bridge the soaring gap between the demand and supply of the forest products resulting in decreased pressure on forests and subsequently resulting in sustainability of the forests and forest products.

## 2.7 Economic aspects:

Productivity enhancement of trees and forests of Orissa using clonal technology shall definitely improve the economic conditions of target groups. Planting of high yielding clonal plants will increase the productivity considerably on a sustainable basis. This will generate extra income to various stakeholders including farmers, fringe foresters and small land-owners. A reasonable number of high yielding clonal plants will be available for regular planting in different agro-climatic zone. The production of genetically improved quality seed through CSOs will be an additional economic gain to the community.

## 2.8 Environmental aspect:

Reforestation through clonal plants will increase and improve the tree cover of the state. The clones of selected species will be planted in different geographical locations of the state which will greatly improve the environmental condition of the State. Therefore, no environmental hazards will be produced within the framework of the project. All of these will benefit the conservation of biodiversity and the environmental improvement of the project area.

## 2.9 Social aspects:

The present project proposal mostly covers the research and development activities which will have social impact including poverty alleviation. Target beneficiaries will include people living in and around the forests, particularly the tribals, are directly / indirectly dependent upon the forests products and services, estimated at around 50 per cent of the State's population of about 39 million.

## 2.10 Risks:

Large scale use of clonal material leads to loss of genetic variability, subsequently resulting into narrowing of genetic base of the planting material. Susceptibility of the clonal material to a particular pathogen may results in heavy mortality of the entire planting stock. Therefore, large scale use of clonal material is risky *per se*. Still the realization of the potentialities of genetic gains with the use of clonally propagated superior genotypes remains undisputed.

Clonal material being genetically uniform result into severe interaction and demand on the sites and therefore, need more care for their maintenance. Slight neglect of the plantations raised from clonal planting material may results into large scale failures.

Production of clonal planting material is more technical than raising the seedlings through traditional methods. Therefore, small and marginal farmers will have to depend upon other sources to acquire quality clonal planting material. The state government is well cognizant of these issues and prepared to support the small land holders and farmers in this context as also to ensure overall risk mitigation.

### **3. Outputs**

#### **3.1 Specific objective 1:**

##### **Creating a base of quality planting material and its regular supply.**

###### **Output 3.1.1**

###### **Selection of phenotypically superior CPTs and CPCs**

On the basis of straightness of the bole, tree form, insect and disease resistance and other traits, a large number of CPTs and CPCs will be selected in different agro-climatic zones of state.

###### **Output 3.1.2**

###### **Physical strengthening of existing infrastructure.**

This will include strengthening of different infrastructure at nursery like-mist chamber, shade house, poly-house and other related civil works with temperature control devices.

#### **3.2 Specific objective 2:**

##### **Identifying region specific suitability of clones**

###### **Output 3.2.1**

###### **Standardization of technique**

Different species require different inputs for its growth. Hence optimum level of each factor in terms of potting media, temperature and humidity along with the fertilizer requirements will be evaluated in the nursery.

###### **Output 3.2.2**

###### **Mass multiplication of genetically improved clonal plants**

Once the multiplication technique will be established a large number of clonal plants will be raised for further testing in the field.

###### **Output 3.2.3**

###### **Hardening of rooted plants**

The clonal plants will be hardened in shade houses before planting in field

###### **Output 3.2.4**

###### **Planting in CTA**

The clonal plants will be planted in CTA in different agro-climatic zones of the State.

###### **Output 3.2.5**

###### **Multiplication of genetically superior clones in CMA**

The high yielding clones will be further multiplied in CMA.

###### **Output 3.2.6**

###### **Establishment of CSO's**

CSO's will be established for the production of genetically improved quality seeds.

### 3.3 Specific objective 3:

#### **Provide technical guidance and training to foresters and farmers**

##### Output 3.3.1

###### **Overseas training to key staff**

In the beginning of the project educational tours and short training will be given to the key staff in the country, where similar type of work is going on.

##### Output 3.3.2

###### **Training to the foresters and farmers**

The field staff associated with the project will be given regular training at the executing institute, i.e., RPRC by the key staff. Training and technical guidance will also be given to farmers and foresters, who are interested to create infrastructure for raising clonal plants for field planting.

##### Output 3.3.3

###### **Preparation of progress and final report both in Hindi and English version**

Analysis of data and publication of progress and final report, preparation of CDs and other useful extension material for the benefit of stakeholders / user groups and also to provide ITTO member countries. Seminars, Symposia and workshops will be organized to transfer technology to the user group.

#### 4. Activities

<b>SPECIFIC OBJECTIVE</b>	<b>OUTPUTS</b>	<b>ACTIVITIES</b>
<b>1. Creating a base of quality planting material and its regular supply.</b>	<b>1.1 Selection of phenotypically superior CPTs and CPCs</b>	<b>Activity 1.1.1</b> Appointment of SRFs and JRFs and other supporting staff. <b>Activity 1.1.2</b> Extensive survey for selection and identification of CPTs / CPCs. <b>Activity 1.1.3</b> Purchase of camera, Laptop computer and computer peripherals.
	<b>1.2 Physical strengthening of existing infrastructure</b>	<b>Activity 1.2.1</b> Physical strengthening of infrastructure at different research centres. <b>Activity 1.2.2</b> Purchase of temperature control devices and up-gradation of laboratories.
<b>2. Identifying region :specific suitability of clones</b>	<b>2.1 Standardization of technique</b>	<b>Activity 2.1.1</b> Preparation of potting media and purchase of related equipments.

	<b>2.2 Mass multiplication of genetically improved clonal plants.</b>	<b>Activity 2.2.1</b> Mass multiplication of clonal plants in nursery.
	<b>2.3 Hardening of rooted plants</b>	<b>Activity 2.3.1</b> Up-keep of shade house with misting devices
	<b>2.4 Planting in CTA</b>	<b>Activity 2.4.1</b> Selection of CTAs. <b>Activity 2.4.2</b> Soil work and planting of clonal plants
	<b>2.5 Multiplication of genetically superior high yielding clones in CMA.</b>	<b>Activity 2.5.1</b> Selection of CMA. <b>Activity 2.5.2</b> Planting of tested clones for further multiplication in CMS.
	<b>2.6 Establishment of CSOs</b> ( e.g., village forest and JFM committees)	<b>Activity 2.6.1</b> Site selection for CSOs. <b>Activity 2.6.2</b> Conversion of some CMAs to CSOs.
<b><u>3. Provide technical guidance and training to foresters and farmers.</u></b>	<b>3.1 Overseas training to Key staff &amp; stakeholders</b>	<b>Activity 3.1.1</b> Key staff will be sent overseas for educational tour/short training.
	<b>3.2 Training to the foresters and farmers</b>	<b>Activity 3.2.1</b> Field staff working in the project will be provided necessary training by the Key staff.  <b>Activity 3.2.2</b> Training will also be provided to individual land owners, farmers and other stakeholders interested in similar type of work.
	<b>3.3 Preparation of progress and final report both in Oriya and English versions.</b>	<b>Activity 3.3.1</b> Preparation of progress and final report both in Oriya and English versions.  <b>Activity 3.3.2</b> Preparation of extension material for free circulation to foresters, revenue officials, user groups and other stakeholders.  <b>Activity 3.3.3</b> Organization of seminars, symposia, workshops to up-date the knowledge and disseminate research findings.

## 5. Logical Framework Worksheets

The proposed work plan of the project, which is spread to be covered within 3 years duration as under:-

### LOGICAL FRAMEWORK CHART/VORKSHEET-1

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1	2	3	4
<p><b>Development objective:</b>  <u>The project aims at productivity and sustainability of trees, plantations, and forests of Orissa state as a result of genetically improved quality planting material used for raising plantations in the forest areas, and more so outside the forests and in the agroforestry sector.</u></p>	<p>CPTs and CPCs available in different agro-climatic zones of state.            High yielding clonal plants of selected timber species available.            Established CSOs in 50 ha. of tested clones will enable availability of quality seed.</p>	<p>Technical reports            The representative from concerned donor and technical agencies will review and evaluate the project every year.</p>	<p>Sustainable supply of QPM            Trained resource of foresters and farmers available.</p>
<p><b>Specific objective-1</b> <u>Creating a base of quality planting material and its regular survival.</u>  <b>Output-1.1</b>            Selection of phenotypically superior CPTs and CPCs</p>	<p>Extensive field survey in different agroclimatic zones for selection of a large number of CPTs and CPCs of selected species.            Collection of sufficient plant material for mass multiplication of clonal plants at nursery.</p>	<p>Technical reports.            Evaluation report of project activities and outputs.</p>	<p>Base of QPM created.</p>

**LOGICAL FRAMEWORK CHARTWORKSHEET-2**

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1	2	3	4
<b>Output 1.2 Physical Strengthening of existing infrastructure.</b>	<u>Renovation of existing labs at RPRC and its filed research centres involved in the project.</u>	Technical reports Evaluation report of project activities.	Improved infrastructure available.
<b>Specific Objective 2</b> <u>Identifying region specific suitability of clones</u> <b>Output 2.1</b> Standardization of technique <b>Output 2.2</b> <u>Mass multiplication of genetically improved clonal plants.</u> <b>Output 2.3</b> Hardening of rooted plants <b>Output 2.4</b> Planting in CTAs. <b>Output 2.5</b> Multiplication of genetically superior high yielding clones in CMA. <b>Output 2.6</b> Establishment of CSOs.	Preparation of potting media and purchase of chemical.  Mass multiplication of Clonal plants in nursery.  Conversion of some selected CMAs to Clonal seed orchards (CSCs)	Technical reports.          Technical reports  Technical reports. Testing of seed in laboratory.	Genetically improved clonal plants available.          CMA created.  Sustainable supply of quality seeds assured.

**LOGICAL FRAMEWORK CHARTIWORKSHEET-3**

PROJECT ELEMENT	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1	2	3	4
<p><b>Specific objective3</b>  <u>Provide technical guidance and training to foresters and tree farmers.</u></p> <p><b>Output-3.1</b>            Overseas training to Key staff</p> <p><b>Output-3.2</b>  <u>Training to the foresters and tree farmers</u></p> <p><b>Output-3.3</b>            Preparation of progress and final report both in Oriya and English version.</p>	<p><u>Key staff of the project will be provided overseas training and educational tour to update their knowledge and expertise.</u></p> <p>Training and technical guidance to supporting field staff, planters and farmers.  <u>Organization of seminars, symposia, workshop for dissemination of findings.</u></p> <p><u>Preparation of project report.</u>  <u>Preparation of extension material.</u></p>	<p>Technical reports</p> <p>Extension material</p> <p><u>Project completion report.</u></p>	<p>Trained foresters and stakeholders available for SFM.</p> <p><u>Final evaluation.</u></p>

## 6. WORKPLAN

The proposed work plan of the project, which is spread to be covered within 3 years duration is given below:-

PROJECT OUTPUTS AND ACTIVITIES	RESPONSIBLE PARTIES	I Year				II Year				III Year			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Appointment of SRFs, JRFs & Computer Operator.	Project Director and key staff	*											
2. Survey and selection of CPTs, CPCs and collection of propagating materials.	Project director and key staff	*	*	*	*								
3. Physical strengthening- i) Renovation of research lab. ii) Strengthening of existing infrastructure and establishment of nursery. iii) Construction of boundary wall including maintenance of existing facilities at field stations of the silviculture division of state.	Project director and key staff	*	*	*	*								

### WORKPLAN-2

PROJECT OUTPUTS AND ACTIVITIES	RESPONSIBLE PARTIES	I Year				II Year				III Year			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	2	3	4	5	6	7	8	9	10	11	12	13	14
4. Procurement of laptop, computers with peripherals and software packages, camera, books and journals.	Project Director and key staff	*											
5. Standardization of technique for development of clonal plants. Purchase of nursery and lab equipments, chemicals, glassware, temp. control devices.	Project director and key staff					*	*						
6. Production of genetically improved clonal plants. Expenses on plantation work & maintenance.	Project director and key staff							*	*	*	*		

### WORKPLAN-3

PROJECT OUTPUTS AND ACTIVITIES <b>1</b>	RESPONSIBLE PARTIES <b>2</b>	I Year				II Year				III Year			
		Q1 <b>3</b>	Q2 <b>4</b>	Q3 <b>5</b>	Q4 <b>6</b>	Q1 <b>7</b>	Q2 <b>8</b>	Q3 <b>9</b>	Q4 <b>10</b>	Q1 <b>11</b>	Q2 <b>12</b>	Q3 <b>13</b>	Q4 <b>14</b>
7. Establishment of CSOs for production of genetically improved quality seeds.	Project Director and key staff									*	*	*	*
8. Overseas training to key staff in USA, Australia, Brazil and elsewhere. Organization of workshop-cum-training to field staff.	Project director and key staff	*	*	*	*	*	*	*	*				
9. Publication of extension materials	Project director and key staff									*	*	*	*
10. Preparation of reports and dissemination of results / findings, seminars, symposia.	Project director and key staff										*	*	*
11. Purchase of Vehicle 4 wheeler (1)	Project director and key staff	*											

## 7. BUDGET

With an international contribution of 579,416 US\$ and an Orissa Govt. contribution (in cash and/or kind) of 355,017 US\$ ( say in the form of salary to the permanent Govt. employees, who are engaged in project activities) the overall budget of this project totals 934,433 US\$. The details of the overall budget by activity and the consolidated yearly project budget by source are given in tables 7.1, 7.2 and 7.3. (Where, 1US\$ = Rs. 46.35 I.C.)

**Table 7.1 Overall Project budget by Activity (International contributions)**

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub-contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
Output 1.1 Selection of <u>Phenotypically superior trees / clumps</u>								
1.1.1 Appointment of SRF, JRFs...	<u>30294</u>						Q.1 Y1	<u>30294</u>
1.1.2 Extensive survey for CPTs & CPCs....		6475					Q.1-4 Y1	6472
1.1.3 Purchase of digital camera, laptop, computer with latest configuration & peripherals		<u>19416</u>					Q.1 Y1	<u>19416</u>

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub-contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
<b>Output 1.1 sub Total:</b>	<b><u>30294</u></b>	<b><u>25888</u></b>						<b><u>56182</u></b>
<b>Output 1.2 Physical strengthening of Infrastructure</b>								
<b>1.2.1 Upgradation of laboratories</b>				<u>150000</u>			Q.1-4 Y1	<u>150000</u>
<b>Output 1.2 sub total</b>				<b><u>150000</u></b>				<b><u>150000</u></b>
<b>Output 2.1 Standardization of technique</b>								
<b>2.1.1 Preparation of potting media</b>					34520		Q.1.2/ Y1-2	34520
<b>2.1 Output sub total</b>					<b>34520</b>			<b>34520</b>
<b>Output 2.2 Mass multiplication</b>								
<b>2.2.1 Mass multiplication of clonal plants</b>		<u>19416</u>					Q.3-4/ Y1-2	<u>19416</u>

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub-contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
<b>Output 2.2 sub Total:</b>		<b><u>19416</u></b>						<b><u>19416</u></b>
<b>Output 2.3 Hardening of Plants</b>								
<b>2.3.1 Upkeep of nursery, shade house, misting unit</b>		43150					Q.1-4/ Y1-2	<u>43150</u>
<b>Output 2.3 sub total</b>		<b>43150</b>						<b>43150</b>
<b>Output 2.4 Planting in CTAs</b>								
<b>2.4.1 Selection of CTAs</b>		8630					Q.1.2/ Y3	8630
<b>2.4.2 Soil work</b>		8630					Q.1 Y3	8630
<b>Output 2.4 sub tototal:</b>		<b>17260</b>						<b>17260</b>
<b>Output 2.5 Multiplication of clonal plants</b>								
<b>2.5.1 Selection of CMAs</b>		8630					Q.1-2/ Y1-2	8630

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub- contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
2.5.2 Planting of tested clones		8630					Q. 3/ Y2	8630
<b>Output 2.5 sub total</b>		<b>17260</b>						<b>17260</b>
<b>Output 2.6 Establishment of CSOs.</b>								
2.6.1 Site selection for CSOs		8630					Q. 1/ Y3	8630
2.6.2 Conversion of CMAs to CSOs		8630					Q. 2/ Y3	8630
<b>Output 2.6 sub total</b>		<b>17260</b>						<b>17260</b>
<b>Output 3.1 overseas training</b>								
3.1.1 Tour & Training of key staff.			<u>50000</u>				Q. 1-4/ Y1	<u>50000</u>
<b>Output 3.1 sub total:</b>			<b><u>50000</u></b>					<b><u>50000</u></b>
<b>Output 3.2 Training farmers / foresters</b>								

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub- contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
3.2.1 Field Staff/farmers			<u>19416</u>				Q.1-4/ Y2	<u>19416</u>
<b>Output 3.2 subtotal:</b>			<b><u>19416</u></b>					<b><u>19416</u></b>
<b>Output 3.3 Preparation of progress</b>								
3.3.1 Preparation of progress		<u>17250</u>					Q. 2-4/ Y3	<u>17250</u>
<b>Output 3.3 sub total:</b>		<b><u>17250</u></b>						<b><u>17250</u></b>
<b>NON – ACTIVITY BASED EXPENSES:</b>								
<b>1. Fuel and Utilities (electricity + water)</b>					<u>38838</u>		Q.1-4/ Y1-3	<u>38838</u>
<b>2. Office Supply</b>						6472	Q.1-4/ Y1- 3	6472
<b>3. Vehicle – (1) 4 – wheeler</b>				<u>10000</u>		6472	Q. 1/ Y1	<u>16472</u>
<b>Non-activity based sub-total:</b>				<b><u>10000</u></b>	<b><u>38838</u></b>	<b>12944</b>		<b><u>61782</u></b>

Output/ Activities+ Non-Activity expenses	Budget components							
	10. Project Personnel US\$	20. Sub- contracts	30. Duty Travel	40. Capital Items	50. Consumable Items	60. Miscellaneous	Quarter / Year	Grand Total
<b>Component Total:</b>	<b><u>30294</u></b>	<b>157484</b>	<b><u>69416</u></b>	<b><u>160000</u></b>	<b><u>73358</u></b>	<b>12944</b>		<b><u>503496</u></b>
Monitoring & Evaluation cost								<b><u>18000</u></b>
Sub Total								<b><u>521496</u></b>
Expost evaluation cost								<b><u>15000</u></b>
<b>Sbu Total:</b>	<b><u>30294</u></b>	<b>157484</b>	<b><u>69416</u></b>	<b><u>160000</u></b>	<b><u>73358</u></b>	<b>12944</b>		<b><u>536496</u></b>
Programme support cost 8%								<b><u>42920</u></b>
<b>Grand Total:</b>								<b><u>579416</u></b>

**Table: 7.2 Consolidated yearly project by source (FAO/UNDP/DFID/ITTO...) US\$**

	<b>BUDGET COMPONENTS</b>	<u>Unit Cost</u>	<b>Total</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>10</b>	<b>PROJECT PERSONNEL</b>					
	11. SRF 1 no	216\$/man/mo	<u>7770</u>	<u>2590</u>	<u>2590</u>	<u>2590</u>
	12. JRF 3 nos.	173\$/man/mo	18642	6214	6214	6214
	13. Computer Operator 1 no.	108\$/man/mo	3882	1294	1294	1294
	<b>19. Component Total</b>		<b><u>30294</u></b>	<b><u>10098</u></b>	<b><u>10098</u></b>	<b><u>10098</u></b>
<b>20</b>	<b>SUB- CONTRACTS</b>					
	21. Survey selection, collection of clonal material.	270\$/mo	6472	3236	3236	--
	22. Purchase of digital camera, laptop with latest configuration.	Varied	19416	15102	2157	2157
	23. Mass multiplication of clonal plants	539\$/mo	19416	6472	6472	6472
	24. Upkeep of nursery	1798\$/mo	43150	21575	21575	--
	25. Selection of CTAs, CMAs. Site	719\$/mo	25890	8630	8630	8630
	26. Soil work, Planting of CTSs & CMAs.	719\$/mo	25890	8630	8630	8630
	27. Publication, Workshop, Seminar		<u>17250</u>	<u>5750</u>	<u>5750</u>	<u>5750</u>
	<b>29. Component Total:</b>		<b><u>157484</u></b>	<b><u>69395</u></b>	<b><u>56450</u></b>	<b><u>31639</u></b>
<b>30</b>	<b>DUTY TRAVEL</b>					
	31. International Travel					
	31.1 Tour, Training of Key Staff	Varied	<u>50000</u>	25000	25000	--
	32. Domestic travel					
	32.1 Local Field trips, training	Varied	19416	6472	6472	6472
	<b>39. Component Total</b>		<b><u>69416</u></b>	<b><u>31472</u></b>	<b><u>31472</u></b>	<b><u>6472</u></b>

<b>40</b>	<b>CAPITAL ITEMS</b>					
	<b>BUDGET COMPONENTS</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
	41. Strengthening of Infrastructure.	Varied	<u>150000</u>	<u>75000</u>	<u>75000</u>	--
	42. Vehicle					
	42.1. 4 Wheeler (1)	10000\$/Vehicle	<u>10000</u>	<u>10000</u>	--	--
	<b>49. Component Total</b>		<b><u>160000</u></b>	<b><u>85000</u></b>	<b><u>75000</u></b>	--
<b>50</b>	<b>CONSUMABLE ITEMS</b>					
	51. Standardization of nursery technique	Varied	34520	21575	10788	2157
	52. Fuel & Utilities					
	521. Fuel	2158\$/Yr	6474	2158	2158	2158
	522. Utilities (Electricity + Water)	10788\$/Yr	32364	10788	10788	10788
	<b>59. Component Total:</b>		<b>73358</b>	<b>34521</b>	<b>23734</b>	<b>15103</b>
<b>60</b>	<b>MISCELLANEOUS</b>					
	61. Office Supplies	2157\$/Yr	6472	2157	2157	2158
	62. Contingencies	2157\$/Yr	6472	2157	2157	2158
	<b>69. Component Total:</b>		<b>12944</b>	<b>4314</b>	<b>4314</b>	<b>4316</b>
	<b>Sub Total:</b>		<b><u>503496</u></b>	<b><u>234800</u></b>	<b><u>201068</u></b>	<b><u>67628</u></b>
<b>80</b>	<b>81. MONITORING &amp; EVALUATION Cost</b>		<b><u>18000</u></b>	--	--	--
	82. ITTO Ex-post evaluation cost.		<u>15000</u>	--	--	--
	<b>89. Component Total:</b>		<b><u>33000</u></b>	--	--	--
	programme support cost 8%		<u>42920</u>	--	--	--
90	Refund of project costs.		--	--	--	--
<b>100</b>	<b>Grand Total</b>		<b><u>579416</u></b>	--	--	--

**Table: 7.3 Consolidated yearly project by source (E) OrissaGovernment US Dollar.**

	<b>BUDGET COMPONENTS</b>	<u>Unit Cost</u>	<b>Total</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>10</b>	<b>PROJECT PERSONNEL</b>					
	11. Project Director-1	659\$/mo	23730	7910	7910	7910
	12. Silviculturist – 3	483\$/man/mo	52149	17383	17383	17383
	13. Assistant Silviculturist – 2	410\$/man/mo	29550	9850	9850	9850
	14. Scientist – 2	450\$/man/mo	32400	10800	10800	10800
	15. Forest Range Officer – 16	377\$/man/mo	217188	72396	72396	72396
			<b>355017</b>	<b>118339</b>	<b>118339</b>	<b>118339</b>
	<b>19. Component Total</b>		<b>355017</b>	<b>118339</b>	<b>118339</b>	<b>118339</b>
20	Sub contract					
30	Duty Travel					
40	Capital Items					
50	Consumable Items					
60	Miscellaneous					
	Sub-total					
70	Executing agency cost					
<b>100</b>	<b>GRAND TOTAL</b>		<b>355017</b>	<b>118339</b>	<b>118339</b>	<b>118339</b>

## **PART-III OPERATIONAL ARRANGEMENT**

### **1. Management Structure:**

This project will be implemented by the Regional Plant Resources Centre under the guidance of the Orissa Forest Department. A competent senior officer of the department will serve as the Project Director.

Project activities will be conducted by the four state level Silviculturists (officers of OFD) stationed at different agro-climatic regions of Orissa and their supporting staff, viz., Assistant Silviculturists, Scientists and Research Range Officers, posted in the field.

### **2. Monitoring Reporting and Evaluation:**

#### **2.1 Time for Report submitting:**

- 1) The annual report of the project should be submitted one month before the scheduled project inspecting date, or any time, if and when the OFD or donor agency seeks so.
- 2) Completion report should be submitted two months after the planned completion time of the project.
- 3) Research reports, dissertations or treatises for different phases of the project must be submitted as filed documentation & immediately after published.

#### **2.2 Monitoring and summarization:**

It is suggested that the project team submits an annual report at the end of every work year; officials concerned hold a technical conference attended by related persons in Orissa and elsewhere and then check and accept the project.

#### **2.3 Evaluation:**

The monitoring mission will evaluate the implementation of the project through the report and the result submitted.

#### **2.4 Time schedule:**

It is advisable that monitoring and evaluation of the project be conducted during a certain period (e.g. half or one year) after the expenditure is allocated.

### **3. Future Operation and Maintenance:**

- 1) The working group members shall respectively undertake the output of different parts of the project, with everyone having his responsibility.
- 2) The head of the project group shall coordinately arrange the equipment furnished for the project.
- 3) Financing, administration and personnel system shall be made the research group so that the project proceeds smoothly.

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**ToF Executive Summary**  
**Annex 2: Proposed Amendment of TT Rules**

**OFSSP ToF**  
**Annex 2**  
**TT Rules Amendment**  
**(one quick draft option)**

Where any timber requiring permit under TT Rules is transported from the private land to any other place, the owner of such tree before transporting the timber file before the Forest Range Officer having jurisdiction over the area -either directly or send it by Registered post with acknowledgement due- a declaration containing details of the land (survey number, e.g.,) from which the tree is cut, number of trees, species of trees, quantity of timber and the place to which such timber is being transported. Every such declaration shall be acknowledged. The declaration of the applicant should be certified by two members of Village Forest Committee authorized for the purpose of village forests under section 8 of The Village forest Rules and countersigned by the lowest revenue official and forester. The Forest Range Officer should carry the inspection and grant permission for transport of timber within a month of receipt of application. If no such response or permission is received within a month, the applicant can transport the timber on the basis of his declaration certified by Village Forest Committee members and countersigned by the revenue official and forester.

Footnote: This is one suggestion, noted as it is as an option, in order to send the message about the urgency for reducing hurdles faced by tree owners, perceived and otherwise. Once the rationale behind the suggestion is approved, it or an appropriately amended version will be expanded and justified in a proper manner as per the main report and transformed into a self-explanatory gazette notification.

**ToF Executive Summary**  
**Annex 3: Proposed Species Choice**

**OFSSP ToF**  
**Annex 3**  
**Proposed Species Choice**

**1. Trees Suitable for Various Forest Division and its Economic Importance**

Sl. No.	Scientific Name	Local Name/ Common Name	Species Found in Natural Forest	Species Commonly Planted by Forest Department in Plantation Programme in Forest Area	Species Commonly Found in Private Land Outside the Forest Area	Species Found Across Various Forest Divisions and Districts	<i>Species Commonly Used By People For-</i>									
							Fodder	Fire wood	Fuel wood	Structural Timber	Household Need	Furniture	Agricultural Implements	Industrial raw material	Food	Fibre
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	<i>Acacia auriculiformis</i>	Jaranasak, Acacia		✓	✓	All All		✓	✓		✓	✓		✓		
2	<i>Acacia catechu</i>	Khair, Khadir, Katha, Catechu tree	✓			* *	✓		✓					✓		
3	<i>Acacia arabica</i>	Babul, Bamur, Guharia	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		
4	<i>Acacia mangium</i>	Mangium, Brown sal wood, Australian teak		✓	✓	Max. Div. All Dist.		✓			✓	✓		✓		

5	<i>Adenanthera pavonina</i>	Manda Kaincha, Red wood	✓			Except 23, 24, 8, 28 Except β e y q		✓								
6	<i>Adina cordifolia</i>	Kurum, Haland	✓			Except 28 Except q					✓					
7	<i>Aegle marmelos</i>	Bel	✓		✓	All All		✓							✓	
8	<i>Ailanthus excelsa</i>	Mahal, Maharukh			✓	Except 28 All								✓		
9	<i>Albizia chinensis</i>	Ghodalan j, China siris	✓		✓	* *	✓							✓		
10	<i>Albizia lebbeck</i>	Siris, Tentera	✓		✓	All All				✓	✓	✓				
11	<i>Albizia odoratissima</i>	Tinia, Black siris	✓		✓	All All					✓	✓				
12	<i>Albizia procera</i>	Sarapatri, white siris		✓	✓	All All				✓						
13	<i>Anacardium occidentale</i>	Cashew nut, Bhalia, Lanka Amba		✓	✓	All All		✓							✓	
14	<i>Anogeissus acuminata</i>	Phasi	✓	✓	✓	Except 28 Except q										
15	<i>Anogeissus latifolia</i>	Dhauda, Axle- wood tree	✓			Except 28 Except q			✓	✓		✓				
16	<i>Anthocephalus cadamba</i>	Kadamba , Cadam			✓	* All								✓		

17	<i>Artocarpus heterophyllus</i>	Panas, Jackfruit	✓		✓	4,3, 2, 21, 20, 22, 11 All	✓				✓	✓			✓	
18	<i>Azadirachta indica</i>	Nimba, Neem tree			✓	* All	✓									
19	<i>Barringtonia acutangula</i>	Hinjai, Hengul	✓		✓	4,28 q,v										
20	<i>Bauhinia variegata</i>	Kanchan			✓	* All	✓								✓	
21	<i>Bombax ceiba</i>	Simuli, semul, Indian Kapok	✓		✓	All All							✓			✓
22	<i>Borassus flabellifer</i>	Palmyra palm			✓	All All			✓	✓		✓		✓	✓	✓
23	<i>Boswellia serrata</i>	Sallaki, Salai	✓			All All							✓	✓		
24	<i>Bridelia retusa</i>	Kasi, Khais	✓		✓	Except 23, 24, 8 Except b,y,β	✓		✓	✓		✓		✓		
25	<i>Buchanania lanzan</i>	Char, Chironji	✓			All All							✓	✓		
26	<i>Calophyllum inophyllum</i>	Polang	✓		✓	20 z				✓		✓	✓			
27	<i>Caryota urens</i>	Salap, Indian sago	✓		✓	* *									✓	✓
28	<i>Cassia fistula</i>	Sunari, Indian Laburnam	✓			All All				✓						
29	<i>Cassia siamea</i>	Sana chakunda		✓	✓	* All		✓								

		Chakundi														
30	<i>Casuarina equisetifolia</i>	Jhaun, Casuarina		✓	✓	28, 20 All		✓	✓	✓	✓		✓	✓		
31	<i>Ceiba pentandra</i>	Bilati simili, Kapok			✓	* All								✓		✓
32	<i>Chloroxylon swietenia</i>	Bheru, Satinwood	✓			* *					✓		✓			
33	<i>Cinnamomum zeylanicum</i>	Dalchin, Cinnamon			✓	* *									✓	
34	<i>Cocos nucifera</i>	Nadia, Coconut			✓	* All					✓			✓	✓	✓
35	<i>Dalbergia latifolia</i>	Sisua, Rosewood	✓	✓		Except 23, 24, 8 All	✓			✓	✓	✓	✓			
36	<i>Dalbergia sissoo</i>	Sissu	✓	✓		Except 23, 24, 8 All	✓			✓	✓	✓	✓			
37	<i>Delonix regia</i>	Golmohar, Krushnacaduda			✓	* All	✓	✓						✓		
38	<i>Dillenia indica</i>	Ou, Elephant apple			✓	23, 24, 8 All									✓	
39	<i>Diospyros melanoxylon</i>	Kendu, ebony	✓			All All				✓	✓		✓		✓	
40	<i>Emblica officinalis</i>	Amla, Emblin myrobalan	✓		✓	All All	✓								✓	
41	<i>Eucalyptus sp</i>	Nilagiri, Eucalypt		✓	✓	* All		✓	✓	✓	✓			✓		

42	<i>Gmelina arborea</i>	Gambari, Gamhar	✓		✓	* All					✓	✓	✓			
43	<i>Grevillea robusta</i>	Sweta chandrika , Silveroak		✓	✓	* *										
44	<i>Grewia tiliaefolia</i>	Dhamana	✓			Except 23, 24, 8 Except β, e, y		✓	✓							✓
45	<i>Heritiera minor</i>	Sundari	✓	✓		28 q		✓		✓			✓			
46	<i>Hevea brasiliensis</i>	Ana rubber, para rubber				* *		✓						✓		
47	<i>Holoptelea integrifolia</i>	Dhau	✓			* *							✓			
48	<i>Lagerstroemia parviflora</i>	Sidh, Sena	✓			All All				✓	✓		✓			
49	<i>Lannea coromandelica</i>	Mahi, Jial	✓			All All										
50	<i>Limonia acidissima</i>	Kaitha, Wood apple			✓	* *					✓	✓			✓	
51	<i>Litsea sebifera</i>	Medh, Jayasand ha	✓			* *								✓		
52	<i>Madhuca longifolia</i>	Mahul, Mahua	✓		✓	All Except q, l		✓	✓	✓				✓	✓	
53	<i>Mallotus philippensis</i>	Kamalag undi, Kamala tree	✓			Except 23, 24, 8 Except β,e,y								✓		
54	<i>Mangifera indica</i>	Amba, Mango	✓		✓	All All	✓	✓			✓	✓			✓	

55	<i>Melia azedarach</i>	Bilati Nimba, Persian Lilac			✓	*	*									
56	<i>Melia composita</i>	Mahaneem	✓			*	*									
57	<i>Mesua ferrea</i>	Nageswar, Mesua	✓			*	All			✓						
58	<i>Michelia champaca</i>	Champa, Champak	✓	✓	✓	11, 20, 21, 22, 2, 3, 4 All							✓			
59	<i>Mimusops elengi</i>	Baula, Bulletwood	✓	✓	✓	*	All			✓	✓		✓		✓	
60	<i>Ougeinia oojeinensis</i>	Bandhan, Bandhan	✓			*	*			✓						
61	<i>Pistacia vera</i>	Pestabadam, Pistachio		✓		*	*									
62	<i>Pithecellobium dulce</i>	Ankada, Simakayan		✓		Absent All		✓	✓	✓		✓		✓		✓
63	<i>Polyalthia longifolia</i>	Debdaru			✓	Absent All										
64	<i>Pongamia pinnata</i>	Karanj, Pongam oil tree	✓		✓	*	All				✓			✓		
65	<i>Pterocarpus marsupium</i>	Bija, piasal, gum kino	✓			All Except b, d, l, q		✓	✓		✓	✓	✓	✓	✓	
66	<i>Pterocarpus santalinus</i>	Rakta chandan, Red sandal wood	✓	✓		All Except b, d, l, q				✓		✓				
67	<i>Pterospermum acerifolium</i>	Muchukund	✓		✓	*	All						✓			

68	<i>Rhizophora mucronata</i>	Rai	✓	✓		28 q										
69	<i>Samanea saman</i>	Chakunda, rain tree			✓	Absent All	✓	✓	✓		✓		✓	✓		
70	<i>Santalum album</i>	Chandan, Sandal wood tree	✓			1,22,26 All					✓			✓		
71	<i>Sapindus emarginatus</i>	Ritha, Etha, Soapnut	✓		✓	* All										
72	<i>Saraca asoca</i>	Ashok	✓			* All										
73	<i>Schleichera oleosa</i>	Kusum	✓		.	* b, d, l, q					✓		✓			
74	<i>Semecarpus anacardium</i>	Bhalia, marking nut	✓		.	* All										
75	<i>Sesbania grandiflora</i>	Agasti			✓	Absent j	✓	✓						✓	✓	
76	<i>Shorea robusta</i>	Sal, Saragi, Rengal	✓		✓	All Except q		✓	✓	✓	✓	✓	✓	✓	✓	
77	<i>Spathodea campanulata</i>	Turi, African tulip			✓	* All										
78	<i>Spondias pinnata</i>	Ambada			✓	* All	✓								✓	
79	<i>Sterculia foetida</i>	Jangali badam	✓			2, 3, 4, 11, 20, 21, 22 All										✓
80	<i>S. urens</i>	Genduli, Kodal	✓			2, 3, 4, 11, 20, 21, 22 All								✓		✓

81	<i>Strychnos nux-vomica</i>	Kochila, Nuxvomica tree	✓			All	All										
82	<i>Strychnos potatorum</i>	Nirmala, cleaming nut tree				All	All					✓					
83	<i>Swietenia mahagoni</i>	Mahogany	✓	✓	✓	*	*										
84	<i>Syzygium cumini</i>	Jamu, Jamun	✓		✓	Except 8, 23, 24 All	✓			✓	✓		✓		✓		
85	<i>Syzygium jambos</i>	Golap Jamu	✓		✓	Except 8, 23, 24 All	✓				✓		✓		✓		
86	<i>Tamarindus indica</i>	Tentuli, Tamarind	✓		✓	*	All	✓	✓	✓		✓		✓		✓	
87	<i>Tectona grandis</i>	Teak, Saguan	✓	✓	✓	All	All				✓	✓	✓	✓			
88	<i>Terminalia arjuna</i>	Arjun, Kahu	✓			*	All										
89	<i>Terminalia bellirica</i>	Bahada, Belleric myrobalan	✓			*	Except q									✓	
90	<i>Terminalia catappa</i>	Desi badam, Indian almond	✓		✓	*	All									✓	
91	<i>Terminalia chebula</i>	Harida, Chebulic myrobalan	✓			*	Except q									✓	
92	<i>Terminalia tomentosa</i>	Asan, Sahaj	✓			*	Except q		✓	✓	✓		✓				
93	<i>Trewia nudiflora</i>	Panigam hari			✓	*	All					✓		✓			

94	<i>Xylia xylocarpa</i>	Kangada	✓			8, 23, 24 Except β, e, y		✓		✓	✓		✓			
95	<i>Ziziphus jujuba</i>	Barkoli, Ber			✓	* All	✓	✓			✓		✓		✓	
96	<i>Careya arborea</i>	Kumbhi	✓			* *	✓								✓	✓
97	<i>Cleistanthus collinus</i>	Karada, karala			✓	* *	✓						✓			
98	<i>Soymida febrifuga</i>	Rohan, Rohini	✓			* *										
99	<i>Pinus kesiya</i>	Khasi pine		✓		18, 22 p, t		✓	✓					✓		
100	<i>Cordia myxa</i>	Garvana			✓	* All									✓	
101	<i>Avicennia officinalis</i>	Bani	✓	✓		28 q, l, d		✓		✓	✓		✓		✓	
102	<i>Simarouba glauca</i>	Mahatil, Simaruba			✓	Absent All		✓	✓							
103	<i>Dillenia pentagyna</i>	Rai	✓			Except 8, 23, 24 Except β, e, y		✓							✓	
104	<i>Peltophorum pterocarpum</i>	Radhach uda			✓	Absent All	✓	✓								
105	<i>Leucaena leucocephala</i> (salvador var.)	Subabul, Nagarjuna			✓	Absent All	✓				✓		✓	✓		
106	<i>Dendrocalamus strictus</i>	Salia, Male bamboo	✓	✓		All All	✓			✓	✓		✓	✓	✓	
107	<i>Bambusa arundinacea</i>	Daba, Female bamboo	✓			* *				✓	✓		✓	✓		

108	<i>Bambusa nutans</i>	Badi bauns			✓	Absent All	✓			✓	✓		✓	✓		
109	<i>Kydia calycina</i>	Pula	✓			Except 8, 23, 24 Except β, e, y								✓		
110	<i>Prosopis juliflora</i>	Bilati babul				Absent *	✓							✓		
111	<i>Dalbergia paniculata</i>	Barah Baula				* *	✓									
112	<i>Casuarina cunninghamii</i>	Casuarina				Absent *		✓	✓					✓		
113	<i>Celitis orientalis</i>	Kharkas, Trema, charcoal tree	✓		✓	3, 4, 11, 20, 21, 22 All								✓		
114	<i>Erythrina variegata</i>	Paldhua	✓			4, 13, 14, 15 All										

N. B : \* = Not clear

**Forest Division Code:** (1) Angul, (2) Dhenkanal, (3) Athamallick, (4) Baripada, (5) Karanjia, (6) Keonjhar, (7) Athagarh, (8) Sambalpur, (9) Sundargarh, (10) Deogarh, (11) Banai, (12) Bamara, (13) Rairakhol, (14) Gh.-South, (15) Gh.-North, (16) Parlakhemundi, (17) Boudh, (18) Phulbani, (19) Baliguda, (20) Puri, (21) Nayagarh, (22) Jeypore, (23) Khariar, (24) Bolangir, (25) Kalahandi, (26) Raygarah, (27) Nabarangpur, (28) Rajnagar.

**District Code:** (a) Anugul (b) Balasore (c) Barahmpur (d) Bhadrak (e) Bolangir, (f) Boudh, (g) Cuttack (h) Deogarh (i) Dhenkanal (j) Gajapati (k) Ganjam (l) Jagatsinghpur (m) Jajpur (n) Jharsuguda (o) Kalahandi (p) Kandhamal (q) Kendrapada (r) Keonjhar (s) Khurda (t) Koraput (u) Malkangiri (v) Mayurbhanj (w) Nabrangpur, (x) Nayagarh (y) Nuapuda, (z) Puri (α) Rayagada (β) Sambalpur (γ) Sonpur (δ) Sundargarh

## 2. Suitability of Promising Species for Orissa and its Climatic Requirements

Sl No.	Species	Species can be made free for		Rationale						
		Entire State	Specific District	Climate	Soil pH, Depth	Habit	Production	Species in Demand	Commonly found in Private Land	Natural Regeneration
1	<i>Acacia auriculiformis</i>	✓		Rainfall (RF) = 1300-1700mm Dry season = 4-6 month Tolerates seasonal water logging	Alkali-Neutral-Acid, Shallow depth	Nitrogen Fixing Tree (NFT), Coppice	Fast growing species, 10-20m <sup>3</sup> /ha/yr	✓	✓	Easy
2	<i>Acacia mangium</i>		Coastal districts	RF = 1000-2100mm, Dry season = 3-4 month, Tolerates seasonal waterlogging, prefers moist site	Acid-Neutral, poor site, tolerates salinity	Termite resistant, NFT, Biodrainage species	Fast growing 20-46m <sup>3</sup> /ha/yr	✓	✓	Not too difficult
3	<i>Acacia arabica</i>	✓		RF=200-1000mm, Dry season- 6-9 month, Tolerates seasonal water logging	Alkali-Neutral	NFT, Biodrainage species	Calorific value- 4800-4950cal/g	✓	✓	Easy

4	<i>Ailanthus excelsa</i>	✓				Pioneer species in harsh environment, extremely wind hardy	Fast growing	✓	.	Easy
5	<i>Albizia lebbeck</i>	✓		RF-500-2500mm	Neutral-Acid	Termite resistant	Fast growing, 18-28m <sup>3</sup> /ha/yr	✓	✓	Easy
6	<i>Anacardium occidentale</i>	✓		RF-500-1600mm, Dry season = 4-6 month	Neutral acid, grows in coastal soil where fresh water available, tolerates poor soil	Termite resistant, helps in sand dune consolidation	800-3000kg nut/ha/yr	✓	✓	Easy
7	<i>Anthocephalus cadamba</i>		Coastal districts	RF-1300-1400mm, Dryseason- 0-3 month, Prefers moist site	Neutral-Acid		Fast growing, 10-40 m <sup>3</sup> /ha/yr	✓	✓	Difficult
8	<i>Azadirachta indica</i>	✓		RF-450-1200mm, Dry season- 5-7 month	Neutral, Deep soil	Termite resistant	5-18m <sup>3</sup> /ha/yr	✓		Easy
9	<i>Cassia siamea</i>		Western Orissa	RF-650-900mm Dry season = 4-6 month	Neutral-Acid Deepsoil	Coppicer	8-12m <sup>3</sup> /ha/yr	✓		Difficult

10	<i>Casuarina equisetifolia</i>	✓		RF-750-2500 Dryseason - 3-4 months	Alkaline-Neutral, prefers saline soil	NFT, termite resistant, wind break species	6-18m <sup>3</sup> /ha/yr, Durable wood	✓	✓	Difficult
11	<i>Tectona grandis</i>	✓		RF-1250-2500mm Dryseason = 3-5 month	Neutral-acid, prefers fertile and deep soil	Coppicer	6-18m <sup>3</sup> /ha/yr, Durable wood	✓	✓	Difficult
12	<i>Syzygium cumini</i>	✓		RF-1500-5000mm	Alkaline-Neutral	Resistant to termite, biodrainage species	CV-4800 cal/g Durable wood	✓	✓	Easy
13	<i>Sesbania grandiflora</i>	✓		RF->1000mm Dry season = 2- 4month	Neutral-Acid	Conserves soil, NFT	20-25m <sup>3</sup> /ha/hr	✓	✓	Easy
14	<i>Samanea saman</i>	✓		RF-760-3000mm Dry season - 2- 4month	Neutral-Acid	NFT, Biodrainage species seasonal water logging	20-35m <sup>3</sup> /ha/yr	✓	✓	Easy
15	<i>Pithecellobium dulce</i>	✓				NFT, Coppicer, tolerates salt wind		✓	✓	Easy

16	<i>Bauhinia variegata</i>	✓				NFT Coppicer, species for pollarding and lopping		✓	✓	Easy
17	<i>Leucaena leucocephala</i>	✓		RF-600-1000 mm Dry season = 2-6 month	Alkaline to Neutral	NFT, Coppicer, tolerates salt wind	Salvador type - 30-40, Hawai type - 20-25 m <sup>3</sup> /ha/hr	✓	✓	Easy
18	<i>Gmelina arborea</i>	✓		RF-1000-2500 mm Dry season = 2-4 month	Neutral-Acid fertile soil	Coppicer termite resistant	18-32 m <sup>3</sup> /ha/hr	✓	✓	Easy
19	<i>Eucalyptus grandis</i>		Coastal districts	RF-1000-4000 mm Dry season = 0-2 month	Neutral-Acid moist soil	Coppicer, biodrainage species	24-70 m <sup>3</sup> /ha/hr	✓		Not too difficult
20	<i>Dalbergia latifolia</i>	✓				Coppicer, NFT		✓		Easy
21	<i>Avicennia officinalis</i>		Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Ganjam		Saline soil, saline water in undation	Can be used as live wall near sea		✓		Difficult

Limited List of Species for ToF -distinguishable from natural forest species:

1	<i>Acacia auriculiformis</i>	Jaranasak, Acacia
2	<i>Acacia mangium</i>	Mangium, Brown sal wood, Australian teak
3	<i>Ailanthus excelsa</i>	Mahal, Maharukh
4	<i>Albizia procera</i>	Sarapatri, white siris
5	<i>Anacardium occidentale</i>	Cashew nut, Bhalia, Lanka Amba
6	<i>Anthocephalus cadamba</i>	Kadamba, Cadam
7	<i>Azadirachta indica</i>	Nimba, Neem tree
8	<i>Bauhinia variegata</i>	Kanchan
9	<i>Borassus flabellifer</i>	Palmyra palm
10	<i>Cassia siamea</i>	Sana chakunda, Chakundi
11	<i>Casuarina equisetifolia</i>	Jhaun, Casuarina
12	<i>Ceiba pentandra</i>	Bilati simili, Kapok
13	<i>Cinnamomum zeylanicum</i>	Dalchin, Cinnamon
14	<i>Cocos nucifera</i>	Nadia, Coconut
15	<i>Delonix regia</i>	Golmohar, Krushnachuda
16	<i>Dillenia indica</i>	Ou, Elephant apple
17	<i>Eucalyptus sp</i>	Nilagiri, Eucalypt
18	<i>Grevillea robusta</i>	Sweta chandrika, Silveroak
19	<i>Hevea brasiliensis</i>	Ana rubber, para rubber
20	<i>Limonia acidissima</i>	Kaitha, Wood apple

21	<i>Melia azedarach</i>	Bilati Nimba, Persian Lilac
22	<i>Pistacia vera</i>	Pestabadam, Pistachio
23	<i>Pithecellobium dulce</i>	Ankada, Simakayan
24	<i>Samanea saman</i>	Chakunda, rain tree
25	<i>Sesbania grandiflora</i>	Agasti
26	<i>Spathodea campanulata</i>	Turi, African tulip
27	<i>Spondias pinnata</i>	Ambada
28	<i>Strychnos potatorum</i>	Nirmala, clearing nut tree
29	<i>Trewia nudiflora</i>	Panigamhari
30	<i>Ziziphus jujuba</i>	Barkoli, Ber
31	<i>Cleistanthus collinus</i>	Karada, karala
32	<i>Pinus kesiya</i>	Khasi pine
33	<i>Cordia myxa</i>	Garvana
34	<i>Simarouba glauca</i>	Mahatil, Simaruba
35	<i>Peltophorum pterocarpum</i>	Radhachuda
36	<i>Leucaena leucocephala (salvador var.)</i>	Subabul, Nagarjuna
37	<i>Bambusa nutans</i>	Badi bauns
38	<i>Prosopis juliflora</i>	Bilati babul
39	<i>Dalbergia paniculata</i>	Barah Baula
40	<i>Casuarina cunninghamii</i>	Casuarina

**ToF Executive Summary**  
**Annex 4: Kerala ToF Timber Transit Rules**

## OFSSP ToF

### Annex 4

#### Kerala ToF Timber Transit Rules

Kerala Promotion Of Tree Growth In Non - Forest Areas Act 2005". Section 6 of the act reads as follows "6. Right of owners to cut and remove trees in non notified areas in non forest land:- Notwithstanding anything contained in any other law for time being in force and subject to the other provisions of this act, every owner of non forest land in a non notified area shall have the right to cut and transport any tree, other than sandalwood tree, standing on his land". This means trees outside the forests (except in notified areas) can be cut and removed without any approval from the forest or any other department. There are certain restrictions in notified areas which include mangrove areas or cardamom or coffee plantations, or any other ecologically sensitive zone notified by the Govt.. Even in notified areas small land holders can cut and remove any tree except the specified trees. However, owners other than small land holders would require permit to cut and remove trees from notified area. Specified trees are *Santalum album*, *Tectona grandis*, *Dalbergia latifolia*, *Xylia xylocarpa*, *Terminatia tomentosa*, *Michelia chempaca*, *Grewia tiliaefolia*, *Cedrela toona*, *Tetrameles nudiflora*, *Dysoxylum malabariucum*, *Diospyrus sp.* In the nutshell, there is no restriction on felling and transport of trees of any species (except sandalwood) from the non forest areas. Restrictions apply only to certain notified areas including mangroves and other eco-sensitive areas. Even in notified areas the procedure has been simplified. Similar provisions can be considered in the context of Orissa State.

## **ToF Executive Summary**

### **Annex 5: Law Enforcement, Certification and CoC**

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### ToF

#### Annex 5

#### **Law Enforcement, Certification and CoC**

Illegal harvesting should be a common concern, both prior to and following the imposition of cumbersome or tough timber transit regulations and logging bans. It is worth studying how the TT rules, sawmill closures, logging ban and timber shortages- on their own and put together, could cause increased levels of illegal logging and decreasing productivity.

Stating *sotto-voce*, such regulatory framework could also have disruptive effects on neighbouring States through legal and illegal trade, timber smuggling, and market disruptions, thus potentially contributing to unsustainable harvesting in States wherefrom wood is transported across the border for meeting the demand of consumers and retailers in Orissa. Lack of public awareness of the causes and consequences, and much less participation in designing and implementing timber tree harvesting rules or in recognizing local dependency on forests, results in resistance and continued illegal activities for subsistence survival, especially in the absence of safety-net policies that address adverse poverty and unemployment impacts. Only where the goal of conservation of the natural forest resource is pro-actively accompanied by transitional adjustment policies for alternative timber supplies from ToF, including sustainable plantations and farm-forestry, the forest resource management can be effective as a conservation strategy while acting as safety nets to minimize local burdens.

*Prima facie*, the number of staff assigned to forest crime detection should be increased and work in a committed and coordinated manner. But, if this is not feasible, given the resource limitations, improving the terms and conditions of the existing forestry and related officials may reduce corruption, especially if there is adequate decentralization of roles and responsibilities as well as administrative and financial powers. Incentives such as rewards for contributing to the apprehension of those involved in illegal activities are likely to improve staff performance more than general improvements in terms and conditions of employment. Such incentives merit to be combined with measures to foster the commitment of forestry officials and other stakeholders to forest law enforcement. Training of forestry officials and staff is also needed to provide them with a better understanding of the regulatory framework and increased knowledge of the techniques and mechanisms for effective monitoring and reporting of illegal activities. Towards this goal, there need to be developed and deployed scientific and technical methodologies for acceptable and effective law enforcement, among which certification and chain of custody are among the most modern market tools.

#### **Certification & Log tracking**

While forest certification is a tool designed to assess the sustainability of forest operations, the implementation of certification initiatives and the development of certification standards also provide opportunities to address legal compliance. Forest inspections carried out by an independent, third party accredited organization assess the forest and plantation owners'/operators' compliance with a set of criteria and indicators; this almost always includes the operators' adherence to the legal framework for scientific tree planting and sustainable forest management. Establishing forest certification partnerships is therefore a practice which can ensure that timber is not only legal but also sustainably produced. If information on certification follows the wood through the chain of custody, it can have a positive influence by choosing products which originate legally from well-managed forests.

Certification is easier and less costly for law-abiding entities. Certification is desirable for private trees because certified plantations are supposed to be exempt from the government forest audit. At the same time, independent certification is beneficial for the OFD as it would free up scarce resources that would otherwise be dedicated to monitoring and enforcing law and other requirements for the application of codes of practices for tree growing outside the forests as also for sustainable forest management plans. In this regard, it is important to distinguish between crimes and regulatory offences.

Log tracking would enable the Forest Department to closely monitor timber production and related flows through the chain of custody. It is being used in several developing countries to improve forest monitoring and control, and OFD could adopt it as a model practice for others to follow in the country. Pilot implementation is recommended and its eventual mainstreaming for the entire ToF programme.

Road or river checkpoints do not require any advanced and costly technology and may, under certain conditions, be very efficient in detecting wood which has been logged or is being transported illegally. The circulation of logging trucks should be restricted to working hours or checkpoints must be manned around the clock, otherwise they will be ineffective.

A system may be developed using information technology to process, document and store information on harvesting, processing and marketing of tree and other forest products. This initiative, which could easily be financed internationally -say by ITTO, UNDP or FAO or any benevolent bilateral donor such as DFID, EC, JBIC -includes log numbering to trace any log right back to its stump. A plastic number tag is attached to the log and associated stump after felling. Computerized bar codes as log tags (and hammers) are to be first tested on a wide range of timber species in order to assess feasibility. Log and stump numbers are recorded into a special form, and this procedure is repeated for all trees that are felled. Once the logs arrive at the log landing, additional log sizing and log numbering is done. These new numbers are used by forestry officers during log scaling and in the timber statement. A full-time worker may be recruited by the department to carry out the log numbering in the field, duly supervised by the forest ranger responsible for the area.

Certification can indeed be an efficient instrument for improving legal compliance in via voluntary, market-driven mechanism, which provides an independent third-party assurance that tree products have been produced according to a set of pre-agreed standards. Some certification schemes are operational throughout the world, including the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification Scheme (PEFC). Others are national in scope, such as MTCC in Malaysia. Most of these include clauses of law compliance in their standard and consider legality and transparency as one of the pillars of good management. Although government may have no direct role in the certification process, the GoO could develop purchasing policies that promote the use of certified products. Certification relieves governments of the burden of controlling law compliance as monitoring is conducted by independent third parties.

Some schemes are self-policed, while others rely on independent, external audits. They may only certify the ToF and forest management, while others include chain of custody tracking and certify the products. Some schemes involve all interested parties in the standard setting process and allow public access to information on past or planned ToF and forest management activities. While the two known schemes of direct relevance to OFD, where illegal logging and illegal timber trade are perceived as problems, are the FSC and the PEFC, these could be adjusted to a phased approach as in Malaysia..

The FSC scheme includes systems for independent auditing and chain of custody control. Legality at the forest management level is ensured by compliance with the FSC principles and

criteria. Tracing and tracking forest products is provided by chain of custody certification. The PEFC is a mutual recognition programme of national initiatives, and therefore its rules and standards could be adjusted to Orissa's contextual considerations. The PEFC operational guidelines include references to law compliance, such as "legal, customary and traditional rights" should be clarified, recognized and respected.

The need for more specific guidance on the legality issue is motivating analyses of the possibilities of implementing independent verification systems of legal compliance. In this case, verification of legal compliance would be a first step towards full certification. Controlled Wood Standards provide a simple way for purchasers to specify wood and wood products that exclude the most controversial aspects of tree and forest management from their supply chains. It also allows tree owners and forest managers operating in situations where full certification may be prohibitive for reasons which are beyond their control - for example, due to lack of clear land tenure - to supply "controlled" wood and gain access to international markets.

The Government can facilitate certification of timber (and other forest) products and thus promote law compliance. For example, it could accept independently certified plantations and forests as complying with the legal prescriptions issued by the government. Timber producers and suppliers have the option of either having government inspectors examining compliance or contracting an independent certification entity to do so. Most would prefer an independent certifying body to the more complex procedures of traditional government system. The government would benefit, as it does not need to use up scarce talent and resources in securing compliance with the law. This policy could contribute to the spread of certification in Orissa, making the State one of the leaders in the country, for which it is bound to be recognized and rewarded.

Needless to repeat that Certification schemes with chain of custody tracking can help trace the origin of wood and make it more difficult to hide theft and other illegalities. Chain of custody certification allows forest product manufacturers and traders to exclude illegally harvested material in their supply chains. This then allows retailers and other major forest products users (e.g. national and local state procurers) to avoid illegal wood in their own purchasing. Furthermore, If information on certification follows the wood through the chain of custody, informed consumers can have a positive influence on the entire process. It should also help promote export with premium prices to industrialized countries where consumers are increasingly demanding products that originate from legal sources, be they logs, secondary processed wood products or handicrafts.

The relevance of certification in summary is to diminish the amount of regulation that is being imposed on a private woodland owner and a tree farmer, to ensure legal control and compliance, cooperative involvement of stakeholders, and to incentivate tree planting without cumbersome hurdles and with potential marketing benefits and higher prices. However this should involve Chain of Custody certification of unbroken trails to provide physical evidence that the certified product originates from a particular source providing the link between buyers and sellers through to the point of final sale and ensuring legal compliance. *Ab-initio, explicit* guidance and assistance to small land holders, woodland owners and tree planters is warranted towards group certification in order to keep costs reasonable and to motivate the ToF community as a whole.