

**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM FOR AFFORESTATION AND REFORESTATION
PROJECT ACTIVITIES (CDM-AR-PDD) Version 04**

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**SECTION A. General description of the proposed A/R CDM project activity:****A.1. Title of the proposed A/R CDM project activity:**

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Improving Rural Livelihoods Through Carbon Sequestration By Adopting Environment Friendly Technology based Agroforestry Practices

Version 06

Date: 03/02/2011 (dd/mm/yyyy)

A.2. Description of the proposed A/R CDM project activity:

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The proposed A/R CDM project activity will mobilize resource-poor farmers to raise tree plantations on farmlands. It proposes to link resource poor farmers and end users of wood products in order to optimise the land use and to facilitate the co-ordination of wood producers, agronomists, financial institutions and non-governmental organizations to improve the livelihood opportunities of rural households. The project activity is implemented on the degraded farmlands or lands used for rainfed subsistence agriculture.

The project is implemented in the two states of India: Orissa and Andhra Pradesh. The project area includes small landholders spread over a total of six districts: Rayagada, Koraput and Kalahandi districts in Orissa and the districts of Visakhapatnam, Srikakulam, and Vizianagaram in Andhra Pradesh. These districts have a pre-dominance of indigenous population, notified as Scheduled Tribes and Scheduled Castes in India, with the majority of them being poor.

The state of Orissa is one of the poorest states in India in terms of per capita income. In Orissa, about 41 % of population belongs to Scheduled Castes & Scheduled Tribes. Orissa also has the largest number of indigenous communities or tribes in the country, i.e. 62 tribes constitute about 23 % of total population. The tribal population is predominant in Koraput, Rayagada, and Kalahandi districts.

In the state of Andhra Pradesh, the project area covers 33 indigenous communities or tribes in the three districts of Srikakulam, Visakhapatnam and Vizianagaram. The major tribes represented in the project area include, Andh, Bagata, Bhil, Chenchu, Chenchuar, Gadabas and Gond.

The participation of small and marginal farmers representing indigenous communities and their organization as part of the CDM A/R makes this project unique in contributing to their land use choice, improvement of livelihood opportunities and in promoting their capacity to organize and implement climate change mitigation initiatives.

The specific objectives of the project include:

- To pilot reforestation activities for generating high-quality greenhouse gas removals by sinks that can be measured, monitored and verified;
- To develop plantation and agro forestry models, which can provide multiple benefits to farmers in terms of timber, firewood and non-wood forest products;
- To provide additional income and to promote livelihoods of resource poor farmers through carbon revenues.
- To reforest degraded lands to control soil and water erosion and reclaim lands.
- To reduce the dependence of industry on natural forests thereby conserving biodiversity.



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- To build capacity of various stakeholders to benefit from global mechanisms.

The project implements reforestation on 1607.7 ha of land belonging to 1590 farmers in the states of Andhra Pradesh and Orissa. The reforestation activities under the project were undertaken between 2004 and 2007.

The project contributes to **sustainable development** in the following ways.

- Development of institutional mechanisms for implementing A/R CDM project activities;
- Promotion of local financing arrangements for restoration of degraded lands by resource-poor farmers to meet the cost of plantation and maintenance;
- Identification of resource-poor farmers and to improve their awareness to tree growing;
- Improvement in productivity of degraded lands under the project activity through a participatory approach involving local farmers, JK Paper Ltd, and VEDA Climate Change Solutions Limited (VCCSL);
- Development, testing and dissemination of best practices in plantation and agro forestry to minimize risks (fire, pests, insects and disease) and maximize environmental and social benefits.
- Provision of seedlings raised from **clonal technology** to the farmers to raise plantations;
- Promotion of **farmer-industry partnerships** with buy-back arrangements to purchase wood;
- Generation of additional income from carbon credits to the farmers;
- Development and **strengthening of the capacity** of various stakeholders - resource-poor farmers, governmental and non-governmental organizations through training and technical assistance to take advantage of the international mechanisms;
- **Conservation of biodiversity** through reduced dependence on natural forests by producing raw material for housing, construction and industry on private lands through plantation forestry;
- Build partnerships with national and international research organisations and to promote awareness and adoption of appropriate agro-forestry models among the farmers.

The project is financed by the project participants viz., VCCSL, JK Paper Ltd and the participating farmers. The farmers' equity contribution is in the form of land and labour supplies in the establishment of tree crops. The resource poor farmers are also contributing their savings as investment in the plantation activity. Accordingly, the beneficiary farmers themselves out of their savings or through loans meet the plantation establishment cost.

JKPL has contributed to the identification of the farmers, supported the supply of improved planting stock to the participating farmers, provided the extension advice and initiated arrangements for the purchase of wood grown from the plantations established under the project. It has had primary planting and technical on the ground implementation responsibility.

VCCSL has piloted the CDM project in coordination with JKPL, farmers, and other stakeholders to facilitate the flow of Carbon revenue to the participating farmers with JKPL doing the main project implementation work/planting activities in the field. It is envisaged that at least 80% of the carbon revenue will be transferred to the beneficiary farmers, as mutually agreed by VEDA Macs/VCCSL and JKPL, in order to not only ensure maximum benefits to them, but also to retain their interest in the project; thus, ensuring permanence. The benefit sharing arrangement proposed in this project makes helps to lower transaction costs for the resource poor landowners participating in the project.

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A Monitoring Committee comprising the representatives of VCCSL and JKPL, as well as provision of audited records, will ensure that the share of the benefits from the sale of carbon credits due to the participating farmers will effectively go to them. A joint escrow account between VCCSL and JKPL will be the institutional mechanism for channelling carbon revenues to the farmers. Therefore, the carbon sequestration benefits of the project serve the roles of climate change mitigation and as a source of alternate income to farmers to meet the operation and maintenance expenses for reforestation of degraded lands.

A.3. Project participants:

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Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be indicated using the following tabular format.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Indicate if the Party involved wishes to be considered as a project participant (Yes/No)
Government of India (host)	<ul style="list-style-type: none"> VEDA Climate Change Solutions Ltd. JK Paper Ltd 	No
Government of Canada	International Bank for Reconstruction and Development as a trustee for BioCarbon Fund	Yes
(*) In accordance with the CDM A/R modalities and procedures, at the time of making the CDM-AR-PDD public at the stage of validation, a Party involved may or may not have provided its <u>approval</u> . At the time of requesting registration, the approval by the Party(ies) involved is required.		
Note: When the CDM-AR-PDD is prepared to support a proposed new baseline and monitoring methodology (form CDM-AR-NM), at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.		

A.4. Description of location and boundaries of the A/R CDM project activity:
A.4.1. Location of the proposed A/R CDM project activity:

The proposed A/R CDM project activity is located in Koraput, Kalahandi and Rayagada districts of Orissa and Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh in India.

Figure A.1: Map of India showing the provincial states of Andhra Pradesh and Orissa, in which the A/R CDM project activity is implemented.



Table A.1: Details of land proposed under the project



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<i>District</i>	<i>Villages</i>	<i>Blocks/ Mandals</i>	<i>Land under project (in ha)</i>	<i>Number of parcels</i>	<i>Average land under project per farmer (in ha)</i>
Vizianagaram	151	30	620.68	444	1.48
Srikakulam	107	20	232.01	473	0.51
Rayagada	78	12	269.29	247	1.24
Koraput	29	06	140.65	107	1.60
Kalahandi	80	10	178.01	279	0.70
Visakhapatnam	56	19	167.08	158	1.07
	501	97	1607.7	1708	1.01

A.4.1.1. Host Party(ies):

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Government of India ratified the Kyoto Protocol in August 2002.

A.4.1.2. Region/State/Province etc.:

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The project is implemented in a cluster of 6 districts - Koraput, Kalahandi and Rayagada in Orissa; and Visakhapatnam, Vizianagaram and Srikakulam districts in Andhra Pradesh. The district clusters in each state adjoin one another and represent similar agro-climatic conditions.

A.4.1.3. City/Town/Community etc:

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Farming communities of the two states are involved in the project; however, special emphasis is placed on resource-poor farmers, who raise plantations of tree species for carbon sequestration in their farmlands.

A.4.2 Detailed geographic delineation of the project boundary, including information allowing the unique identification(s) of the proposed A/R CDM project activity:

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The project boundary includes all discrete parcels of lands owned by different farmers in the blocks/ mandals (an administrative block) of the six districts noted in A.4.1.2. Each of these parcels of land is identified through GPS coordinates. The GPS coordinates of the identified land parcels of the project are presented as part along with the list of land parcels in Annex 5. The GPS coordinates reflect the delineation of land parcels on the ground. Additionally, each parcel of land is also identified using official documents and maps of the Land Administration/Revenue Department. The Figures A.2 to A.7 present the maps of districts included in the projects.

Table A.2: District wise land utilization particulars in ha (percent in parenthesis)

Land use category	Andhra Pradesh			Orissa		
	Vizianagar am	Srikakulam	Visakhapat nam	Kalahandi	Rayagada	Koraput
Geographical area	630,038	584,290	1,134,284	836,000	728,000	790,000
Forest area	111969 (17.8)	70840 (12.1)	477791 (42.1)	314000 (37.6)	281000 (38.6)	188000 (23.8)



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Barren land	77753 (12.3)	50410 (8.6)	130938 (11.5)	42000 (5.0)	143000 (19.6)	122000 (15.4)
Land in non-agricultural use	77013 (12.2)	90095 (15.4)	101048 (8.9)	35000 (4.2)	38000 (5.2)	43000 (5.4)
Permanent pastures	4899 (0.8)	930 (0.2)	2968 (0.3)	23000 (2.7)	26000 (3.6)	28000 (3.5)
Miscellaneous tree crops & groves	7668 (1.2)	2619 (0.5)	34779 (3.1)	8000 (1.0)	21000 (2.9)	60000 (7.6)
Cultivable waste	3680 (0.6)	470 (0.1)	8898 (0.7)	23000 (2.7)	22000 (3.0)	29000 (3.7)
Other fallows	10224 (1.6)	4271 (0.7)	11722 (1.0)	20000 (2.39)	33000 (4.5)	18000 (2.3)
Current fallows	14706 (2.3)	56845 (9.7)	54977 (4.8)	11000 (1.3)	13000 (1.8)	15000 (1.9)
Net area sown	322057 (51.1)	307357 (52.6)	311163 (27.4)	360000 (43.1)	151000 (20.7))	287000 (36.3)

Figure A.2: Map of Koraput District in the provincial State of Orissa.

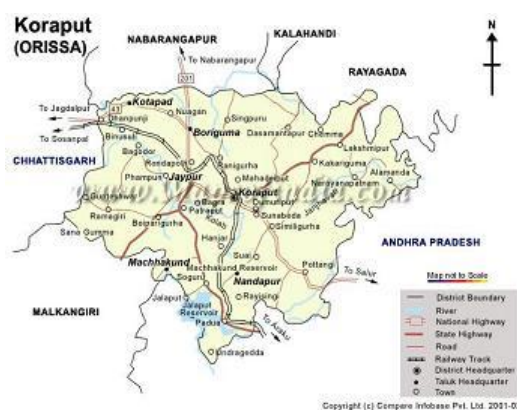


Figure A.3: Map of Rayagada district in the provincial State of Orissa.



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Figure A.4: Map of Kalahandi district in the State of Orissa.



Figure A.5: Map of Srikakulam district in the provincial State of Andhra Pradesh.

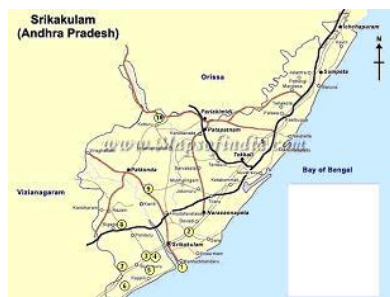


Figure A.6: Map of Vizianagaram district in the provincial State of Andhra Pradesh.



Figure A.7: Map of Visakhapatnam District in the provincial State of Andhra Pradesh.



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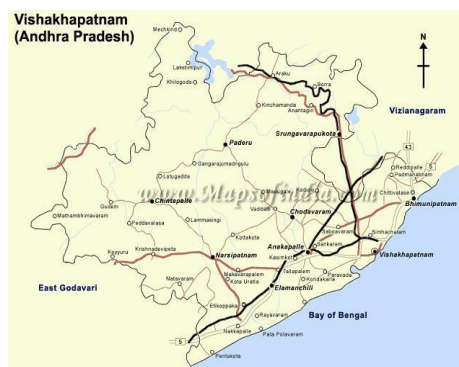
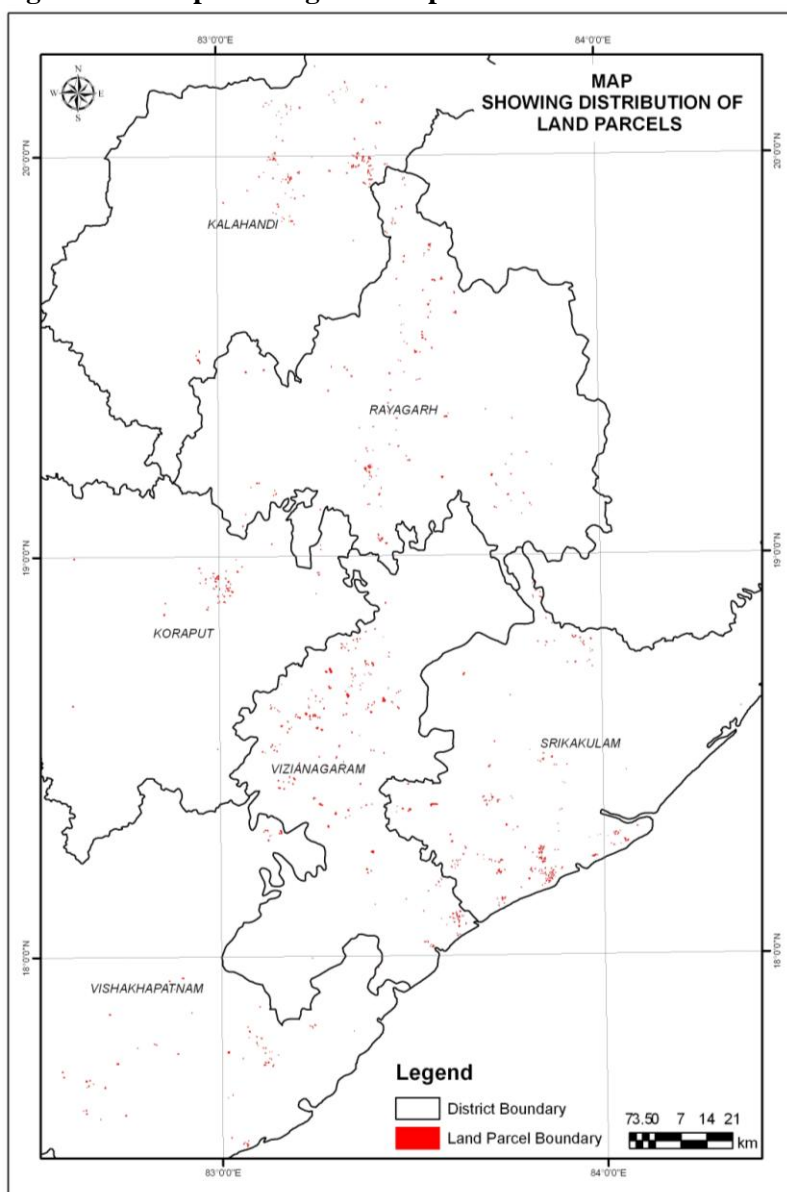


Figure A.8: Map showing all land parcels



**A.5. Technical description of the A/R CDM project activity:****A.5.1. Description of the present environmental conditions of the area planned for the proposed A/R CDM project activity, including a concise description of climate, hydrology, soils, ecosystems (including land use):**

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The area proposed for the project is degraded farmland in the districts of Rayagada, Kalahandi and Koraput in the State of Orissa; in the coastal districts of Srikakulam, Vizianagaram and Visakhapatnam in the State of Andhra Pradesh in India.

The lands are either not put to any use at present or being intermittently used for rainfed agriculture for cultivation of minor millets, cereals and pulses because of many barriers such as technological and financial.

Soils

The major soil types in the proposed project area consist of red sandy, lateritic and alluvial soils in Orissa and sandy loams and sandy soils in Andhra Pradesh. The soils represented are 'slightly acidic' to 'moderately alkaline'.

Climate

The four major seasons observed in the project area include: monsoon (June-September), post-monsoon (October-November), winter (December to February) and summer (March-May). The climate is wet during monsoon, moderate during winter and dry during summer. The minimum and maximum temperature of the project area is 13⁰C and 49⁰C, respectively. The annual rainfall ranges from 300 to 1400 mm. The predominant wind direction is southeast to west. The relative humidity ranges from 30% to 80%.

Geology and Hydro-geological aspects

The land is trespassed with hills and valleys. The rivers Nagavali and Vamsadhara pass through the project area. The drainage pattern is dendritic to sub-dendritic in nature.

The ground water fluctuates greatly in response to rainfall, with the maximum decline in the water table is between April and June and the maximum rise during November.

The detailed physical environmental profile of the project area is given in section 3.3 of the Environmental Management Framework of the project.

Ecosystem

The forest types represented in the districts of Koraput, Kalahandi and Rayagada of Orissa include: moist peninsular Sal forests (C3/C2, Champion & Seth Classification) and moist mixed deciduous forests (3C/C3). The major species of these forest types are - *Shorea robusta*, *Embllica officinalis*, *Butea frondosa*, *Mangifera indica*, *Tamarindus indica*, *Terminalia bellerica*, *Terminalia chebula*, *Artocarpus integrifolius*, *Diospyros melanoxylon*, etc.

The forests in Srikakulam, Vizianagaram and Visakhapatnam districts of Andhra Pradesh are of miscellaneous type with no dominant species. These forests represent the transition between the Teak belt of South India and the southern extremity of the Central Indian Sal belt. The common species grown in the region include: *Xylia xylocarpa*, *Pterocarpus marsupium*, *Adina cordifolia*, *Anogeissus latifolia*,



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Terminalia alata, T. arjuna, T. bellerica, Mitragyna parviflora, Ougenia dalbergeioidis, Kydia calycina, Mangifera indica, Diospyros melanoxylon, Buchnanania lanzan, Dalbergia latifolia, Gmelina arborea, Lannea coromandelica, Lagerstroemia spp. Dendrocalamus strictus, Bambusa arundinaceae etc.

A.5.2. Description of the presence, if any, of rare or endangered species and their habitats:

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The faunal species present in the forests in the six districts of Andhra Pradesh and Orissa where the project is located include Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Gaur (*Bibos gaurus*), Blackbuck (*Antelope cervicapra*), Sambar (*Cervus unicolor*), Chital (*Axis axis*), Barking Deer (*Muntiacus muntjak*), Indian Wild Boar (*Sus scrofa*), Pangolin (*Manis crassicaudata*), Jackal (*Canis aureus*), Jungle Cat (*Felis chaus*) etc.

There are no designated wildlife sanctuaries or national parks in the three project districts in Andhra Pradesh. However, Kambalakonda Wildlife Sanctuary exists within Visakhapatnam city. Karlapat wildlife sanctuary is located in Kalahandi district and Narayanpatna wildlife sanctuary is proposed to be set up in Rayagada district in Orissa.

The project is to be taken up only on private lands with clear legal title and any land that is reserved forest, protected forest or wildlife sanctuary or any other forest land is not part of the project activities as has also been stated in the Environment Management Framework (3.4). Section 3 of the Environment Management Framework presents the details of the flora and fauna of the project area in Andhra Pradesh and Orissa. Thus, endangered species are not found in the project area.

A.5.3. Species and varieties selected for the proposed A/R CDM project activity:

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The following tree species used in the project reflect the preferences of farmers and the suitability of species for the land use and agro-climatic conditions in the project area. The three categories of stand models covered in the project include: Eucalyptus Clone, Eucalyptus Seed Route & Casuarina.

Eucalyptus spp

Eucalyptus is a fast growing species and belongs to the Myrtaceae family. It reaches a maximum height of 75 ft. However, the average height ranges from 25 to 75 ft. It is evergreen hardy species, predominantly blooms in winter and tolerates cold weather. Considering the dry climate and frequent drought recurrences, this species is preferred in the project because of its high drought tolerance. It also grows under a wide range of climate and soil conditions and well adapted to the semi-arid conditions of the project area. Furthermore, JKPL has tailored some of the clonal Eucalyptus to better grow under such conditions.

The wood is used to meet the needs of small timber, fuelwood, construction and pulp production. The widely used species of Eucalyptus include: *E. grandis*, *E. camaldulensis*, and *E. tereticornis*.

Hybridization from *Eucalyptus tereticornis* & *E. camaldulensis* has taken place in the R&D areas of JKPL. Seeds collected from those hybrid plants developed in the R&D facilities are used for plantation activities.

As regards to Eucalyptus clone, coppice from the aforesaid hybrid plants are collected from the R&D areas and planted in the root trainer blocks with appropriate concentration of systematic fungicides & insecticides. Once the roots & shoots of the plants develop, the plants are transferred to hardening chambers where they are kept for 30 days. Subsequently, the hardened plants are moved to the open



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Nurseries from where they are transported to the planting sites. It is used as small timber, support poles in construction and in the production of pulp and paper production

Casuarina equisetifolia

Casuarina equisetifolia is an evergreen tree reaching a height of 18-22 m. It is monoecious or dioecious. About 2-3% of the species display monoecious characteristics. Males start to flower in the second year while females flower a year later. It is wind-pollinated species and the fruit is a woody cone with 1 to 2 cm in diameter. The cone contains 70-90 seeds and takes 3-4 months to mature. Seeds (achenes: 600 to 2000 seeds per g) are produced annually and have membranous wing and are dispersed through wind and water. Germination rate varies between 30 and 84%, but seeds are only viable for a few months. There are two main flowering and fruiting seasons although some fruits are produced all year round.

Adaptations of the species to dry climate include scale-like verticillate leaves and modified needle-like twigs for reducing transpiration through sunken stomata that occur in grooves, hairs, thickened cells and cuticle. It is a light demanding species that needs open sites for establishment, free from plant competition. It forms permanent stands in saline coastal environments and sand dunes.

It is salt tolerant but has low tolerance to frost and fire. It is adapted to grow on sand dunes and it develops stilt roots and prop roots in waterlogged areas. Cuttings and layerings from low spreading branches often propagate it. It is good as firewood and for charcoal making and is widely planted for amenity purposes, coastal reclamation, medicinal purposes, tannin, dyes, pulp and paper. It has been planted mainly in Andhra Pradesh for the project.

A.5.4. Technology to be employed by the proposed A/R CDM project activity:

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One of the main technologies employed in this project is reforestation through direct planting with environmental-friendly techniques on less productive and degraded lands. Good practice guidance and successful technologies adopted elsewhere, as well as experiences gained from the World Bank financed forestry projects have been adopted. World Bank environmental and social Safeguards will be followed.

Reforestation on the degraded agricultural lands and improvised methods of tree growing have been implemented based on the technical experience of JK Paper Limited (JKPL) working in association with the local farming community of resource poor farmers.

JK Paper Limited has embarked on a research & development programme to increase productivity of farm forestry. To fulfil the objectives of research and development programme, state of the art technology and infrastructure such as Greenhouses, Hardening Chambers, Nurseries and Laboratories have been developed. The Agro-Economic Research Centre (AERC) in southern Orissa is involved in disseminating modern agriculture practices to farmers, as is JKPL.

Site preparation

To prevent soil erosion, reduce GHG emissions and protect the existing carbon stocks, site burning and overall tillage is not carried out during the site preparation. The soil profile, pH and electric conductivity of soils in the region are studied. The land is prepared for planting by minimal site disturbance. For slopy areas ploughing is done across the slope to prevent erosion.

The pits ranging from 0.015 – 0.0283 m³ are dug along the contour and most of the original vegetation is kept intact. The site preparation is conducted in the winter season. The soil is treated with termiticides (in case of *Eucalyptus*). Insecticides are used for pest management, if necessary. An integrated pest



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management plan is incorporated in the Environment Management Framework developed for the project. Weeding operations are carried out manually. The plantations do not require any access roads, as they are located near villages.

Planting stock development and nursery technology

The planting stock used in the project has been developed from Candidate trees of Eucalyptus and Casuarina selected from stands (Eucalyptus - Araku valley, Visakhapatnam, Aguru in Rayagada district; Casuarina – selected stands in the districts of Vizianagaram and Visakhapatnam) located around the project area and from clonal material developed from mother plants that grow under similar conditions.

Clonal Eucalyptus: The clones of Eucalyptus are genetically superior, fast growing, grow uniformly and contribute to increased productivity (i.e. 2 to 3 times higher than normal seed route plantations). The clones also ensure improved productivity of coppice crops and compensates for low productivity of soils. The clones are produced following macro-propagation (mist propagation) technique. The method described by Hartmann and Kester (1989) in Plant propagation and the new Eucalyptus forests by Aracruz, Brazil outlined in Marcus Wallenberg Foundation (1984) is followed. The method consists of collecting coppice sprouts that are just beginning to harden and keeping them constantly moist while 2-leaf-pair cuttings are prepared and end-dipped in rooting hormone. The cuttings are placed under intermittent mist in individual containers. For successful clonal propagation JKPL has an R & D centre with 14 mist chambers covering an area of 3700 m², hardening area of 1200 m² and open nursery area of 10,000 m². The clonal technology with root trainers has contributed to the production of quality planting stock. The root development is better in root trainers than in Polypots as multiple roots seldom form in the root trainers and root coiling is also avoided. The out planting results are quite high thereby increasing survival and productivity. The quality parameters for saplings are developed and delivery of planting material is made after due quality inspection.

To sustain production of selected clones, JKPL has established mother orchards from which cuttings are prepared and are treated with fungicide solution (Bavistin) and growth hormone, IBA. The seedlings are transplanted in root trainer blocks containing vermiculite. These are then placed inside the state of art greenhouses where required conditions for conducive growth are created through automatic temperature and humidity control systems. After about 35-40 days when the shoots and roots emerge from the cuttings they are shifted to the acclimatization chamber and are kept for 10-15 days to harden and subsequently shifted to the sunlight with controlled irrigation for 2 months, during this period they attain a height of about 45 cm and are ready for planting in the fields.

Seed origin Eucalyptus: For Eucalyptus based on seed propagation, saplings are raised in decentralized nurseries across the districts in different locations for easy delivery of saplings to resource poor farmers. Generally, the nursery capacity ranges from 100,000 to 150,000 seedlings. In the nursery, genetically superior seeds from multiple sources such as Forest Research Institute (FRI) Dehradun, Western India Match Company (WIMCO) and Seed Production Areas (SPA) at Aguru, Jaykaypur in Orissa are used for planting stock production.

Casuarina seedling production: Casuarina saplings are also raised in decentralized nurseries in the coastal areas of Andhra Pradesh.

Planting Technique and spacing

Planting is done in pits of 30 X 30 X 30 cm. Bag plants are used after removing the polythene cover carefully, without disturbing the soil in the bag. To ensure good growth, weeds are removed manually



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three times a year during the first year. Survival is checked within three months time and mortality if any is replanted.

In seed route plantations (*Eucalyptus globulus*), the number of seedlings required per ha is 2,500 with spacing of 3 m x 1.33 m. The coppicing cycle of the species is 5/6 years and the expected fuel wood from the branches and bark per ha is about 10 tonnes.

Casuarina is propagated through seedlings. Spacing of 1 m x 1 m is maintained. The pits are filled with organic manure. About 1/3rd of the plant from the base is pruned during the 2nd year of plantation to stimulate growth and to avoid crowding.

Plantation management - Eucalyptus

The plantations are raised by resource poor farmers in rainfed conditions. The organizers enumerate the plantations every year during the months of January and February. A third party will carry a sample check to verify the authenticity of this Enumeration. The plantations are kept weed free by hand picking the weeds. Fire line tracing is done during the summer months all across the plots. The termite damage occurs in the initial stages of plantations, say in 2 to 4 months time. To control initial stage of termite attack Phorate is used and spray of Bavistin is done during initial stage of the Plantations to prevent fungal diseases. All above information is given in the package of practices. The plants are treated with Kodesa, a botanical pesticide derived from *Cleistanthus collinus* tree.

In order to impart the technical know-how of the clonal technology, the farmers are provided with training/awareness on clonal propagation, planting, and plantation management through by JK Field Staff who are well qualified in Forestry, Agriculture and allied Science and also supported by M/s Veda Climate Change Solutions Staff. Such programmes are conducted periodically to upgrade the knowledge of the beneficiaries.

Eucalyptus is managed with a 5-year rotation period. The plantations are felled and debarked manually. The cutting is normally done using a manual saw but in some places mechanised saws may be used. The branches and twigs are retained by farmer for firewood. The main stem is debarked and cut to smaller lengths for transporting by truck, tractors, tucks or carts depending upon the distance.

Coppicing: *Eucalyptus* spp. regenerates naturally by coppicing, thus avoiding site and soil disturbance. After harvesting, *Eucalyptus* will be regenerated through coppicing. As many shoots regenerate through natural means, only two or three strong shoots are allowed to grow by cutting the remaining shoots.

Plantation management – Casuarina

Casuarina is a large fast growing evergreen tree. It grows well in both southwest and northeast monsoon. and grows well in loose fine coastal sands. It is a good pulpwood species and its major uses are fuel wood, timber and some medicinal purposes.

Ploughing: The land is ploughed with traditional plough or mould board plough. Generally ploughing is done manually and in very few cases farmers adopt mechanical ploughs. In case of slopy land, terracing is done to avoid soil loss. The frequency of ploughing depends upon the looseness of the soil.



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Fertilization: A dose of super phosphate and muriate of potash at 8 kg per hectare is applied two months after the planting.

Pruning: In the 2nd year branches are pruned flush to the stem up to 1/3rd of the stem height. This will induce 1/3rd of height, growth and clean stems.

Harvesting: The Eucalyptus and Casuarina plantations are felled, debarked and loaded on to the truck manually and transported by tractors or trucks. The harvested sites will be kept intact for further regeneration for next coppice crop. Thus by using this technology the degraded /subsistence agriculture lands could be converted to carbon sinks over multiple rotations.

In order to impart the technical know-how felling & transportation, the farmers are provided with training/awareness on size & length of billets and relevant procedures by JK paper Mills Plantation Officers. Such programmes are conducted periodically to upgrade the knowledge of the beneficiaries. The company also maintains a robust management system supported by manuals and procedures by detailing the critical operations, training requirements and competency needs.

A.5.5. Transfer of technology/know-how, if applicable:

In order to impart the technical know-how of the clonal technology, the farmers are provided with training/awareness on clonal propagation, planting, and plantation management through by JK Field Staff who are well qualified in Forestry, Agriculture and allied Science and also supported by M/s Veda Climate Change Solutions Staff. Such programmes are conducted periodically to upgrade the knowledge of the beneficiaries.

A.5.6. Proposed measures to be implemented to minimize potential leakage:

There are three sources of leakage relevant to the proposed methodology (AR-AM0004 /Version-03) and they include:

- Carbon stock decreases caused by displacement of pre-project activities such as;
 - agricultural crops,
 - grazing and fuel-wood collection activities;
- Carbon stock decreases caused by the increased use of wood posts for fencing.

The leakage estimates from the displacement of agricultural crops is not an issue as there is hardly any agriculture practices on the lands that have been included within the project boundary. Leakage due to grazing is not considered as under the project, there will be increased production of fodder and as per the methodology it can be considered zero under conditions where the planned A/R CDM project activity produces more fodder, as is the case here. Leakage due to displacement of fuelwood collection and increased use of fence posts is also considered insignificant as it is less than 2% of the actual net GHG removals by sinks.¹ Further according to the guidance provided by EB44, the GHG emissions resulting from increased use of wood posts for fencing is considered to be insignificant and therefore excluded from calculations of leakage.

However, some leakage is expected from the project activity due to transportation of the wood from the project sites to the paper mill, which is the buyer of the wood. Awareness programmes are being

¹ http://cdm.unfccc.int/EB/022/eb22_repan15.pdf



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conducted for the participating farmers to minimize the use of fossil fuels which will result in the GHG emissions and they will be encouraged to use common transportation facilities, conventional transport such as bullock carts, use of biofuels etc to reduce the emission levels. It is expected that the above measures will minimize leakage and contribute to optimum utilization of the transportation requirements.

Kindly refer to section E.5.2., for more details.

A.6. Description of legal title to the land, current land tenure and rights to tCERs / ICERs issued for the proposed A/R CDM project activity:

>>

The land used for implementing the A/R CDM project activity is legally owned by local people and is private property. These lands are under the control of the project participants at the starting date of the AR CDM project activity and are expected to remain under the control of the project participants during the crediting period.

The land use prior to project activity is of subsistence agriculture. The farmers own wood and non-wood products produced on the land and therefore, the farmers have legal right to harvest and sell the wood products as well as the revenue generated from the sale of emission reductions.

An institutional mechanism “VEDA Climate Change Solutions Limited (VCCSL)” has been established to specifically deal with issues related to carbon revenue. Farmers’ agreements have been signed among VCCSL, JKPL and the farmers, as an addendum to JKPL’s timber purchase template, which lists the responsibilities of each partner clearly. Copies of the agreements made with the farmers who have already enrolled into the project activity will be presented at the time of validation.

The wood will be sold by the farmers at the highest price to the paper mills where appropriate and the resultant income from the sale of timber would entirely be transferred to the local farmers.

A.7. Assessment of the eligibility of the land:

>>

The land is below the forest national thresholds (crown cover, tree height and minimum land area) for forest definition under decisions 11/CP.7 and 19/CP.9 as communicated by the respective DNA;

The Government of India (Host Country) defines ‘forest’² as land having growing trees with:

- A minimum surface area of 500 m²;
- A minimum tree crown cover of 15%;
- A minimum height of 2 meters;

The reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December, 1989.

The lands to be planted in the proposed A/R CDM project activity are private lands, which are under subsistence agriculture. Although small parcels of land currently have multiple use species, no plot has (or has had since 1990) a contiguous area of 1 ha with a crown cover of greater than 15% and tree height of 2 m. Therefore the lands of the proposed A/R CDM project activity comply with the definition of afforestation/reforestation as per decision 11/CP.7.

² http://cdm.unfccc.int/DNA/cdf/files/2008/0707_india.pdf



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The land is not temporarily unstocked as a result of human intervention such as harvesting or natural causes or is not covered by young natural stands or plantations which have yet to reach a crown density or tree height in accordance with national thresholds and which have the potential to revert to forest without human intervention.

The AR eligibility tool Version 01, “Procedures to demonstrate the eligibility of lands for Afforestation and Reforestation CDM project activities”³ approved by the CDM Executive Board is used to assess land eligibility.

The land eligibility for CDM is assessed through participatory rural appraisal (PRA). The PRA exercise is undertaken with community participation. The followed, formats used, and the findings of the appraisal are enclosed as Annexure 8. Evidence based on land records and PRA suggest that the project lands are eligible as per the CDM land eligibility rules. CDM eligibility has also been established through a satellite CDM land eligibility analysis carried out by “SCIENCE” an organization based in Dehradun, Uttar Pradesh, India, and validated by FSI (Forest Survey of India).

Moderate resolution remote sensing images will not be able to pick up plantations done in scattered smallholdings. Medium resolution satellite datasets due to their pixel range of around 30 m would be able to map patches only greater than 2.25 ha. Further, the site quality selected may also be of marginal grade and may not allow full expression of the stock sometime which will also limit the contrast required to identify the plantation patches in space-based remote sensing.

However, very high to high resolution images ranging from sub meter to few meter resolutions can pick up patches, which however have to be procured where information requirement justifies volume of investment. Any further investment in getting the remote sensing data for plots less than 2 ha would adversely affect the share of revenue to the farmers since it would increase the project development costs. Revenue records are the source of evidence for proving the eligibility of lands less than 2 ha and parcels of land smaller than 0.05 ha have been excluded from the project.

- a) Eligibility of plots smaller than 2ha was assessed using revenue records. The revenue records categorically state the status of land for a given time period and these records are available for all parcels <2ha. The information from PRA is combined with the information on the land use from revenue records to demonstrate that there was no forest between December 1989 and the project start date. Attachment 1a provides examples of information based on revenue records. If needed, records for all parcels <2ha could be provided for verification. The information covered by the PRA has also been presented earlier. Therefore, evidence from PRA and revenue records is in compliance with the AR eligibility tool Version 01, “Procedures to demonstrate the eligibility of lands for Afforestation and Reforestation CDM project activities” in demonstrating the absence of forest between December 1989 and the project.
- b) All parcels less than 0.05 ha, not conferring to forest definition have been eliminated and the project area is 1607.7 ha.

³ http://cdm.unfccc.int/Reference/Procedures/methAR_proc03.pdf

**A.8. Approach for addressing non-permanence:**

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The project is conceived and designed in such a way that harvesting of the plantations would be done at a rotation of five years and those areas would be regenerated in the succeeding year to allow for a smoothing of the net anthropogenic GHG removals by sinks curve. The net anthropogenic GHG removals by sinks from the project are assessed using tCERs.

The planting activity has been completed during the period 2004 to 2007. The rotation age of trees planted in the project is 5 years for Eucalyptus and 4 years for Casuarina. Coincidence with peaks in carbon stocks is not an issue as the net GHG removals by sinks is based on the inventory data of plantations within the project area and they reflect average volume of standing timber on the farmer land parcels. The data also reflects individual farmer circumstances under which thinning and harvesting are proposed and implemented.

Farmers have different time preferences for thinning and harvesting and these are spread over the crediting period. The thinning and harvesting are taken into account in the calculations of cumulative GHG removals by sinks. The TARAM calculations also reflect the information on thinning and harvesting in the calculations of cumulative GHG removals by sinks. Therefore, the management practices of farmers do not allow the peaks of carbon stocks to coincide with verification schedules.

A.9. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:

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Table A.4: Estimation of net anthropogenic GHG removals by sinks in tonnes of CO₂-e



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Year	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of actual net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO ₂ e)
2004	-	237	-	237
2005	-	7,589	-	7,589
2006	-	30,081	-	30,081
2007	-	77,366	-	77,366
2008	-	150,141	-	150,141
2009	-	184,921	-	184,921
2010	-	202,956	-	202,956
2011	-	175,011	-	175,011
2012	-	90,789	-	90,789
2013	-	146,888	-	146,888
2014	-	185,467	-	185,467
2015	-	192,240	-	192,240
2016	-	188,435	-	188,435
2017	-	87,536	-	87,536
2018	-	147,434	-	147,434
2019	-	174,751	-	174,751
2020	-	205,663	-	205,663
2021	-	185,181	-	185,181
2022	-	88,082	-	88,082
2023	-	136,718	-	136,718
2024	-	188,174	-	188,174
2025	-	202,410	-	202,410
2026	-	185,727	-	185,727
2027	-	77,366	-	77,366
2028	-	150,141	-	150,141
2029	-	184,921	-	184,921
2030	-	202,956	-	202,956
2031	-	175,011	-	175,011
2032	-	90,789	-	90,789
2033	-	146,888	-	146,888
TOTAL				146,888

A.10. Public funding of the proposed A/R CDM project activity:

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No public funds or official development assistance is associated with this project activity.

SECTION B. Duration of the project activity / crediting period
B.1 Starting date of the proposed A/R CDM project activity and of the crediting period:

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25/06/2004

B. 2. Expected operational lifetime of the proposed A/R CDM project activity:

>>

30 years

**B.3 Choice of crediting period:****B.3.1. Length of the renewable crediting period (in years and months), if selected:**

>>

Not Applicable

B.3.2. Length of the fixed crediting period (in years and months), if selected:

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30 years and 00 months

SECTION C. Application of an approved baseline and monitoring methodology**C.1. Title and reference of the approved baseline and monitoring methodology applied to the proposed A/R CDM project activity:**

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Approved afforestation and reforestation methodology AR-AM0004 /Version-03 named “**Reforestation or Afforestation of Land Currently under Agricultural Use**” is applied to the proposed A/R CDM project activity.

C.2. Assessment of the applicability of the selected approved methodology to the proposed A/R CDM project activity and justification of the choice of the methodology:

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The proposed A/R CDM project activity and its context meet the conditions of the approved methodology (**AR-AM0004**) outlined below.

- The lands to be afforested /reforested are highly degraded and are subjected to further degradation or will remain low in a carbon steady state in absence of the present project activity which proposes to undertake agro-forestry plantation in these degraded lands
- The project activity can lead to a shift of pre-project activities outside the project boundary, e.g. a displacement of agriculture, grazing and/or fuel-wood collection activities

The prevailing conditions of the A/R project activity confirm to the following applicability conditions of the methodology.

- Lands to be afforested or reforested are degraded and the lands are still degrading or remain in a low carbon steady state
 - This is indicated by no tree biomass and nil or highly insignificant non-tree biomass (refer to baseline information in Annex 3). Also the remote sensing imageries of two time periods clearly demonstrate the degraded condition of lands considered for A/R CDM in the past as well as now⁴.
- Site preparation does not cause significant longer-term net decreases of soil carbon stocks or increases of non-CO₂ emissions from soil;
 - On most land parcels, farmers practice selective site preparation for planting. In situations where plough is used, the small farmers mostly use traditional plough that is used to suppress weeds within the rows of proposed planting area. Such disturbance does

⁴ DARE/ICAR ANNUAL REPORT 2006–2007 (<http://www.icar.org.in/en/node/340>)



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not significantly disturb the soil. Therefore, there is no significant influence of plough that could increase GHG emissions

- Carbon stocks in soil organic carbon, litter and dead wood can be expected to further decrease due to soil erosion and human intervention or increase less in the absence of the project activity, relative to the project scenario
 - Given that the lands are under subsistence agriculture or short-term fallow lands, the stocks of soil organic carbon are expected to decrease with no project activity and there is no scope for litter and dead wood carbon accumulation due to absence of tree vegetation.
- Flooding irrigation is not permitted

The lands considered for A/R CDM project activity is dry land, completely rainfed and the ground water in the region fluctuates greatly in response to rainfall, with the maximum decline in the water table is between April and June and the maximum rise during November. Given this situation, practice of flooding irrigation is not feasible.
- Soil drainage and disturbance are insignificant, so that non CO₂-greenhouse gas emissions from these types of activities can be neglected;
 - Physical features of lands considered for the project indicate the absence of the problem of drainage
 - Irrigation practice will not be adopted but will be rainfed. Thus, the issue of drainage is not relevant.
- The amount of nitrogen-fixing species (NFS) used in the A/R CDM project activity is not significant, so that greenhouse gas emissions from denitrification can be neglected in the estimation of actual net greenhouse gas removals by sinks.
 - As per paragraph 37 of EB 44, N₂O emissions from nitrogenous species are insignificant and need not be considered for the calculation of GHG removals by sinks of A/R CDM project activity.
- The A/R CDM project activity is implemented on land where there are no other on-going or planned A/R activities (no afforestation/reforestation in the baseline).
 - No other afforestation and reforestation activities implemented either by the government or private agencies are currently ongoing or expected to occur in the foreseeable future. Therefore, this project activity is not affected by other afforestation and reforestation initiatives. The present national and sectoral policies prevalent in the project area do not provide any financial or other incentives to the private landowners for restoring the degraded land. Considering the rate of afforestation/reforestation in the project area in the past, and the continued non availability of financial resources, it can be safely assumed that the historic afforestation/reforestation trend will continue in the absence of the project activity. Further, the National Afforestation Programme (NAP) of the Federal Ministry of Environment and Forests and the Coastal Afforestation Programme of the State Governments of Andhra Pradesh and Orissa implemented with the support from external agencies address only the government lands and do not cover the private lands. In the absence of governmental support and financial incentives, the lands area allowed to be degraded.

C.3. Assessment of the selected carbon pools and emission sources of the approved methodology to the proposed CDM project activity:

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The carbon pools selected for monitoring under the project are noted in the Table C.1 below.



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Table C.1: Selected carbon pools

Carbon Pools	Selected(Yes/No)	Justification/Explanation
Above ground	Yes	Major carbon pool subjected to project activity
Below ground	Yes	Major carbon pool subjected to project activity
Dead wood	No	Conservative approach under project activity
Litter	No	Conservative approach under project activity
Soil organic carbon	No	Conservative approach under project activity

The sources of emissions from the project activity are noted in the Table C.2 below.

Table C.2: Sources of GHG emissions

Source	Gas	Included/ excluded	Justification / Explanation
Combustion of fossil fuels used for vehicles	CO ₂	Yes	Potential significant emission source due to transportation
	CH ₄	No	Potential emission is negligibly small as per the methodology applied
	N ₂ O	No	Potential emission is negligibly small as per the methodology applied
Burning of biomass	CO ₂	No	Not applicable
	CH ₄	Yes	Emissions are not expected to occur as biomass burning activity is not practiced as part of site preparation in the project. In cases of natural fire, these emissions will be monitored and accounted, however this is expected to be negligible
	N ₂ O	Yes	Emissions are not expected to occur as biomass burning activity is not practiced as part of site preparation in the project. In cases of natural fire, these emissions will be monitored and accounted, however this is expected to be negligible

C.4. Description of strata identified using the <i>ex ante</i> stratification:

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The steps of stratification outlined in the methodology and the relevant data sources are used for defining the project strata.

As per the guidance of the step 1 of the methodology, conditions prior to implementation of the project are considered; these include the information on soil, climate, vegetation, cropping systems, and status with regard to displacement of activities outside the project boundary. As per step 2, project-specific data on proposed stand models and associated information is considered in defining the strata. Project stratification is conducted taking into account the pre-existing conditions reflecting the baseline as well as data pertaining to the project stand models.

Data sources: Data used for stratification is based on field visits, official data on land use, and survey data collected from farmers to reflect the factors influencing the project land parcels.



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Step 1: Stratification of the project area is as per the pre-existing conditions.

(a) The factors such as land use, pre-existing vegetation, soil, and climate that influence land use and evolution of carbon stocks are taken into account.

(b) Information on the above physical variables (soil characteristics, slope, rainfall etc.) is collected from revenue records, soil maps and information on land eligibility on large parcels was assessed using remote sensing images.

(c) Information pertaining to livestock in the period prior to the project indicated that the lands were not used for livestock grazing in the pre-project period as the lands were under subsistence agriculture.

(d) The land use prior to the project in terms of the crops cultivated by the farmers was collected and to assess the land use pattern

(e) The information on pre-existing vegetation, land use pattern, soil type, and geographic, site characteristics was utilized to conduct preliminary stratification. This resulted in identification of:

- Two preliminary strata corresponding to the three districts each in the states of Orissa and Andhra Pradesh have been identified to represent distinct soil and agro-climatic conditions.
 - o (1) districts of Andhra Pradesh (that include Srikakulam, Vizianagaram and Visakhapatnam);
 - o (2) districts of Orissa (that include Koraput, Kalahandi and Rayagada)
- For example, the districts of Andhra Pradesh represent sandy soils whereas districts of Orissa represent Red and laterite soil types.

(f) The supplemental information from the assessments indicated the above ground vegetation; including the herbaceous vegetation on the lands is significant as the lands have been in use for subsistence agriculture for a long period. Information collected on the prior to land parcels. As the lands have been in agricultural use for a long period, deforestation issues are not relevant for the project area. The supplemental information on soil, vegetation characteristics, livestock information and prior land use and potential land use in the absence of the project was considered.

(g) The final stratification of the baseline scenario based on preliminary assessments and supplemental information indicated that the two strata identified taking into account the the relevant land use information including agro-climatic conditions and pre-existing vegetation of the clusters of districts in Orissa and Andhra Pradesh are distinct. Thus, there are 2 strata – Orissa and Andhra Pradesh states (each comprising of three districts each) based on pre-existing conditions of the site.

(h) As the agroclimatic and land use characteristics within in each stratum are similar, the land parcels in the districts are assigned to the respective stratum covering the district.

Step 2 Stratification of the project area.

(a) The stratification of the project area is based on the stand models adapted to the baseline strata.

(1) In the project, the first stage of project stratification covers three reforestation models identified for implementation include; Eucalyptus clone, Eucalyptus seed-based, and Casuarina.. Planting of the stand models is done in a phased manner over a period of four years (Table C.4.1 and Attachment 12) involving the three reforestation models.

(2) Growth information on stand models - The growth information of species included in the stand models is collected and growth most relevant to the context of the project area considered in defining the stand models.

(3) Management practices of the reforestation models

(i) Seedling production



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Clonal Eucalyptus Production: The clones of Eucalyptus are produced following macro-propagation (mist propagation) technique. The Clonal Technology with Root Trainers has given considerable improvement in the production of quality planting stock. The root development is better in Root Trainers than in Polypots as multiple roots seldom form in the Root Trainers and root coiling is totally avoided. The out planting results were quite high thereby increasing survival and productivity.

Seed Origin Eucalyptus Production: For Eucalyptus seed origin saplings decentralized Nurseries are raised across the districts in different locations for easy delivery of saplings to resource poor Farmers. Generally the Nursery Capacity is about 1.00 Lakh to 1.50 lakh depending upon the number of Farmers interested for Plantations during the Survey. In the Nursery relatively genetically superior seeds are used for planting stock production which are procured / collected from various sources like Forest Research Institute (FRI) Dehradun, WIMCO and own Seed Production Area (SPA) at Aguru, Jaykaypur.

Casuarina Seedling Production: Casuarinas saplings are also raised in decentralized nurseries in the coastal areas of Andhra Pradesh.

(ii) Site preparation

The soil profile, pH and electric conductivity of soils in the region and studied. The land is prepared for planting by removing small grasses and weeds. For slopy areas ploughing is done across the slope to prevent erosion.

(iii) Planting technique

The planting is done by digging pits of 30 x 30 x 30 cm on the ground by using a crow bar. Alignment is done with 3 x 2 m spacing. To ensure good growth and survival weeds are removed manually three times a year in the first year. Further, survival is checked within three months time and mortality if any is replanted.

(iv) Management of stand models

The plantations are raised by resource poor farmers in rainfed conditions. The beneficiaries are selected by Veda Climate Change Solutions Limited and advised to protect the plantations especially in the initial months from cattle damage. Veda supervisors & JKPL Field Officers (village organizers) will periodically visit the plantation and carryout extension services advising the farmers on maintenance of plantations. The organizers enumerate the plantations every year during the months of January and February. A third party will carry a sample check to verify the authenticity of this Enumeration. The plantations are kept weed free by hand picking the weeds. Fire line tracing is done during the summer months all across the plots. The termite damage occurs in the initial stages of plantations, say in 2 to 4 months time. To control initial stage of termite attack Phorate is used and spray of Bavistin is done during initial stage of the Plantations to prevent fungal diseases. All above information is given in the package of practices. The plants are treated with Kodesa, a botanical pesticide derived from *Cleistanthus collinus* tree.

In order to impart the technical know-how of the clonal technology, the farmers are provided with training/awareness on clonal propagation, planting, and plantation management through by JK Field Staff who are well qualified in Forestry, Agriculture and allied Science and also supported by M/s Veda Climate Change Solutions Staff. Such programmes are conducted periodically to upgrade the knowledge of the beneficiaries.



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Fertilization: A dose of super phosphate and muriate of potash at 8 Kgs. each per hectare is applied two months after the planting.

Pruning: In the 2nd year branches are pruned flush to the stem up to 1/3rd of the stem height. This will induce 1/3rd of height, growth and clean stems.

Harvesting: The plantation maturity for Eucalyptus pulpwood is at 5 years. The plantations will be felled, debarked and loaded on to the truck manually. The wood felled is transported by tractors or trucks. The harvested sites will be kept intact for further regeneration for next coppice crop. Thus by using this technology the degraded /subsistence agriculture land could be converted to carbon sink.

(b) The information on the establishment of each stand model considered as part of the stratification included:

(1) *Planting schedule* - The planting schedule of the stand models is considered as part of the stratification. The details of planting schedule of the stand models, by year is presented in Table C.4.1

(2) *Area planted under the stand models* - The area planted under the stand models is outlined in Table C.4.1. Based on the area planted under the stand models in each of the two baseline strata, a total of five project strata are identified

(3) Geographical location of stand models.

The geographic location of the stand models is recorded based on the GPS coordinates of the land parcels

(c) The project stratification reflects the distinct strata based on stand models whose growth characteristics differ significantly from each other and are expected to reflect in the actual net greenhouse gas removals by sinks. Considering the homogeneity of the stand models, management variables such as replanting, thinning and pruning, and harvesting are not considered for stratification.

Step 3: Final ex ante stratification

(a) A total of five project strata are identified taking into account three stand models implemented in the project. The project strata are geographically delineated and the following final *ex-ante* stratification is adopted based on a combination of pre-existing conditions and reforestation models (Table C.4.1).

Each stratum can be distinctly identifiable as per the details presented in Step 2. The consistency of the area of strata is ensured through field checks of GPS coordinates.

(b) The information on the stand models is organized in the geographic information system to ensure consistency in the baseline and project strata and to serve as a basis for *ex post* stratification.

The final *ex-ante* A/R stratification of the project covering the 5 strata are presented below and their planting schedule by year and area under each stratum is presented in Table C.4.1. All the land parcels under this project are categorized according to the following unique codes, as per the 5 strata. (Attachment 14)

- i. AP – Eu (clonal) [AEC]
- ii. AP – Eu (seed) [AES]
- iii. AP – Casuarina [ACA]



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- iv. Orissa – Eu (clonal) [OEC]
- v. Orissa – Eu (seed) [OES]

Table C4.1: Year-wise area planted in the project strata in ha

Year of plantation	Districts of Andhra Pradesh			Districts of Orissa		Total
	AEC	AES	ACA	OEC	OES	
2004	17.31	9.25	49.12	76.84	27.73	180.25
2005	130.95	7.57	108.71	72.45	29.31	348.99
2006	210.44	8.46	95.11	32.09	40.76	386.86
2007	227.14	26.64	129.07	198.81	109.96	691.62
TOTAL	585.84	51.92	382.01	380.19	207.76	1607.7

C.5. Identification of the baseline scenario:

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C.5.1. Description of the application of the procedure to identify the most plausible baseline scenario (separately for each stratum defined in C.4.):

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The most plausible baseline scenario has been determined following “Procedure for selection of most plausible baseline scenario”, as outlined in AR AM0004 methodology.

Step 1: Demonstration that the proposed AR CDM project activity meets the conditions under which the methodology is applicable and that baseline approach 22(a) can be used.

The lands under the project are all discrete parcels owned by individual farmers. Dry land agriculture has been practiced on these lands for a long period. The subsistence agriculture on laterite and sandy soils in semi-arid climate with short rainy and prolonged dry seasons contributed to steep decline in the productivity of lands. These lands are expected to remain under subsistence agriculture or as fallow lands in the absence of the project. Considering the use of lands for agriculture, the pre-existing vegetation is also either absent or insignificant. As a consequence, the lands are expected to degrade further in the absence of the project. Therefore, baseline approach 22(a) is relevant to the project context. The project activity also complies with all the relevant applicability conditions of the methodology

Step 2: Description of the project boundary:

The project boundary includes all-discrete parcels of lands owned by different farmers in the districts and blocks/mandals (an administrative unit within a district). Each of these parcels of land is identified through GPS coordinates. The summary list of land parcels is presented in **Annexure 5**.

GPS coordinates are the centre point of the land parcels as against the boundary coordinates, which are normally taken. The actual dimensions of the land parcels are indicated by physical measurements. This is done considering land parcels are small and the accuracy of GPS metres can vary up to 50m.

In addition, the project boundary of each individual parcel of land will further be identified by the official land documents of Land Administration/ Revenue Departments.

Step 3: Analyze the historical land use, local and sectoral land use policies or regulations and land use alternatives:



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a) Assessment of the historical and existing land use/cover changes in context of socio economic conditions.

The project lands have very low productivity and the resource poor farmers are not in a position to improve land productivity in the foreseeable future. As a consequence, the lands are expected to remain in the pre-project state. Furthermore, the field surveys indicate that there is no possibility of natural encroachment of trees because there are no seed sources that can disperse on to the project sites. This is also supported by the fact that the lands to be reforested have been non-forested lands at least since 1989 and no natural growth of trees has been identified. .

b) Assessment of the historical and existing land use/cover changes.

Currently, most sites are under subsistence agriculture or left fallow over the time. This has resulted in the following:

The lands in the proposed project activity are either under subsistence agriculture or fallow lands. The agriculture activity undertaken on these lands is mainly in the form of short duration millet crops. In case of fallow lands, other anthropogenic pressures for fuel wood, grazing etc. do not allow natural regeneration.

c) Assessment of the national and/or sectoral policies

The recorded forest area in the country is 76.5 million hectares and about 64 million hectares have tree cover and 25.5 million ha of this area is degraded. It requires that forest/tree cover needs to be developed over another 41 million ha area outside the forests to achieve the goal of having one third area under forest and tree cover i.e. 109 million ha area as per the National Forest Policy.

The Policy has been revised over the years to evolve new strategy for forest conservation and management and a National Forestry Action Programme has been formulated to achieve the enunciated goal. However, the programme is not matched with the financial resources required for its implementation. Further, the Policy and the Action Plan addresses only the government lands. There is neither a programme to promote afforestation/reforestation on the privately owned lands nor any financial incentives to encourage reforestation on these lands. Hence, without the proposed A/R CDM project activity, the project area may not be restored through afforestation/reforestation.

Additional investments from both public and private sectors are required to make progress on the goals set in the National Forestry Action Plan to increase the forest cover. Considering the small size of holdings and resource poor status of farmers, the desired increase in tree cover on agricultural lands is not expected to take place in the prevailing policy environment. The National Forest Policy and the National Forestry Action Programme can be downloaded at: <http://envfor.nic.in/nfap/> or <http://www.envfor.nic.in/divisions/fp/nfp.pdf>

The Joint Forest Management (JFM) programme is a government program implemented only on degraded forest lands owned by the Government. The program allows partnerships between forest department and local communities. The JFM programme essentially deals with degraded forest lands on the fringes of natural forests. The present A/R CDM project is to be implemented on private lands, land under subsistence agriculture or short-term fallow agricultural lands and therefore beyond the purview of the Joint Forest Management programme. Further information can be accessed at: <http://www.iifm.ac.in/databank/jfm/jfmccl.html>

The information presented in the steps 1-3 clearly demonstrate the applicability of the baseline approach 22(a) (existing or historical changes in carbon stocks in the carbon pools with the project boundary) and

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the scenario “lands to be planted are degraded lands and will continue to degrade in absence of the project” is the most plausible baseline scenario.

d) Land use alternatives.

The field surveys, interviews with stakeholders and socio-economic analysis indicated that the plausible alternative land uses available to the project participants are either continuation of the subsistence agriculture or keeping it fallow for want of resources. For the lands under category (a), lands to be forested have been severely degrading over the last decades and are degrading. Most lands are currently covered by sparse grass and shrubs, and occasionally with a few growing trees.

The land use alternatives identified are as follows.

1. Abandonment of agriculture on the lands: As agriculture continues to remain a major source of livelihood, the lands are likely to remain under agricultural use. Additionally, average size of agricultural holding continues to decline because of population pressure. Therefore, the lands are not likely to be abandoned from agricultural use.
2. Continuation of the prevailing practice of subsistence agriculture: Resource-poor farmers own the lands and these lands have been degrading because of insufficient resources. The project areas would remain either under subsistence agriculture and continue to degrade in the absence of the project activity.
3. Implementing the reforestation activity not as a CDM project activity: Reforestation as a non-CDM activity could be implemented either by individual farmers or by JKPL, however these alternatives are unlikely because of the following reasons:
 - (i) *Reforestation to be undertaken by JKPL on purchased or leased farmlands not as a CDM project for meeting its raw material supplies:* This alternative is unlikely to be realized as JKPL’s demand could be met from purchases of wood from market without incurring transaction costs of organizing procurement for wood. Therefore, this alternative cannot be expected to be realised in the foreseeable future.
 - (ii) *Individual farmers implementing reforestation:* The farmers in the project area are poor and own small land parcels. They do not have required resources to invest in tree plantations and manage them while forgoing the small but regular annual revenue from subsistence agriculture. Considering the absence of mandatory land use policies or incentives, the reforestation is not likely to be implemented.

Table C.5.1: Alternatives and reason for adoption/rejection of the course of action

S.No.	Alternatives	Baseline scenario	Reason for adoption/rejection of the course of action
1	Abandonment of agricultural land	No	Considering the population pressure on land resources, abandonment of agricultural lands is not expected
2	Continuation of subsistence agriculture	Yes	Subsistence agriculture is a rainfed activity, which provides low returns and restricts the farmers from taking up other activities to gain better livelihood.
3.	Implementing the reforestation activity not as a CDM project activity	No	<i>Reforestation activity of JKPL as non-CDM activity for raw material supplies on lands purchased or leased from farmers:</i> JKPL can undertake reforestation activities on agricultural lands that are purchased or leased from farmers. However, it does not have plans to do so as JKPL’s wood



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			<p>demand could be met from the purchases of wood directly from market.</p> <p><i>Reforestation activity as non-CDM activity on small and marginal farmer holdings:</i> The reforestation cannot be implemented as non-CDM activity taking into account the barriers of investment and delay in revenue stream from tree growing, technologies that need to be disseminated and costs required in organizing small and marginal farmers, developing supporting institutions and knowledge sharing on the environmental benefits of tree growing.</p> <p>Without CDM revenue, reforestation is not feasible on small and marginal farms.</p>
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(e) *Assessment of continued relevance of pre-project land use:* As noted in the above (a) and (b) of step 3, considering the low productivity of the lands in the region, and lack of resources and capacity of the farmers, the pre-project land use of subsistence farming is expected to continue in the foreseeable future taking into account the prevailing productivity of land. As a consequence, the land-use/land-cover of the pre-project scenario can only support subsistence agriculture or fallows considering that all other land use alternatives are subject to one more barriers as outlined in the sub-steps above.

Step 4: Stratify the A/R CDM project area.

The details on the stratification of the project area are presented in Section C.4.

Step 5: Determine the baseline land use / land cover scenario for each stratum

Based on field surveys, it has been established that there is no possibility of forest establishment as land parcels are either used for subsistence agriculture and there is no woody vegetation with seed sources that could naturally regenerate on land parcels. In the absence of any intervention, there is no potential for forest establishment in the near future.

Therefore, the land parcels in the districts of Andhra Pradesh and Orissa are expected to remain, as short-term fallow lands or will be used for subsistence agriculture.

C.5.2. Description of the identified <u>baseline scenario</u> (separately for each stratum defined in Section C.4.):

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The lands to be planted in the proposed A/R CDM project activity are severely degraded and comprise low-productivity lands that are under subsistence agriculture. The project is spread over six districts, with three districts in the state of Orissa and three districts in the state of Andhra Pradesh. The **two clusters of districts** – Koraput, Kalahandi and Rayagada in Orissa; and Srikakulam, Vizianagaram and Visakhapatnam in Andhra Pradesh were initially categorized into two baseline strata taking into account the preliminary observations of land use and pre-existing vegetation.

C.6. Assessment and demonstration of additionality:
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The steps outlined in the *Tool for the Demonstration and Assessment of Additionality in A/R CDM Project Activities (Version 2)*⁵ is followed to demonstrate the additionality of the project activity.

STEP 0: Preliminary screening based on the starting date of the project activity

The project was formally initiated in 2004, through the submission of a Project Idea Note by VEDA MACS to the World Bank's Carbon Finance team and therefore it qualifies as an early start project. The CDM was actively considered in the design of the project. The additional revenue from sale of Certified Emission Reductions was considered essential for VEDA MACS to mobilize resource poor farmers and the private sector.

STEP 1: Identification of alternatives to the project activity consistent with current laws and regulations

The lands to be reforested in the project boundary are under subsistence agriculture. These lands have low levels of productivity. Observations of region's land-use through field surveys and interviews with stakeholders resulted in identifying the following land use alternatives:

- Abandonment of agriculture on the lands
- Continuation of the prevailing practice of subsistence agriculture
- Implementing the reforestation activity not as a CDM project activity

(a) Abandonment of agriculture on the lands

The 1607.7 ha project land is owned by 1590 farmers and is likely to remain under subsistence agricultural use. The average size of agricultural holding continues to decline because of population pressure. Therefore, the lands are not likely to be abandoned from agricultural use.

(b) Continuation of the prevailing practice of subsistence agriculture

The project lands continue to be used for subsistence agriculture. These include growing of millets and other dry land crops. Subsistence agriculture is also a rainfed activity, hence it translates into low returns and restricts already resource constrained farmers from taking up other activities to gain better livelihoods as they have to devote full time on agriculture to earn subsistence living and lack investment needed for other land use alternatives.

(c) Implementing the reforestation activity not as a CDM project activity

- (i) By VEDA MACS: From the earliest communication submitted by VEDA MACS, it is clear that this project was conceived explicitly for the benefit of the participating farmers and only with expectation of CER revenue. VEDA MACS was not expected to derive any income from this project activity, only reimbursement of costs before passing on the majority (80%) of the CER benefit to the farmers.
- (ii) By JKPL: JKPL got involved into this project, as a corporate partner, to collaborate with VEDA MACS to provide technological know-how, plant material and the essential market linkage for the farmers⁶. While JKPL does work with farmers, those are mostly larger land-holdings, whereas

⁵ <http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-01-v2.pdf>

⁶ Article by JKPL in Indian Pulp and Paper Technical Association (IPPTA) Journal, Vol 20, No. 1, Jan-Mar 2008 (Attachment 26)



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for this CDM project JKPL staff were specifically instructed, (please refer to chronology below) to identify beneficiaries who were small/marginal farmers (as per definition provided by the World Bank) or from indigenous communities, with a emphasis on identifying women beneficiaries. As demand for raw material can easily be met from purchases of wood from market sources, this alternative, specifically the planned inclusion of the intended category of beneficiaries is not expected to be realized as a baseline scenario.

- (iii) *By individual farmers:* The small land holding size and high demographic pressure on available land resources requires ways to diversify the sources of farm incomes to address poverty and enhance the livelihood opportunities. Implementation of tree growing activities on farms is one of the ways to enhance household incomes of small and marginal farmers. However, this option faces multiple barriers such as lack of institutional support, absence of improved technology for tree growing, and delayed returns from tree growing. These barriers cannot be overcome without additional institutional, technological and financial support. Therefore, this alternative is not expected to be realized as a baseline scenario.

Sub-step 1b: Enforcement of applicable laws and regulations

The current rules and regulations do not restrict farmers from taking up any farming activity or tree plantation activity. The baseline scenario is not in variance with any laws and regulations in force. However, the implementation of A/R activity is not a mandatory requirement and the lands considered for the project are agricultural private land-holdings that could continue to be under subsistence agriculture or remain fallow for short periods for various reasons that will be outlined in Step 3-Barrier analysis.

STEP 2: Investment analysis:

As per the “Tool for the demonstration and assessment of additionality in A/R CDM project activities” version 2, one of the analyses - either the Investment Analysis or the Barrier Analysis needs to be applied. This project is designed to channel 80% of the revenue from sale of tCER to 1590 farmers; it is neither feasible nor appropriate to undertake investment analysis for this project situation.

Accordingly, this project uses the Barrier Analysis (Step 3), which is presented below.

STEP 3: Barrier analysis:***Sub-step 3a: Identify barriers that would prevent the implementation of the type of the proposed project activity:***

Considering the low productivity and subsistence farming practiced in the project area, farmers face a range of barriers related to institutional capacity, investment, lack of access to credit, technology, prevailing practice, land holding size, and access to market that prohibit the growing of trees on agricultural land. The first and foremost barrier is that any single farm, of average size 1.01 ha cannot become a stand-alone plantation, with or without CDM, an external institutional structure is required to organize multiple farmers. The sole reason for creation of the institutional structure under this CDM project is to encourage farmers to grow trees and enable them to earn carbon credits accruing to this tree planting activity.

The barriers faced by the farmer and the measure implemented to remove these barriers are outlined below.

1) Institutional barrier – lack of organization of farmers



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There are several institutional barriers that prohibit farmers to pursue land use activities other than those pursued by them this far. The initial consultations with farmers identified that their very low capacity, absence of awareness to land use alternatives, lack of access to technology, and risk aversion to activities that do not provide immediate returns are the prohibitive barriers, which can only be alleviated with external institutional support.

Measures implemented to overcome the barriers

To overcome the institutional barriers to tree growing, VEDA MACS, a Cooperative Society, organized the farmers and consulted with them on the ways of institutional support that would enable them to undertake tree growing activities on a part of their land. As part of the institutional assessment, it was recognized that the farmers needed technological inputs, upfront financing support, market linkage, and continuous institutional support. As the primary sponsor of the project, VEDA MACS held discussion with a range of stakeholders that could alleviate the barriers faced by the farmers. These discussions led to the development of the Project Idea Note (PIN) that was submitted to the Bio Carbon Fund, as early as as January 2004. (CN1). As a small farmer tree growing initiative, this project was favorably considered by the BioCarbon Fund. As the first project of its kind for BioCF in particular and LULUCF in general, the institutional model was discussed in detail over several months, leading to revisions of the PIN during through the year 2004 (CN2, CN3, CN4).

During the discussions with the BioCarbon Fund, it was realized that improved tree growing technology is a key driver for improving the productivity of land holdings of small farmers. JKPL had joined the project in the role of supplier of plantation material and supply of batches of samplings had commenced, with the delivery to the first farmer, which is established as the project start date (CN-Start date). In this context, the potentially critical role of JKPL for the supply of improved technology was discussed, specifically to overcome the technology and extension support barriers to small farmers and the BioCF strongly advised on a more substantial and formal role for JKPL in the project (CN5).

Parallel to the discussions with BioCF, VEDA MACS had continued to communicate and consult with the Indian DNA, JKPL and various commercial banks. Based on the discussion with BioCF (CN5, referred above), JKPL sent a formal expression of interest in participating in this project in January 2005 (CN6). Parallaly, the Indian DNA provided a no-objection letter to VEDA MACS in July 2005 (CN7).

The project was accepted in the BioCF portfolio in September 2005 (CN8), following which a World Bank team visited the project to understand and further discuss the institutional and implementation arrangements for the project. (CN9) After discussing various models, the team suggested the adoption of a “specialized carbon venture model”. To operationalise this model, it was found necessary for JKPL to become an project participant. To this end, it became necessary for JKPL to either become a shareholder of the “carbon company” or enter into a MOU with VEDA MACS. The route subsequently chosen was of a MoU, which was signed between VEDA MACS and JKPL (CN10). Based on the discussions during the World Bank team’s visit, VEDA MACS created a specialized carbon company, which led to the incorporation (CN11) of the Veda Climate Change Solutions Ltd (VCCSL). Through its acceptance letter to the World Bank, VEDA MACS noted all the steps taken to strengthen the financial and implementation structure of the project (CN12).

Based on the newly defined project structure, a Letter of Intent (LOI) was signed with BioCF in January 2006 (CN13). The project was considered an approved by the Indian DNA in February 2006 (CN14). However, at that time only VEDA MACS was listed as a project participant. Based on the discussions with the World Bank team, a tri-partite agreement was prepared, for signature by each participating farmer, JKPL and VEDA MACS. These agreements were signed from November 2006 onwards, as participating farmers continued to be identified (CN15). Following World Bank rules, the Project Information Document (PID) was published in December 2006 (CN16). To adhere to the strict



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conditions, regarding share small/marginal/women farmers, imposed by the BioCF, JKPL issued an internal letter to its field officers requiring the identification of specific categories of farmers (CN17).

The Emission Reductions Purchase Agreement (ERPA) for this project was signed in May 2007 (CN18). In 2009, VEDA MACS transferred all its rights, responsibilities and obligations to VCCSL. In view of the changed project structure, i.e., inclusion of JKPL and VCCSL as project participants, the DNA was requested to issue a revised Host Country Approval (CN 19) and the HCA was issued in July 2009 (CN20).

The three project participants – Veda Climate Change Solutions Ltd (VCCSL), JKPL and BioCarbon Fund have the following distinct institutional roles to support the implementation of this small farmer tree growing project. All three participants are acting for the benefit of the 1590 farmers participating in this project, as 80% of all the tCER revenue will be transferred to the farmers.

- i) VCCSL - To provide institutional support and coordination to the farmers of the project
- ii) JKPL – Support improved tree growing technology and provide extension support services
- iii) BioCarbon Fund – To provide institutional support for training, knowledge sharing to access the incentives of project based market mechanisms for climate change regulation as well as provision of advance financing commitment,

The sequence of events in project evolution is presented below to illustrate that the objective of the project was removing barriers to tree growing by farmers and the different roles of the project participants are specifically designed to achieve this objective.

Table C.6.1: Chronology of events related to the development of the project (provided as Attachment 27)

Timeline (date/month/yr)	Description of Events	Document Reference
19/1/2004	Formal submission of PIN by VEDA MACS	CN1
8/2/2004	Letter from VEDA MACS to WB (Richard)	CN2
24/6/2004	Submission of revised PIN by VEDA MACS	CN3
2004	Early communication between VEDA MACS and JKPL	CN4
25/6/2004	Delivery of a set of saplings to the first farmer for commencement of plantation. This is established as the formal project start date in the PDD.	CN-Start date (Attachment 4)
June – Nov 2004	Communication between BioCF and VEDA MACS, including specific suggestion for a formal role for JKPL	CN5
31/01/2005	Letter from JKPL expressing interest in formally joining the project	CN6
25/07/2005	No objection letter from DNA, authorizing VEDA MACS to develop the project	CN7
Sept 2005	Internal Memorandum accepting the project sponsored by VEDA MACS in the BioCF portfolio	CN8
Oct – Nov 2005	World Bank Aide Memoire (AM), suggesting the adoption of a “specialized carbon venture model”	CN9
17/12/2005	MOU between VEDA MACS and JKPL, with clear reference to VEDA as the project sponsor	CN10
27/12/2005	Based on suggestion in the AM, incorporation of “VEDA Climate Change Solutions Ltd.” as a specialized institutional mechanism for carbon trading.	CN11
Jan 2006	Response from VEDA MACS to World Bank Aide	CN12



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	Memoir, accepting the suggestion to include JKPL	
Jan 2006	Signing of LOI (JKPL, VEDA MACS and WB)	CN13
Feb 2006	DNA meeting and issuance of LOA to VEDA MACS	CN14
Nov 2006 onwards	Signing of tri-partite agreements (JKPL, VEDA MACS and Farmers)	CN15
Dec 2006	Project Information Document (PID), which includes the original implementation mechanism	CN16
10/1/2007	Letter from JKPL to their field staff giving guidelines for identification of farmers.	CN17
8/5/2007	Signing of ERPA between VEDA MACS, VCCSL and JKPL	CN18
4/4/2009	Letter to DNA, requesting for replacement of VEDA MACS with VCCSL and inclusion of JKPL in revised LOA	CN19
15/07/2009	Revised LOA issued by India DNA, jointly to VCCSL and JKPL, based on the old PDD submission	CN20

2) Investment barriers

i. Low per capita income and high investment cost of raising tree plantations

Income from agricultural production is the main source of livelihood for communities in the project area. The agricultural production is subjected to prolonged droughts. The annual income per capita in the project area is about INR 7,500 and if the weather is not favourable, it could go below INR 5,000 for the farmers living under subsistence agriculture. Under this situation, many farmers live below poverty level. from wood will occur only after five years of the initial investment. The investment per hectare and maintenance cost of tree plantations is very high at INR 20,550 for seed route; and INR 34,300 for clonal plantations. It is not possible for local people to afford the high investment in plantation establishment, as incomes. The small farmers with low per capita income⁷ in the poverty dominated Kalahandi, Bolangir and Koraput districts of Orissa cannot afford such high costs required for raising tree plantations⁸.

ii) Delay in income stream from tree growing activities

Another aspect relevant to high upfront investment is the delay in income from timber revenue associated with the long tree-growing period relative to the consumption time preference of the small farm households. The delay in timber revenue translates into to large opportunity costs for farmers as they have to forego subsistence agriculture necessary for sustenance. There are no institutional mechanisms to support the farmers for the loss of agricultural income and delayed revenue stream from tree growing activity.

iii) Lack of bank credit for farm forestry on small farmer lands

Availability of loans from commercial banks for the purpose of afforestation and reforestation activities is very low because of the long rotation, high market risk and economic unattractiveness in the context of degraded lands. This is demonstrated by the data on disbursement of loans for farm forestry from two

⁷ <http://www.orissalinks.com/orissagrowth/archives/1116>

⁸ Planning commission of India < http://planningcommission.nic.in/plans/stateplan/sdr.../sdr_orich4.doc > (Attachment 23)



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leading banks in Rayagada of Orissa and Vizainagaram of Andhra Pradesh (Table C.6.2). As can be seen from this table, the amount disbursed for farm forestry is less than 0.5% that of the total farm loans disbursed in the area. Furthermore, the percentage of small farmers who have availed such loans, averaged over a five year period is less than 2% in Orissa and about 2% in Andhra Pradesh.

Table C.6.2: Disbursement of loans for farm forestry in Rayagada district of Orissa and Vizainagaram district of Andhra Pradesh

Year	Total farm loans disbursed (Rs. in Lakhs)	Amount disbursed for farm forestry (Rs. in Lakhs)	Number of beneficiaries (farmers)	% small farmers availing such loans
Orissa¹				
2005	3216	16.07	230	1.15
2006	2718	14.94	201	1.20
2007	6213	36.03	340	1.00
2008	9651	55.97	439	2.00
2009	4527	23.54	312	1.85
Andhra Pradesh²				
2005	32926	197.55	2525	1.25
2006	26026	150.95	2013	2.00
2007	31040	183.13	2376	3.20
2008	30604	156.08	2080	1.75
2009	17184	87.63	1150	2.10

¹Lead Bank, Rayagada, Orissa

²Lead Bank, Vizainagaram, Andhra Pradesh

Several studies, including by Sarap (1990)⁹; Atibudhi (2005)¹⁰; Panda (2005)¹¹; Mishra (2005)¹² highlight the credit constraints inhibiting small farmers' access to formal credit, including credit supply, bureaucratic procedures, asset-based lending policies, informal tenancy contracts, delayed loan processing procedures and caste barriers. The study also highlights the correlation between small farm size and high transaction costs. Thus, lack of access to credit is a major barrier for small and marginal farmer investment in tree growing activities.

Measures implemented to overcome the investment barriers

a) Transfer of CER revenue to farmers

Keeping in mind the limited income sources of farmers, it is widely recognized that farmers would need additional financial incentive to commit a portion of their land to grow and maintain the plantations. The CDM consideration was considered as a partial measure to address the investment barriers. In 2006, VEDA MACS and JKPL entered into tri-partite agreement with each of the farmers, committing the transfer of at least 60% of the total CER revenue as revenue to the farmers. However, VCCSL and JKPL through their interactions with the farmers in the project area realized that the proposed 60% share of

⁹ Sarap Kailas, 1990. Factors affecting small farmers' access to institutional credit in Rural Orissa, India; *Development and Change* (SAGE, London, Newbury Park and New Delhi), Vol. 21 (1990) 281-307.

¹⁰ Atibudhi, H.N., Flow of institutional credit to agriculture in Orissa, Chapter 9 in *Emerging Issues on Rural Credit*; published as Institutional Credit and Factors Influencing Its Flow to Agriculture in Orissa in *Indian Journal of Agricultural Economics*, July 1, 2005

¹¹ Panda, R.K., 2005 Investment Behaviour of Farm Households and Flow of Institutional Credit - A Study in Orissa, *Indian Journal of Agricultural Economics*, July 1, 2005.

¹² Mishra, R.K., 2005. Impact of Institutional Finance on Farm Income and Productivity: A Case Study of Orissa, *Indian Journal of Agricultural Economics*, July 1, 2005



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CER revenue is not attractive enough to the small farmers to be part of the CDM project. To retain the interest of the small farmers in plantation activity, VCCSL and JKPL decided to transfer additional 20% share of CER revenue to the farmers, through the tri-partite agreement, making it 80% of the CER revenue as direct CER revenue transfer to the farmers. This was considered necessary although it was considered difficult to meet the transaction costs of CDM project activity from the remaining 20% of CER revenue as transaction costs of meeting regulation project coordination and management are alarmingly high.

b) Advance payment of revenue

In order to partially compensate the delays associated with the revenue from tree growing activity, under the terms of the ERPA, BioCF would, upon successful validation of the project, release to the consortium, and in turn the farmers, annually for the carbon revenue to be generated by the tree planting activity, even though verification of tCERs would take place only once every 5 years. This clause is meant to provide farmers the critical continuous payment and incentive. The proposal of advance payment of the CER revenue was intended to assure the farmers that the prohibitive barrier of delayed revenue from tree growing is partially addressed by the advance payment for the sale of carbon credits from the project to the BioCarbon Fund so as to partially alleviate the transaction costs of the participating farmers and to cushion the delay in timber revenue.

c) Development of financial intermediation

Based on the tri-partite agreement and in order to provide confidence to the farmers and to ensure transparency in the transfer of CER revenue, an ESCROW bank account on behalf of the participating farmers of the project has been created in the project area. The revenue sharing is based on the relative actual contribution of land holding of each farmer to the project. The CER revenue transferred from the BioCarbon Fund for the purchase of carbon credits is to be deposited in the bank account. The revenue is then distributed among the participating farmers. The revenue share will be explained to the participating farmers and revenue distribution procedures, including the rationale for payment of exact amounts to each farmer, are to be audited by external auditors to ensure the transparency in the distribution of carbon revenue of the project.

3) High transaction costs of sourcing raw material from small and marginal farmers

There are significant differences in the transaction costs of sourcing raw material from small farmers in the CDM A/R project as compared to large farmers in the past. The situation is similar to dealing with retailers versus whole-sellers, wherein the cost of dealing with retailers is high as compared to dealing with whole-sellers. With respect to the current CDM project, an illustrative sample calculation for dealing with large number of small farmers versus small number of large farmers for obtaining the same amount of wood is present in table C.6.3. The transaction cost of procuring say, 1000 Mt of wood from a larger farmer is only Rs. 2315 as compared to Rs. 9840 for a small farmer, which is about 325% more. The above said quantity of wood can be procured from just 2 large farmers as opposed 10 small farmers.

The increase in cost for a small farmer is mainly due to of higher cost involved in communicating with the large number of spatially dispersed small farmers, delivering clonal seedlings in smaller consignments to multiple locations in remote areas. The same logic applies for providing credit facilities and collection of small quantity of raw material from spatially dispersed small farms. Thus, analysis in Table C.6.3 shows that the high transaction cost of sourcing raw material from small and marginal farmers is a barrier.

Table C.6.3: Indicative transaction cost for procuring 1000 Mt of wood



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<i>Activity</i>	<i>In case of Large Farmers Number Of Farmers - 2 Rs./1000 Mt</i>	<i>In case of Small Farmers Number Of Farmers - 10 Rs./1000 Mt</i>
Communication (no. of trips for contacting, providing loans etc.)	160	800
Supply of seedling	800	4000
Providing credit	900	4500
Harvesting (Per Mt)	150	150
Loading and unloading (Mt)	30	40
Transportation (MT)	200	250
Other activities	75	100

4) Technology barriers associated with production of improved planting stock

Discussions with local communities during participatory rural appraisal (PRA) (see Annex 8) indicated that the farmers do not have access to quality seed sources. The improved planting stock is a major contributor to productivity improvement of tree plantations. As productivity of small farmers holdings can only be harnessed to the fullest potential using improved planting stock, the clone and improved seed-based Eucalyptus and improved Casuarina planting stock was considered most essential requirement for convincing the farmers to adopt tree growing activity. Furthermore, the silvicultural practices needed for successful establishment and management of plantations are beyond the scope of small farmers. In this context, the supply of seedlings raised through clonal propagation techniques and improved seed sources and also provision of technical advice could only facilitated through the JKPL because of its technological capabilities and experience in tree growing. The extension support for the planting activity was shared by the VCCSL and JKPL so that the improved planting practices are implemented on the farm holdings.

Measures implemented to overcome the technological barriers

JKPL provides technical guidance on clonal Eucalyptus production and disseminates the information on improved tree growing practices in local language. In order to reach out to farmers with no formal education, personnel with experience in small farmer community outreach and extension need to be deployed to share field level practical information on tree planning and management practices. Table C.6.4 presents the constraints of the small farmers in implementing the silvicultural practices of tree growing activity and the interventions of VCCSL and JKPL implemented in overcoming the technical barriers.

Table C.6.4: Barriers to silvicultural practices adopted for raising plantations on small farmer lands

Silvicultural activity/practice	Practice and limitation	How it will be overcome under the CDM A/R project
Site preparation	Small and marginal farmers have limited knowledge of site preparation for undertaking clonal plantations. No training institutes are present nearby to impart such training. Publicity material is prepared and distributed by JKPL. However, lack of literacy hinders farmers from use of such material	<i>VCCSL is responsible for helping farmers in site preparation</i>
Raising of seedlings	Significant technical knowledge is required for raising clonal seedlings, which is not available with the small and marginal farmers. Technology for producing clones and creating awareness in farmers on clonal saplings requires upfront investment. It is not possible for small and marginal farmers to buy small quantity of seeds, poly bags, irrigation pumps and other implements required for	<i>JKPL will provide the seedlings.</i>



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	raising seedlings	
Planting techniques	Clonal propagation requires careful management of high density planting of improved seedlings that are costly to produce and manage. Adoption of appropriate planting techniques is crucial for successful establishment of plantations. Farmers are unaware of these techniques.	<i>The VCCSL Officer will pay regular visits and provide technical knowhow under the proposed A/R CDM project, given there are no training institutes in the region</i>
Application of inputs	Traditionally, afforestation/reforestation programmes in this region does not involve application of inputs such as organic or inorganic fertilizers. Thus, for obtaining high yields from clonal plantations, application of organic and inorganic fertilizers, pesticides etc. are necessary. This would require training of farmers.	<i>VCCSL will create awareness on application of fertilizers to plantations for effective growth</i>
Felling, debarking & transportation	Felling, debarking and loading of harvested material requires technical skills and equipment, transport arrangements that need to be procured as small and marginal farmers lack knowledge of harvest and post harvest procedures and face large transaction costs.	<i>VCCSL will guide the small and marginal farmers with the help of literature developed by JKPL in carrying out this activity</i>

The land, resource and institutional capacity constraints of small farmers are major barriers in undertaking AR CDM project activities. As small farmers are poor and do not have adequate land to meet the livelihood requirements, they face significant constraints in allocating land for tree planting activity.

The project faces significant capacity constraints due to absence of local institutions to support the farm level tree growing initiatives. Moreover, the capacity required to meet the requirements of CDM project implementation is not available in the group of farmers. The organization of small and marginal farmers under the project helps to overcome the low capacity of prevailing local institutions. The extension services of VCCSL and JKPL minimize the transaction costs to farmers. The wood procurement arrangements would protect farmers from wood price volatility and prevents distressed sale of wood in the informal market. The distribution of carbon revenue to the farmers of the project through the ESCROW bank account helped to organize the farmers and provide annual revenue to support allocation of land for tree planting activity.

STEP 4: Common practice test

There has been no comparable reforestation initiative in the region. The earlier and similar reforestation activities are mostly implemented on public lands or with specific government supported initiative for supporting indigenous communities and do not have similar objectives as this project. There are several sources of raw material for the pulp and paper industry¹³ and farm forestry holds a very small share of the raw materials market. This share, especially from large farmers, further shows a decreasing trend, as seen in Attachment 19. The Indian paper manufacturer association website extensively refers to agroforestry on degraded lands, which is implemented as per the guidelines for multi-stakeholder partnerships for forestation¹⁴. These initiatives for forestation on degraded lands, community lands and other government lands is widely supported by the paper and industry but small plantation private agricultural lands is not included in this and is not a common practice. Farm level afforestation and reforestation activities have been sporadic in the absence of local institutions to support forestry activities on private lands. There have been no efforts to organise the farmers to undertake any such activity.

¹³ Jain R.K. et al, Indian Paper Industry Raw Material Scenario, Growth Prospects and Pathways, IPPTA Journal Vol 19, No.3, Jul-Sep 2007 (provided as Attachment 24)

¹⁴ http://www.ipma.co.in/knowledge_resource.asp (provided as Attachment 25)

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There are projects that support small plantations on newly distributed lands to indigenous people, however in these projects farmer outreach, education and coordination is supported through various government-led programs. The registered CDM project from ITC is implemented by a government supported organization, Society for Elimination of Rural Poverty (SERP), and involves formation of groups of tribal farmers to raise plantations on degraded lands¹⁵. The non-CDM activities of BILT in AP¹⁶ and Orissa¹⁷ are backed by multiple government funded initiatives and focus on degraded lands. In these contexts, this project, which has no government support and is a purely private sector (farmers, paper company and specialized CDM venture company) initiative can even be considered first of its kind.

Conclusion: The barriers do not prevent the continuation of prevailing practice of subsistence agriculture but would constrain the implementation of the project activity as a non-CDM activity due to the barriers outlined above.

The approval and registration of the proposed A/R CDM project activity will alleviate the barriers noted above and enable the project activity to generate the following benefits:

- The project would serve as a demonstration for designing and implementing future AR CDM project activities in the region on private, marginal lands.
- The project demonstrates the role of improved planting methods, extension and training programs organized by the project entities i.e. VCCSL and JK Paper Limited in particular, to overcome technological barriers to afforestation / reforestation activities.

Figure: C.1: Farmers' visit to JKPL clonal technology facility



- Reforestation activities will provide employment opportunities to poor and vulnerable group's resulting in environmental protection, soil conservation, and increased biomass production.
- The project will build partnerships with the objective of improving the socio-economic conditions of the local resource poor communities. The close interaction among individuals, communities, industry, NGOs, international organisations and government strengthens the capacity for technical and extension services. The implementing agencies contribute to improved awareness to the role of tree growing in climate change mitigation.

C.7. Estimation of the <i>ex ante</i> baseline net GHG removals by sinks:
--

Baseline net GHGs removal by sink is considered to be insignificant for the proposed project activity as the carbon stock change for the baseline scenario without trees is set as zero and for the baseline strata

¹⁵ <http://cdm.unfccc.int/Projects/DB/BVQI1222275709.04/view>

¹⁶ <http://www.bilt.com/Kamalapuram.asp>

¹⁷ <http://www.bilt.com/sewa.asp>



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with trees the carbon stock change is considered to be negligible as there is low or no biomass (non-tree shrubs) in the baseline scenario (Please refer to section C.5.1-5. Estimation of baseline net GHGs removal by sink).

The baseline land use in the project area was assessed by two methods: a) through questionnaire survey (Questionnaire enclosed as Attachment 6b) and b) through field observation during recording of GPS readings while marking the plot boundary. The project area considered for project activities is predominantly agricultural land abandoned or left fallow. A census questionnaire survey (100% of farmers covering all land parcels) to assess the baseline land use and other practices was conducted. It is evident from this survey that there are no standing trees on the project land parcels. This is further supported by the field survey which was conducted as part of the project boundary marking exercise.

The baseline strata reflect the continuation of historical or existing land use of subsistence agriculture with following features.

- a) no growing trees or woody perennials exist, and
- b) no trees or other woody perennials will start to grow at any time during the crediting period, or
- c) no trees or other woody perennials will reach the threshold for the national definition of forest due to ongoing cutting and burning cycles that are part of shifting cultivation systems, the baseline net greenhouse gas removals by sinks are expected to be negative due to ongoing degradation.

For these strata the project assumes that baseline net greenhouse gas removal by sinks is zero:

$$C_{BSL} = 0 \text{ for all } t^* = t_{cp} \quad (1)$$

Where,

C_{BSL} = baseline net greenhouse gas removals by sinks; t CO₂-e.

t^* = number of years elapsed since the start of the AR project activity; yr

t_{cp} = year at which the first crediting period ends; yr

Table C.7.1: Annual estimation of baseline net anthropogenic GHG removals by sinks

Please present final results of your calculations using the following tabular format.	
Year	Annual estimation of baseline net anthropogenic GHG removals by sinks in tonnes of CO ₂ e
2004	0
2005	0
2006	0
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	0



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2014	0
2015	0
2016	0
2017	0
2018	0
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
Total estimated baseline net GHG removals by sinks (tonnes of CO₂ e)	0
Total number of crediting years	
Annual average over the crediting period of estimated baseline net GHG removals by sinks (tonnes of CO₂ e)	

C.8. Date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline:

>>

Date of completion of baseline study: Feb-May 2004

Name of persons/entity determining the baseline

Vanita Empowerment, Development and Advancement Mutually Aided Cooperative Society Ltd. (VEDA MACS)/VEDA Climate Change Solutions Ltd.

Mr. M.Satyanarayana, Honorary Advisor, VEDA MACS Email: satya_vedas@yahoo.com

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SECTION D. Estimation of *ex ante* actual net GHG removals by sinks, leakage and estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period

D.1. Estimate of the *ex ante* actual net GHG removals by sinks:

>>

Ex ante assessment of carbon stock changes in the project

The details of growth data i.e. GBH, DBH, Height, Volume and Yield of *Eucalyptus* & *Casuarina* is collected regularly from the field and maintained in a register by the Research and Development Office of the JKPL. The data of those plantations is rechecked after six months to assess the growth rates.

The assumptions are based on the growth data collected by JKPL in its plantation programme and the backup records are also being maintained by the JKPL and will be presented at the time of validation.

Table D.1: Stand volume

Year	Stand Volume (m ³ ha ⁻¹)		
	<i>Eucalyptus</i> Clonal	<i>Eucalyptus</i> Seed Route	<i>Casurina</i>
1	4.72	1.56	9.96
2	22.51	9.67	31.96
3	46.50	23.11	65.39
4	112.95	42.40	103.01
5	159.92	66.94	Harvesting
6	Harvesting		

The stand volume is converted into biomass and carbon stock taking into account wood density and carbon fraction of the biomass.

Table D.2: Wood density, BEF, root-shoot ratio and carbon fraction values used in calculations

Species or group of species	Wood Density Dj	Carbon fraction CFj	Biomass Expansion Factor		Root to shoot ratio			Applicability of Rj according to above-ground biomass (AGB)		
			BEFj-1 (Method 1)	BEFj-2 (Method 2) Recommended	Rj-1	Rj-2	Rj-3	Use Rj-1 when AGB is less than	Use Rj-2 when AGB is between	Use Rj-3 when AGB is above
Dimensionless	t d.m. m ⁻³	t C (t d.m.) ⁻¹	Dimensionless		dimensionless			t d.m. ha ⁻¹	t d.m. ha ⁻¹	t d.m. ha ⁻¹
Casuarina	0.83	0.50		1.20	0.46	0.32	0.23	50	50	150
Eu-Cl	0.34	0.50		2.00	0.45	0.35	0.20	50	50	150
Eu-Sr	0.34	0.50		2.00	0.45	0.35	0.20	50	50	150



The data sources selected were:

- ☐ WD: IPCC 2006
- ☐ BEF: IPCC 2003 table 3.A.1.10
 - o Casuarina: BEF2 minimum value for tropical pines
 - o Eucalyptus: BEF2 minimum value for broadleaf
- ☐ Root to shoot: IPCC 2003 table 3.A.1.8
 - o Casuarina: Mean values for conifer plantation
 - o Eucalyptus: Mean values for eucalyptus plantation

Project emissions

Most of the lands under the project are barren and do not contain any tree growth. The grass and herbaceous vegetation (present in insignificant quantities as the lands are under subsistence agriculture or short-term fallow lands) is cleared through manual ploughing to prepare land for planting activity. The farmers do not practice biomass burning in site preparation; as a consequence, emissions from biomass burning are zero. The project also does not use machinery in site preparation, thinning and harvesting. Therefore, there are no emissions associated with the use of machinery in site preparation and logging. Additionally, as per the decision of paragraph 37 of EB44, the GHG emissions associated with fertilizers, removal of herbaceous vegetation and transportation are insignificant and can be ignored.

Considering that no project GHG emissions are expected to be significant, the project emissions are considered **zero**. The only GHG emissions relevant for the project are the GHG emissions associated with the natural fires, which are proposed to be monitored and recorded for the *ex post* calculations.

$$GHG_E = 0$$

Ex ante actual net GHG removals by sinks

The actual net greenhouse gas removals by sinks represent the sum of changes in carbon stocks in the carbon pools within the project boundary, minus the increase in greenhouse emissions by sources measured in CO₂ equivalents within the project boundary that are a result of the implementation of an A/R CDM project activity.

$$C_{ACTUAL} = \Delta C_{P, LB} - GHG_E$$

C_{ACTUAL} = Actual net greenhouse gas removals by sinks; t CO₂-e

$\Delta C_{P, LB}$ = Sum of the changes in living biomass carbon stocks (above- and below-ground); t CO₂-e

GHG_E = Sum of the increases in GHG emissions by sources within the project boundary as a result of the implementation of an A/R CDM project activity; t CO₂-e

The ex ante actual net GHG removals by sinks are calculated as per the steps of the methodology presented in **Annex 7**. In this context, assessment of pre-existing vegetation, its relative significance/insignificance and methods proposed for assessment of tree biomass are taken into account.



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a) Treatment of pre-existing vegetation

As per approved methodology AR-AM0004, Version 03, the carbon stocks in the living biomass of pre-existing non-tree and tree vegetation are not significant in the project (< 2% of the anticipated actual net GHG removals by sinks).

Considering the insignificant pre-project vegetation, the change in the carbon stocks in the living biomass of pre-existing non-tree and tree vegetation is significant.

Most of the lands under the project are under subsistence agricultural use and do not contain woody vegetation. The grass and herbaceous vegetation (present in insignificant quantities as the lands have been in cultivation) whose biomass is insignificant is cleared through manual ploughing to prepare land for planting activity. Therefore, for these reasons, the change in carbon stocks of pre-existing vegetation in living biomass is assumed to be **zero**.

During the site preparation, the farmers also do not practice biomass burning; as a consequence, emissions from biomass burning are also zero.

b) Treatment of trees

As per approved methodology AR-AM0004, Version 03, for the purpose of estimating *ex ante* actual changes in the the carbon stocks of living biomass, *Method 2 - Stock Change Method* has been applied to the stand models defined in the project.

The growth data collected, i.e. DBH, Height, Volume and Yield of Eucalyptus & Casuarina in the region has been used to estimate the *ex ante* actual changes in carbon stocks using the *stock change method*. The growth data collected by JKPL in its plantation programme is maintained in a register by the Research and Development Office of the JKPL.

Table D.1.1: Ex ante actual net GHG removals by sinks from the project

Project year <i>t</i> *	Actual net greenhouse gas removals by sinks
Year	tCO ₂ e
1	237
2	7,589
3	30,081
4	77,366
5	150,141
6	184,921
7	202,956
8	175,011
9	90,789
10	146,888
11	185,467
12	192,240
13	188,435
14	87,536
15	147,434
16	174,751



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17	205,663
18	185,181
19	88,082
20	136,718
21	188,174
22	202,410
23	185,727
24	77,366
25	150,141
26	184,921
27	202,956
28	175,011
29	90,789
30	146,888
TOTAL	146,888

D.2. Estimate of the *ex ante* leakage:

The project area of 1607.7 ha, when seen in comparison to the net sown area of the six project districts 17, 38,577.00 ha is less than 0.1%. Considering the village as one unit, the displacement of activity due to conversion of croplands to project land is negligible, as the farmers in the project area have diverted only a small portion of land for the plantation activity under the A/R CDM project. Hence, the activity displacement due to displacement of fuel wood collection can be ignored.

Under normal circumstances, in between rows of clonal plantations / seed origin plantations, there is growth of weeds & grasses. Attachment 21 provides evidence of the same. Additionally, under the baseline study detailed in Annex 3, the production of grass under current conditions is as low as 1.3 to about 4 t/ha/yr. The CDM A/R plantations will increase the availability of grasses for use as fodder. Firstly, the cropping system traditionally in rainfed and subsistence agriculture involves multiple cropping, involving cereals, pulses and oil seeds. Straw of only certain cereal crops can be used as livestock fodder. Since the crop yields are low due to subsistence agricultural practices and absence of irrigation and fertilizer application, the straw yield will also be proportionately low. Thus, the straw or grass availability is insignificant under the baseline scenario, 1.3 t to 4 t/ha/yr. Under the proposed A/R CDM project, grass growth will be permitted between the rows of trees. Farmers will be allowed to cut the grass grown in between the rows of trees for use as fodder. Thus, there will be no leakage or shifting of grazing due to implementation of the CDM A/R project.

The lands considered for the CDM A/R project are subsistence agricultural lands subjected to annual ploughing and weeding leading to removal of perennial plants and weeds. Thus these subsistence agricultural lands are devoid of any shrubby or perennial biomass growth, providing fuelwood. Woody biomass available on the lands being considered for the project is therefore highly insignificant. Under the proposed CDM A/R project, branches of size smaller than 9cm are not collected but left for the farmer and this is approximately 10 to 15 tonnes per ha and this biomass from branches would be available to the farmers for use as fuelwood. Thus there will be no displacement of fuelwood gathering. Instead additional fuelwood will become available to the farmers post CDM A/R project implementation.

Plantation	Total biomass harvested/ha (t)	Quantity of branches or lops and tops of size <9 cm girth (t/ha)
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Eucaluptus	70	15% (10.5)
Casuarina	100	15 % (15)
Clonal Eucalyptus	100	15 % (15)

As per the paragraph 35 of the EB 42, the GHG emissions from transportation are considered insignificant; therefore these are not required to be considered in the calculation of leakage¹⁸.

The fencing is done by using thin branches, twigs etc., by tying with jute rope and after a period of one year i.e. once the plantation attains manageable height, these are used as fuel wood. The activity displacement due to use of this fuelwood for fencing is negligible as the total acreage under the plantation in comparison to average land under CDM per village is negligible. The paragraph 37 of the EB 44 has also noted that the GHG emissions from the fencing material are insignificant, and therefore should be neglected¹⁹.

As the leakage from all the sources put together is insignificant, the leakage from the project is assumed to be zero.

¹⁸ <http://cdm.unfccc.int/EB/042/eb42rep.pdf>

¹⁹ <http://cdm.unfccc.int/EB/044/eb44rep.pdf>

**SECTION E. Monitoring plan****E.1. Monitoring of the project implementation:****E.1.1. Monitoring of forest establishment and management:**

>>

1. Monitoring project boundary and project implementation

The procedures to be followed and data to be collected for the monitoring of project boundary, forest establishment and forest management are outlined below and further details are presented in Annex 4 of this PDD.

1.1 Monitoring of project boundary

The monitoring of project boundary will include checking and confirming through field surveys, GPS coordinates and official records that the areas afforested/reforested are consistent with the eligible areas defined in the CDM-AR-PDD.

Table E.1.1: Parameters for monitoring of Project boundary

ID number ²⁰	Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Data / other measures of data	Comment
E.1.1.1.01	Consistency of A/R areas	Ha	m	At planting	As per monitoring	
E.1.1.1.02	Land tenure, control and contractual relations		m (checked)	At planting	As per monitoring	

1.2 Monitoring of forest establishment

The following aspects are to be monitored as part of forest establishment.

- Site preparation carried out as per the guidance of the methodology.
- Species planted in each stratum
- Planting date, location and area planted
- Survival checking:
 - The initial survival rate of planted trees is done three months after planting, and re-planting shall be conducted if the survival rate is lower than 90 % of the initial planting density.
 - Planting in gaps is done during year 2 and year 3.
 - Final survival checking is done three years after the planting.
 - The checking of the survival rate may be conducted using permanent sample plots.
- Document and justify any deviation from the planned forest establishment.

Table E.1.2: Parameters for monitoring of forest establishment

²⁰ ID number used for cross-referencing in the PDD



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ID number	Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Data / other measures of data	Comment
E.1.2.1.01	Cleaning and site preparation date	d/m/y		Prior to planting	As per monitoring	
E.1.2.1.02	Area affected in cleaning and site preparation area	Ha	e	Prior to planting	As per monitoring	
E.1.2.1.03	Biomass removed in cleaning and site preparation	t.ha-1	e	Before planting	As per monitoring	
E.1.2.1.04	Species planted and planting density	tree.ha ⁻¹	m	At planting	As per monitoring	
E.1.2.1.05	Planting date	d/m/y		At planting	As per monitoring	
E.1.2.1.06	Planting area	Ha	m	At planting	As per monitoring	
E.1.2.1.07	Survival	%	e	3 months of planting & 3 years after planting	As per monitoring	

1.3 Monitoring of project forest management

The monitoring of forest management will focus on activities related to silvicultural management such as thinning, harvesting, coppicing, replanting, and impact of natural disturbances such as fires, pests etc. They activities are monitored as per the periodicity of their occurrence during the monitoring period.

Table E.1.3: Parameters for monitoring of forest management

ID number	Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Data / other measures of data	Comment
E.1.3.1.01	Thinning/harvest date by species	d/m/y		At thinning/ harvest	As per monitoring	
E.1.3.1.02	Thinning/harvest area by species	Ha	m	At thinning/ harvest	As per monitoring	
E.1.3.1.03	Thinning/harvest volume by species	m ³	m/e	At thinning/ harvest	As per monitoring	
E.1.3.1.04	Coppicing date by species	d/m/y		At coppicing	As per monitoring	
E.1.3.1.05	Coppicing area by species	Ha	m	At coppicing	As per monitoring	
E.1.3.1.06	Coppice volume by species	m ³	m/e	At coppicing	As per monitoring	
E.1.3.1.07	Replanting date harvest/coppice	d/m/y		At replanting	As per monitoring	
E.1.3.1.08	Replanting area by species	Ha	m	At replanting	As per monitoring	
E.1.3.1.09	Disturbance type - fire	alphanu-meric		At disturbance event	As per monitoring	
E.1.3.1.10	Disturbance date	d/m/y		At disturbance event	As per monitoring	
E.1.3.1.11	Disturbance area	Ha	e	At disturbance event	As per monitoring	



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E.1.3.1.12	Disturbance by species and biomass lost	t.d.m.ha ⁻¹	m/e	At disturbance event	As per monitoring	
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E.1.2. If required by the selected approved methodology, describe or provide reference to, SOPs and quality control/quality assurance (QA/QC) procedures applied.

>>

Standard Operating Procedures (SOPs) will be developed for all field related activities. These SOPs would be adhered to at all times and activities will be documented in detail for verification purposes. To ensure the collection of reliable field data; the following would be done:

- Training of field-team members so that they are aware of all procedures and the importance of collecting data as accurately as possible
- Installation of plots in the field to measure all pertinent components using the SOPs
- Checking of field measurements by qualified personnel so as to correct any errors
- Documentation of all activities with a list of all members involved in field related activities and certification by the project leader that the team is trained
- Training of new staff recruited.

The QA/QC procedure applied to the project is provided as part of monitoring plan in Annex 4.

E.2. Sampling design and stratification

Stratification and sampling for ex-post calculations

a) Stratification

The five following strata are adopted for the project.

- i. AP – Eu (clonal) [AEC]
- ii. AP – Eu (seed) [AES]
- iii. AP – Casuarina [ACA]
- iv. Orissa – Eu (clonal) [OEC]
- v. Orissa – Eu (seed) [OES]

Post stratification will be conducted after the first monitoring event to address the possible changes in the project strata in comparison to the strata adopted at the project design.

b) Sampling

Permanent sampling plots are used for sampling to measure and monitor changes in carbon stocks of the carbon pools over time. The square plots of 256 m² (16 X 16 meter) are established covering all the strata of the project. The plots will be demarcated using GPS and the information on their geographical location in the field, along with the information on administrative location, stratum and sub-stratum is recorded.

The method of sample size calculation adopted in the methodology AR AM0004 is same as the Method I (samples drawn without replacement) of the A/R Methodological Tool - Calculation of the number of sample plots for measurements within A/R CDM project activities (Version 02.1). This method is used for calculation of the number of sample plots for the project.

The equations and procedure for determining the sample size are outlined below.

Equation 5 of the Tool/Equation 67 of AR AM0004 (Version 3)

$$n = \frac{\left[\sum_{h=1}^L N_i \cdot st_i \right]^2}{\left(N \cdot \frac{E_1}{z_{\alpha/2}} \right)^2 + \sum_{i=1}^L N_i \cdot (st_i)^2}$$

Equation 6 of the Tool/Equation 68 of AR AM0004 (Version 3)

$$n_i = \frac{\sum_{i=1}^L N_i \cdot st_i}{\left(N \cdot \frac{E_1}{z_{\alpha/2}} \right)^2 + \sum_{i=1}^L N_i \cdot (st_i)^2} \cdot N_i \cdot st_i$$

Where

L = total number of strata

z = z value for a confidence level (95%)

E = allowable error ($\pm 10\%$ of the mean), $E = Q \cdot DLP$;

st_i = standard deviation of stratum i

n_i = number of samples per stratum allocated

N = number of total sample units (all stratum), $N = \sum N_i$

N_i = number of sample units for stratum i, calculated by dividing the area of stratum i by the area of the sample plot of 256 m² (16 x 16 meter).

Q = Approximate average value of the estimated quantity Q , (e.g. wood volume); e.g. m³ ha⁻¹

DLP = Desired level of precision (e.g. 10%); dimensionless

The standard deviation of each stratum (st_i) is determined for the first monitoring event based on the measurement of the growth of the project species in the region. For the second and subsequent monitoring periods, the standard deviation estimated from the prior monitoring period is used to calculate the number of sample plots. The z value for 95% confidence is equal to 1.9599. The allowable error is estimated as $\pm 10\%$ of the expected mean biomass carbon stock per plot at the end of a rotation. The parameters used in the calculation of the number of sample plots are presented in Table E.2.

Table E.2: Parameters used for the calculation of the number of sample plots

Strata	Integer	1	2	3	4	5
Area of stratum i	Ha	585.84	51.92	382.01	380.19	207.76
Mean Q_i	t C/ha	119.91	71.28	73.02	106.14	37.83
St_i	t C/ha	39.43	28.66	63.55	37.83	19.48
Coeff.of variation – CV	%	32.88%	40.21%	87.03%	35.64%	51.49%
N	Integer	64,309	64,309	64,309	64,309	64,309
N_i	Integer	23,434	2,077	15,280	15,208	8,310
$Z_{\alpha/2}$	-	1.9599	1.9599	1.9599	1.9599	1.9599

The tool and the methodology recommend the use of a precision of 10% percent for targeting the error and a confidence interval of 90%. In the project, as a measure of conservativeness, the number of sample plots is estimated using a level of precision of 10% and a confidence interval of 95%.

The number of sample plots estimated using the 10% precision is 77. An additional 30% of plots are

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added to insure against the loss of sample plots during the monitoring period. Therefore, a total of 100 sample plots are considered appropriate for the monitoring purpose. The sample plots are rounded to the nearest integer and distributed over five strata. The distribution of plots in different strata is outlined in the Table E.3. It is possible to modify the sample size after the first monitoring event taking into account the actual variation of carbon stock changes assessed from the measurement. If further variation in the standard deviation is observed during the measurement campaign, the number of plots would be revised suitably.

Table: E.3: Sample plots

Degree of level of precision (error)	Total number of sample plots	Andhra Pradesh			Orissa	
		AEC	AES	ACA	OEC	OES
10%	77	26	2	28	16	5
Additional 30% plots to insure against risk of loss of plots	23	8	1	8	5	1
	100	34	3	36	21	6

Location of sampling plots

To avoid subjective choice of plot locations, the permanent sample plots are located systematically with a random start. This is accomplished with the help of a random number generation technique. **The list of sample plots and location on the land parcels in each district has been recorded and archived in the project database.** The sample plot map is developed in such a way that the project developers and DOE can identify and locate the sample plots in the field.

The ex post stratification will be undertaken in situations where strata defined at the start of the project undergo changes from the influences of human or natural factors. The number of sample plots will be revised and adjusted as per the ex post stratification.

E.3. Monitoring of the baseline net GHG removals by sinks, if required by the selected approved methodology:

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The baseline scenario of lands under agriculture is established using the approved baseline methodology AR-AM0004, i.e., “Reforestation or afforestation of land currently under agricultural use (Version 3)”. Considering the insignificant pre-project vegetation, the net changes in the baseline removals by sinks are expected to be insignificant. Therefore, the carbon stock changes in the baseline scenario are set to zero and the baseline net GHG removals by sinks are **not** monitored during the project period.

E.4. Monitoring of the actual net GHG removals by sinks:

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Data collection is being organized taking into account the carbon pools, sample frame and the number of sample plots. Section E.4.1 outlines the data to be collected on the project scenario in order to monitor the changes in carbon pools. Periodic checks of the data are being undertaken to verify the data consistency. The electronic spreadsheet formats are being used to archive the data and errors corrected and measurement error assessed. Monitoring data will be archived for 2 years following the end of the last crediting period.



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The actual net greenhouse gas removals by sinks represent the sum of verifiable changes in the carbon stocks of pools within the project boundary, minus the increase in GHG emissions measured in CO₂ equivalents by the sources as a result of the implementation of the project activity and calculated as per the equations outlined in the approved methodology AR AM0004.

E.4.1. Data to be collected in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R CDM project activity:

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Project data on verifiable changes in the individual carbon pools will be collected as per the steps and procedures of the monitoring plan. The monitoring and data collection procedures will also take into account the procedures on the sample plots as outlined in Annex 4 on monitoring plan. The calculation of the change in the stocks of carbon pools project will be done as per the equations outlined in the Section III of AR AM0004 methodology.

The project utilizes published growth data and data collected by JKPL to calculate the relationship between growth and biomass of *Eucalyptus* and *Casuarina*. The field measurements on sample plots will be used in the growth and biomass relationship to calculate the actual net GHG removals by sinks.

Table E.4.1: Data collected on the sample plots to assess the verifiable changes

ID number	Data variable		Source of data	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Record-ing frequency	Propor-tion of data moni-tored	Comment
E.4.1.1.01	DLP	Desired level of precision		%		Prior to start of project		For QA/QC of monitoring
E.4.1.1.02	PBB_{ikt}	Proportion of biomass burnt in stratum i , stand model k , time t	Project – assessment after natural fire	Dimension-less	m/e	Annually	100%	No slash and burn is practiced in the project. Only biomass affected by natural fire is recorded.
E.4.1.1.03	PL _{ID}	Sample plot ID	Project	alpha numeric		At the start or during the project		Numeric ID to be assigned to each permanent sample plot
E.4.1.1.04	PL _{ik}	Total number of plots in stratum i , stand model k	Field survey & measurement	Dimension-less	c	5-year	100%	
E.4.1.1.05	R_j	Root-shoot ratio		Dimension-less	e	5 year	100%	Local and species-specific value have priority
E.4.1.1.06	16/12	Ratio of molecular weights of CH ₄ and carbon;	Universal constant	Dimension-less	Universal constant			
E.4.1.1.07	44/12	Ratio of molecular weights of carbon and CO ₂ ;	Universal constant	Dimension-less	Universal constant			
E.4.1.1.08	44/28	Ratio of molecular weights	Universal constant	Dimension-less	Universal constant			



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		of N ₂ O and nitrogen						
E.4.1.1.09		Confidence level (e.g. 95%)		%	d	Before the start of the project	100%	For QA/QC of monitoring
E.4.1.1.10	<i>A</i>	Total size of all strata (A), e.g. the total project area	Project records/GIS	Ha	m	Start of project & adjusted at every 5 years	100%	
E.4.1.1.11	<i>A_i</i>	Area of each stratum	Project records/GIS	ha	m	Start of project & adjusted at 5 years	100%	
12								Not applicable
E.4.1.1.13	<i>A_{ikt}</i>	Area of stratum <i>i</i> , stand model <i>k</i> , at time <i>t</i> ;	Project records/GIS	ha	m	Monitoring period or yearly	100%	Measured for strata and stands
E.4.1.1.14	<i>A_{B,ikt_sb}</i>	Area of burn in stratum <i>i</i> , stand model <i>k</i> , time <i>t</i> ; ha	Measurement	ha	m	Monitoring period or yearly	100%	No slash and burn is practiced in the project. Only the project area affected by natural fire is monitored and recorded
E.4.1.1.15	<i>AP</i>	Sample plot area	Measurement	m ²	m	5-year	100%	
E.4.1.1.16	<i>BEF</i>	Biomass expansion factor (BEF)	Local-derived, national inventory, IPCC GPG LULUCF	Dimensionless	e	5-year		Local-derived and species specific value have the priority (IPCC default in LULUCF GPG 2003, Table 3A.1.10)
E.4.1.1.17	<i>B_{ijt}</i>	Average above-ground biomass stock before burning for stratum <i>i</i> , species <i>j</i> , time <i>t</i>	Measurement	t d.m. ha ⁻¹	m	Prior to the burn	Sample plots	
E.4.1.1.18	<i>N/C ratio</i>	Nitrogen/carbon ratio	Literature	Dimensionless	e	Once per species or group of species		IPCC default value (0.01) is used if no appropriate value
E.4.1.1.19	<i>C_{AB,ijt}</i>	Carbon stock in above-ground biomass for stratum <i>i</i> , species <i>j</i> , time <i>t</i> ;	Project calculation	t C	c	5-year	100%	
E.4.1.1.20	<i>C_{ACTUAL}</i>	Actual net GHG removals by sinks;	Project calculation	t CO ₂ -e.	c	5-year	100%	
E.4.1.1.21	<i>C_{BB,ijt}</i>	Carbon stock in below-ground biomass for stratum <i>i</i> , species <i>j</i> , time <i>t</i> ;	Project calculation	t C	c	5-year	100%	
E.4.1.1.22	<i>CE</i>	Average biomass combustion efficiency	GPG LULUCF; National inventory	Dimensionless	e	At the start of project		IPCC default value (0.5) is used if no appropriate value



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E.4.1.1.23	<i>CF</i>	Carbon fraction	Local, national, IPCC GPG LULUCF	t C(t d.m.) ⁻¹	e	Once per crediting period		Local and species-specific value have the priority (IPCC default = 0.5)
E.4.1.1.24	<i>CF_j</i>	Carbon fraction of species <i>j</i>	Local, national, IPCC GPG LULUCF	t C (t d.m.) ⁻¹	e	Once per species	100% of species or species group	Local value have the priority (IPCC default = 0.5)
E.4.1.1.25	<i>C_i</i>	Cost of establishing a sample plot for each stratum <i>i</i>		US\$ or local currency	m	5-years	100%	
E.4.1.1.28	<i>DBH</i>	Diameter at breast height of living trees	Plot measurement	cm (living)	m	5 year	100% trees on sample Plots	Measurement at each verification
E.4.1.1.29	<i>D_j</i>	Wood density of species <i>j</i>	Local-derived, national inventory, IPCC GPG LULUCF	t d.m. m ⁻³	e	5 year		Local-derived and species-specific value have the priority
E.4.1.1.30	<i>D</i>	Average wood density	Local-derived, national inventory, IPCC GPG LULUCF	t d.m. m ⁻³	e	5 year		Local-derived and species-specific value have the priority
E.4.1.1.31	<i>E</i>	Allowable error		depends on the variable calculated	c	5-year	100%	
E.4.1.1.32	<i>E_{BiomassBurn}</i>	Increase in GHG emission as a result of biomass burning within the project boundary	Calculation	t CO ₂ -e	c	5-year	100%	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.33	<i>E_{BiomassBurn, CH₄}</i>	CH ₄ emission from biomass burning in natural burn	Calculation	t CO ₂ -e	c	5-year	100%	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.34	<i>E_{BiomassBurn, N₂O}</i>	N ₂ O emission from biomass burning in natural burn	Calculation	t CO ₂ -e	c	5-year	100%	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.35	<i>E_{BiomassBurn, CO₂}</i>	CO ₂ emission from biomass burning in natural burn	Calculation	t CO ₂ -e	c	5-year	100%	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded



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E.4.1.1.40	<i>ERN₂₀</i>	Emission ratio for N ₂ O	Literature	Dimension-less	e			(IPCC default = 0.007)
E.4.1.1.41	<i>ERCH₄</i>	Emission ratio for CH ₄	Literature	Dimension-less	e			(IPCC default = 0.012)
E.4.1.1.42	<i>ff(DBH,H)</i>	Allometric equation for species <i>j</i> linking above-ground tree biomass (kg tree ⁻¹) to DBH and possibly tree height (<i>H</i>) measured in plots for stratum <i>I</i> , species <i>j</i> , time <i>t</i> .		kg tree ⁻¹	c	Once per species	for all major species or group of species	Use local/global equations validated for local conditions
43-45								<i>Not in meth.</i>
E.4.1.1.46	<i>GHGE</i>	Increase in GHG emission as a result of the implementation of the proposed A/R CDM project activity within the project boundary	Calculation	t CO ₂ -e	c	5-year	100%	
E.4.1.1.47	<i>GW_{PCH₄}</i>	Global Warming Potential for CH ₄	IPCC literature	Dimension-less	e	Once per commitment period		
E.4.1.1.48	<i>GW_{P_{N2O}}</i>	Global Warming Potential for N ₂ O	IPCC literature	Dimension-less	e	Once per commitment period		
E.4.1.1.49	<i>H_{ijt}</i>	harvested volume and fuel wood for stratum <i>i</i> , species <i>j</i> , at time <i>t</i>	Harvest data	m ³	c	Annually	100%	Annually recorded
E.4.1.1.50	<i>iID</i>	Stratum <i>i</i> D (1, 2, 3, ... <i>mSP</i> project scenario (<i>ex post</i>) strata)	Project map/GIS	alpha numeric	defined	At stand establishment	100%	Each stand has a particular year to be planted under each stratum
E.4.1.1.51	<i>ID_{ikt}</i>	Stand ID	Project map/GIS	alpha numeric	defined	At stand establishment	100%	Each stand has a particular year to be planted under each stratum
E.4.1.1.52	<i>lat/long</i>	Plot location	Project and plot map and GPS locating, GIS		m	5 years	100%	Plot location with GPS prior to project start and at each field measurement
E.4.1.1.53	<i>MCAB_{,ijt}</i>	Mean carbon stock in above-ground biomass per unit area for stratum <i>I</i> , species <i>j</i> , time <i>t</i>		t C ha ⁻¹	c	5 year		
E.4.1.1.54	<i>MCBB_{,ijt}</i>	Mean carbon stock in below-ground biomass per unit area for	Calculations	t C ha ⁻¹	c	5 year		



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		stratum i , species j , time t						
E.4.1.1.55	mV_{ijt}	Mean merchantable volume per unit area for stratum i , species j , time t	Calculations	$m^3 ha^{-1}$	c	5 year	100% sample plots	Calculated from E.4.1.1.13 and possibly E.4.1.1.15 using locally derived equations, or directly measured by field instrument
E.4.1.1.56	N	Maximum number of sample plots in the project Area	Calculations	Dimension-less	c	5-years	100%	
E.4.1.1.57	n	Sample size (total number of sample plots required) in the project	Calculations	Dimension-less	c	5-years	100%	
E.4.1.1.58	N_i	Maximum number of sample plots in stratum i	Calculations	Dimension-less	c	Prior to start of project and adjusted at every 5-year	100%	
E.4.1.1.59	n_i	Sample size for stratum i	Calculations	Dimension-less	c	Before the start of the project and adjusted thereafter every 5-year	100%	Calculated for each stratum
60-63								<i>Not in meth</i>
E.4.1.1.64	$nTRPL_{ikt}$	Number of trees in the sample plot t	Plot measurement	Number	m	5 years	100% trees in plots	Counted in plot measurement
E.4.1.1.65	H	Tree height	Plot measurement	m	m	5 year	100% trees in plots	Measurement in each monitoring period
66 - 71								Same as ID No. E.4.1.1.01 to E.4.1.1.05
E.4.1.1.72	sti	Standard deviation for each stratum i ;		Dimension-less	e	At each monitoring event	100%	Used for estimating numbers of sample plots of each stratum and stand, as necessary
E.4.1.1.73	TB_{ABj}	Above-ground biomass of a tree	Calculations	kg dry matter tree ⁻¹	c	5-year	100%	
E.4.1.1.74	TC_{ABj}	Carbon stock in aboveground biomass per tree of species j	Calculations	kg C tree ⁻¹	c	5-year	100%	
E.4.1.1.75	tID	Age of plantation (1, 2, 3, ... years)	Stratum map/GIS	year	m	At stand establishment	100%	Counted since the planted year
E.4.1.1.76	$trID$	Tree ID (1, 2, 3, ... tr ...)	Field measurement	Dimension-less	m	5-year	100%	



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		TR = total number of trees in the plot)						
E.4.1.1.77	XF	Plot expansion factor	Calculations	Dimensionless	c	5-year	100%	
E.4.1.1.78	$z\alpha/2$	Value of statistic z (normal probability density function), for $\alpha = 0.05$ (implies a 95% confidence level)		Dimensionless	m	5-years	0%	
E.4.1.1.79	$\Delta C_{AB,ijt}$	Annual carbon stock change in above-ground biomass for stratum i , species j , time t	Calculations	t C yr ⁻¹	c	5-year	100%	
E.4.1.1.80	$\Delta C_{AB,ikt}$	Annual carbon stock change in above-ground biomass for stratum i , stand model k , time t	Calculations	t C yr ⁻¹	c	5-year	100%	
E.4.1.1.81	$\Delta C_{BB,ijt}$	Annual carbon stock change in below-ground biomass for stratum i , species j , time t	Calculations	t C yr ⁻¹	c	5-year	100%	
E.4.1.1.82	$\Delta C_{BB,ikt}$	Annual carbon stock change in below-ground biomass for stratum i , stand model k , time t	Calculations	t C yr ⁻¹	c	5-year	100%	
E.4.1.1.83	$\Delta C_{LB,ikt}$	Annual carbon stock change in living biomass for stratum i , stand model k , time t	Calculations	t CO ₂ -e. yr ⁻¹	c	5-year	100%	
E.4.1.1.84	$\Delta C_{P,LB}$	Sum of the changes in living biomass carbon stocks (above and below-ground)	Calculations	t CO ₂ -e.	c	5-year	100%	
E.4.1.1.85	ΔMC_{ABikt}	Mean carbon stock change in above-ground biomass stratum i , stand model k , between two monitoring events	Calculations	t C ha ⁻¹	c	5-year	100%	
E.4.1.1.86	ΔMC_{ABikt}	Mean carbon stock change in above-ground biomass stratum i , stand model k , between two monitoring events	Calculations	t C ha ⁻¹	c	5-year	100%	



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E.4.1.1.87	$\Delta MC_{BB,ikt}$	Mean carbon stock change in below-ground biomass stratum i , stand model k	Calculations	t C ha ⁻¹	c	5-year	100%	
E.4.1.1.88	ΔMC_{BBiKT}	Mean carbon stock change in below-ground biomass stratum i , stand model k , between two monitoring events	Calculations	t C ha ⁻¹	c	5-year	100%	
E.4.1.1.89	$\Delta PC_{AB,ijt}$	Plot level mean carbon stock change in above-ground biomass in stratum i , species j between two monitoring events	Calculations	t C ha ⁻¹	c	5-year	100%	
E.4.1.1.90	$\Delta PC_{BB,ijt}$	Plot level mean carbon stock change in above-ground biomass in stratum i , species j between two monitoring events	Calculations	t C ha ⁻¹	c	5-year	100%	
E.4.1.1.91	ΔTC_{ABjt}	Carbon stock change in above-ground biomass per tree of species j in year t	Calculations	kg C tree ⁻¹	c	5-year	100%	
E.4.1.1.92	ΔTC_{ABjT}	Carbon stock change in above-ground biomass per tree of species j between two monitoring events	Calculations	kg C tree ⁻¹	c	5-year	100%	
E.4.1.1.93	ΔTC_{BBjt}	Carbon stock change in below-ground biomass per tree of species j in year t	Calculations	kg C tree ⁻¹	c	5-year	100%	
E.4.1.1.94	ΔTC_{BBjT}	Carbon stock change in below-ground biomass per tree of species j between two monitoring events	Calculations	kg C tree ⁻¹	c	5-year	100%	



E.4.2. Data to be collected in order to monitor the GHG emissions by the sources, measured in units of CO₂ equivalent, that are increased as a result of the implementation of the proposed A/R CDM project activity within the project boundary:

Most of the lands under the project are barren and do not contain woody vegetation. The grass and herbaceous vegetation (present in insignificant quantities as the lands are under subsistence agriculture or short-term fallow lands) is cleared through manual ploughing to prepare land for planting activity. The farmers do not practice biomass burning in site preparation; as a consequence, emissions from biomass burning are zero. The project also does not use machinery in site preparation, thinning and harvesting. Therefore, there are no emissions associated with the use of machinery in site preparation and logging. Additionally, as per the decision of EB42, the GHG emissions associated with fertilizers, removal of herbaceous vegetation and transportation are insignificant and can be ignored and these EB42 decisions are already implemented in AR AM0004 Version 3 of the methodology.

Considering that no project GHG emissions are expected to be significant, the project emissions are considered **zero**.

The only GHG emissions relevant for the project are the GHG emissions associated with the natural fires, which are proposed to be recorded as part of project monitoring. The following data and parameters with ID Numbers associated with the biomass burn in natural fires are included in Table E.4.1 in the previous section and reproduced below as Table E.4.2 are archived for project monitoring.

Table E.4.2: Data to be collected on GHG emissions

ID number	Data variable		Comment
E.4.1.1.02	PBB_{ikt}	Proportion of biomass burnt in stratum i , stand model k , time t	No slash and burn is practiced in the project. Only biomass affected by natural fire is recorded.
E.4.1.1.14	A_{B,ikt_sb}	Area of burn in stratum i , stand model k , time t ; ha	No slash and burn is practiced in the project. Only the project area affected by natural fire is monitored and recorded
E.4.1.1.22	CE	Average biomass combustion efficiency	IPCC default value (0.5) is used if no appropriate value
E.4.1.1.23	CF	Carbon fraction	Local and species-specific value have the priority (IPCC default = 0.5)
E.4.1.1.24	CF_j	Carbon fraction of species j	Local value have the priority (IPCC default = 0.5)
E.4.1.1.32	$E_{BiomassBurn}$	Increase in GHG emission as a result of biomass burning within the project boundary	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.33	$E_{BiomassBurn, CH_4}$	CH ₄ emission from biomass burning in natural burn	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.34	$E_{BiomassBurn, N_2O}$	N ₂ O emission from biomass burning in natural burn	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.35	$E_{BiomassBurn, CO_2}$	CO ₂ emission from biomass burning in natural burn	No slash and burn is practiced in the project. Only the project area and biomass affected by natural fire is monitored and recorded
E.4.1.1.40	ERN_2O	Emission ratio for N ₂ O	(IPCC default = 0.007)
E.4.1.1.41	ER_{CH_4}	Emission ratio for CH ₄	(IPCC default = 0.012)
E.4.1.1.46	$GHGE$	Increase in GHG emission as a result of the implementation of the proposed A/R CDM project activity within the project boundary	
E.4.1.1.47	GW_{PCH_4}	Global Warming Potential for CH ₄	



E.4.1.1.48	GWP_{N2O}	Global Warming Potential for N ₂ O	
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E.5. Leakage:

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As per the applied methodology, leakage associated with activity displacement is only relevant for the project.

$$LK = LK_{ActivityDisplacement} + LK_{fencing} \quad (\text{Equation 100 of the methodology})$$

The leakage associated with fencing is not relevant to the project as land parcels of the project are surrounded by other agricultural lands and fencing of these land parcels is done using live hedges, twigs, thorny shrubs, and bushes during early years of plantation and fencing is not required in the subsequent years of project.

Therefore, $LK_{fencing} = 0$.

The relevant sources of activity displacement leakage are clarified and procedures for assessing the sources are specified below.

5.1 $LK_{ActivityDisplacement}$

$LK_{Activity\ displacement}$ covers activities that could lead to displacement of grazing and cropland as well as shifts in fuelwood collection outside the project boundary as a consequence of implementation of the A/R project activity.

$$LK_{Activitydisplacement} = LK_{conversion} + LK_{fuelwood} \quad (\text{Equation 101 of the methodology})$$

$LK_{conversion}$ covers activities that could lead to: (a) conversion for grazing ($LK_{conv-graz}$); and (b) conversion for cropland ($LK_{conv-crop}$)

$$LK_{conversion} = LK_{conv-graz} + LK_{conv-crop} \quad (\text{Equation 102 of the methodology})$$

Leakage associated with the conversion of land to grazing ($LK_{conv-graz}$) is **only relevant** for the project and its significance is assessed below.

Whereas, leakage associated with conversion to cropland is **not** observed as there is **no** displacement of farming households as a consequence of project implementation. Moreover, the small size of planted land parcels account for only a small proportion of the land holdings. Therefore, there is no displacement of agricultural activities outside the project boundary.

Therefore, $LK_{conv-crop} = 0$

5.1.1 Displacement of grazing activity ($LK_{conv-graz}$):



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Taking into account the baseline approach 22(a) of the methodology and the conditions under which the project is implemented, the animal population in the region is expected to either remain constant or decline over the project crediting period.

Leakage due to displacement of grazing is not expected to occur for the following reasons.

- i. Small proportion of land under the project relative to the total agricultural land available with the farmers for fodder production
- ii. Project produces more fodder relative to the fodder production in the baseline scenario.

To demonstrate that leakage associated with displacement of grazing activities is **zero**, the following steps of the methodology are followed.

Step 1: As per the methodology, monitoring of leakage due to displacement of grazing is expected to be relevant for up to 5 years after the measures to address grazing are implemented and any conversion of land to grazing in the subsequent period is **not** attributable to the A/R CDM project activity.

In this context, it is clarified that the measures to address to control grazing were adopted on the land parcels of the project area at the starting of the project in the year 2004.

The livestock population in the region includes cows, bullocks, buffaloes, sheep and goat. Considering the differences in the *biomass* intake of different categories of livestock, they are expressed in animal equivalent units (AEU) to assess the fodder requirements during the pre-project period.

The units of conversion for estimating the animal equivalent units (AEU) are as below.

Cow, bullock, and buffalo = 1 AEU

Goat = 0.2 AEU

Sheep = 0.2 AEU

In order to estimate the number of livestock that depended on the land parcels in the pre-project period, district livestock census data for the year 2003 was adopted. The census data on animals is converted into animal equivalent units (AEU) and livestock density in AEU per ha was estimated for each of the six districts in which the project is located. The livestock density per ha of the district is applied to the portion of the project area located in the respective district in order to calculate the number of livestock attributable to the pre-project land parcels in each of the six districts. The summation of the livestock of pre-project land parcels of all six districts resulted in the livestock estimate of the baseline scenario (NaBL).

Table E 4.3: Livestock on the project land parcels under the baseline scenario

	Vizianagaram	Srikakulam	Visakhapatnam	Kalahandi	Rayagada	Koraput
Livestock density in animal equivalent units (AEU) per ha (A)	1.40	1.72	1.07	0.73	0.71	0.96
Project area – 1607.72 ha (B)	620.68	232.01	269.29	140.65	178.01	167.08
Pre-project	866	399	288	103	127	160



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livestock attributable to project area (A*B)						
Total	866+399+288+103+127+160 = 1943 AEU					

The number of livestock in animal equivalent units attributed to the pre-project area under the baseline

$$Na_{BL} = sNa_{BL} / SFR_{PAga} \quad \text{Equation 36 of the methodology}$$

$$Na_{BL} = 1943$$

$$SFR_{PAga} = 1$$

Na_{BL} = average pre-project number of animals from the different livestock groups that are grazing in the project area; dimensionless

sNa_{BL} = sampled pre-project number of animals from the different livestock groups that are grazing in the project area; dimensionless

SFR_{PAga} = fraction of total project area sampled; dimensionless given the conditions under which this methodology is applicable. Considering that the livestock census data is used, $SFR_{PAga} = 1$ is set in the equation 36 of the methodology.

Step 2: The number of animal equivalent units (AEU) displaced outside the project boundary ($Na_{outside,t}$) can be assessed as the difference between the number of animals attributed to depend on pre-project area for grazing (Na_{BL}) and the number of animals that can depend on the fodder production from the project area ($Na_{AR,t}$).

$$Na_{outside,t} = Na_{BL} - Na_{AR,t}$$

$Na_{outside,t}$ = Number of animals displaced outside the project area at year t , dimensionless

Na_{BL} = Estimate of pre-project number of animals in livestock equivalent units that would be grazing in the project area under the baseline scenario; dimensionless.

$Na_{AR,t}$ = Number of animals assessed to be present in the project area at year t , dimensionless

For the ex ante estimation on the number of animals that the project supports ($Na_{AR,t}$), the fodder production capacity of project lands was assessed from literature and research studies. From these sources, fodder production per ha on the project land parcels is assessed to be between 4.5 and 5.5 tonnes per ha per year.

The number of animals that support the fodder produced from the project lands is estimated based on the daily biomass intake of the livestock. The daily biomass intake value of 7.5 kg/day/AEU specified by the



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Directorate of Animal Husbandry, Government of Andhra Pradesh has been adopted for the purpose²¹. The annual biomass consumption of an AEU is estimated below.

$$= 7.5 \text{ kg/day/AEU} * 30 \text{ days} * 12 \text{ months} * 0.001$$

$$= 2.7 \text{ t d.m. yr}^{-1}$$

With the annual biomass consumption of 2.7 t d.m. yr⁻¹ per AEU, one ha of project land is expected to support 1.5 to 2.0 animal equivalent units (AEU). These values are used to estimate *ex-ante*, the number of animals that the project land parcels can support by providing fodder supplies during the project period.

$$\begin{aligned} \text{If } Na_{AR}, t &= 1607.72 * 1.5 &= & 2411.58 \text{ or } 2412 \text{ AEU} \\ \text{If } Na_{AR}, t &= 1607.72 * 2.0 &= & 3215.44 \text{ or } 3215 \text{ AEU} \end{aligned}$$

$$\text{At } 1.5 \text{ AEU: } Na_{outside,t} = Na_{BL} - Na_{AR,t} = 1943 - 2412 = - 469$$

$$\text{At } 2.0 \text{ AEU: } Na_{outside,t} = Na_{BL} - Na_{AR,t} = 1943 - 3215 = - 1272$$

The *ex-ante* estimates show $Na_{BL} < Na_{AR,t}$ with no potential displacement of animals outside the project for the purpose of grazing.

$$Na_{outside,t} = Na_{BL} - Na_{AR,t} = 0; (LK_{conv-grazing} = 0)$$

Monitoring of Na_{AR} ,

During project implementation, the number of animal equivalent units supported by the project ($Na_{AR,t}$) is monitored using survey of random sample of animal owner households whose land parcels are the discrete areas of the project. The monitoring results are to be presented in the monitoring report for the purpose of verification.

5.1.2 Displacement of agricultural activities ($LK_{conv-crop}$):

As noted above, *ex-ante* estimates demonstrate that $LK_{conv-crop} = 0$. Therefore **no monitoring** on the displacement of agricultural activities is required in the project.

5.1.3 Displacement of fuel-wood collection ($LK_{fuel-wood}$)

Lands under the project do not contain any tree growth in the baseline scenario. Only grass and herbaceous vegetation is present in insignificant quantities. As a consequence, the pre-project annual fuel-wood gathering in the project area is **zero**.

$$FG_{BL} = 0$$

The Steps 1 and 2 of the section 7.1. 3 of the methodology are therefore not relevant for the project.

²¹ Directorate of Animal Husbandry, 2010. Report on Major Livestock Products for Years 2008-09 and 2009-10, Integrated Sample Survey, Animal Husbandry Department, Government of Andhra Pradesh, Hyderabad, Andhra Pradesh.



Based on Step 3, leakage due to displacement of fuel-wood collection is set as zero ($LK_{\text{fuel-wood}} = 0$) as the information gathered from PRA and growth data of the project indicates that the fuel-wood production is expected to increase significantly as a result of the project. Consequently, $FG_{BL} < FG_{AR,t}$ will hold throughout the project crediting period. Therefore, **no** monitoring of the leakage from displacement of fuel-wood collection outside the project is required in the project.

In order to demonstrate that the fuelwood production from the project is greater than that of the baseline scenario, the fuelwood production from pruning, thinning and final harvest of the project is to be reported.

$$FG_{\text{outside}} = FG_{BL} - FG_{AR,t} \quad (\text{Equation 117 of the methodology})$$

$$= 0 - FG_{AR,t}$$

5.2 Increased use of wood posts for fencing (LK_{fencing})

As per paragraph 37(b) of the meeting report of EB 44, “GHG emissions from collection of wood from non-renewable sources to be used for fencing of the project area insignificant in A/R CDM project activities and may therefore be neglected in A/R baseline and monitoring methodologies.” Nonetheless, it can be noted that in the project activity, fencing is done using live hedges, twigs, thorny shrubs, bushes etc. and once plantations reach a manageable height, fencing is not even required.

Therefore, $LK_{\text{fencing}} = 0$

As per the paragraph 35, EB 42 report, emissions associated with transportation are considered insignificant and can be neglected²². Therefore, emissions from the transport of personnel to areas outside the project boundary and products to the market are not required to be monitored.

E.5.1. If applicable, please describe the data and information that will be collected in order to monitor leakage of the proposed A/R CDM project activity:

>>

Based on the discussion in Section E.5 above, leakage in the project activity is estimated to be zero. Parameters to ex-post establish that leakage is zero will be monitored as per Table E-5.1. Clarifications on the non-applicability of monitoring requirements for the variables are noted in the comments column in the table below.

Table E-5.1: Data to be collected and archived to demonstrate the absence of leakage

²² <http://cdm.unfccc.int/EB/042/eb42rep.pdf>



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ID Number	Data Variable		Source of data	Data Unit	Measured (m) calculated (c) estimated (e)	Recording Frequency	Proportion of data monitored	Comment
E5.1.01	44/12	Ratio of molecular weights of carbon and CO ₂	Universal constant	Dimensionless	Universal constant			
E5.1.02	aLK_{NGL}	Average leakage due to conversion of non-grassland to grassland per displaced animal in NGL areas	AR-CDM-PDD	t CO ₂ - e. animal ⁻¹	c - e	Ex-ante in AR CDM PDD	SFR_{NGL}	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.03	aLK_{XGL}	Average leakage due to conversion of non-grassland to grassland per displaced animal in XGL areas	AR-CDM-PDD	t CO ₂ - e. animal ⁻¹	c - e	Ex-ante in AR CDM PDD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.04	APV	Average volume of wood posts	Estimated	m ³	e	5-year	SFR_p	
E5.1.05	BEF_2	Biomass expansion factor (BEF)	Local-derived, national inventory IPCC	Dimensionless	e	5-year	100% of sampling plots	
E5.1.06	c	Community index (C=total number of communities) Di		Dimensionless	Defined	Years 0,1 and 5		As per the ex-ante estimation (Refer Section D.2), so this variable is not applicable.
E5.1.07	CF_j	Carbon fraction of dry matter, species j	Literature	t C (t d.m.) ⁻¹	E	Once per species or group of species	100%	



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E5.1.08	CS_i	Locally derived carbon stock of identified lands (including all five eligible carbon pools) of stratum i	Field measurement	t CO ₂ -e. ha ⁻¹	m	Years 0, 1 and 5		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.09	CS	Locally derived average carbon stock of unidentified lands (including all five eligible carbon pools)	Field measurement	t CO ₂ -e. ha ⁻¹	m	0, 1 and 5 years		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.10	DBP	Average distance between wood posts	Field sampling	m	m	5 years	SFR_p	
E5.1.11	D_j	Wood density of species j	Local-derived, national inventory, IPCC	t d.m. m ⁻³	e	5-year	100% of sampling plots	
E5.1.12	dNa_{EGLt}	Number of animals displaced in EGL areas at time t	Calculations	Dimensionless	c	Yearly	100%	
E5.1.13	dNa_{NGLt}	Number of animals displaced in NGL areas at time $t - 1$	Calculations	Dimensionless	c	Yearly	100%	
E5.1.14	dNa_{XGLt}	number of animals displaced in XGL areas at time $t - 1$	Calculations	Dimensionless	c	Yearly	100%	
E5.1.17	$FG_{AR,t}$	Volume of fuel-wood in the project area according to monitoring	Field sampling	m ³ yr ⁻¹	m	Yearly	SFR_{PAfw}	



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E5.1.18	FG_{BL}	Average pre-project annual volume of fuel-wood gathered in project area – estimated <i>ex ante</i> and specified in the AR-CDM-PDD	AR-CDM-PDD	$m^3\ yr^{-1}$	c - e	<i>Ex ante</i> in AR-CDM PDD		As there is no woody vegetation in pre-project lands, so this variable is zero and not applicable.
E5.1.19	$FG_{NGL,t}$	Monitored volume of fuelwood gathering in NGL areas and supplied to pre-project fuelwood collectors and/or charcoal producers	Field measurement	$m^3\ yr^{-1}$	m	Yearly	SFR_{NGL}	
E5.1.20	$FG_{outside,t}$	Volume of fuel-wood gathering displaced outside the project area at year t – as per Step 1	Calculations	$m^3\ yr^{-1}$	c	Yearly	100%	
E5.1.21	FG_t	Volume of fuel-wood gathering displaced in unidentified areas	Calculations	$m^3\ yr^{-1}$	c	Yearly	100%	
E5.1.22	$FNRP$	Fraction of posts from offsite non-renewable sources	Field measurement	Dimensionless	m	5-year	SFR_p	
E5.1.24	hh	Household index (Hh =total number of households)			Defined	Year 0.1 and 5		As per the ex-ante estimation (Refer Section D.2), this variable is not applicable.
E5.1.25	i	Strata index (S =total number of strata)		Dimensionless	Defined	Year 0, 1 and 5		As per the ex-ante estimation (Refer Section D.2), this variable is not applicable.
E5.1.26	IAC_{hci}	Identifiable areas converted by household, hh in stratum I	Field measurement	ha	m	Year 0, 1 and 5	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.27	IAC_{hci}	Identifiable areas converted of stratum i , by household hh in community c	Field measurement	ha	m	Year 0, 1 and 5	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.



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E5.1.29	<i>LK</i>	Total project leakage	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.30	<i>LK_{fuel-wood}</i>	Leakage due to the displacement of fuel-wood collection	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.31	<i>LK_{ActivityDisplacement}</i>	Leakage due to activity displacement	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.32	<i>LK_{conversion}</i>	Leakage due to conversion of forest to non-forest	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.33	<i>LK_{conv-graz}</i>	Leakage resulting from conversion for grazing	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.34	<i>LK_{conv-crop}</i>	Leakage resulting from conversion for cropland	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.35	<i>LK_{conv-crop,c}</i>	Leakage due to conversion of land to cropland attributable to displacement (activity shifting) in community	Calculations	t CO ₂ -e.	c	Yearly	100%	



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E5.1.36	$LK_{fencing}$	Leakage due to increased use of wood posts for fencing	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.37	LK_{NGL}	Leakage due to conversion of non-grassland to grassland in NGL areas	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.42	LK_{XGL}	Leakage due to conversion of non-grassland to grassland in XGL areas	Calculations	t CO ₂ -e.	c	Yearly	100%	
E5.1.43	$Na_{AR,t}$	Number of animals present in the project area at year t	Field measurements	Dimensionless	m	Yearly	SFR_{PAga}	
E5.1.44	Na_{BL}	Ex ante estimated pre-project number of animals from the different livestock groups grazing under the baseline scenario	AR-CDM-PDD	Dimensionless	e	Ex ante in AR-CDMPD D	SFR_{PAga}	The estimate of Na_{BL} is based on official livestock census data of the districts in which the project is located. $Na_{BL} = 1943$
E5.1.45	$Na_{EGL,t}$	Number of animals present in the sampled EGL areas at time t	Field sample survey	Dimensionless	m	Yearly	SFR_{EGL}	
E5.1.46	$Na_{EGL,t-1}$	Number of animals present in the sampled EGL areas at time $t-1$, as specified in the PDD	AR-CDM-PDD	Dimensionless	c - e	Ex ante in AR-CDMPD D		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.47	$Na_{NGL,t}$	Number of animals present in the sampled NGL areas at time t	Field measurements	Dimensionless	m	Yearly	SFR_{NGL}	



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E5.1.48	$Na_{NGL,t-1}$	Number of animals present in the sampled NGL areas at time $t-1$, as specified in the AR-CDM-PDD	AR-CDM-PDD	Dimensionless	c - e	Ex ante in AR-CDMPD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.49	$Na_{outside,t}$	Number of animals displaced outside the project area at year t	Calculations	Dimensionless	c	Yearly	100%	
E5.1.51	PAR_t	Perimeter of the areas to be fenced at year t	Field measurements, GPS, GIS	m	m	Yearly	100%	
E5.1.52	SF	Sampling factor of household hh	Calculations	Dimensionless	c	Yearly	10% or at least 30 households	
E5.1.53	SF_c	Sampling factor of household c	Calculations	Dimensionless	c	Years 0, 1 and 5	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2), this variable is not applicable.
E5.1.54	SFR_{EGL}	Fraction of sampled EGL areas sampled with respect to total	CDM-AR-PDD	Dimensionless	Defined using statistical criteria	Ex ante in AR-CDM-PDD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.55	SFR_{NGL}	Fraction of sampled NGL areas sampled with respect to total	CDM-AR-PDD	Dimensionless	Defined using statistical criteria	Ex ante in AR-CDM-PDD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.56	SFR_P	Fraction of sampled project areas sampled fencing posts	CDM-AR-PDD	Dimensionless	Defined using statistical criteria	Ex ante in AR-CDM-PDD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.57	SFR_{PAfw}	Fraction of sampled project areas sampled for fuel-wood collection	CDM-AR-PDD	Dimensionless	Defined using statistical criteria	Ex ante in AR-CDMPD		As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.



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E5.1.58	SFR_{PAga}	Fraction of sampled project areas sampled for grazing animals	CDM-AR-PDD	Dimensionless	Defined using Statistical criteria	Ex ante in AR-CDMPD		For livestock census data, $SFR_{PAga} = 1$ is adopted
E5.1.59	SHH	Sampled households, number of households	Field measurement	Dimensionless	Defined	Year 0	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.60	SHH_c	Sampled households in community c	Field measurement	Dimensionless	Defined	Year 0	10% of communities (or at least 10), 10% of households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.61	$TACP$	Total area of land on which pre-project activities were displaced due to project activities	Field measurement	ha	m	Year 0	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.62	$TACP_c$	Total area of cropland planted that is owned by community c	Field measurement	ha	m	Year 0	10% of communities (or at least 10), 10% of households per	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.63	$TACP_h$	Total area of cropland planted that is owned by household hh	Field measurement	ha	m	Year 0	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.64	$TNHH$	Total number of households using project lands in baseline	Field measurement	ha	m	Year 0	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.
E5.1.65	$TNHH_c$	Total number of households in community c using project lands in baseline	Field measurement	ha	m	Year 0	10% or at least 30 households	As per the ex-ante estimation (Refer Section D.2) there is no activity displacement, so this variable is not applicable.

E.5.2. Specify the procedures for the periodic review of implementation of activities and measures to minimize leakage, if required by the selected approved methodology:



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No leakage is expected to occur and therefore no procedures for the review of activities to minimize leakage are anticipated.

E.6. Provide any additional quality control (QC) and quality assurance (QA) procedures undertaken for data monitored not included in section E.1.3:

>>

To ensure the collection of reliable field data and to ensure its quality, information on the standard forest management procedures and project monitoring requirements will be provided to farmers. Information on the following measures would be shared with the participating farmers as part of quality assurance of the field data.

- Installation of test plots in the field to measure all pertinent components using the SOPs developed
- Checking of field measurements by a qualified person so as to correct any errors in techniques
- Documentation requirements of field related activities
- Training on field monitoring to individual or groups of farmers as relevant.

Table E.6.1: Quality control/quality assurance procedures

Data (Indicate ID number)	Uncertainty level of data (High/ Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
E.1.1.1.01 Consistency of A/R areas	Low	Random plot checks using GPS
E.1.2.1.04 Species planted & density	Low	Random checks over the project area to ensure the area of species is correctly measured
E.1.3.1.10 Disturbance area -fire	Low	Field survey checks
E.4.1.1.05 Root-shoot ratio	Low	Data that deviate significantly from default value shall be checked
E.4.1.1.16 Biomass Expansion Factor	Low	Data that deviate significantly from default value shall be checked
E.4.1.1.23 Carbon fraction	Low	Data that deviate significantly from default value shall be checked
E.4.1.1.28 DBH	Low	Random plot checks
E.4.1.1.29 Wood density	Low	Data that deviate significantly from default value shall be checked
E.4.1.1.65 Tree height	Low	Random plot checks

The additional details on QC/QA are presented in Annex 4 under monitoring plan.

E.7. Please describe the operational and management structure(s) that the project operator will implement in order to monitor actual GHG removals by sinks and any leakage generated by the proposed A/R CDM project activity:

>>

Under the authorization of the project participants, VCCSL together with JK Paper Ltd will be responsible for the monitoring function. JK Paper Ltd is responsible for providing technical services, including arranging training to the planting entities i.e. farmers/communities involved, measuring and monitoring of the actual GHG removals by sinks and any leakage generated by the proposed A/R CDM



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project activity. The relevant information and data is being documented and archived by the project entities in both electronic and paper formats.

VCCSL in association with JKPL will provide technical instructions on reforestation and forest management including fieldwork, and conduct the intensive supervision for implementation of the proposed A/R CDM project activity. JKPL will collect specific activity data on a routine basis.

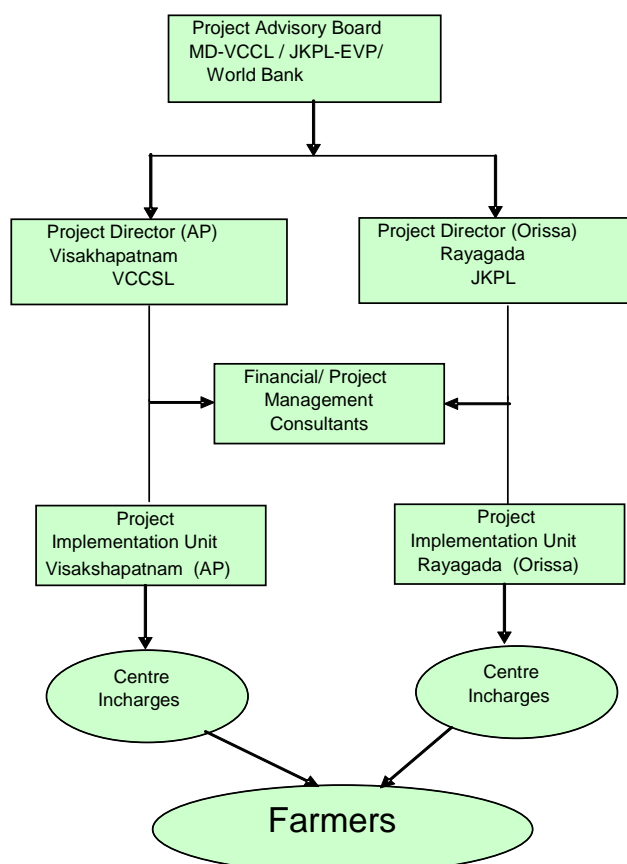
JKPL & VCCSL will be responsible for measuring and monitoring of the actual GHG removals by sinks and any leakage generated by the proposed A/R CDM project activity.

VCCSL will provide technical consultation and training in the measuring and monitoring of the actual GHG removals by sinks and leakage generated by the proposed A/R CDM project activity, and together with JKPL will be responsible for drafting the monitoring report and the monitoring function in general.

An expert team will be established for addressing any technical issues that may arise, and for checking and verification of measured and monitored data.

Project Management Unit (PMU):

A Project Management Unit (PMU) is proposed to be constituted to implement the EMF and also the Project. It is to be located at Visakhapatnam, Andhra Pradesh and will consist of two Project Implementation Units (PIU) located at Rayagada and Visakhapatnam. These two PIUs will be assisted by a Project Management Consultant and a Financial Management Consultant. The PMU will be guided by the Project Advisory Board consisting of representatives of VCCSL, JKPL and the World Bank.





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W.e.f 1 July, 2010, it is proposed that the expenditure on EMF and the project will be incurred by the PMU only which will follow the guidelines, procedures and regulations of the World Bank and will be responsible for submission of all reports and returns to the World Bank, VCCSL and JKPL as the case may be.

E.8. Name of person(s)/entity(ies) applying the monitoring plan:

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Project Management Unit (PMU) consisting of representatives of VCCSL and JKPL
Ashutosh Mahana
Assistant Manager (Plantations)
JK Paper Mills,
Jaykaypur, Rayagada, Orissa
Ph: 91-6856-233701, 233550

Mr. V Shanmukha Rao
Project Manager
VCCSL
2-35-15/2, Perraju pet,
Kakinada 533003, AP
Ph: +91-884-2372430

SECTION F. Environmental impacts of the proposed A/R CDM project activity:**F.1. Documentation on the analysis of the environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project boundary of the proposed A/R CDM project activity:**

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The proposed A/R CDM project activity will increase the forest cover in project towns/townships and provide the following additional environmental benefits.

Within the Project area:

- The project will bring the degraded farm lands into appropriate land use by adopting best agro-forestry practices.
- Carbon loss from the soil would be arrested and soil productivity will improve over time through nutrient cycling processes.
- Production of raw material locally would result in less transportation costs resulting in less consumption of fossil fuels and thereby reduced emissions.
- Biodiversity would be conserved by enhancing forest connectivity and reduce pressure on the natural forests by providing sustainable firewood to the local communities.
- Firewood produced will be an additional benefit and will replace non-renewable sources of energy such as kerosene and help in reducing GHG emissions indirectly. Firewood produced will reduce the pressure on the nature reserves from firewood collection and contribute to strengthening biodiversity conservation.
- The project will enhance awareness of the people to sustainable land use.
- The planted areas serve as habitats for the movement of some types of birds, mammals and



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snakes.

Outside the project area:

- The project contributes to the sequestration of carbon in the wood.
- The use of renewable wood reduces the dependence of paper industry on natural forests for wood and will help conserve the natural forests and their biodiversity.
- The project fosters relationships between the farmers and industry in a mutually beneficial manner.
- Promotes use of wood in place of synthetic construction materials which release carbon such as asbestos, iron and cement and help mitigate the global greenhouse gas emissions.
- The project promotes development of forestry models with multiple benefits.

Risk analysis and countermeasures:

- **Fire and pest risk:** The burning of crop residues in neighboring cropland represents a fire threat to the forests. This can be alleviated through technical measures and awareness training to local farmers/communities, strengthening patrolling and monitoring, as well as building firebreaks. Furthermore, reforestation arrangements will reduce fire and pest risks.
- **Site preparation:** The site preparation will not disturb the vegetation and soil in the planting sites. The technical measures to be employed in mitigating the impacts are to plant the tree species with low density (1250-2500 trees per hectare), limited site preparation (40 cm X 50 cm in diameter or 0.2 m²) and retaining the existing vegetation as much as possible (see section A.4.8). As a result, the surface area disturbed by site preparation is estimated to account for only 2-5% of the total land surface. Therefore the site and soil preparation will have minor negative impacts on original soil and vegetation.
- **Pesticide:** Improper pesticide application would be harmful to natural environment, including polluting soil, water and air conditions, as well as the wildlife habitat and to the people working on the land. Under the proposed A/R CDM activity, environmental friendly measures such as mixed species arrangement, seed and seedling quarantine are being adopted.

None of these risks and/or negative impacts is considered significant.

An elaborate Environment Impact Assessment was carried out by a reputed organization "Centre for Environment Education", Hyderabad. After field visits and interaction with the multiple stakeholders, an Environment Management Framework (EMF) was formulated for the project and the same is attached as an annexure-10.

F.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken an environmental impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:

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No significant negative impacts are likely to occur due to environmental-friendly techniques adopted in the proposed A/R CDM project activity, e.g., avoidance of slash and burn, minimum soil disturbance in site preparation, proper choice of tree species and their spatial arrangement, etc.



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An environmental safeguards review has been undertaken by Ms. Preeti Kumar, and Mr. Ranjan Samantray, Environmental Specialists with the World Bank, New Delhi during January, 2006 and as suggested by them an analysis of the environmental situation in the project areas with respect to water resources management and pesticide use has been conducted based on secondary data, information and discussions with the key stakeholders. A detailed Environmental Management Framework (EMF) has been developed to alleviate any possible negative impacts due to the project activity as well as to offset the impact of replication of this pilot project.

A table of potential impacts of project activities and mitigation measures developed as part of EMF exercise is shown below:

Table F.2.1: Potential impacts of project activities and mitigation measures					
Activity	Sub-activities	Process	Issues	Potential impacts	Mitigation measures
Activities with backward linkage to the project activity	Raising of clonal saplings	Selection of candidate plus trees	Identification of candidate plus tree from locations outside the local (Orissa, Andhra Pradesh, extended to South India) gene pool	Poor adaptation of plants to local conditions	Selection of candidate plus trees from Orissa, Andhra Pradesh and other Indian locations that have similar agro-climatic conditions
				Introduction of new pests and disease causing pathogens	Contained trial plantations with identified candidate plus trees for long duration (three harvests)
					Weeding out and sanitary disposal (burning of plant residues and affected soil) of pest and disease affected plants
			Identification of candidate plus trees that are more prone to pest attacks (in view of good performance on other parameters such as productivity)		Identification of Candidate Plus T trees on the basis of pest resistance (along with other parameters such as productivity)
		Pest management	Fumigation with Monocrotophos in mist chambers and application of Chlorpyrifos to saplings – classified as Class Ib-Highly Hazardous and Class-II Moderately Hazardous (as per WHO classification) are not permissible under World Bank supported projects	Impact on human and environmental health	Identification of safer alternatives



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			Non-use of appropriate protective gear while handling of fungicides and pesticides	Impact on human health	Awareness generation and monitoring to ensure use of appropriate protective gear
			Application of chemical fertilizers	Leaching of fertilizer residues and pollution of water bodies due to over use of chemical fertilizers	Use of organic manures such as vermicompost for nursery plants
		Water management	Over extraction of water from the Nagavali river for maintaining moisture levels in mist chambers and for watering saplings	Competition with other water uses especially during the dry season	Use of efficient irrigation equipment and water conservation measures

F.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section F.2. above:

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The project although is not expected to have negative environmental impacts, an Environmental Management Framework (EMF) has been developed specifying a set of guidelines, training and institutional arrangements that would be used by the VCCSL and JK Paper Limited to monitor potential environmental impacts and encourage farmers to take proactive mitigation measures. The EMF will be internalized into JKPL's existing plantation management systems. Further, environmental monitoring plan and remedial measures for any risks will be implemented and monitored.

The strategy proposed for water management is detailed in Table below:

Table F.3.1: Water management strategy proposed as part of the EMF of the project				
Action at the level of farmers		Action at the level of JK Papers Ltd.		
Cultural methods	Physical methods	Extension	Measures	Change in Process
Taking up plantation at the onset of the monsoon so as to fully utilize rainfall for meeting the water needs of the saplings. Selection of sites that are not in the immediate vicinity (there must be at least 5 m distance between the plantation and the field crop so as to reduce chance of water competition between field crops and the plantation) Use of organic manures Mulching (even by retention of leaf litter) to reduce water loss through evaporation	Construction of bunds along the contour and across the slope for fields that are located on sloppy terrain. Excavations of farm ponds or ditches that can harvest rainwater and enhance soil moisture.	Encourage farmers to adopt cultural methods for water conservation and discourage them from providing irrigation to the plantation with ground water. Periodically monitor farmers' plots to provide technical advice on water management	Disseminate information on efficient water management including selection of water-efficient clones, irrigation methods, etc.	-



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The strategy proposed for pesticide usage management is detailed in Table below:

Table F.3.2: Pest management strategy proposed as part of EMF of this project				
Action at the level of farmers		Action at the level of JK Papers Ltd.		
Methods to prevent termite incidence (before it occurs)	Methods to control termite damage	Extension	Measures	Change in Process
Selection of sites that do not have a history of or vulnerability to termite infestation. Clearing of stubbles and residues of any previous crop. Use of only well rotten organic manures.	Use of botanical extracts or safe chemical pesticides	Encourage farmers to adopt cultural methods and use botanical extracts and safe chemical pesticides. Discourage farmers from application of chemical pesticides (especially Phorate) if they are using clonal seedlings pre-treated with Chlorpyrifos by JK Papers Ltd. Periodically monitor farmers' plots to identify infestation of termites and suggest treatment to control damage	Dissemination of information on use of botanicals, natural enemies, cultural methods, safer insecticides, etc.	Treatment of clonal seedlings as per standardized procedure using Chlorpyrifos at nursery before supply to farmers

The strategy proposed for nutrient management is detailed in Table below:

Table F.3.3 : Nutrient management strategy proposed as part of EMF of this project				
Action at the level of farmers		Action at the level of JK Papers Ltd.		
Cultural methods	Physical methods	Extension	R and D	Change in Process
Selection of sites after soil testing. Use of green manures after the first year. Use of recommended doses of fertilizers including organic manures. Leaf litter, loppings, etc., at the site for nutrient recycling. Inter-cultivation of weeds to enhance soil organic matter	Ploughing across slope and construction of bunds along the contour on slopy land to prevent soil erosion	Actively encourage farmers to adopt cultural methods. Discourage farmers from excessive application of chemical fertilizers. Periodically monitor farmer's plots to check nutrient status and suggest measures to supplement nutrients.	R and D (either directly or through collaboration with research institutions such as CRIDA, ICRISAT, KFRI, ANGRAU) on integrated nutrient management including the use of intercropping, green manures, organic manures, etc.	Selection of sites after soil testing. Periodic monitoring of soil nutrient status.

The roles and responsibilities of the project entities are presented in the following table:

Table F.3.4 : Roles and responsibilities of VCCSL and JK Papers Ltd. with respect to the implementation of the EMF			
VCCSL		JK Paper Ltd.	
Role	Responsibility pertaining to EMF	Role	Responsibility pertaining to EMF



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VCCSL	<p>Implementation of EMF in the project area.</p> <p>Inform World Bank on EMF progress as part of regular project reporting requirements (if any).</p> <p>Source and secure external technical assistance for monitoring of EMF implementation once every year.</p> <p>Conduct periodic (six-monthly) monitoring visits to plantation plots (at least 20% of the plots of project farmers) to monitor and take required measures to strengthen EMF implementation</p>	Dy. General Manager (Plantations)	<p>Implementation of EMF activities by JK Paper Ltd. Ensure that all legal and regulatory provisions relevant to the EMF are satisfactorily met through the project processes (for example, provisions on pesticide use).</p> <p>Ensure that R and D on aspects relevant to the EMF is considered a thrust area of the overall R and D efforts of JK Paper Ltd.</p> <p>Liaison with government and non-government agencies for securing support for EMF implementation (for example, utilize existing government schemes and programmes for training, supply of inputs, etc.)</p>
		Manager (Plantations)	<p>Ensure that extension and monitoring systems of JK Paper Ltd. integrate the provisions of the EMF.</p> <p>Identify training needs of various levels of staff and organize capacity building programmes by sourcing in-house and external expertise as required.</p> <p>Preparation of IEC material for farmers on EMF.</p>
		Dy. Manager (Plantations and Special Projects)	<p>Maintain an MIS of the EMF activities and provide periodic (six-monthly) reports to VCCSL for consolidation and reporting to the World Bank.</p>
		Assistant Manager (Plantations)	<p>Ensure capacity building of field level staff for providing technical support to enable implementation of EMF at the farmer's level.</p> <p>Organize monthly review of EMF activities through a meeting with the Supervisors</p> <p>Conduct periodic (six-monthly) monitoring visits to plantation plots (all plots of project farmers) to monitor and take required measures to strengthen EMF implementation.</p> <p>Coordinate with local line departments and NGOs to facilitate convergence of existing schemes and expertise for training of farmers.</p> <p>Identify farmers who are 'best practitioners' with respect to EMF.</p> <p>Organize exposure visits of farmers to 'best practitioner' farmer's plots.</p>
		Supervisors	<p>Provide extension support to farmers on EMF.</p> <p>Monitor plantation plots on a monthly basis and interact with the project farmers to ensure that the provisions of the EMF are efficiently met.</p> <p>Report back on EMF performance to Manager (Plantations).</p>

The monitoring of the EMF implementation is done by JK Paper Ltd. through its internal monitoring systems. External assistance will be sourced if needed. The key parameters for monitoring are presented in the following table. Indicators based on these parameters have to be developed to suit the project requirements.

Table F.3.5 : Key parameters for monitoring				
Parameter	Field aspects to monitor	Monitoring frequency for field aspects	Management aspects to monitor	Monitoring frequency for management aspects



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Water resources	Source of water Schedule for irrigation SMC measures adopted	Monthly by JK Paper Ltd.	Information and training programmes for farmers. Training programmes for Supervisors. Periodic monitoring of plantation plots. Periodic review of Supervisors. Adequate staff to handle EMF. Maintenance of MIS on EMF. R and D on aspects relevant to EMF.	Six-monthly by JK Paper Ltd and annually by VCCSL through external agency appointed for the purpose by VCCSL.
Pesticide use	Names of pesticides used Quantity of pesticides used IPM practices adopted			
Nutrient management	Soil testing done Type and quantity of chemical fertilizers used INM practices adopted			
Land use	Species composition of plantation plot (type and numbers) Clonal composition of plantation plot			
Legal and regulatory provisions				

SECTION G. Socio-economic impacts of the proposed A/R CDM project activity:

G.1. Documentation on the analysis of the major socio-economic impacts, including impacts outside the project boundary of the proposed A/R CDM project activity:

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Agriculture is the main source of income for local communities in the project area. However, due to severe soil erosion, agricultural production is suffering very much from periodic droughts. Food productivity is very low. The table below shows the % of population living below poverty line in the project area (Andhra Pradesh and Orissa) with Orissa having the highest percentage (47.15%) of population living below poverty line compared to other states in India. The data in the table also includes the average % of population living below poverty line at all India level.

**Table G.1.1: Population below poverty line in the project area during 1999-2000
(Based on 30 days recall period)**

S.no.	States	Rural		Urban		Combined	
		No of persons (lakhs)	% of person	No of persons (lakhs)	% of person	No of persons (lakhs)	% of person
1	Andhra Pradesh	58.13	11.05	60.88	26.63	119.01	15.77
2	Orissa	143.69	48.01	25.40	42.83	169.09	47.15
3	All India	1932.43	27.09	670.07	23.62	2602.50	26.10

Source: Planning Commission, New Delhi.

Table G.1.2: Socio-economic profile of project area

District	No. of villages	Planting area (ha)	Population	Labour force	People employed outside	Minority population	Cropland area (ha)	Annual firewood consumption per capita (kg)
Kalahandi	80	178.01	13,34,372	3,07,043	2,17,000	5,19,014	5,33,000	380
Koraput	29	140.65	11,77,954	2,79,021	1,21,022	6,60,018	3,07,000	320
Rayagada	78	269.29	8,23,019	2,47,239	1,23,132	5,02,053	1,40,000	330

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Srikakulam	107	232.01	32,07,012	3,35,629	2,15,478	10,20,589	3,05,892	330
Visakhapatnam	56	167.08	36,70,321	4,56,589	1,53,251	14,25,356	4,02,569	280
Vizainagaram	151	620.68	24,01,275	2,98,245	1,80,258	12,03,256	5,89,235	330

The goal of the project is to improve livelihoods of the rural poor and vulnerable groups of the society through reforestation activities and also to contribute to environmental protection, soil conservation, increased biomass production and employment generation.

Socio economic impact of the proposed A/R activity

To maximize the socio-economic benefits, the reforestation design was prepared using participatory rural appraisal (PRA) methods. PRA methods were adopted in interviewing and consulting the local farmer households to understand their preferences and concerns, so that the proposed A/R CDM project activity would better respond to their desires for livelihood improvement.



Figure G.1: PRA exercise being undertaken in Ajjaram village of Srikakulam district.

The local farmers participate in the reforestation activities such as site preparation, planting, weeding, thinning, harvesting, etc. The project will provide the participating farmers increased returns from the sale of wood, firewood, intercrops and carbon trading. The project removes the risk of timber sale due to the partnership with industry i.e. JKPL. A quadripartite agreement involving VCCSL, farmer, JK Paper, and Bank/micro finance lending organisation in case bank loan is availed will determine the roles / obligations of each of the party. If loan is not availed from a bank by farmer, a tripartite agreement among farmers, JKPL and VCCSL will determine the same.

The main socio-economic benefits of the project would include:

- The project will **improve the quality of life of the vulnerable sections** of the society i.e. resource-poor farmers in the most backward regions of the country by helping them to bring their uncultivated **degraded lands to productive use by fostering partnerships** among farmers, industry, financial institutions and non-governmental organizations.
- The project activity will lead to higher fodder growth within the project boundary compared to the baseline scenario. In the absence of project activity, growth of fodder occurs only during rainy season. Due to the project activity, there will be greater availability of fodder for stall feeding.
- The project will create substantial employment **opportunities** to the local people in the plantation activities such as nursery operations, planting and post planting, protection etc. besides long term



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job positions as detailed in the table F-2. Most employment opportunities will be taken by the local farmers/communities involved in the proposed A/R CDM project activity and beyond (whose lands do not fall within the project boundary). Project area in Orissa and Andhra Pradesh has predominance of indigenous communities and ethnic minorities, thus most of the employment opportunities will be available to them.

Table G.1.3: Employment created by project activities

States	Area (ha)	No. of villages that benefit	Number of man days generated			
			Nursery	Planting & maintenance	Harvesting (including debarking and loading)	Total
Orissa	587.95	187	17,237	1,72,372	1,98,227	3,87,836
Andhra Pradesh	1019.77	314	42,849	4,28,496	4,92,770	9,64,115
Total	1607.7	501	60,086	6,00,868	6,90,997	13,51,951

- The project will also help in **saving valuable foreign exchange**, as the paper industry would be meeting their requirement from the locally grown wood instead of importing raw material from outside.
- The impact of the proposed project on individual farmer will be significant in comparison to other schemes as farmer will get multiple benefits and increased returns from the sale of wood, firewood, intercrops and sale of carbon credits. In addition, the project is envisaged with the collaboration of local JK paper industry to utilize the timber grown in a sustainable manner from the local farmers with less transportation cost. The project will also build partnerships among the local people, industry and non-governmental organizations with the objective of improving the socio-economic conditions of the people.
- The project will **generate productive self-employment** to poor farmers and their family members in activities such as land preparation, plantation, post plantation etc.
- **Demonstration effect:** The project will establish best practices and will serve as a model for others to emulate. Awareness programs for training and education including training of trainers proposed to be undertaken as part of this project. It will help in bringing the new technologies and opportunities to local people so that the project can be replicated both within and outside the country. The project has the potential to scale up and can be replicated in other parts of the country.
- The **capacity** of the poor farmers to access benefits from the global mechanisms such as CDM would be enhanced through training and extension.
- **Empowerment:** The project will empower the stakeholders to undertake improved commercial operations based on principles of sustainable development and help in building their negotiation skills.

Other Benefits

- (1) **Sustainable fuel-wood supply:** The proposed A/R CDM activity will provide sustainable fuel sources for local farmers.



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(2) **Strengthening social cohesion:** As indicated earlier, individual farmer households and communities are too weak to successfully manipulate the chain from investment, production to market especially for the timber and non-timber products which will take a much longer period than food production. In addition, the lack of organizational instruments also prevents them from overcoming technological barriers. The proposed A/R CDM project activity will entail close interaction among individuals, communities, companies, government and supporting networks for social and productive services, especially for the ethnic minorities.

(3) **Technical training and demonstration:** Local farmers and communities do not have access to quality seed sources and lack skills for producing high quality seedlings and for successful tree planting. In the proposed A/R CDM project activity, the local paper industry organizes trainings for local communities to assist them in understanding and evaluating the issues of hosting the proposed A/R CDM project activity, both on-site and off-site such as seed and seedling selection, nursery management, site preparation, planting models and Integrated Pest Management.

Potential socio-economic risks and countermeasures

(1) Cultural Resources

There are no cultural relics and/or cultural reserve that have been identified in the project area, and consequently, no damage to non-replicable cultural property will occur under the proposed A/R CDM project activity. Meanwhile, the project does not involve any sites for local social gatherings or other spiritual activities, thus the project activities will not impact the normal local gatherings and religious activities. The project activities of reforestation are fully consistent with local people's beliefs on protecting local environment.

(2) Tribal Groups

There are many ethnic minority groups located in the project area but they are not involved as project participants. However, few tribal's people (less than 5%) who have been given land by the Govt. as part of its rehabilitation program have joined as project participants. The project area of 1607.7 ha, when seen in comparison to the net sown area of the six project districts i.e. 17,38,577 ha is less than 0.1%.²³ Accordingly, this project activity does not have any significant impact on the tribal groups or population.

(3) Economic risk

The potential economic risks are lower yields of biomass due to less rain fall and/or poor management of the plantations established under the project such as lack of pest and fire control, which could contribute to project failure and loss to the farmers. This risk will be mitigated through technical assistance and training to farmers by VCCSL, local paper industry and forestry institutions, as well as by the extension network of the NGO sector. Local paper industry i.e. JKPL is experienced in reforestation and will provide the technical assistance to farmers.

G.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken a socio-economic impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to supporting documentation:

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The only uncertainty is related to weather conditions in general and rainfall in particular.

²³ Source: Directorate of Economics and statistics, Govt of AP and Govt of Orissa.



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As the project activity is undertaken through large number of individual farmers, the individual understanding and implementation capacity of the farmers vary from each other and hence this factor may contribute to significant difference in the final outcome at the level of individual farmers. The institutional arrangement of the project removes the negative socioeconomic impacts. However, the decrease in yield may be possible due to unfavorable weather conditions. Its impact on the overall project level averages out, but at individual farmer's level, it may lead to considerable difference in terms of the revenues.

G.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section G.2 above:

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To alleviate the problem to some extent, the farmers will be encouraged to take up crop insurance. Efforts will be made to conduct special training for the farmers having low perception capacity in terms of understanding the technical aspects of the plantations.

SECTION H. Stakeholders' comments:

H.1. Brief description of how comments by local stakeholders have been invited and compiled:

>>

The comments were collected from primary as well as secondary stakeholders

H.1.1: Primary stakeholders

Comments by primary stakeholders have been invited using PRA methodology. Ten villages were investigated using the PRA which included the following processes:

- (1) **Registration of farmers through personal contact:** A project leaflet has been prepared with the brief introduction of the project objective, main activities, benefits and potential risks, as well as the modalities and procedures of the CDM A/R project. The leaflet was distributed to the communities and was explained during the PRA process.

Figure H1.1: The registration of farmers in the project.

Sl	Name	Village	District	Signature
28	Munishwar Bafu	Sukumbam	Sukumbam	[Signature]
29	M. A. Bafu	Sukumbam	VR	[Signature]
30	M. A. Bafu	Sukumbam	VR	[Signature]
31	U. A. Bafu	Sukumbam	VR	[Signature]
32	V. A. Bafu	Sukumbam	VR	[Signature]
33	P. A. Bafu	Sukumbam	VR	[Signature]
34	A. A. Bafu	Sukumbam	VR	[Signature]
35	B. A. Bafu	Sukumbam	VR	[Signature]
36	S. A. Bafu	Sukumbam	VR	[Signature]
37	K. A. Bafu	Sukumbam	VR	[Signature]
38	M. A. Bafu	Sukumbam	VR	[Signature]
39	P. A. Bafu	Sukumbam	VR	[Signature]
40	S. A. Bafu	Sukumbam	VR	[Signature]
41	R. A. Bafu	Sukumbam	VR	[Signature]
42	G. A. Bafu	Sukumbam	VR	[Signature]
43	A. A. Bafu	Sukumbam	VR	[Signature]
44	M. A. Bafu	Sukumbam	VR	[Signature]
45	P. A. Bafu	Sukumbam	VR	[Signature]
46	S. A. Bafu	Sukumbam	VR	[Signature]
47	K. A. Bafu	Sukumbam	VR	[Signature]
48	M. A. Bafu	Sukumbam	VR	[Signature]
49	P. A. Bafu	Sukumbam	VR	[Signature]
50	S. A. Bafu	Sukumbam	VR	[Signature]
51	R. A. Bafu	Sukumbam	VR	[Signature]
52	G. A. Bafu	Sukumbam	VR	[Signature]
53	A. A. Bafu	Sukumbam	VR	[Signature]
54	M. A. Bafu	Sukumbam	VR	[Signature]
55	P. A. Bafu	Sukumbam	VR	[Signature]
56	S. A. Bafu	Sukumbam	VR	[Signature]
57	K. A. Bafu	Sukumbam	VR	[Signature]
58	M. A. Bafu	Sukumbam	VR	[Signature]
59	P. A. Bafu	Sukumbam	VR	[Signature]
60	S. A. Bafu	Sukumbam	VR	[Signature]

- (2) **Seminar of farmers' representatives.** To get comprehensive information of the historic and current situation and existing problems of local communities, as well as to understand the need and

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desire of local farmers, a meeting of farmer representatives was held in each selected village. Participants included village headers, farmer representatives, etc. Favorable tree species were also discussed and listed by scoring in the meeting.

Figure H.1.2: Mr.A.K.Sharda, Former Vice President, Raw Material Division, JKPL addressing farmers' sensitization workshop at Rayagada.



Figure H1.3: Farmers' sensitization workshop at Rayagada.



- (3) **Questionnaire:** Questionnaires were developed and distributed among different stakeholders, 10-15 households randomly selected from each selected village, local institutions, etc. The questionnaires were collected and analyzed to understand the local socio-economic profiles, land use, land tenure, income and sources, land management ways, awareness, technical know-how, favorable tree species, technical and financial barriers, need and desire of farmers to participate in the proposed A/R CDM project activity. These questionnaires will be made available at the time of validation.
- (4) **Interview:** Various stakeholders involved in the proposed A/R CDM project activity were interviewed. 10-15 households randomly selected from each selected village were also interviewed using semi-structured approach.

H.1.2: Secondary stakeholders

The data from the secondary stakeholders was collected during meetings held with the World Bank team during October, 2005 and also during interaction with the Environment Team of the World Bank, New Delhi as part of Environmental Safeguards Review during January, 2006 and August, 2006.

- **Local Forest Departments:** The data from Forest Department was collected from the local offices of the Forest Department.



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- **National and Provincial Governments:** The World Bank team obtained the views of National and State governments as part of the due diligence during October 2005 at Delhi and Hyderabad.

H.2. Summary of the comments received:

>>

Comments received from local farmers, villagers and companies/firms, etc. is summarized as below:

1. Primary stakeholders

i. Farmers/communities

Local farmers/communities expressed their strong interest to participate in the proposed A/R CDM project activity because they thought that through participating in the proposed project activity they could obtain the following benefits:

- ✓ Employment: They do not have to find jobs far away from hometown, and the proposed project activity makes it possible to look after their cropland.
- ✓ Increased revenues from selling wood and non-wood products and carbon credits.
- ✓ Greening their barren lands that can improve local environment, shelter cropland and reduce the impacts of droughts.
- ✓ Improved knowledge of tree planting and forest management methods through technical training.

PRA survey indicates that 80 out of 95 farmer households randomly chosen from 10 villages are willing to participate in the proposed project activity, translating to participation rate of 83%.

During the PRA process, the scoring assessment on tree species also indicated that local farmers/communities prefer tree species that grow fast and have good market, such as *Eucalyptus spp*, *Casuarina*, *Bamboo* etc.

ii. Paper Industry, i.e. JKPL

JK Paper Limited (JKPL) is interested in participating in the proposed A/R CDM project activity. The JKPL would like to facilitate technical support and extension services because:

- More raw material will be available close to the Mill since they are now transporting significant part of wood from as far as 2000 km from the plant site. The project would reduce the transportation cost of the wood and would lower the GHG emissions associated with transportation of wood.
- The decision of the Paper Mill to procure at least of part of their raw material requirement through the CDM project supports the farmers' revenues. The Linkages with the farmers gives JKPL an opportunity to win the confidence of the local farmers. The farmers will also be benefited because of the access to high quality clonal seedlings with the buyback arrangement.
- The improved clones of JKPL contribute to improving the productivity of degraded lands through clonal technology, which ultimately brings them more yields from the unit area.

2. Secondary stakeholders

- i. **Local Forest Departments:** Forest Departments in the States of Orissa and Andhra Pradesh view that the proposed A/R CDM project activity will increase forest resources, improve the local environment and increase income of local farmers/communities, as well as demonstrate best practices in plantation management.



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- ii. **National and Provincial Governments:** The national and provincial governments consider that the proposed A/R CDM project activity can improve local economy and alleviate poverty, especially for the ethnic minorities, and at the same time contribute to climate change mitigation and biodiversity conservation. Therefore, the A/R CDM project activity would have great impacts if technical practices developed by the project activity are extended to neighbouring areas or local communities that are not involved in the project.
- iii. **Downstream communities:** Communities at the downstream areas believe that the proposed A/R CDM project activity will improve water quality downstream by reducing soil erosion and provide a good model for land management. However, they will also be advised to avoid slash and burn and overall ploughing for soil preparation because these practices result in severe soil erosion, and to carefully select and use fertilizers and pesticides.

H.3. Report on how due account was taken of any comments received:

>>

The comments received from the PRA survey were fully taken into account as follows:

- Participation of local farmers/communities and companies/farms is on a voluntarily basis.
- Choice of financing arrangements was based on the preference of local farmers/communities.
- Preferences of local farmers/communities were taken into account in the selection of tree species;
- Most of tree species used are native to local, and a mixed species arrangement is being used.
- Compound and/or organic fertilizers will be applied in *Eucalyptus* plantation through small holes rather than overall dispersion;
- Use of chemical pesticides will be limited. Instead, diseases and pests will be controlled by mixed tree species arrangement and other biological measures;
- Slash and burn site preparation and overall ploughing for soil preparation will not be used.



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ACTIVITY

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FAX:	+91 884 2372430
E-Mail:	vcsl@vcslindia.org
URL:	www.vcslindia.org
Represented by:	C.A.Rao
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Salutation:	Mr.
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Direct tel:	+91 884 2372430
Personal E-Mail:	vcsl@vcslindia.org

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City:	Rayagada
State/Region:	Orissa
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E-Mail:	mcgoel@jkpm.jkpl.com
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Represented by:	Mr. Jeremy Wallace
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Department:	Environment Department

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding involved in the project.

**Annex 3****BASELINE INFORMATION**

Baseline information was collected using primary and secondary data sources. The primary data covered information on pre-existing vegetation, land use, local ecology and socio-economic conditions in the project area. Secondary data covered information on regional land use agricultural services, local economy, and resource status of local communities.

Primary data*Pre-existing vegetation*

Field studies were conducted using sample survey methods. The surveys covered assessments of woody and non-woody vegetation in the six districts of Orissa and Andhra Pradesh. Based on preliminary surveys, two clusters of districts – Koraput, Kalahandi and Rayagada in Orissa; and Srikakulam, Vizianagaram and Vishakapatnam in Andhra Pradesh were categorized into two baseline strata.

Woody vegetation

The existence or non-existence of baseline woody vegetation was first assessed through participatory rural appraisal. Subsequently, sample plots were laid in those parcels for which some baseline vegetation was reported during the PRA. The plot size was 20 X 20m in those parcels which were greater than 1 ha and in those that were smaller than 1 ha, plots of 10 X 10 m were laid. In all 51 sample plots were laid – 9 plots each in all the districts except Koraput where 6 plots were laid.

The baseline surveys indicated that woody vegetation on land parcels either lacking or is insignificant as lands have been in subsistence agriculture for a long time. The surveys also indicated that there are no significant differences in the pre-existing vegetation of land parcels in the two district clusters of Orissa and Andhra Pradesh.

The total number of land parcels in the project is 1708 and this belongs to 1590 farmers. The number of sample plots is 51, and this is about 3% of the total number of land parcels included under the project.

Non-woody vegetation

Considering that lands have been in agricultural use, no shrub vegetation was observed during field surveys. The surveys indicated only small quantities of grass and herbaceous vegetation. Fresh and dry weight of the herbaceous vegetation was assessed using 1m x 1 m plots laid out randomly in the land parcels. Considering the seasonal nature of herbaceous vegetation, the annual changes in the biomass of herbaceous vegetation are not likely to be significant. The paragraph 35 of the EB42 states that the GHG emissions from the removal of herbaceous vegetation are insignificant and can be neglected in the A/R CDM project activities²⁴. Therefore, the carbon stock changes in non-woody vegetation are considered insignificant.

Table A3.1: Survey of baseline biomass in the project area

²⁴ <http://cdm.unfccc.int/EB/042/eb42rep.pdf>



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District	Sample	Location	Herbaceous vegetation		Dry weight (t/ha)
			Fresh weight (gm)	Dry weight (gm)	
Kalahandi	Sample 1	Bhawanipatna	1030.0	336.0	3.60
Koraput	Sample 1	Kakriguma	808.2	129.6	1.30
	Sample 2	Laxmipur	756.3	138.9	1.39
Rayagada	Sample 1	Lekopai	1012.0	420.0	4.20
	Sample 2	Pitamahal	1150.0	390.0	3.90
Srikakulam	Sample 1		637.0	277.0	2.77
Visakhapatnam	Sample 1		512.0	266.5	2.66
Vizainagaram	Sample 1		703.0	209.6	2.10

The baseline surveys indicated insignificant pre-existing vegetation. Considering the similar agro-climatic conditions of the project area, there are also no significant differences in the pre-existing vegetation of the two clusters of districts in Orissa and Andhra Pradesh. Therefore, all the land parcels in the two baseline strata are grouped into **one baseline stratum** and the baseline net GHG removals by sinks of the project are considered zero.

Land use and socio-economic profile

The information on land use and socio-economic profile of the project was obtained using field visits, participatory rural appraisal (PRA) methods and focus group discussions with farmers, community groups and local leaders.

The documentation on PRA and consultations with local stakeholders will be made available at the time of validation.

Secondary data

The secondary data has been obtained from the local land revenue administration and other district level offices.

**Annex 4****MONITORING PLAN****1. Monitoring of the baseline net GHG removals**

The baseline carbon stock changes need not be monitored because the accepted baseline approach 22(a) assumes continuation of existing changes in carbon pools within the project boundary from the time of project validation.

2. Monitoring of the proposed A/R CDM project activity**a) Monitoring of the project boundary**

Activities to demonstrate that the actual area afforested conforms with the area outlined in the PDD.

- Information on the discrete parcels of lands owned by different farmers in each blocks/ mandals (an administrative block) of the six districts is recorded and archived. Each of these parcels of land is identified through GPS coordinates.
- The development of tree cover is monitored periodically throughout the crediting period and it is confirmed that the area falls within the project boundary, as defined using the GPS coordinates.
- The documentation on land tenure and contractual relations are checked to ensure the rights of farmers to the carbon credits are valid.

b) Monitoring of the forest establishment

Activities pertaining to forest establishment to be recorded

- Information on site preparation, planting schedule, location, area and species planted will be recorded in plot journals and archived in the project database
- Information on area planted by year in each stratum as confirmed through field surveys.
- Information on species composition and characteristics of planted species as well as pre-existing vegetation are recorded;
- The characteristics of stand models are recorded in the project database;
- The area and location of supplemental plantings undertaken to fill the gaps is recorded in the project database and identified on the strata maps;

Monitoring of post-planting activities to demonstrate the forest establishment

- Information on climatic extremes that can impact stand establishment and stand growth will be recorded;
- Surveys are conducted after 90 days of planting to evaluate the survival rates and to fill the gaps and survival rates of planted stock should be established by undertaking surveys during the initial establishment period.
- Final survival check is conducted in the permanent sample plots at the end of third year of plantation and survival percent estimated from surveys is recorded in the project database. The survival percent at the end of 3rd year will be reported for verification purposes.



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- Information pertaining to droughts and floods and other emergencies will be monitored and recorded and the area affected by them will be taken into account the *ex post* calculations of the carbon stock changes.
- In case of fires, the causes, area affected, season and duration of fire occurrence shall be also recorded and the emissions associated with the burning of biomass shall be calculated and accounted as part of project emissions.

c) Monitoring of the forest management

- Information on silvicultural management activities such as thinning, tending, harvesting, coppicing, replanting and other operations that influence the GHG removals by sinks will be monitored and the information is recorded in the project database.
- Information on the occurrence of natural fires or other natural or human induced disturbances and the area and the biomass affected shall be recorded and reported;
- Deviations, if any, in the forest management activities from those outlined in the project design document will be monitored and the reasons for such deviations will be recorded.

3. Monitoring the actual net GHG removals by sinks data

a) Stratification

Post stratification will be conducted to address the possible changes of project boundary and planting scheme in comparison to the outline of the project design. The post-stratification will address the changes in carbon stocks in comparison to the details outlined in the project design. Strata or substrata could be aggregated if they represent similar carbon stock changes. Otherwise, new strata could be defined.

b) Sampling frame and sample size

The combination of three species categories (*Eucalyptus* clonal, *Eucalyptus* seed, and *Casuarina*) and two locations lead to the identification of **five** project strata.

- i. AP – Eu (clonal) [AEC]
- ii. AP – Eu (seed) [AES]
- iii. AP – Casuarina [ACA]
- iv. Orissa – Eu (clonal) [OEC]
- v. Orissa – Eu (seed) [OES]

A total of 77 sample plots distributed over five strata would be used to monitor the project. The distribution of plots across the strata is presented in the table below. The details of sample size calculation are presented in **Annex 6** of the PDD.

The tool and the methodology recommend the use of a precision of 10% percent for targeting the error and a confidence interval of 90%. In the project, as a measure of conservativeness, the number of sample plots is estimated using a level of precision of 10% and a confidence interval of 95%.

The number of sample plots estimated using the 10% precision is 77. An additional 30% of plots are added to insure against the loss of sample plots during the monitoring period. Therefore, a total of 100 sample plots are considered appropriate for the monitoring purpose. The sample plots are rounded to the nearest integer and distributed over five strata. It is possible to modify the sample size after the first



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monitoring event taking into account the actual variation of carbon stock changes assessed from measurement. If further variation in the standard deviation is observed during the measurement campaign, the number of plots would be revised suitably.

Table 1: Sample plot distribution

Degree of level of precision (error)	Total number of sample plots	Andhra Pradesh			Orissa	
		<i>Eu</i> (Clonal)	<i>Eu</i> (Seed)	<i>Casuarina</i>	<i>Eu</i> (Clonal)	<i>Eu</i> (Seed)
10%	77	26	2	28	16	5
Additional 30% plots to insure against risk of loss of plots	23	8	1	8	5	1
	100	34	3	36	21	6

c) Location of sampling plots

The permanent sample plots will be located systematically with a random start, which is considered good practice in GPG-LULUCF. This can be accomplished with the help of a GPS in the field. The geographical position (GPS coordinate), administrative location, stratum and sub-stratum series number of each plots will be recorded and archived. The sampling plots will be distributed randomly and evenly.

The centers of the square sample plots are marked to facilitate the measurement of trees located on the plot at each inventory and subsequent inventories. The precise location of plots is recorded, as they would need to be identified at the subsequent verification.

d) Frequency of monitoring

Monitoring is planned at five-year intervals during the crediting period.

e) Data on tree vegetation parameters for calculation of above ground tree biomass

Carbon stock changes over time will be estimated using data for biomass growth. The biomass growth will be calculated as a function of volume growth.

The biomass estimation consists of the following steps:

- 1) Determination of the location of sample plots.
- 2) Separately for each species present in the sample plot, measurement of DBH of all trees with DBH greater than 2.5 cm .
- 3) Calculation of mean diameter per species to assess the volume.
- 4) For each species, the heights of trees are measured and average height is calculated.
- 5) For each species, height class is assessed (according to species, mean diameter and average height).
- 6) The volume per tree of the aboveground biomass corresponding to average diameter is assessed from the allometric equation/ yield table.
- 7) For each species, the volume is multiplied by number of trees on the sample plot to obtain volume per sample plot.
- 8) Volume per plot is calculated as a product of volume per hectare and area of the plot.

**g) Procedures for measurement of tree biomass*****Tree diameter***

The diameter of a tree is measured at breast height (1.37 m). The measurement is rounded down to full centimeters. The minimum diameter to be measured is 2.5 cm.

Tree height

For each site, yield class will be determined by measuring tree heights. If the heights of several trees are the same, one measurement can be used for several trees.

h) Procedures for maintenance of equipment used in vegetation measurement

The common procedures to be followed in the maintenance of equipment used in vegetation measurement are outlined below. In case no ready guidance is available on the procedures, the recommendations of local forest management agency will be followed.

- When compass is used in the field, it is calibrated to compensate for the local difference between magnetic and true north (magnetic declination) and adjustment is completed in order to facilitate the recording of accurate bearing.
- It is recommended to use DBH tapes made of steel or aluminum, and cloth tapes should be avoided considering their propensity for wear and tear that could result in measurement inaccuracies.
- Pacing can be useful to establish the relationship between map and photo information with the measurements on the ground. One step represents half of a pace and two steps equal one pace. Therefore, crew should be trained in pacing on flat ground.

Recording of vegetation measurement data

The data formats will be used for recording and reporting vegetation measurement data. The formats outlined at the end of this monitoring plan illustrate the details that would be collected during plot measurements

i) Calculation of volume

Volume estimation of *Eucalyptus* & *Casuarina* will be done based on past measurements in the region.

j) Calculation of carbon stock and carbon stock change

Data to assess the change in aboveground carbon stock would be based on the measurements of permanent sample plots. Carbon stock changes over time will be calculated using data on biomass growth.



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From the volume of trees, carbon stock in CO₂ will be calculated (density, CF, BEF, CO₂/C). The method applied for measuring and estimating carbon stock change over time in the project area is a net method thus all biomass decrements resulting from silvicultural activities or fodder collection, etc. are implicitly covered.

4. Monitoring GHG emissions by sources as the results of the A/R CDM project activity

There are no GHG emissions associated with the implementation of the project as there is no biomass burning involved in the site preparation and site preparation and planting activities are carried out using manual methods Therefore, project emissions **GHG_E** are considered zero.

The monitoring will cover natural fires. In cases of fire, the area and volume affected will be assessed and emissions associated with the biomass burning from fire are calculated and accounted as part of actual net GHG removals by sinks.

Procedures for emergency preparedness for cases where emergencies could cause unintended emissions

- *Procedures to assess the GHG emissions due to fire in the boundary*

The project would consider the inputs of local communities in implementing the fire management plan. The fire prevention measures such as establishment of fire lines, reduction of fuel load, clearance of brushwood and dry vegetation close to the project parcels would be implemented.

In case of accidental fires, the area and carbon stock affected would be assessed using field surveys and measurement. The procedures for calculation of GHG emissions from natural fires would be adopted to account the project emissions.

Step 1: The area subjected to biomass burning would be assessed using field survey methods and recorded in the project database.

Step 2: The amount of non-CO₂ emissions is assessed based on the CO₂ emissions from biomass burning, therefore, CO₂ emissions from biomass burning would be estimated as precursor to the estimation of non-CO₂ emissions.

Step 3: Data on combustion efficiencies are adopted from the Tables 3A.1.12, 3A.1.14 GPG/LULUCF) and data on emission factors of non-CO₂ gases are adopted from Tables 3.A 15 and 3.A.16 of GPG-LULUCF to estimate the emissions. The mean emission factors of CH₄ (0.012) and N₂O (0.007) released from biomass burning should be used.

- *Procedures to assess the impact of pest infestation on the carbon stock of the project*

In case of pest damage, monitoring team would assess the area affected and the carbon stock of the pest affected area and implement pest management measures to minimize negative impacts on the remaining carbon stock in the project boundary and to prevent the spread of infestation to areas outside project boundary.

- *Impact of weather related disturbances on carbon stocks in the project boundary*

Procedures would be implemented to assess the weather related disturbances events such as



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droughts and floods in the project area and survival of plantations in the affected areas. The data from field surveys of the affected areas would be used to assess the impact of droughts and floods on the carbon stock of the project.

5. Monitoring the leakage

a) Displacement of grazing

The ex ante assessment indicated that the displacement of grazing is not expected to occur as a result of the project as additional fodder is produced in the project area.

During project implementation, the number of animal equivalent units supported by the project ($(Na_{AR,t})$) is monitored using survey of random sample of animal owner households whose land parcels are the discrete areas of the project. The monitoring results are to be presented in the monitoring report for the purpose of verification.

b) Displacement of fuelwood collection

Lands under the project do not contain any tree growth in the baseline scenario. Only grass and herbaceous vegetation is present in insignificant quantities. As a consequence, the pre-project annual fuel-wood gathering in the project area is **zero**.

The fuel-wood production is expected to increase significantly as result of the project. Consequently, $FG_{BL} < FG_{AR,t}$ will hold throughout the project crediting period. As the project produces more fuelwood in comparison to the baseline, therefore, there is also no risk of fuelwood leakage. Therefore, **no** monitoring of the leakage from displacement of fuel-wood collection outside the project is required in the project.

In order to demonstrate that the fuelwood production from the project is greater than that of the the baseline scenario, the fuelwood production from pruning, thinning and final harvest of the project is to be presented in the monitoring report.

6. Quality Assurance and Quality Control (QA/QC)

To ensure that the net anthropogenic GHG removals by sinks are measured and monitored precisely, credibly, verifiably and transparently, a quality assurance and quality control (QA/QC) procedure will be implemented,

a) Reliable field measurements

To ensure the reliable field measurements,

- Standard Operating Procedures (SOPs) for each step of the field measurements, including all detail phases of the field measurements and provisions for documentation for verification purposes are proposed in this document and they will be adjusted periodically.
- Training courses on the field data collection and data analyses would be held for persons involving in the field measurement works. The training courses will ensure that each field-team member is fully aware of all procedures and the importance of collecting data as accurately as possible.

b) Verification of field data

To verify that plots have been installed and the measurements taken correctly,



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- Randomly selected plots will be re-measured by teams other than those involved in the prior plot measurements
- Key re-measurement elements include the location of plots, DBH and tree height.
- The re-measurement data will be compared with the original measurement data. Errors assessed in the prior measurements will be corrected and recorded and would be used to calculate the measurement error.

c) Verification of data entry and analysis

To minimize the possible errors in the process of data entry, the entry of both field data and laboratory data will be reviewed by an independent expert team and compared with independent data to ensure that the data is realistic. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before the final analysis of the monitoring data is completed.

d) Data maintenance and archiving

Data archiving will take both electronic and paper forms, and copies of all data will be provided to each project participant. All electronic data and reports will also be copied on durable media such as CDs and copies of the CDs are stored in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;
- GPS coordinates and other spatial data;
- Estimates of the carbon stock changes in all pools and non-CO₂ GHG and corresponding calculation spreadsheets;
- Copies of the measuring and monitoring reports.

7. Monitoring of socioeconomic issues

In the years of project verification, the project monitoring unit will fill in a questionnaire on the socioeconomic issues relevant to the project. The project monitoring would also consider the socioeconomic factors that influence the status of carbon pools.

8. Collection of project data and information

Following details are proposed to be collected under the monitoring plan for the project activity

Table 2: Data collected from the farmers enrolled in the project activity

A	Information on the participating farmer		
S.No.	Item	Data	Remarks
1	Name of Farmer		Full name
2	Address		
3	H.No.		
4	Village		
5	Mandal /Block		
6	District		
7	Pin code		
8	Phone, if any.		
B	Information on land tenure		
1	Area (ha)		1 ha = 2.5Acres



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1a	Proof of ownership		Pattadar Pass Book, Pahani, separation deed, lease right, etc
2	Survey No.		
2a	Survey map/ cadastral information		
3a	Longitude		
3b	Latitude		
4	Type of land		
4a	Land surface (plane/slope)		
4b	Soil type (alluvial/laterite/sandy loam/sandy)		
5 a	Was the land covered with forest in 1989/90 (crown cover of 15%, with trees > 5 Mt.)	No (default)	
5b	Was the land forested for 50 years before now (crown cover of 15%, with trees > 5 Mt.)	No (default)	Statement of Yes/ No is adequate
6	Existing land use (agri/fallow)		
6a	If, Agri, which crops, in last three years		
6b	If Fallow, how many years		
7	Rainfed/ Irrigation		
7a	If irrigated; well/canal		
7b	Type of irrigation (flood/drip)		
7c	Source of power for irrigation (electricity/diesel)		
8	Baseline digital photograph: (yes/no)		If GPS Camera is used (Make/model)
9	Whether any shrubs and grasses need to be cleared for plantation		
10	Is the land used at present for grazing (If yes, how much fodder is produced or no. of animals grazed and for how many days in a year.		Yes/ No
11	Trees present, No. species wise, DBH		

Table 3: Data on land preparation and planting

C	Land preparation		
S.No.	Item	Data	Remarks
1	Grass patches cleared ; Qty in Kgs,		
1a	Is biomass burning practiced (yes/no)		



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2	Any trees cleared (yes/no)		
3	Number of pits/trenches		
4	Type of Species planted		
5	Spacing		
6	Number of plants per ha		
7	Seedling transport distance in km		
8	Mode of transport (truck/ LCV/ tractor/ bullock cart)		

Table 4: Survival data

D	Survival		
S.No.	Item	Data	Remarks
1	Year and month of survey		
2	Mortality (yes/no)		
3	If yes, number/ha		
4	Replacement with new plants; if yes, number/ha.		
5	Survival percent		
	Year 1		
	Year 2		
	Year 3		

Table 5: Sample plot details

E	Sample plot ID		
S.No.	Item	Data	Remarks
1	Size of plot (in Length X Breadth in meters)		
2	Date of demarcation		
3	Demarcated by		
4	No. trees in Sample plot		
5	Longitude of sample plot		
6	Latitude of sample plot		
7	DBH of trees in sample plot		
7a	Species		
7a(i)	DBH of tree no.		
7a(ii)	DBH of tree no.		
8	Height of trees in sample plot		
8a	Species		
8a (i)	Height of tree no...		
8a(ii)	Height of tree no...		



Annex 5

SUMMARY OF LAND PARCELS

Sl	Name of the district	No. of land parcels	PRA done	Number of participating villages
1	Rayagada	247	10	78
2	Kalahandi	279	07	80
3	Koraput	107	10	29
4	Visakhapatnam	158	06	56
5	Vizianagram	444	07	151
6	Srikakulam	473	07	107
7	Total	1708	47	501



Annex 6

Calculation of Sample Size for Monitoring of the Project

Enclosed as separate file

Annex 7

Calculation of GHG Removals by Sinks

Enclosed as separate file

Annex 8

Participatory Rural Appraisal

Enclosed as separate file

Procedure followed and data collected through PRA exercise:

- 1) Social Mapping of the Village/ Project areas.
- 2) Important events & current human intervention in the project land.
- 3) Project area stratifications.
- 4) Land use pattern & land cover history.
- 5) Choice of species by ranking analysis.
- 6) Trend Analysis of Land for last 20 Years.
- 7) Trend Analysis of Agricultural Crops for last 20 years.
- 8) Route Cause analysis for changing over of cropping pattern by the villagers.
- 9) Cattle Population in the village & its trend analysis for last 20 years.
- 10) Fire wood requirement by the villagers and its fulfilment by different kinds of woods/ branches etc.



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Annex 9

List of participating villages in the project

CODE	JK_CODE	State	District	Species
1	OKL04EC0001	Orissa	Kalahandi	Euc(CI)
2	OKL04EC0002	Orissa	Kalahandi	Euc(CI)
3	OKL04EC0003	Orissa	Kalahandi	Euc(CI)
4	OKL04EC0004	Orissa	Kalahandi	Euc(CI)
5	OKL04EC0004	Orissa	Kalahandi	Euc(CI)
6	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
7	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
8	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
9	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
10	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
11	OKL04EC0005	Orissa	Kalahandi	Euc(CI)
12	OKL04EC0006	Orissa	Kalahandi	Euc(CI)
13	OKL04EC0007	Orissa	Kalahandi	Euc(CI)
14	OKL04EC0008	Orissa	Kalahandi	Euc(CI)
16	OKL04EC0010	Orissa	Kalahandi	Euc(CI)
17	OKL04EC0011	Orissa	Kalahandi	Euc(CI)
18	OKL04EC0012	Orissa	Kalahandi	Euc(CI)
19	OKL04EC0013	Orissa	Kalahandi	Euc(CI)
20	OKL04EC0014	Orissa	Kalahandi	Euc(CI)
21	OKL04EC0015	Orissa	Kalahandi	Euc(CI)
22	OKL04EC0016	Orissa	Kalahandi	Euc(CI)
23	OKL04EC0017	Orissa	Kalahandi	Euc(CI)
24	OKL04EC0018	Orissa	Kalahandi	Euc(CI)
25	OKL04EC0019	Orissa	Kalahandi	Euc(CI)
26	OKL04EC0020	Orissa	Kalahandi	Euc(CI)
27	OKL04EC0021	Orissa	Kalahandi	Euc(CI)
28	OKL04EC0021	Orissa	Kalahandi	Euc(CI)
29	OKL04ES0110	Orissa	Kalahandi	Euc(Sr)
30	OKL04ES0111	Orissa	Kalahandi	Euc(Sr)
31	OKL04ES0112	Orissa	Kalahandi	Euc(Sr)
32	OKL04ES0114	Orissa	Kalahandi	Euc(Sr)
33	OKL04ES0115	Orissa	Kalahandi	Euc(Sr)
34	OKL04ES0116	Orissa	Kalahandi	Euc(Sr)
35	OKL04ES0117	Orissa	Kalahandi	Euc(Sr)



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36	OKL04ES0118	Orissa	Kalahandi	Euc(Sr)
37	OKL04ES0119	Orissa	Kalahandi	Euc(Sr)
38	OKL04ES0120	Orissa	Kalahandi	Euc(Sr)
39	OKL05EC0022	Orissa	Kalahandi	Euc(CI)
40	OKL05EC0023	Orissa	Kalahandi	Euc(CI)
41	OKL05EC0024	Orissa	Kalahandi	Euc(CI)
42	OKL05EC0025	Orissa	Kalahandi	Euc(CI)
43	OKL05EC0026	Orissa	Kalahandi	Euc(CI)
44	OKL05EC0027	Orissa	Kalahandi	Euc(CI)
45	OKL05EC0028	Orissa	Kalahandi	Euc(CI)
46	OKL05EC0029	Orissa	Kalahandi	Euc(CI)
47	OKL05EC0030	Orissa	Kalahandi	Euc(CI)
48	OKL05EC0031	Orissa	Kalahandi	Euc(CI)
49	OKL05EC0033	Orissa	Kalahandi	Euc(CI)
50	OKL05EC0036	Orissa	Kalahandi	Euc(CI)
51	OKL05EC0036	Orissa	Kalahandi	Euc(CI)
52	OKL05EC0037	Orissa	Kalahandi	Euc(CI)
53	OKL05EC0037	Orissa	Kalahandi	Euc(CI)
54	OKL05EC0038	Orissa	Kalahandi	Euc(CI)
55	OKL05EC0039	Orissa	Kalahandi	Euc(CI)
56	OKL05EC0040	Orissa	Kalahandi	Euc(CI)
57	OKL05EC0041	Orissa	Kalahandi	Euc(CI)
58	OKL05EC0041	Orissa	Kalahandi	Euc(CI)
59	OKL05EC0041	Orissa	Kalahandi	Euc(CI)
60	OKL05EC0042	Orissa	Kalahandi	Euc(CI)
61	OKL05EC0043	Orissa	Kalahandi	Euc(CI)
62	OKL05EC0044	Orissa	Kalahandi	Euc(CI)
63	OKL05EC0045	Orissa	Kalahandi	Euc(CI)
64	OKL05EC0046	Orissa	Kalahandi	Euc(CI)
65	OKL05EC0047	Orissa	Kalahandi	Euc(CI)
66	OKL05EC0048	Orissa	Kalahandi	Euc(CI)
67	OKL05EC0049	Orissa	Kalahandi	Euc(CI)
68	OKL05EC0050	Orissa	Kalahandi	Euc(CI)
69	OKL05EC0051	Orissa	Kalahandi	Euc(CI)
70	OKL05EC0052	Orissa	Kalahandi	Euc(CI)
71	OKL05EC0052	Orissa	Kalahandi	Euc(CI)
72	OKL05EC0053	Orissa	Kalahandi	Euc(CI)
73	OKL05EC0054	Orissa	Kalahandi	Euc(CI)
74	OKL05EC0055	Orissa	Kalahandi	Euc(CI)
75	OKL05EC0057	Orissa	Kalahandi	Euc(CI)



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76	OKL05EC0057	Orissa	Kalahandi	Euc(CI)
77	OKL05EC0058	Orissa	Kalahandi	Euc(CI)
78	OKL05EC0059	Orissa	Kalahandi	Euc(CI)
79	OKL05EC0060	Orissa	Kalahandi	Euc(CI)
80	OKL05EC0061	Orissa	Kalahandi	Euc(CI)
81	OKL05EC0062	Orissa	Kalahandi	Euc(CI)
82	OKL05EC0062	Orissa	Kalahandi	Euc(CI)
83	OKL05EC0062	Orissa	Kalahandi	Euc(CI)
84	OKL05EC0063	Orissa	Kalahandi	Euc(CI)
85	OKL05EC0063	Orissa	Kalahandi	Euc(CI)
86	OKL05EC0064	Orissa	Kalahandi	Euc(CI)
87	OKL05ES0121	Orissa	Kalahandi	Euc(Sr)
88	OKL05ES0123	Orissa	Kalahandi	Euc(Sr)
89	OKL05ES0124	Orissa	Kalahandi	Euc(Sr)
90	OKL05ES0125	Orissa	Kalahandi	Euc(Sr)
91	OKL05ES0126	Orissa	Kalahandi	Euc(Sr)
92	OKL05ES0127	Orissa	Kalahandi	Euc(Sr)
93	OKL05ES0128	Orissa	Kalahandi	Euc(Sr)
94	OKL05ES0130	Orissa	Kalahandi	Euc(Sr)
95	OKL05ES0131	Orissa	Kalahandi	Euc(Sr)
96	OKL05ES0132	Orissa	Kalahandi	Euc(Sr)
97	OKL05ES0133	Orissa	Kalahandi	Euc(Sr)
98	OKL05ES0134	Orissa	Kalahandi	Euc(Sr)
99	OKL05ES0135	Orissa	Kalahandi	Euc(Sr)
100	OKL05ES0136	Orissa	Kalahandi	Euc(Sr)
101	OKL05ES0137	Orissa	Kalahandi	Euc(Sr)
102	OKL05ES0138	Orissa	Kalahandi	Euc(Sr)
103	OKL05ES0139	Orissa	Kalahandi	Euc(Sr)
104	OKL05ES0140	Orissa	Kalahandi	Euc(Sr)
105	OKL05ES0141	Orissa	Kalahandi	Euc(Sr)
106	OKL05ES0142	Orissa	Kalahandi	Euc(Sr)
107	OKL05ES0143	Orissa	Kalahandi	Euc(Sr)
108	OKL06EC0065	Orissa	Kalahandi	Euc(CI)
109	OKL06EC0067	Orissa	Kalahandi	Euc(CI)
110	OKL06EC0069	Orissa	Kalahandi	Euc(CI)
111	OKL06EC0070	Orissa	Kalahandi	Euc(CI)
112	OKL06EC0072	Orissa	Kalahandi	Euc(CI)
113	OKL06EC0073	Orissa	Kalahandi	Euc(CI)
114	OKL06EC0074	Orissa	Kalahandi	Euc(CI)
115	OKL06EC0074	Orissa	Kalahandi	Euc(CI)



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116	OKL06EC0074	Orissa	Kalahandi	Euc(CI)
117	OKL06EC0075	Orissa	Kalahandi	Euc(CI)
118	OKL06EC0066	Orissa	Kalahandi	Euc(CI)
119	OKL06ES0144	Orissa	Kalahandi	Euc(Sr)
120	OKL06ES0145	Orissa	Kalahandi	Euc(Sr)
121	OKL06ES0148	Orissa	Kalahandi	Euc(Sr)
122	OKL06ES0149	Orissa	Kalahandi	Euc(Sr)
123	OKL06ES0150	Orissa	Kalahandi	Euc(Sr)
124	OKL06ES0151	Orissa	Kalahandi	Euc(Sr)
125	OKL06ES0152	Orissa	Kalahandi	Euc(Sr)
126	OKL06ES0153	Orissa	Kalahandi	Euc(Sr)
127	OKL06ES0154	Orissa	Kalahandi	Euc(Sr)
128	OKL06ES0155	Orissa	Kalahandi	Euc(Sr)
129	OKL06ES0157	Orissa	Kalahandi	Euc(Sr)
130	OKL06ES0158	Orissa	Kalahandi	Euc(Sr)
131	OKL06ES0159	Orissa	Kalahandi	Euc(Sr)
132	OKL06ES0160	Orissa	Kalahandi	Euc(Sr)
133	OKL06ES0161	Orissa	Kalahandi	Euc(Sr)
134	OKL06ES0162	Orissa	Kalahandi	Euc(Sr)
135	OKL06ES0163	Orissa	Kalahandi	Euc(Sr)
136	OKL06ES0164	Orissa	Kalahandi	Euc(Sr)
137	OKL06ES0165	Orissa	Kalahandi	Euc(Sr)
138	OKL06ES0166	Orissa	Kalahandi	Euc(Sr)
139	OKL06ES0167	Orissa	Kalahandi	Euc(Sr)
140	OKL06ES0168	Orissa	Kalahandi	Euc(Sr)
141	OKL06ES0169	Orissa	Kalahandi	Euc(Sr)
142	OKL06ES0170	Orissa	Kalahandi	Euc(Sr)
143	OKL06ES0171	Orissa	Kalahandi	Euc(Sr)
144	OKL06ES0172	Orissa	Kalahandi	Euc(Sr)
145	OKL06ES0173	Orissa	Kalahandi	Euc(Sr)
146	OKL06ES0174	Orissa	Kalahandi	Euc(Sr)
147	OKL06ES0175	Orissa	Kalahandi	Euc(Sr)
148	OKL06ES0176	Orissa	Kalahandi	Euc(Sr)
149	OKL06ES0177	Orissa	Kalahandi	Euc(Sr)
150	OKL06ES0179	Orissa	Kalahandi	Euc(Sr)
151	OKL06ES0180	Orissa	Kalahandi	Euc(Sr)
152	OKL06ES0181	Orissa	Kalahandi	Euc(Sr)
153	OKL06ES0182	Orissa	Kalahandi	Euc(Sr)
155	OKL06ES0184	Orissa	Kalahandi	Euc(Sr)
156	OKL06ES0185	Orissa	Kalahandi	Euc(Sr)



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157	OKL06ES0186	Orissa	Kalahandi	Euc(Sr)
158	OKL06ES0187	Orissa	Kalahandi	Euc(Sr)
159	OKL06ES0188	Orissa	Kalahandi	Euc(Sr)
160	OKL06ES0189	Orissa	Kalahandi	Euc(Sr)
161	OKL06ES0190	Orissa	Kalahandi	Euc(Sr)
162	OKL06ES0191	Orissa	Kalahandi	Euc(Sr)
163	OKL06ES0192	Orissa	Kalahandi	Euc(Sr)
164	OKL07EC0076	Orissa	Kalahandi	Euc(CI)
165	OKL07EC0077	Orissa	Kalahandi	Euc(CI)
166	OKL07EC0078	Orissa	Kalahandi	Euc(CI)
167	OKL07EC0079	Orissa	Kalahandi	Euc(CI)
168	OKL07EC0080	Orissa	Kalahandi	Euc(CI)
169	OKL07EC0081	Orissa	Kalahandi	Euc(CI)
170	OKL07EC0081	Orissa	Kalahandi	Euc(CI)
171	OKL07EC0081	Orissa	Kalahandi	Euc(CI)
172	OKL07EC0081	Orissa	Kalahandi	Euc(CI)
173	OKL07EC0081	Orissa	Kalahandi	Euc(CI)
174	OKL07EC0082	Orissa	Kalahandi	Euc(CI)
175	OKL07EC0083	Orissa	Kalahandi	Euc(CI)
176	OKL07EC0084	Orissa	Kalahandi	Euc(CI)
177	OKL07EC0085	Orissa	Kalahandi	Euc(CI)
178	OKL07EC0086	Orissa	Kalahandi	Euc(CI)
179	OKL07EC0087	Orissa	Kalahandi	Euc(CI)
180	OKL07EC0088	Orissa	Kalahandi	Euc(CI)
181	OKL07EC0089	Orissa	Kalahandi	Euc(CI)
182	OKL07EC0090	Orissa	Kalahandi	Euc(CI)
183	OKL07EC0092	Orissa	Kalahandi	Euc(CI)
184	OKL07EC0094	Orissa	Kalahandi	Euc(CI)
185	OKL07EC0098	Orissa	Kalahandi	Euc(CI)
186	OKL07EC0099	Orissa	Kalahandi	Euc(CI)
187	OKL07EC0100	Orissa	Kalahandi	Euc(CI)
189	OKL07EC0102	Orissa	Kalahandi	Euc(CI)
190	OKL07EC0103	Orissa	Kalahandi	Euc(CI)
191	OKL07EC0106	Orissa	Kalahandi	Euc(CI)
192	OKL07EC0106	Orissa	Kalahandi	Euc(CI)
193	OKL07EC0107	Orissa	Kalahandi	Euc(CI)
194	OKL07EC0108	Orissa	Kalahandi	Euc(CI)
195	OKL07ES0193	Orissa	Kalahandi	Euc(Sr)
196	OKL07ES0194	Orissa	Kalahandi	Euc(Sr)
197	OKL07ES0195	Orissa	Kalahandi	Euc(Sr)



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198	OKL07ES0196	Orissa	Kalahandi	Euc(Sr)
199	OKL07ES0197	Orissa	Kalahandi	Euc(Sr)
201	OKL07ES0199	Orissa	Kalahandi	Euc(Sr)
202	OKL07ES0200	Orissa	Kalahandi	Euc(Sr)
204	OKL07ES0202	Orissa	Kalahandi	Euc(Sr)
205	OKL07ES0207	Orissa	Kalahandi	Euc(Sr)
206	OKL07ES0208	Orissa	Kalahandi	Euc(Sr)
207	OKL07ES0209	Orissa	Kalahandi	Euc(Sr)
208	OKL07ES0210	Orissa	Kalahandi	Euc(Sr)
209	OKL07ES0211	Orissa	Kalahandi	Euc(Sr)
210	OKL07ES0212	Orissa	Kalahandi	Euc(Sr)
211	OKL07ES0213	Orissa	Kalahandi	Euc(Sr)
212	OKL07ES0214	Orissa	Kalahandi	Euc(Sr)
213	OKL07ES0215	Orissa	Kalahandi	Euc(Sr)
214	OKL07ES0216	Orissa	Kalahandi	Euc(Sr)
215	OKL07ES0217	Orissa	Kalahandi	Euc(Sr)
216	OKL07ES0218	Orissa	Kalahandi	Euc(Sr)
217	OKL07ES0219	Orissa	Kalahandi	Euc(Sr)
218	OKL07ES0220	Orissa	Kalahandi	Euc(Sr)
219	OKL07ES0221	Orissa	Kalahandi	Euc(Sr)
220	OKL07ES0222	Orissa	Kalahandi	Euc(Sr)
221	OKL07ES0223	Orissa	Kalahandi	Euc(Sr)
222	OKL07ES0224	Orissa	Kalahandi	Euc(Sr)
223	OKL07ES0225	Orissa	Kalahandi	Euc(Sr)
224	OKL07ES0226	Orissa	Kalahandi	Euc(Sr)
225	OKL07ES0227	Orissa	Kalahandi	Euc(Sr)
226	OKL07ES0228	Orissa	Kalahandi	Euc(Sr)
227	OKL07ES0229	Orissa	Kalahandi	Euc(Sr)
228	OKL07ES0230	Orissa	Kalahandi	Euc(Sr)
229	OKL07ES0231	Orissa	Kalahandi	Euc(Sr)
230	OKL07ES0233	Orissa	Kalahandi	Euc(Sr)
231	OKL07ES0235	Orissa	Kalahandi	Euc(Sr)
232	OKL07ES0236	Orissa	Kalahandi	Euc(Sr)
233	OKL07ES0237	Orissa	Kalahandi	Euc(Sr)
234	OKL07ES0238	Orissa	Kalahandi	Euc(Sr)
235	OKL07ES0239	Orissa	Kalahandi	Euc(Sr)
236	OKL07ES0240	Orissa	Kalahandi	Euc(Sr)
237	OKL07ES0241	Orissa	Kalahandi	Euc(Sr)
238	OKL07ES0242	Orissa	Kalahandi	Euc(Sr)
239	OKL07ES0243	Orissa	Kalahandi	Euc(Sr)



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240	OKL07ES0244	Orissa	Kalahandi	Euc(Sr)
241	OKL07ES0245	Orissa	Kalahandi	Euc(Sr)
242	OKL07ES0246	Orissa	Kalahandi	Euc(Sr)
243	OKL07ES0247	Orissa	Kalahandi	Euc(Sr)
244	OKL07ES0248	Orissa	Kalahandi	Euc(Sr)
245	OKL07ES0249	Orissa	Kalahandi	Euc(Sr)
246	OKL07ES0250	Orissa	Kalahandi	Euc(Sr)
247	OKL07ES0251	Orissa	Kalahandi	Euc(Sr)
248	OKL07ES0252	Orissa	Kalahandi	Euc(Sr)
249	OKL07ES0253	Orissa	Kalahandi	Euc(Sr)
250	OKL07ES0254	Orissa	Kalahandi	Euc(Sr)
251	OKL07ES0255	Orissa	Kalahandi	Euc(Sr)
252	OKL07ES0257	Orissa	Kalahandi	Euc(Sr)
253	OKL07ES0259	Orissa	Kalahandi	Euc(Sr)
254	OKL07ES0260	Orissa	Kalahandi	Euc(Sr)
255	OKL07ES0261	Orissa	Kalahandi	Euc(Sr)
256	OKL07ES0262	Orissa	Kalahandi	Euc(Sr)
257	OKL07ES0263	Orissa	Kalahandi	Euc(Sr)
258	OKL07ES0264	Orissa	Kalahandi	Euc(Sr)
259	OKL07ES0265	Orissa	Kalahandi	Euc(Sr)
260	OKL07ES0266	Orissa	Kalahandi	Euc(Sr)
261	OKL07ES0267	Orissa	Kalahandi	Euc(Sr)
263	OKL07ES0269	Orissa	Kalahandi	Euc(Sr)
264	OKL07ES0270	Orissa	Kalahandi	Euc(Sr)
265	OKL07ES0271	Orissa	Kalahandi	Euc(Sr)
266	OKL07ES0272	Orissa	Kalahandi	Euc(Sr)
267	OKL07ES0273	Orissa	Kalahandi	Euc(Sr)
268	OKL07ES0274	Orissa	Kalahandi	Euc(Sr)
269	OKL07ES0275	Orissa	Kalahandi	Euc(Sr)
270	OKL07ES0276	Orissa	Kalahandi	Euc(Sr)
271	OKL07ES0277	Orissa	Kalahandi	Euc(Sr)
272	OKL07ES0279	Orissa	Kalahandi	Euc(Sr)
273	OKL07ES0283	Orissa	Kalahandi	Euc(Sr)
274	OKL07ES0284	Orissa	Kalahandi	Euc(Sr)
275	OKL07ES0285	Orissa	Kalahandi	Euc(Sr)
276	OKL07ES0286	Orissa	Kalahandi	Euc(Sr)
277	OKL07ES0287	Orissa	Kalahandi	Euc(Sr)
278	OKL07ES0288	Orissa	Kalahandi	Euc(Sr)
279	OKL07ES0289	Orissa	Kalahandi	Euc(Sr)
280	ORG04EC0001	Orissa	Rayagada	Euc(CI)



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281	ORG04EC0002	Orissa	Rayagada	Euc(CI)
282	ORG04EC0002	Orissa	Rayagada	Euc(CI)
283	ORG04EC0003	Orissa	Rayagada	Euc(CI)
284	ORG04EC0004	Orissa	Rayagada	Euc(CI)
285	ORG04EC0005	Orissa	Rayagada	Euc(CI)
286	ORG04EC0006	Orissa	Rayagada	Euc(CI)
287	ORG04EC0007	Orissa	Rayagada	Euc(CI)
288	ORG04EC0008	Orissa	Rayagada	Euc(CI)
289	ORG04EC0009	Orissa	Rayagada	Euc(CI)
290	ORG04EC0011	Orissa	Rayagada	Euc(CI)
291	ORG04EC0012	Orissa	Rayagada	Euc(CI)
292	ORG04EC0013	Orissa	Rayagada	Euc(CI)
293	ORG04EC0014	Orissa	Rayagada	Euc(CI)
294	ORG04EC0015	Orissa	Rayagada	Euc(CI)
295	ORG04EC0015	Orissa	Rayagada	Euc(CI)
296	ORG04EC0016	Orissa	Rayagada	Euc(CI)
297	ORG04EC0016	Orissa	Rayagada	Euc(CI)
298	ORG04EC0017	Orissa	Rayagada	Euc(CI)
299	ORG04EC0018	Orissa	Rayagada	Euc(CI)
300	ORG04EC0019	Orissa	Rayagada	Euc(CI)
301	ORG04ES0114	Orissa	Rayagada	Euc(Sr)
302	ORG04ES0116	Orissa	Rayagada	Euc(Sr)
303	ORG04ES0117	Orissa	Rayagada	Euc(Sr)
305	ORG04ES0119	Orissa	Rayagada	Euc(Sr)
306	ORG04ES0120	Orissa	Rayagada	Euc(Sr)
307	ORG04ES0121	Orissa	Rayagada	Euc(Sr)
308	ORG04ES0122	Orissa	Rayagada	Euc(Sr)
309	ORG04ES0123	Orissa	Rayagada	Euc(Sr)
310	ORG04ES0124	Orissa	Rayagada	Euc(Sr)
311	ORG04ES0125	Orissa	Rayagada	Euc(Sr)
312	ORG04ES0126	Orissa	Rayagada	Euc(Sr)
313	ORG04ES0127	Orissa	Rayagada	Euc(Sr)
314	ORG04ES0128	Orissa	Rayagada	Euc(Sr)
315	ORG04ES0129	Orissa	Rayagada	Euc(Sr)
316	ORG04ES0130	Orissa	Rayagada	Euc(Sr)
317	ORG04ES0131	Orissa	Rayagada	Euc(Sr)
318	ORG04ES0132	Orissa	Rayagada	Euc(Sr)
319	ORG04ES0133	Orissa	Rayagada	Euc(Sr)
320	ORG05EC0020	Orissa	Rayagada	Euc(CI)
321	ORG05EC0020	Orissa	Rayagada	Euc(CI)



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322	ORG05EC0021	Orissa	Rayagada	Euc(CI)
323	ORG05EC0022	Orissa	Rayagada	Euc(CI)
324	ORG05EC0023	Orissa	Rayagada	Euc(CI)
325	ORG05EC0024	Orissa	Rayagada	Euc(CI)
326	ORG05EC0025	Orissa	Rayagada	Euc(CI)
327	ORG05EC0025	Orissa	Rayagada	Euc(CI)
328	ORG05EC0025	Orissa	Rayagada	Euc(CI)
329	ORG05EC0026	Orissa	Rayagada	Euc(CI)
330	ORG05EC0027	Orissa	Rayagada	Euc(CI)
331	ORG05EC0030	Orissa	Rayagada	Euc(CI)
332	ORG05EC0031	Orissa	Rayagada	Euc(CI)
333	ORG05EC0032	Orissa	Rayagada	Euc(CI)
334	ORG05EC0033	Orissa	Rayagada	Euc(CI)
335	ORG05EC0034	Orissa	Rayagada	Euc(CI)
336	ORG05EC0035	Orissa	Rayagada	Euc(CI)
337	ORG05EC0036	Orissa	Rayagada	Euc(CI)
338	ORG05ES0134	Orissa	Rayagada	Euc(Sr)
339	ORG05ES0135	Orissa	Rayagada	Euc(Sr)
340	ORG05ES0136	Orissa	Rayagada	Euc(Sr)
341	ORG05ES0137	Orissa	Rayagada	Euc(Sr)
342	ORG05ES0138	Orissa	Rayagada	Euc(Sr)
344	ORG05ES0140	Orissa	Rayagada	Euc(Sr)
345	ORG05ES0141	Orissa	Rayagada	Euc(Sr)
346	ORG05ES0142	Orissa	Rayagada	Euc(Sr)
347	ORG05ES0143	Orissa	Rayagada	Euc(Sr)
348	ORG05ES0144	Orissa	Rayagada	Euc(Sr)
349	ORG05ES0145	Orissa	Rayagada	Euc(Sr)
350	ORG05ES0146	Orissa	Rayagada	Euc(Sr)
351	ORG05ES0147	Orissa	Rayagada	Euc(Sr)
352	ORG05ES0148	Orissa	Rayagada	Euc(Sr)
353	ORG05ES0149	Orissa	Rayagada	Euc(Sr)
354	ORG05ES0151	Orissa	Rayagada	Euc(Sr)
355	ORG05ES0152	Orissa	Rayagada	Euc(Sr)
356	ORG05ES0153	Orissa	Rayagada	Euc(Sr)
357	ORG05ES0154	Orissa	Rayagada	Euc(Sr)
358	ORG05ES0154	Orissa	Rayagada	Euc(Sr)
359	ORG05ES0155	Orissa	Rayagada	Euc(Sr)
360	ORG05ES0156	Orissa	Rayagada	Euc(Sr)
361	ORG05ES0157	Orissa	Rayagada	Euc(Sr)
362	ORG06EC0038	Orissa	Rayagada	Euc(CI)



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363	ORG06EC0038	Orissa	Rayagada	Euc(CI)
364	ORG06EC0039	Orissa	Rayagada	Euc(CI)
365	ORG06EC0040	Orissa	Rayagada	Euc(CI)
366	ORG06EC0041	Orissa	Rayagada	Euc(CI)
367	ORG06EC0042	Orissa	Rayagada	Euc(CI)
368	ORG06EC0042	Orissa	Rayagada	Euc(CI)
369	ORG06EC0043	Orissa	Rayagada	Euc(CI)
370	ORG06EC0044	Orissa	Rayagada	Euc(CI)
371	ORG06EC0046	Orissa	Rayagada	Euc(CI)
372	ORG06EC0048	Orissa	Rayagada	Euc(CI)
373	ORG06EC0050	Orissa	Rayagada	Euc(CI)
374	ORG06EC0052	Orissa	Rayagada	Euc(CI)
375	ORG06EC0053	Orissa	Rayagada	Euc(CI)
376	ORG06EC0054	Orissa	Rayagada	Euc(CI)
377	ORG06EC0055	Orissa	Rayagada	Euc(CI)
378	ORG06EC0056	Orissa	Rayagada	Euc(CI)
379	ORG06EC0057	Orissa	Rayagada	Euc(CI)
380	ORG06EC0058	Orissa	Rayagada	Euc(CI)
381	ORG06EC0059	Orissa	Rayagada	Euc(CI)
383	ORG06ES0158	Orissa	Rayagada	Euc(Sr)
384	ORG06ES0159	Orissa	Rayagada	Euc(Sr)
385	ORG06ES0160	Orissa	Rayagada	Euc(Sr)
386	ORG06ES0162	Orissa	Rayagada	Euc(Sr)
387	ORG06ES0163	Orissa	Rayagada	Euc(Sr)
388	ORG06ES0164	Orissa	Rayagada	Euc(Sr)
389	ORG06ES0165	Orissa	Rayagada	Euc(Sr)
390	ORG06ES0166	Orissa	Rayagada	Euc(Sr)
391	ORG06ES0167	Orissa	Rayagada	Euc(Sr)
392	ORG06ES0168	Orissa	Rayagada	Euc(Sr)
393	ORG06ES0169	Orissa	Rayagada	Euc(Sr)
394	ORG06ES0170	Orissa	Rayagada	Euc(Sr)
395	ORG06ES0171	Orissa	Rayagada	Euc(Sr)
396	ORG06ES0172	Orissa	Rayagada	Euc(Sr)
397	ORG06ES0174	Orissa	Rayagada	Euc(Sr)
398	ORG06ES0175	Orissa	Rayagada	Euc(Sr)
399	ORG06ES0176	Orissa	Rayagada	Euc(Sr)
400	ORG06ES0177	Orissa	Rayagada	Euc(Sr)
401	ORG06ES0179	Orissa	Rayagada	Euc(Sr)
402	ORG06ES0182	Orissa	Rayagada	Euc(Sr)
403	ORG06ES0183	Orissa	Rayagada	Euc(Sr)



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404	ORG06ES0184	Orissa	Rayagada	Euc(Sr)
405	ORG06ES0185	Orissa	Rayagada	Euc(Sr)
406	ORG06ES0186	Orissa	Rayagada	Euc(Sr)
407	ORG06ES0187	Orissa	Rayagada	Euc(Sr)
408	ORG06ES0188	Orissa	Rayagada	Euc(Sr)
409	ORG06ES0189	Orissa	Rayagada	Euc(Sr)
410	ORG06ES0190	Orissa	Rayagada	Euc(Sr)
412	ORG07EC0062	Orissa	Rayagada	Euc(CI)
413	ORG07EC0063	Orissa	Rayagada	Euc(CI)
414	ORG07EC0063	Orissa	Rayagada	Euc(CI)
415	ORG07EC0064	Orissa	Rayagada	Euc(CI)
416	ORG07EC0065	Orissa	Rayagada	Euc(CI)
417	ORG07EC0066	Orissa	Rayagada	Euc(CI)
418	ORG07EC0067	Orissa	Rayagada	Euc(CI)
419	ORG07EC0068	Orissa	Rayagada	Euc(CI)
420	ORG07EC0068	Orissa	Rayagada	Euc(CI)
421	ORG07EC0068	Orissa	Rayagada	Euc(CI)
422	ORG07EC0069	Orissa	Rayagada	Euc(CI)
423	ORG07EC0070	Orissa	Rayagada	Euc(CI)
424	ORG07EC0071	Orissa	Rayagada	Euc(CI)
425	ORG07EC0072	Orissa	Rayagada	Euc(CI)
426	ORG07EC0073	Orissa	Rayagada	Euc(CI)
427	ORG07EC0073	Orissa	Rayagada	Euc(CI)
428	ORG07EC0074	Orissa	Rayagada	Euc(CI)
429	ORG07EC0074	Orissa	Rayagada	Euc(CI)
430	ORG07EC0075	Orissa	Rayagada	Euc(CI)
431	ORG07EC0076	Orissa	Rayagada	Euc(CI)
432	ORG07EC0077	Orissa	Rayagada	Euc(CI)
433	ORG07EC0078	Orissa	Rayagada	Euc(CI)
434	ORG07EC0079	Orissa	Rayagada	Euc(CI)
435	ORG07EC0079	Orissa	Rayagada	Euc(CI)
436	ORG07EC0080	Orissa	Rayagada	Euc(CI)
437	ORG07EC0081	Orissa	Rayagada	Euc(CI)
438	ORG07EC0082	Orissa	Rayagada	Euc(CI)
441	ORG07EC0085	Orissa	Rayagada	Euc(CI)
442	ORG07EC0086	Orissa	Rayagada	Euc(CI)
443	ORG07EC0087	Orissa	Rayagada	Euc(CI)
444	ORG07EC0088	Orissa	Rayagada	Euc(CI)
445	ORG07EC0088	Orissa	Rayagada	Euc(CI)
446	ORG07EC0090	Orissa	Rayagada	Euc(CI)



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447	ORG07EC0091	Orissa	Rayagada	Euc(CI)
448	ORG07EC0094	Orissa	Rayagada	Euc(CI)
449	ORG07EC0095	Orissa	Rayagada	Euc(CI)
450	ORG07EC0096	Orissa	Rayagada	Euc(CI)
451	ORG07EC0097	Orissa	Rayagada	Euc(CI)
452	ORG07EC0097	Orissa	Rayagada	Euc(CI)
453	ORG07EC0098	Orissa	Rayagada	Euc(CI)
454	ORG07EC0099	Orissa	Rayagada	Euc(CI)
455	ORG07EC0099	Orissa	Rayagada	Euc(CI)
456	ORG07EC0100	Orissa	Rayagada	Euc(CI)
457	ORG07EC0101	Orissa	Rayagada	Euc(CI)
458	ORG07EC0101	Orissa	Rayagada	Euc(CI)
459	ORG07EC0101	Orissa	Rayagada	Euc(CI)
460	ORG07EC0102	Orissa	Rayagada	Euc(CI)
461	ORG07EC0103	Orissa	Rayagada	Euc(CI)
462	ORG07EC0104	Orissa	Rayagada	Euc(CI)
463	ORG07EC0104	Orissa	Rayagada	Euc(CI)
464	ORG07EC0104	Orissa	Rayagada	Euc(CI)
467	ORG07EC0106	Orissa	Rayagada	Euc(CI)
468	ORG07EC0107	Orissa	Rayagada	Euc(CI)
469	ORG07EC0108	Orissa	Rayagada	Euc(CI)
470	ORG07EC0108	Orissa	Rayagada	Euc(CI)
471	ORG07EC0110	Orissa	Rayagada	Euc(CI)
472	ORG07EC0110	Orissa	Rayagada	Euc(CI)
473	ORG07EC0110	Orissa	Rayagada	Euc(CI)
474	ORG07EC0111	Orissa	Rayagada	Euc(CI)
475	ORG07EC0112	Orissa	Rayagada	Euc(CI)
476	ORG07EC0112	Orissa	Rayagada	Euc(CI)
477	ORG07EC0113	Orissa	Rayagada	Euc(CI)
478	ORG07ES0191	Orissa	Rayagada	Euc(Sr)
479	ORG07ES0192	Orissa	Rayagada	Euc(Sr)
480	ORG07ES0193	Orissa	Rayagada	Euc(Sr)
481	ORG07ES0195	Orissa	Rayagada	Euc(Sr)
482	ORG07ES0196	Orissa	Rayagada	Euc(Sr)
483	ORG07ES0197	Orissa	Rayagada	Euc(Sr)
484	ORG07ES0198	Orissa	Rayagada	Euc(Sr)
485	ORG07ES0199	Orissa	Rayagada	Euc(Sr)
486	ORG07ES0200	Orissa	Rayagada	Euc(Sr)
487	ORG07ES0201	Orissa	Rayagada	Euc(Sr)
488	ORG07ES0202	Orissa	Rayagada	Euc(Sr)



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489	ORG07ES0203	Orissa	Rayagada	Euc(Sr)
490	ORG07ES0205	Orissa	Rayagada	Euc(Sr)
491	ORG07ES0207	Orissa	Rayagada	Euc(Sr)
492	ORG07ES0208	Orissa	Rayagada	Euc(Sr)
493	ORG07ES0208	Orissa	Rayagada	Euc(Sr)
494	ORG07ES0208	Orissa	Rayagada	Euc(Sr)
495	ORG07ES0209	Orissa	Rayagada	Euc(Sr)
496	ORG07ES0210	Orissa	Rayagada	Euc(Sr)
497	ORG07ES0211	Orissa	Rayagada	Euc(Sr)
498	ORG07ES0212	Orissa	Rayagada	Euc(Sr)
499	ORG07ES0213	Orissa	Rayagada	Euc(Sr)
500	ORG07ES0214	Orissa	Rayagada	Euc(Sr)
501	ORG07ES0215	Orissa	Rayagada	Euc(Sr)
502	ORG07ES0216	Orissa	Rayagada	Euc(Sr)
503	ORG07ES0217	Orissa	Rayagada	Euc(Sr)
504	ORG07ES0219	Orissa	Rayagada	Euc(Sr)
505	ORG07ES0221	Orissa	Rayagada	Euc(Sr)
506	ORG07ES0222	Orissa	Rayagada	Euc(Sr)
507	ORG07ES0223	Orissa	Rayagada	Euc(Sr)
508	ORG07ES0224	Orissa	Rayagada	Euc(Sr)
509	ORG07ES0225	Orissa	Rayagada	Euc(Sr)
510	ORG07ES0226	Orissa	Rayagada	Euc(Sr)
511	ORG07ES0227	Orissa	Rayagada	Euc(Sr)
512	ORG07ES0228	Orissa	Rayagada	Euc(Sr)
513	ORG07ES0229	Orissa	Rayagada	Euc(Sr)
514	ORG07ES0230	Orissa	Rayagada	Euc(Sr)
515	ORG07ES0231	Orissa	Rayagada	Euc(Sr)
516	ORG07ES0232	Orissa	Rayagada	Euc(Sr)
517	ORG07ES0233	Orissa	Rayagada	Euc(Sr)
518	ORG07ES0234	Orissa	Rayagada	Euc(Sr)
519	ORG07ES0235	Orissa	Rayagada	Euc(Sr)
520	ORG07ES0236	Orissa	Rayagada	Euc(Sr)
521	ORG07ES0237	Orissa	Rayagada	Euc(Sr)
522	ORG07ES0239	Orissa	Rayagada	Euc(Sr)
523	ORG07ES0240	Orissa	Rayagada	Euc(Sr)
524	ORG07ES0241	Orissa	Rayagada	Euc(Sr)
525	ORG07ES0243	Orissa	Rayagada	Euc(Sr)
526	ORG07ES0244	Orissa	Rayagada	Euc(Sr)
527	OKP04EC0001	Orissa	Koraput	Euc(CI)
528	OKP04EC0002	Orissa	Koraput	Euc(CI)



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529	OKP04EC0003	Orissa	Koraput	Euc(CI)
530	OKP04EC0004	Orissa	Koraput	Euc(CI)
531	OKP04EC0005	Orissa	Koraput	Euc(CI)
532	OKP04EC0006	Orissa	Koraput	Euc(CI)
533	OKP04EC0007	Orissa	Koraput	Euc(CI)
534	OKP04EC0008	Orissa	Koraput	Euc(CI)
535	OKP04EC0009	Orissa	Koraput	Euc(CI)
536	OKP04ES0048	Orissa	Koraput	Euc(Sr)
537	OKP04ES0049	Orissa	Koraput	Euc(Sr)
538	OKP04ES0050	Orissa	Koraput	Euc(Sr)
539	OKP04ES0051	Orissa	Koraput	Euc(Sr)
540	OKP04ES0052	Orissa	Koraput	Euc(Sr)
541	OKP04ES0052	Orissa	Koraput	Euc(Sr)
542	OKP04ES0053	Orissa	Koraput	Euc(Sr)
543	OKP04ES0053	Orissa	Koraput	Euc(Sr)
544	OKP04ES0054	Orissa	Koraput	Euc(Sr)
545	OKP04ES0055	Orissa	Koraput	Euc(Sr)
546	OKP05EC0010	Orissa	Koraput	Euc(CI)
547	OKP05EC0011	Orissa	Koraput	Euc(CI)
548	OKP05EC0011	Orissa	Koraput	Euc(CI)
549	OKP05EC0012	Orissa	Koraput	Euc(CI)
550	OKP05EC0013	Orissa	Koraput	Euc(CI)
551	OKP05EC0014	Orissa	Koraput	Euc(CI)
552	OKP05EC0015	Orissa	Koraput	Euc(CI)
554	OKP05EC0016	Orissa	Koraput	Euc(CI)
555	OKP05EC0017	Orissa	Koraput	Euc(CI)
556	OKP05EC0018	Orissa	Koraput	Euc(CI)
557	OKP05EC0019	Orissa	Koraput	Euc(CI)
558	OKP05EC0020	Orissa	Koraput	Euc(CI)
559	OKP05EC0021	Orissa	Koraput	Euc(CI)
560	OKP05EC0022	Orissa	Koraput	Euc(CI)
561	OKP05EC0023	Orissa	Koraput	Euc(CI)
562	OKP05EC0024	Orissa	Koraput	Euc(CI)
563	OKP05EC0025	Orissa	Koraput	Euc(CI)
565	OKP05EC0027	Orissa	Koraput	Euc(CI)
566	OKP05ES0056	Orissa	Koraput	Euc(Sr)
567	OKP05ES0057	Orissa	Koraput	Euc(Sr)
568	OKP05ES0058	Orissa	Koraput	Euc(Sr)
569	OKP06EC0028	Orissa	Koraput	Euc(CI)
570	OKP06EC0029	Orissa	Koraput	Euc(CI)



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571	OKP06EC0030	Orissa	Koraput	Euc(CI)
572	OKP06ES0059	Orissa	Koraput	Euc(Sr)
573	OKP06ES0060	Orissa	Koraput	Euc(Sr)
574	OKP06ES0061	Orissa	Koraput	Euc(Sr)
575	OKP06ES0062	Orissa	Koraput	Euc(Sr)
576	OKP06ES0062	Orissa	Koraput	Euc(Sr)
577	OKP06ES0063	Orissa	Koraput	Euc(Sr)
578	OKP07EC0031	Orissa	Koraput	Euc(CI)
579	OKP07EC0032	Orissa	Koraput	Euc(CI)
580	OKP07EC0032	Orissa	Koraput	Euc(CI)
581	OKP07EC0033	Orissa	Koraput	Euc(CI)
582	OKP07EC0034	Orissa	Koraput	Euc(CI)
583	OKP07EC0034	Orissa	Koraput	Euc(CI)
584	OKP07EC0034	Orissa	Koraput	Euc(CI)
585	OKP07EC0034	Orissa	Koraput	Euc(CI)
586	OKP07EC0035	Orissa	Koraput	Euc(CI)
587	OKP07EC0035	Orissa	Koraput	Euc(CI)
588	OKP07EC0036	Orissa	Koraput	Euc(CI)
589	OKP07EC0037	Orissa	Koraput	Euc(CI)
590	OKP07EC0038	Orissa	Koraput	Euc(CI)
591	OKP07EC0039	Orissa	Koraput	Euc(CI)
592	OKP07EC0040	Orissa	Koraput	Euc(CI)
593	OKP07EC0041	Orissa	Koraput	Euc(CI)
594	OKP07EC0041	Orissa	Koraput	Euc(CI)
596	OKP07EC0042	Orissa	Koraput	Euc(CI)
597	OKP07EC0042	Orissa	Koraput	Euc(CI)
598	OKP07EC0042	Orissa	Koraput	Euc(CI)
600	OKP07EC0043	Orissa	Koraput	Euc(CI)
601	OKP07EC0043	Orissa	Koraput	Euc(CI)
602	OKP07EC0043	Orissa	Koraput	Euc(CI)
603	OKP07EC0044	Orissa	Koraput	Euc(CI)
604	OKP07EC0045	Orissa	Koraput	Euc(CI)
605	OKP07EC0046	Orissa	Koraput	Euc(CI)
606	OKP07EC0047	Orissa	Koraput	Euc(CI)
607	OKP07ES0065	Orissa	Koraput	Euc(Sr)
608	OKP07ES0066	Orissa	Koraput	Euc(Sr)
609	OKP07ES0067	Orissa	Koraput	Euc(Sr)
610	OKP07ES0068	Orissa	Koraput	Euc(Sr)
611	OKP07ES0069	Orissa	Koraput	Euc(Sr)
612	OKP07ES0070	Orissa	Koraput	Euc(Sr)



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613	OKP07ES0071	Orissa	Koraput	Euc(Sr)
614	OKP07ES0072	Orissa	Koraput	Euc(Sr)
615	OKP07ES0073	Orissa	Koraput	Euc(Sr)
616	OKP07ES0075	Orissa	Koraput	Euc(Sr)
617	OKP07ES0076	Orissa	Koraput	Euc(Sr)
618	OKP07ES0077	Orissa	Koraput	Euc(Sr)
619	OKP07ES0078	Orissa	Koraput	Euc(Sr)
620	OKP07ES0078	Orissa	Koraput	Euc(Sr)
621	OKP07ES0079	Orissa	Koraput	Euc(Sr)
622	OKP07ES0080	Orissa	Koraput	Euc(Sr)
623	OKP07ES0081	Orissa	Koraput	Euc(Sr)
624	OKP07ES0082	Orissa	Koraput	Euc(Sr)
625	OKP07ES0083	Orissa	Koraput	Euc(Sr)
626	OKP07ES0084	Orissa	Koraput	Euc(Sr)
629	OKP07ES0086	Orissa	Koraput	Euc(Sr)
630	OKP07ES0087	Orissa	Koraput	Euc(Sr)
631	OKP07ES0088	Orissa	Koraput	Euc(Sr)
632	OKP07ES0089	Orissa	Koraput	Euc(Sr)
633	OKP07ES0090	Orissa	Koraput	Euc(Sr)
634	AVZ04EC0001	Andhra Pradesh	Vizianagaram	Euc(CI)
635	AVZ04EC0002	Andhra Pradesh	Vizianagaram	Euc(CI)
636	AVZ04EC0004	Andhra Pradesh	Vizianagaram	Euc(CI)
637	AVZ04EC0004	Andhra Pradesh	Vizianagaram	Euc(CI)
640	AVZ04EC0007	Andhra Pradesh	Vizianagaram	Euc(CI)
642	AVZ04EC0009	Andhra Pradesh	Vizianagaram	Euc(CI)
643	AVZ04EC0010	Andhra Pradesh	Vizianagaram	Euc(CI)
644	AVZ04EC0011	Andhra Pradesh	Vizianagaram	Euc(CI)
645	AVZ04EC0012	Andhra Pradesh	Vizianagaram	Euc(CI)
646	AVZ04EC0014	Andhra Pradesh	Vizianagaram	Euc(CI)
648	AVZ05CA0246	Andhra Pradesh	Vizianagaram	Casurina
649	AVZ05CA0247	Andhra Pradesh	Vizianagaram	Casurina
650	AVZ05CA0248	Andhra Pradesh	Vizianagaram	Casurina
651	AVZ05CA0249	Andhra Pradesh	Vizianagaram	Casurina
652	AVZ05CA0250	Andhra Pradesh	Vizianagaram	Casurina
653	AVZ05CA0251	Andhra Pradesh	Vizianagaram	Casurina
654	AVZ05CA0252	Andhra Pradesh	Vizianagaram	Casurina
655	AVZ05CA0253	Andhra Pradesh	Vizianagaram	Casurina
656	AVZ05CA0254	Andhra Pradesh	Vizianagaram	Casurina
657	AVZ05CA0258	Andhra Pradesh	Vizianagaram	Casurina
658	AVZ05CA0263	Andhra Pradesh	Vizianagaram	Casurina



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659	AVZ05CA0265	Andhra Pradesh	Vizianagaram	Casurina
660	AVZ05CA0266	Andhra Pradesh	Vizianagaram	Casurina
661	AVZ05CA0267	Andhra Pradesh	Vizianagaram	Casurina
662	AVZ05CA0269	Andhra Pradesh	Vizianagaram	Casurina
663	AVZ05CA0271	Andhra Pradesh	Vizianagaram	Casurina
664	AVZ05CA0273	Andhra Pradesh	Vizianagaram	Casurina
665	AVZ05CA0274	Andhra Pradesh	Vizianagaram	Casurina
666	AVZ05CA0275	Andhra Pradesh	Vizianagaram	Casurina
667	AVZ05CA0277	Andhra Pradesh	Vizianagaram	Casurina
668	AVZ05CA0280	Andhra Pradesh	Vizianagaram	Casurina
669	AVZ05CA0282	Andhra Pradesh	Vizianagaram	Casurina
670	AVZ05CA0283	Andhra Pradesh	Vizianagaram	Casurina
671	AVZ05CA0284	Andhra Pradesh	Vizianagaram	Casurina
672	AVZ05CA0285	Andhra Pradesh	Vizianagaram	Casurina
674	AVZ05CA0287	Andhra Pradesh	Vizianagaram	Casurina
675	AVZ05CA0288	Andhra Pradesh	Vizianagaram	Casurina
676	AVZ05CA0288	Andhra Pradesh	Vizianagaram	Casurina
678	AVZ05CA0290	Andhra Pradesh	Vizianagaram	Casurina
680	AVZ05CA0292	Andhra Pradesh	Vizianagaram	Casurina
681	AVZ05CA0294	Andhra Pradesh	Vizianagaram	Casurina
682	AVZ05CA0295	Andhra Pradesh	Vizianagaram	Casurina
683	AVZ05CA0296	Andhra Pradesh	Vizianagaram	Casurina
684	AVZ05CA0297	Andhra Pradesh	Vizianagaram	Casurina
685	AVZ05CA0298	Andhra Pradesh	Vizianagaram	Casurina
686	AVZ05CA0300	Andhra Pradesh	Vizianagaram	Casurina
687	AVZ05CA0301	Andhra Pradesh	Vizianagaram	Casurina
688	AVZ05CA0303	Andhra Pradesh	Vizianagaram	Casurina
689	AVZ05CA0305	Andhra Pradesh	Vizianagaram	Casurina
692	AVZ05CA0308	Andhra Pradesh	Vizianagaram	Casurina
693	AVZ05CA0313	Andhra Pradesh	Vizianagaram	Casurina
694	AVZ05CA0315	Andhra Pradesh	Vizianagaram	Casurina
695	AVZ05CA0317	Andhra Pradesh	Vizianagaram	Casurina
696	AVZ05CA0318	Andhra Pradesh	Vizianagaram	Casurina
697	AVZ05CA0320	Andhra Pradesh	Vizianagaram	Casurina
698	AVZ05CA0323	Andhra Pradesh	Vizianagaram	Casurina
699	AVZ05CA0325	Andhra Pradesh	Vizianagaram	Casurina
700	AVZ05CA0330	Andhra Pradesh	Vizianagaram	Casurina
701	AVZ05CA0331	Andhra Pradesh	Vizianagaram	Casurina
702	AVZ05CA0333	Andhra Pradesh	Vizianagaram	Casurina
703	AVZ05CA0334	Andhra Pradesh	Vizianagaram	Casurina



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704	AVZ05CA0335	Andhra Pradesh	Vizianagaram	Casurina
706	AVZ05CA0339	Andhra Pradesh	Vizianagaram	Casurina
707	AVZ05CA0340	Andhra Pradesh	Vizianagaram	Casurina
708	AVZ05CA0342	Andhra Pradesh	Vizianagaram	Casurina
709	AVZ05CA0343	Andhra Pradesh	Vizianagaram	Casurina
711	AVZ05CA0345	Andhra Pradesh	Vizianagaram	Casurina
712	AVZ05CA0346	Andhra Pradesh	Vizianagaram	Casurina
713	AVZ05CA0347	Andhra Pradesh	Vizianagaram	Casurina
714	AVZ05CA0348	Andhra Pradesh	Vizianagaram	Casurina
716	AVZ05CA0350	Andhra Pradesh	Vizianagaram	Casurina
717	AVZ05CA0351	Andhra Pradesh	Vizianagaram	Casurina
718	AVZ05CA0352	Andhra Pradesh	Vizianagaram	Casurina
719	AVZ05CA0354	Andhra Pradesh	Vizianagaram	Casurina
720	AVZ05CA0355	Andhra Pradesh	Vizianagaram	Casurina
721	AVZ05CA0357	Andhra Pradesh	Vizianagaram	Casurina
722	AVZ05CA0361	Andhra Pradesh	Vizianagaram	Casurina
723	AVZ05CA0362	Andhra Pradesh	Vizianagaram	Casurina
724	AVZ05CA0363	Andhra Pradesh	Vizianagaram	Casurina
725	AVZ05CA0365	Andhra Pradesh	Vizianagaram	Casurina
726	AVZ05CA0366	Andhra Pradesh	Vizianagaram	Casurina
727	AVZ05CA0371	Andhra Pradesh	Vizianagaram	Casurina
728	AVZ05CA0372	Andhra Pradesh	Vizianagaram	Casurina
729	AVZ05CA0373	Andhra Pradesh	Vizianagaram	Casurina
731	AVZ05CA0375	Andhra Pradesh	Vizianagaram	Casurina
732	AVZ05CA0376	Andhra Pradesh	Vizianagaram	Casurina
733	AVZ05CA0378	Andhra Pradesh	Vizianagaram	Casurina
734	AVZ05CA0379	Andhra Pradesh	Vizianagaram	Casurina
735	AVZ05CA0380	Andhra Pradesh	Vizianagaram	Casurina
736	AVZ05CA0381	Andhra Pradesh	Vizianagaram	Casurina
737	AVZ05CA0385	Andhra Pradesh	Vizianagaram	Casurina
738	AVZ05CA0386	Andhra Pradesh	Vizianagaram	Casurina
739	AVZ05CA0387	Andhra Pradesh	Vizianagaram	Casurina
741	AVZ05CA0392	Andhra Pradesh	Vizianagaram	Casurina
742	AVZ05CA0393	Andhra Pradesh	Vizianagaram	Casurina
743	AVZ05CA0394	Andhra Pradesh	Vizianagaram	Casurina
744	AVZ05CA0395	Andhra Pradesh	Vizianagaram	Casurina
745	AVZ05CA0396	Andhra Pradesh	Vizianagaram	Casurina
746	AVZ05EC0018	Andhra Pradesh	Vizianagaram	Euc(CI)
747	AVZ05EC0019	Andhra Pradesh	Vizianagaram	Euc(CI)
748	AVZ05EC0020	Andhra Pradesh	Vizianagaram	Euc(CI)



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749	AVZ05EC0021	Andhra Pradesh	Vizianagaram	Euc(CI)
750	AVZ05EC0021	Andhra Pradesh	Vizianagaram	Euc(CI)
751	AVZ05EC0022	Andhra Pradesh	Vizianagaram	Euc(CI)
752	AVZ05EC0023	Andhra Pradesh	Vizianagaram	Euc(CI)
753	AVZ05EC0024	Andhra Pradesh	Vizianagaram	Euc(CI)
754	AVZ05EC0024	Andhra Pradesh	Vizianagaram	Euc(CI)
755	AVZ05EC0025	Andhra Pradesh	Vizianagaram	Euc(CI)
756	AVZ05EC0027	Andhra Pradesh	Vizianagaram	Euc(CI)
757	AVZ05EC0028	Andhra Pradesh	Vizianagaram	Euc(CI)
758	AVZ05EC0029	Andhra Pradesh	Vizianagaram	Euc(CI)
759	AVZ05EC0030	Andhra Pradesh	Vizianagaram	Euc(CI)
760	AVZ05EC0030	Andhra Pradesh	Vizianagaram	Euc(CI)
761	AVZ05EC0033	Andhra Pradesh	Vizianagaram	Euc(CI)
762	AVZ05EC0034	Andhra Pradesh	Vizianagaram	Euc(CI)
764	AVZ05EC0036	Andhra Pradesh	Vizianagaram	Euc(CI)
765	AVZ05EC0037	Andhra Pradesh	Vizianagaram	Euc(CI)
766	AVZ05EC0038	Andhra Pradesh	Vizianagaram	Euc(CI)
767	AVZ05EC0039	Andhra Pradesh	Vizianagaram	Euc(CI)
768	AVZ05EC0040	Andhra Pradesh	Vizianagaram	Euc(CI)
769	AVZ05EC0041	Andhra Pradesh	Vizianagaram	Euc(CI)
770	AVZ05EC0042	Andhra Pradesh	Vizianagaram	Euc(CI)
771	AVZ05EC0043	Andhra Pradesh	Vizianagaram	Euc(CI)
772	AVZ06CA0399	Andhra Pradesh	Vizianagaram	Casurina
773	AVZ06CA0401	Andhra Pradesh	Vizianagaram	Casurina
774	AVZ06CA0402	Andhra Pradesh	Vizianagaram	Casurina
776	AVZ06CA0405	Andhra Pradesh	Vizianagaram	Casurina
777	AVZ06CA0406	Andhra Pradesh	Vizianagaram	Casurina
778	AVZ06CA0407	Andhra Pradesh	Vizianagaram	Casurina
779	AVZ06CA0408	Andhra Pradesh	Vizianagaram	Casurina
780	AVZ06CA0409	Andhra Pradesh	Vizianagaram	Casurina
781	AVZ06CA0410	Andhra Pradesh	Vizianagaram	Casurina
782	AVZ06CA0411	Andhra Pradesh	Vizianagaram	Casurina
783	AVZ06CA0411	Andhra Pradesh	Vizianagaram	Casurina
784	AVZ06CA0412	Andhra Pradesh	Vizianagaram	Casurina
785	AVZ06CA0415	Andhra Pradesh	Vizianagaram	Casurina
787	AVZ06CA0417	Andhra Pradesh	Vizianagaram	Casurina
789	AVZ06CA0419	Andhra Pradesh	Vizianagaram	Casurina
790	AVZ06CA0420	Andhra Pradesh	Vizianagaram	Casurina
792	AVZ06CA0423	Andhra Pradesh	Vizianagaram	Casurina
793	AVZ06CA0424	Andhra Pradesh	Vizianagaram	Casurina



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796	AVZ06CA0428	Andhra Pradesh	Vizianagaram	Casurina
797	AVZ06CA0430	Andhra Pradesh	Vizianagaram	Casurina
798	AVZ06CA0431	Andhra Pradesh	Vizianagaram	Casurina
799	AVZ06CA0432	Andhra Pradesh	Vizianagaram	Casurina
800	AVZ06CA0433	Andhra Pradesh	Vizianagaram	Casurina
801	AVZ06CA0434	Andhra Pradesh	Vizianagaram	Casurina
802	AVZ06CA0435	Andhra Pradesh	Vizianagaram	Casurina
803	AVZ06CA0436	Andhra Pradesh	Vizianagaram	Casurina
804	AVZ06CA0437	Andhra Pradesh	Vizianagaram	Casurina
805	AVZ06CA0438	Andhra Pradesh	Vizianagaram	Casurina
806	AVZ06CA0439	Andhra Pradesh	Vizianagaram	Casurina
807	AVZ06CA0440	Andhra Pradesh	Vizianagaram	Casurina
808	AVZ06CA0441	Andhra Pradesh	Vizianagaram	Casurina
810	AVZ06CA0443	Andhra Pradesh	Vizianagaram	Casurina
811	AVZ06CA0446	Andhra Pradesh	Vizianagaram	Casurina
812	AVZ06CA0447	Andhra Pradesh	Vizianagaram	Casurina
813	AVZ06CA0449	Andhra Pradesh	Vizianagaram	Casurina
814	AVZ06CA0450	Andhra Pradesh	Vizianagaram	Casurina
815	AVZ06CA0451	Andhra Pradesh	Vizianagaram	Casurina
816	AVZ06CA0452	Andhra Pradesh	Vizianagaram	Casurina
817	AVZ06CA0453	Andhra Pradesh	Vizianagaram	Casurina
818	AVZ06CA0454	Andhra Pradesh	Vizianagaram	Casurina
819	AVZ06CA0455	Andhra Pradesh	Vizianagaram	Casurina
820	AVZ06CA0458	Andhra Pradesh	Vizianagaram	Casurina
821	AVZ06CA0459	Andhra Pradesh	Vizianagaram	Casurina
822	AVZ06CA0461	Andhra Pradesh	Vizianagaram	Casurina
823	AVZ06CA0462	Andhra Pradesh	Vizianagaram	Casurina
824	AVZ06CA0463	Andhra Pradesh	Vizianagaram	Casurina
825	AVZ06CA0465	Andhra Pradesh	Vizianagaram	Casurina
826	AVZ06CA0466	Andhra Pradesh	Vizianagaram	Casurina
828	AVZ06CA0468	Andhra Pradesh	Vizianagaram	Casurina
829	AVZ06CA0469	Andhra Pradesh	Vizianagaram	Casurina
830	AVZ06CA0470	Andhra Pradesh	Vizianagaram	Casurina
831	AVZ06CA0471	Andhra Pradesh	Vizianagaram	Casurina
832	AVZ06CA0472	Andhra Pradesh	Vizianagaram	Casurina
833	AVZ06CA0473	Andhra Pradesh	Vizianagaram	Casurina
834	AVZ06CA0474	Andhra Pradesh	Vizianagaram	Casurina
835	AVZ06CA0475	Andhra Pradesh	Vizianagaram	Casurina
837	AVZ06CA0477	Andhra Pradesh	Vizianagaram	Casurina
838	AVZ06CA0478	Andhra Pradesh	Vizianagaram	Casurina



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839	AVZ06CA0479	Andhra Pradesh	Vizianagaram	Casurina
840	AVZ06CA0481	Andhra Pradesh	Vizianagaram	Casurina
841	AVZ06CA0482	Andhra Pradesh	Vizianagaram	Casurina
842	AVZ06CA0491	Andhra Pradesh	Vizianagaram	Casurina
843	AVZ06CA0492	Andhra Pradesh	Vizianagaram	Casurina
844	AVZ06CA0493	Andhra Pradesh	Vizianagaram	Casurina
845	AVZ06CA0494	Andhra Pradesh	Vizianagaram	Casurina
849	AVZ06EC0047	Andhra Pradesh	Vizianagaram	Euc(CI)
850	AVZ06EC0048	Andhra Pradesh	Vizianagaram	Euc(CI)
851	AVZ06EC0049	Andhra Pradesh	Vizianagaram	Euc(CI)
852	AVZ06EC0050	Andhra Pradesh	Vizianagaram	Euc(CI)
853	AVZ06EC0051	Andhra Pradesh	Vizianagaram	Euc(CI)
854	AVZ06EC0052	Andhra Pradesh	Vizianagaram	Euc(CI)
855	AVZ06EC0053	Andhra Pradesh	Vizianagaram	Euc(CI)
856	AVZ06EC0054	Andhra Pradesh	Vizianagaram	Euc(CI)
857	AVZ06EC0055	Andhra Pradesh	Vizianagaram	Euc(CI)
858	AVZ06EC0056	Andhra Pradesh	Vizianagaram	Euc(CI)
859	AVZ06EC0057	Andhra Pradesh	Vizianagaram	Euc(CI)
860	AVZ06EC0058	Andhra Pradesh	Vizianagaram	Euc(CI)
861	AVZ06EC0060	Andhra Pradesh	Vizianagaram	Euc(CI)
862	AVZ06EC0061	Andhra Pradesh	Vizianagaram	Euc(CI)
863	AVZ06EC0062	Andhra Pradesh	Vizianagaram	Euc(CI)
865	AVZ06EC0066	Andhra Pradesh	Vizianagaram	Euc(CI)
866	AVZ06EC0067	Andhra Pradesh	Vizianagaram	Euc(CI)
867	AVZ06EC0068	Andhra Pradesh	Vizianagaram	Euc(CI)
868	AVZ06EC0069	Andhra Pradesh	Vizianagaram	Euc(CI)
869	AVZ06EC0070	Andhra Pradesh	Vizianagaram	Euc(CI)
870	AVZ06EC0070	Andhra Pradesh	Vizianagaram	Euc(CI)
871	AVZ06EC0070	Andhra Pradesh	Vizianagaram	Euc(CI)
872	AVZ06EC0070	Andhra Pradesh	Vizianagaram	Euc(CI)
873	AVZ06EC0070	Andhra Pradesh	Vizianagaram	Euc(CI)
874	AVZ06EC0075	Andhra Pradesh	Vizianagaram	Euc(CI)
875	AVZ06EC0076	Andhra Pradesh	Vizianagaram	Euc(CI)
876	AVZ06EC0077	Andhra Pradesh	Vizianagaram	Euc(CI)
877	AVZ06EC0078	Andhra Pradesh	Vizianagaram	Euc(CI)
878	AVZ06EC0079	Andhra Pradesh	Vizianagaram	Euc(CI)
879	AVZ06EC0080	Andhra Pradesh	Vizianagaram	Euc(CI)
880	AVZ06EC0081	Andhra Pradesh	Vizianagaram	Euc(CI)
881	AVZ06EC0081	Andhra Pradesh	Vizianagaram	Euc(CI)
882	AVZ06EC0082	Andhra Pradesh	Vizianagaram	Euc(CI)



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883	AVZ06EC0083	Andhra Pradesh	Vizianagaram	Euc(CI)
884	AVZ06EC0084	Andhra Pradesh	Vizianagaram	Euc(CI)
885	AVZ06EC0086	Andhra Pradesh	Vizianagaram	Euc(CI)
886	AVZ06EC0087	Andhra Pradesh	Vizianagaram	Euc(CI)
887	AVZ06EC0088	Andhra Pradesh	Vizianagaram	Euc(CI)
889	AVZ06EC0089	Andhra Pradesh	Vizianagaram	Euc(CI)
890	AVZ06EC0090	Andhra Pradesh	Vizianagaram	Euc(CI)
891	AVZ06EC0091	Andhra Pradesh	Vizianagaram	Euc(CI)
892	AVZ06EC0092	Andhra Pradesh	Vizianagaram	Euc(CI)
893	AVZ06EC0093	Andhra Pradesh	Vizianagaram	Euc(CI)
894	AVZ06EC0094	Andhra Pradesh	Vizianagaram	Euc(CI)
895	AVZ06EC0094	Andhra Pradesh	Vizianagaram	Euc(CI)
896	AVZ06EC0094	Andhra Pradesh	Vizianagaram	Euc(CI)
897	AVZ06EC0095	Andhra Pradesh	Vizianagaram	Euc(CI)
898	AVZ06EC0096	Andhra Pradesh	Vizianagaram	Euc(CI)
902	AVZ06EC0100	Andhra Pradesh	Vizianagaram	Euc(CI)
906	AVZ06EC0105	Andhra Pradesh	Vizianagaram	Euc(CI)
907	AVZ06EC0106	Andhra Pradesh	Vizianagaram	Euc(CI)
908	AVZ06EC0107	Andhra Pradesh	Vizianagaram	Euc(CI)
911	AVZ06EC0110	Andhra Pradesh	Vizianagaram	Euc(CI)
912	AVZ06EC0111	Andhra Pradesh	Vizianagaram	Euc(CI)
915	AVZ06EC0115	Andhra Pradesh	Vizianagaram	Euc(CI)
917	AVZ06EC0117	Andhra Pradesh	Vizianagaram	Euc(CI)
918	AVZ06EC0118	Andhra Pradesh	Vizianagaram	Euc(CI)
919	AVZ06EC0119	Andhra Pradesh	Vizianagaram	Euc(CI)
920	AVZ06EC0120	Andhra Pradesh	Vizianagaram	Euc(CI)
921	AVZ06EC0121	Andhra Pradesh	Vizianagaram	Euc(CI)
922	AVZ06EC0121	Andhra Pradesh	Vizianagaram	Euc(CI)
924	AVZ06EC0123	Andhra Pradesh	Vizianagaram	Euc(CI)
925	AVZ06EC0124	Andhra Pradesh	Vizianagaram	Euc(CI)
926	AVZ06EC0125	Andhra Pradesh	Vizianagaram	Euc(CI)
929	AVZ06EC0128	Andhra Pradesh	Vizianagaram	Euc(CI)
930	AVZ06ES0221	Andhra Pradesh	Vizianagaram	Euc(Sr)
931	AVZ06ES0224	Andhra Pradesh	Vizianagaram	Euc(Sr)
932	AVZ06ES0225	Andhra Pradesh	Vizianagaram	Euc(Sr)
933	AVZ06ES0226	Andhra Pradesh	Vizianagaram	Euc(Sr)
934	AVZ06ES0227	Andhra Pradesh	Vizianagaram	Euc(Sr)
935	AVZ07CA0495	Andhra Pradesh	Vizianagaram	Casurina
936	AVZ07CA0496	Andhra Pradesh	Vizianagaram	Casurina
937	AVZ07CA0497	Andhra Pradesh	Vizianagaram	Casurina



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938	AVZ07CA0498	Andhra Pradesh	Vizianagaram	Casurina
941	AVZ07CA0501	Andhra Pradesh	Vizianagaram	Casurina
942	AVZ07CA0503	Andhra Pradesh	Vizianagaram	Casurina
943	AVZ07CA0504	Andhra Pradesh	Vizianagaram	Casurina
944	AVZ07CA0505	Andhra Pradesh	Vizianagaram	Casurina
946	AVZ07CA0507	Andhra Pradesh	Vizianagaram	Casurina
947	AVZ07CA0508	Andhra Pradesh	Vizianagaram	Casurina
948	AVZ07CA0509	Andhra Pradesh	Vizianagaram	Casurina
949	AVZ07CA0514	Andhra Pradesh	Vizianagaram	Casurina
950	AVZ07CA0515	Andhra Pradesh	Vizianagaram	Casurina
951	AVZ07CA0516	Andhra Pradesh	Vizianagaram	Casurina
952	AVZ07CA0517	Andhra Pradesh	Vizianagaram	Casurina
953	AVZ07CA0518	Andhra Pradesh	Vizianagaram	Casurina
954	AVZ07CA0520	Andhra Pradesh	Vizianagaram	Casurina
955	AVZ07CA0521	Andhra Pradesh	Vizianagaram	Casurina
956	AVZ07CA0522	Andhra Pradesh	Vizianagaram	Casurina
957	AVZ07CA0523	Andhra Pradesh	Vizianagaram	Casurina
958	AVZ07CA0524	Andhra Pradesh	Vizianagaram	Casurina
959	AVZ07CA0525	Andhra Pradesh	Vizianagaram	Casurina
960	AVZ07CA0526	Andhra Pradesh	Vizianagaram	Casurina
961	AVZ07CA0528	Andhra Pradesh	Vizianagaram	Casurina
962	AVZ07CA0529	Andhra Pradesh	Vizianagaram	Casurina
963	AVZ07CA0530	Andhra Pradesh	Vizianagaram	Casurina
964	AVZ07CA0531	Andhra Pradesh	Vizianagaram	Casurina
965	AVZ07CA0533	Andhra Pradesh	Vizianagaram	Casurina
966	AVZ07CA0534	Andhra Pradesh	Vizianagaram	Casurina
967	AVZ07CA0535	Andhra Pradesh	Vizianagaram	Casurina
968	AVZ07CA0536	Andhra Pradesh	Vizianagaram	Casurina
969	AVZ07CA0538	Andhra Pradesh	Vizianagaram	Casurina
970	AVZ07CA0539	Andhra Pradesh	Vizianagaram	Casurina
971	AVZ07EC0129	Andhra Pradesh	Vizianagaram	Euc(CI)
972	AVZ07EC0130	Andhra Pradesh	Vizianagaram	Euc(CI)
973	AVZ07EC0131	Andhra Pradesh	Vizianagaram	Euc(CI)
974	AVZ07EC0131	Andhra Pradesh	Vizianagaram	Euc(CI)
975	AVZ07EC0132	Andhra Pradesh	Vizianagaram	Euc(CI)
976	AVZ07EC0133	Andhra Pradesh	Vizianagaram	Euc(CI)
977	AVZ07EC0134	Andhra Pradesh	Vizianagaram	Euc(CI)
978	AVZ07EC0135	Andhra Pradesh	Vizianagaram	Euc(CI)
979	AVZ07EC0137	Andhra Pradesh	Vizianagaram	Euc(CI)
980	AVZ07EC0138	Andhra Pradesh	Vizianagaram	Euc(CI)



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981	AVZ07EC0139	Andhra Pradesh	Vizianagaram	Euc(CI)
982	AVZ07EC0140	Andhra Pradesh	Vizianagaram	Euc(CI)
983	AVZ07EC0141	Andhra Pradesh	Vizianagaram	Euc(CI)
984	AVZ07EC0142	Andhra Pradesh	Vizianagaram	Euc(CI)
985	AVZ07EC0143	Andhra Pradesh	Vizianagaram	Euc(CI)
986	AVZ07EC0144	Andhra Pradesh	Vizianagaram	Euc(CI)
987	AVZ07EC0145	Andhra Pradesh	Vizianagaram	Euc(CI)
990	AVZ07EC0149	Andhra Pradesh	Vizianagaram	Euc(CI)
991	AVZ07EC0150	Andhra Pradesh	Vizianagaram	Euc(CI)
992	AVZ07EC0151	Andhra Pradesh	Vizianagaram	Euc(CI)
993	AVZ07EC0152	Andhra Pradesh	Vizianagaram	Euc(CI)
994	AVZ07EC0153	Andhra Pradesh	Vizianagaram	Euc(CI)
996	AVZ07EC0155	Andhra Pradesh	Vizianagaram	Euc(CI)
997	AVZ07EC0156	Andhra Pradesh	Vizianagaram	Euc(CI)
998	AVZ07EC0157	Andhra Pradesh	Vizianagaram	Euc(CI)
999	AVZ07EC0157	Andhra Pradesh	Vizianagaram	Euc(CI)
1000	AVZ07EC0157	Andhra Pradesh	Vizianagaram	Euc(CI)
1001	AVZ07EC0159	Andhra Pradesh	Vizianagaram	Euc(CI)
1002	AVZ07EC0160	Andhra Pradesh	Vizianagaram	Euc(CI)
1003	AVZ07EC0161	Andhra Pradesh	Vizianagaram	Euc(CI)
1004	AVZ07EC0162	Andhra Pradesh	Vizianagaram	Euc(CI)
1005	AVZ07EC0163	Andhra Pradesh	Vizianagaram	Euc(CI)
1006	AVZ07EC0164	Andhra Pradesh	Vizianagaram	Euc(CI)
1007	AVZ07EC0165	Andhra Pradesh	Vizianagaram	Euc(CI)
1008	AVZ07EC0165	Andhra Pradesh	Vizianagaram	Euc(CI)
1009	AVZ07EC0166	Andhra Pradesh	Vizianagaram	Euc(CI)
1010	AVZ07EC0167	Andhra Pradesh	Vizianagaram	Euc(CI)
1011	AVZ07EC0174	Andhra Pradesh	Vizianagaram	Euc(CI)
1012	AVZ07EC0174	Andhra Pradesh	Vizianagaram	Euc(CI)
1013	AVZ07EC0174	Andhra Pradesh	Vizianagaram	Euc(CI)
1014	AVZ07EC0175	Andhra Pradesh	Vizianagaram	Euc(CI)
1015	AVZ07EC0177	Andhra Pradesh	Vizianagaram	Euc(CI)
1016	AVZ07EC0178	Andhra Pradesh	Vizianagaram	Euc(CI)
1017	AVZ07EC0179	Andhra Pradesh	Vizianagaram	Euc(CI)
1018	AVZ07EC0180	Andhra Pradesh	Vizianagaram	Euc(CI)
1019	AVZ07EC0181	Andhra Pradesh	Vizianagaram	Euc(CI)
1020	AVZ07EC0183	Andhra Pradesh	Vizianagaram	Euc(CI)
1024	AVZ07EC0187	Andhra Pradesh	Vizianagaram	Euc(CI)
1025	AVZ07EC0188	Andhra Pradesh	Vizianagaram	Euc(CI)
1026	AVZ07EC0189	Andhra Pradesh	Vizianagaram	Euc(CI)



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1027	AVZ07EC0190	Andhra Pradesh	Vizianagaram	Euc(CI)
1030	AVZ07EC0193	Andhra Pradesh	Vizianagaram	Euc(CI)
1031	AVZ07EC0194	Andhra Pradesh	Vizianagaram	Euc(CI)
1032	AVZ07EC0195	Andhra Pradesh	Vizianagaram	Euc(CI)
1033	AVZ07EC0196	Andhra Pradesh	Vizianagaram	Euc(CI)
1034	AVZ07EC0197	Andhra Pradesh	Vizianagaram	Euc(CI)
1035	AVZ07EC0198	Andhra Pradesh	Vizianagaram	Euc(CI)
1036	AVZ07EC0199	Andhra Pradesh	Vizianagaram	Euc(CI)
1037	AVZ07EC0200	Andhra Pradesh	Vizianagaram	Euc(CI)
1038	AVZ07EC0201	Andhra Pradesh	Vizianagaram	Euc(CI)
1039	AVZ07EC0202	Andhra Pradesh	Vizianagaram	Euc(CI)
1040	AVZ07EC0203	Andhra Pradesh	Vizianagaram	Euc(CI)
1041	AVZ07EC0203	Andhra Pradesh	Vizianagaram	Euc(CI)
1042	AVZ07EC0204	Andhra Pradesh	Vizianagaram	Euc(CI)
1043	AVZ07EC0205	Andhra Pradesh	Vizianagaram	Euc(CI)
1044	AVZ07EC0207	Andhra Pradesh	Vizianagaram	Euc(CI)
1045	AVZ07EC0208	Andhra Pradesh	Vizianagaram	Euc(CI)
1046	AVZ07EC0209	Andhra Pradesh	Vizianagaram	Euc(CI)
1047	AVZ07EC0210	Andhra Pradesh	Vizianagaram	Euc(CI)
1048	AVZ07EC0211	Andhra Pradesh	Vizianagaram	Euc(CI)
1049	AVZ07EC0212	Andhra Pradesh	Vizianagaram	Euc(CI)
1050	AVZ07EC0213	Andhra Pradesh	Vizianagaram	Euc(CI)
1051	AVZ07EC0214	Andhra Pradesh	Vizianagaram	Euc(CI)
1052	AVZ07EC0215	Andhra Pradesh	Vizianagaram	Euc(CI)
1053	AVZ07EC0215	Andhra Pradesh	Vizianagaram	Euc(CI)
1054	AVZ07EC0216	Andhra Pradesh	Vizianagaram	Euc(CI)
1055	AVZ07EC0217	Andhra Pradesh	Vizianagaram	Euc(CI)
1058	AVZ07EC0219	Andhra Pradesh	Vizianagaram	Euc(CI)
1059	AVZ07EC0220	Andhra Pradesh	Vizianagaram	Euc(CI)
1060	AVZ07ES0228	Andhra Pradesh	Vizianagaram	Euc(Sr)
1061	AVZ07ES0229	Andhra Pradesh	Vizianagaram	Euc(Sr)
1062	AVZ07ES0230	Andhra Pradesh	Vizianagaram	Euc(Sr)
1063	AVZ07ES0231	Andhra Pradesh	Vizianagaram	Euc(Sr)
1064	AVZ07ES0232	Andhra Pradesh	Vizianagaram	Euc(Sr)
1065	AVZ07ES0233	Andhra Pradesh	Vizianagaram	Euc(Sr)
1066	AVZ07ES0234	Andhra Pradesh	Vizianagaram	Euc(Sr)
1067	AVZ07ES0236	Andhra Pradesh	Vizianagaram	Euc(Sr)
1068	AVZ07ES0237	Andhra Pradesh	Vizianagaram	Euc(Sr)
1069	AVZ07ES0238	Andhra Pradesh	Vizianagaram	Euc(Sr)
1070	AVZ07ES0238	Andhra Pradesh	Vizianagaram	Euc(Sr)



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1071	AVZ07ES0238	Andhra Pradesh	Vizianagaram	Euc(Sr)
1072	AVZ07ES0240	Andhra Pradesh	Vizianagaram	Euc(Sr)
1073	AVZ07ES0241	Andhra Pradesh	Vizianagaram	Euc(Sr)
1074	AVZ07ES0242	Andhra Pradesh	Vizianagaram	Euc(Sr)
1075	AVZ07ES0243	Andhra Pradesh	Vizianagaram	Euc(Sr)
1076	AVZ07ES0244	Andhra Pradesh	Vizianagaram	Euc(Sr)
1077	AVZ07ES0245	Andhra Pradesh	Vizianagaram	Euc(Sr)
1078	ASK04CA0163	Andhra Pradesh	Srikakulam	Casurina
1079	ASK04CA0164	Andhra Pradesh	Srikakulam	Casurina
1080	ASK04CA0165	Andhra Pradesh	Srikakulam	Casurina
1081	ASK04CA0166	Andhra Pradesh	Srikakulam	Casurina
1082	ASK04CA0167	Andhra Pradesh	Srikakulam	Casurina
1083	ASK04CA0168	Andhra Pradesh	Srikakulam	Casurina
1084	ASK04CA0169	Andhra Pradesh	Srikakulam	Casurina
1085	ASK04CA0172	Andhra Pradesh	Srikakulam	Casurina
1086	ASK04CA0173	Andhra Pradesh	Srikakulam	Casurina
1087	ASK04CA0174	Andhra Pradesh	Srikakulam	Casurina
1088	ASK04CA0175	Andhra Pradesh	Srikakulam	Casurina
1089	ASK04CA0175	Andhra Pradesh	Srikakulam	Casurina
1090	ASK04CA0177	Andhra Pradesh	Srikakulam	Casurina
1091	ASK04CA0178	Andhra Pradesh	Srikakulam	Casurina
1092	ASK04CA0179	Andhra Pradesh	Srikakulam	Casurina
1093	ASK04CA0180	Andhra Pradesh	Srikakulam	Casurina
1094	ASK04CA0181	Andhra Pradesh	Srikakulam	Casurina
1095	ASK04CA0183	Andhra Pradesh	Srikakulam	Casurina
1096	ASK04CA0184	Andhra Pradesh	Srikakulam	Casurina
1097	ASK04CA0185	Andhra Pradesh	Srikakulam	Casurina
1098	ASK04CA0188	Andhra Pradesh	Srikakulam	Casurina
1099	ASK04CA0189	Andhra Pradesh	Srikakulam	Casurina
1100	ASK04CA0190	Andhra Pradesh	Srikakulam	Casurina
1101	ASK04CA0191	Andhra Pradesh	Srikakulam	Casurina
1102	ASK04CA0192	Andhra Pradesh	Srikakulam	Casurina
1103	ASK04CA0193	Andhra Pradesh	Srikakulam	Casurina
1104	ASK04CA0194	Andhra Pradesh	Srikakulam	Casurina
1105	ASK04CA0196	Andhra Pradesh	Srikakulam	Casurina
1106	ASK04CA0197	Andhra Pradesh	Srikakulam	Casurina
1107	ASK04CA0199	Andhra Pradesh	Srikakulam	Casurina
1108	ASK04CA0200	Andhra Pradesh	Srikakulam	Casurina
1109	ASK04CA0201	Andhra Pradesh	Srikakulam	Casurina
1110	ASK04CA0202	Andhra Pradesh	Srikakulam	Casurina



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1111	ASK04CA0203	Andhra Pradesh	Srikakulum	Casurina
1112	ASK04CA0204	Andhra Pradesh	Srikakulum	Casurina
1113	ASK04ES0047	Andhra Pradesh	Srikakulum	Euc(Sr)
1114	ASK04ES0048	Andhra Pradesh	Srikakulum	Euc(Sr)
1115	ASK04ES0049	Andhra Pradesh	Srikakulum	Euc(Sr)
1116	ASK04ES0050	Andhra Pradesh	Srikakulum	Euc(Sr)
1117	ASK04ES0053	Andhra Pradesh	Srikakulum	Euc(Sr)
1118	ASK04ES0054	Andhra Pradesh	Srikakulum	Euc(Sr)
1119	ASK04ES0055	Andhra Pradesh	Srikakulum	Euc(Sr)
1120	ASK04ES0055	Andhra Pradesh	Srikakulum	Euc(Sr)
1123	ASK04ES0058	Andhra Pradesh	Srikakulum	Euc(Sr)
1124	ASK04ES0059	Andhra Pradesh	Srikakulum	Euc(Sr)
1125	ASK04ES0060	Andhra Pradesh	Srikakulum	Euc(Sr)
1126	ASK04ES0061	Andhra Pradesh	Srikakulum	Euc(Sr)
1127	ASK04ES0062	Andhra Pradesh	Srikakulum	Euc(Sr)
1128	ASK04ES0063	Andhra Pradesh	Srikakulum	Euc(Sr)
1129	ASK04ES0065	Andhra Pradesh	Srikakulum	Euc(Sr)
1130	ASK04ES0066	Andhra Pradesh	Srikakulum	Euc(Sr)
1131	ASK04ES0067	Andhra Pradesh	Srikakulum	Euc(Sr)
1132	ASK04ES0068	Andhra Pradesh	Srikakulum	Euc(Sr)
1134	ASK04ES0070	Andhra Pradesh	Srikakulum	Euc(Sr)
1135	ASK04ES0070	Andhra Pradesh	Srikakulum	Euc(Sr)
1136	ASK05CA0207	Andhra Pradesh	Srikakulum	Casurina
1137	ASK05CA0208	Andhra Pradesh	Srikakulum	Casurina
1138	ASK05CA0210	Andhra Pradesh	Srikakulum	Casurina
1139	ASK05CA0211	Andhra Pradesh	Srikakulum	Casurina
1140	ASK05CA0212	Andhra Pradesh	Srikakulum	Casurina
1141	ASK05CA0213	Andhra Pradesh	Srikakulum	Casurina
1142	ASK05CA0214	Andhra Pradesh	Srikakulum	Casurina
1143	ASK05CA0215	Andhra Pradesh	Srikakulum	Casurina
1144	ASK05CA0216	Andhra Pradesh	Srikakulum	Casurina
1145	ASK05CA0217	Andhra Pradesh	Srikakulum	Casurina
1146	ASK05CA0223	Andhra Pradesh	Srikakulum	Casurina
1147	ASK05CA0225	Andhra Pradesh	Srikakulum	Casurina
1148	ASK05CA0234	Andhra Pradesh	Srikakulum	Casurina
1149	ASK05CA0236	Andhra Pradesh	Srikakulum	Casurina
1150	ASK05CA0237	Andhra Pradesh	Srikakulum	Casurina
1151	ASK05CA0240	Andhra Pradesh	Srikakulum	Casurina
1152	ASK05CA0241	Andhra Pradesh	Srikakulum	Casurina
1153	ASK05CA0243	Andhra Pradesh	Srikakulum	Casurina



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1154	ASK05CA0245	Andhra Pradesh	Srikakulam	Casurina
1155	ASK05CA0249	Andhra Pradesh	Srikakulam	Casurina
1156	ASK05CA0251	Andhra Pradesh	Srikakulam	Casurina
1157	ASK05CA0255	Andhra Pradesh	Srikakulam	Casurina
1158	ASK05CA0257	Andhra Pradesh	Srikakulam	Casurina
1159	ASK05CA0258	Andhra Pradesh	Srikakulam	Casurina
1160	ASK05CA0261	Andhra Pradesh	Srikakulam	Casurina
1161	ASK05CA0262	Andhra Pradesh	Srikakulam	Casurina
1162	ASK05CA0264	Andhra Pradesh	Srikakulam	Casurina
1163	ASK05CA0265	Andhra Pradesh	Srikakulam	Casurina
1164	ASK05CA0270	Andhra Pradesh	Srikakulam	Casurina
1165	ASK05CA0271	Andhra Pradesh	Srikakulam	Casurina
1166	ASK05CA0273	Andhra Pradesh	Srikakulam	Casurina
1167	ASK05CA0273	Andhra Pradesh	Srikakulam	Casurina
1168	ASK05CA0274	Andhra Pradesh	Srikakulam	Casurina
1169	ASK05CA0275	Andhra Pradesh	Srikakulam	Casurina
1170	ASK05CA0281	Andhra Pradesh	Srikakulam	Casurina
1171	ASK05CA0284	Andhra Pradesh	Srikakulam	Casurina
1172	ASK05CA0285	Andhra Pradesh	Srikakulam	Casurina
1173	ASK05CA0285	Andhra Pradesh	Srikakulam	Casurina
1174	ASK05CA0285	Andhra Pradesh	Srikakulam	Casurina
1175	ASK05CA0286	Andhra Pradesh	Srikakulam	Casurina
1176	ASK05CA0287	Andhra Pradesh	Srikakulam	Casurina
1178	ASK05CA0293	Andhra Pradesh	Srikakulam	Casurina
1179	ASK05CA0294	Andhra Pradesh	Srikakulam	Casurina
1180	ASK05CA0298	Andhra Pradesh	Srikakulam	Casurina
1181	ASK05CA0299	Andhra Pradesh	Srikakulam	Casurina
1182	ASK05CA0300	Andhra Pradesh	Srikakulam	Casurina
1183	ASK05CA0302	Andhra Pradesh	Srikakulam	Casurina
1184	ASK05CA0303	Andhra Pradesh	Srikakulam	Casurina
1185	ASK05CA0304	Andhra Pradesh	Srikakulam	Casurina
1186	ASK05CA0305	Andhra Pradesh	Srikakulam	Casurina
1187	ASK05CA0306	Andhra Pradesh	Srikakulam	Casurina
1188	ASK05CA0307	Andhra Pradesh	Srikakulam	Casurina
1189	ASK05CA0309	Andhra Pradesh	Srikakulam	Casurina
1190	ASK05CA0310	Andhra Pradesh	Srikakulam	Casurina
1191	ASK05CA0311	Andhra Pradesh	Srikakulam	Casurina
1192	ASK05CA0312	Andhra Pradesh	Srikakulam	Casurina
1193	ASK05CA0313	Andhra Pradesh	Srikakulam	Casurina
1194	ASK05CA0315	Andhra Pradesh	Srikakulam	Casurina



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1195	ASK05CA0316	Andhra Pradesh	Srikakulam	Casurina
1196	ASK05CA0317	Andhra Pradesh	Srikakulam	Casurina
1197	ASK05CA0318	Andhra Pradesh	Srikakulam	Casurina
1200	ASK05CA0322	Andhra Pradesh	Srikakulam	Casurina
1201	ASK05CA0323	Andhra Pradesh	Srikakulam	Casurina
1202	ASK05CA0324	Andhra Pradesh	Srikakulam	Casurina
1203	ASK05CA0324	Andhra Pradesh	Srikakulam	Casurina
1205	ASK05CA0325	Andhra Pradesh	Srikakulam	Casurina
1206	ASK05CA0328	Andhra Pradesh	Srikakulam	Casurina
1207	ASK05CA0330	Andhra Pradesh	Srikakulam	Casurina
1208	ASK05CA0331	Andhra Pradesh	Srikakulam	Casurina
1209	ASK05CA0332	Andhra Pradesh	Srikakulam	Casurina
1210	ASK05CA0332	Andhra Pradesh	Srikakulam	Casurina
1211	ASK05CA0334	Andhra Pradesh	Srikakulam	Casurina
1212	ASK05CA0337	Andhra Pradesh	Srikakulam	Casurina
1213	ASK05CA0338	Andhra Pradesh	Srikakulam	Casurina
1215	ASK05CA0340	Andhra Pradesh	Srikakulam	Casurina
1216	ASK05CA0342	Andhra Pradesh	Srikakulam	Casurina
1217	ASK05CA0343	Andhra Pradesh	Srikakulam	Casurina
1218	ASK05CA0344	Andhra Pradesh	Srikakulam	Casurina
1219	ASK05CA0345	Andhra Pradesh	Srikakulam	Casurina
1220	ASK05CA0353	Andhra Pradesh	Srikakulam	Casurina
1221	ASK05CA0354	Andhra Pradesh	Srikakulam	Casurina
1222	ASK05CA0358	Andhra Pradesh	Srikakulam	Casurina
1223	ASK05CA0360	Andhra Pradesh	Srikakulam	Casurina
1224	ASK05CA0361	Andhra Pradesh	Srikakulam	Casurina
1226	ASK05CA0365	Andhra Pradesh	Srikakulam	Casurina
1227	ASK05CA0366	Andhra Pradesh	Srikakulam	Casurina
1228	ASK05CA0367	Andhra Pradesh	Srikakulam	Casurina
1229	ASK05CA0368	Andhra Pradesh	Srikakulam	Casurina
1230	ASK05CA0369	Andhra Pradesh	Srikakulam	Casurina
1231	ASK05CA0370	Andhra Pradesh	Srikakulam	Casurina
1232	ASK05CA0371	Andhra Pradesh	Srikakulam	Casurina
1233	ASK05CA0372	Andhra Pradesh	Srikakulam	Casurina
1234	ASK05CA0373	Andhra Pradesh	Srikakulam	Casurina
1235	ASK05CA0374	Andhra Pradesh	Srikakulam	Casurina
1236	ASK05CA0375	Andhra Pradesh	Srikakulam	Casurina
1237	ASK05CA0376	Andhra Pradesh	Srikakulam	Casurina
1238	ASK05CA0377	Andhra Pradesh	Srikakulam	Casurina
1239	ASK05CA0378	Andhra Pradesh	Srikakulam	Casurina



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1240	ASK05CA0379	Andhra Pradesh	Srikakulam	Casurina
1241	ASK05CA0379	Andhra Pradesh	Srikakulam	Casurina
1242	ASK05CA0380	Andhra Pradesh	Srikakulam	Casurina
1243	ASK05CA0382	Andhra Pradesh	Srikakulam	Casurina
1244	ASK05CA0383	Andhra Pradesh	Srikakulam	Casurina
1245	ASK05CA0384	Andhra Pradesh	Srikakulam	Casurina
1246	ASK05CA0385	Andhra Pradesh	Srikakulam	Casurina
1247	ASK05CA0386	Andhra Pradesh	Srikakulam	Casurina
1248	ASK05CA0387	Andhra Pradesh	Srikakulam	Casurina
1249	ASK05CA0389	Andhra Pradesh	Srikakulam	Casurina
1250	ASK05CA0390	Andhra Pradesh	Srikakulam	Casurina
1251	ASK05CA0391	Andhra Pradesh	Srikakulam	Casurina
1252	ASK05CA0392	Andhra Pradesh	Srikakulam	Casurina
1254	ASK05CA0394	Andhra Pradesh	Srikakulam	Casurina
1255	ASK05CA0395	Andhra Pradesh	Srikakulam	Casurina
1256	ASK05CA0396	Andhra Pradesh	Srikakulam	Casurina
1257	ASK05CA0397	Andhra Pradesh	Srikakulam	Casurina
1259	ASK05CA0400	Andhra Pradesh	Srikakulam	Casurina
1260	ASK05CA0401	Andhra Pradesh	Srikakulam	Casurina
1261	ASK05CA0402	Andhra Pradesh	Srikakulam	Casurina
1262	ASK05CA0403	Andhra Pradesh	Srikakulam	Casurina
1263	ASK05CA0404	Andhra Pradesh	Srikakulam	Casurina
1264	ASK05CA0405	Andhra Pradesh	Srikakulam	Casurina
1265	ASK05CA0407	Andhra Pradesh	Srikakulam	Casurina
1266	ASK05CA0408	Andhra Pradesh	Srikakulam	Casurina
1267	ASK05CA0409	Andhra Pradesh	Srikakulam	Casurina
1268	ASK05CA0410	Andhra Pradesh	Srikakulam	Casurina
1269	ASK05CA0412	Andhra Pradesh	Srikakulam	Casurina
1270	ASK05CA0412	Andhra Pradesh	Srikakulam	Casurina
1271	ASK05CA0414	Andhra Pradesh	Srikakulam	Casurina
1272	ASK05CA0415	Andhra Pradesh	Srikakulam	Casurina
1273	ASK05CA0416	Andhra Pradesh	Srikakulam	Casurina
1274	ASK05CA0419	Andhra Pradesh	Srikakulam	Casurina
1275	ASK05CA0423	Andhra Pradesh	Srikakulam	Casurina
1276	ASK05CA0424	Andhra Pradesh	Srikakulam	Casurina
1277	ASK05CA0425	Andhra Pradesh	Srikakulam	Casurina
1278	ASK05CA0426	Andhra Pradesh	Srikakulam	Casurina
1279	ASK05CA0427	Andhra Pradesh	Srikakulam	Casurina
1280	ASK05CA0428	Andhra Pradesh	Srikakulam	Casurina
1281	ASK05CA0429	Andhra Pradesh	Srikakulam	Casurina



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1282	ASK05CA0430	Andhra Pradesh	Srikakulam	Casurina
1283	ASK05CA0431	Andhra Pradesh	Srikakulam	Casurina
1284	ASK05CA0433	Andhra Pradesh	Srikakulam	Casurina
1285	ASK05CA0434	Andhra Pradesh	Srikakulam	Casurina
1286	ASK05CA0435	Andhra Pradesh	Srikakulam	Casurina
1287	ASK05CA0436	Andhra Pradesh	Srikakulam	Casurina
1288	ASK05CA0437	Andhra Pradesh	Srikakulam	Casurina
1289	ASK05CA0438	Andhra Pradesh	Srikakulam	Casurina
1290	ASK05CA0439	Andhra Pradesh	Srikakulam	Casurina
1291	ASK05CA0440	Andhra Pradesh	Srikakulam	Casurina
1292	ASK05CA0441	Andhra Pradesh	Srikakulam	Casurina
1293	ASK05CA0442	Andhra Pradesh	Srikakulam	Casurina
1294	ASK05CA0443	Andhra Pradesh	Srikakulam	Casurina
1295	ASK05EC0001	Andhra Pradesh	Srikakulam	Euc(CI)
1296	ASK05EC0001	Andhra Pradesh	Srikakulam	Euc(CI)
1297	ASK05EC0002	Andhra Pradesh	Srikakulam	Euc(CI)
1298	ASK05EC0003	Andhra Pradesh	Srikakulam	Euc(CI)
1299	ASK05EC0004	Andhra Pradesh	Srikakulam	Euc(CI)
1300	ASK05EC0005	Andhra Pradesh	Srikakulam	Euc(CI)
1301	ASK05EC0005	Andhra Pradesh	Srikakulam	Euc(CI)
1302	ASK05EC0006	Andhra Pradesh	Srikakulam	Euc(CI)
1303	ASK05EC0007	Andhra Pradesh	Srikakulam	Euc(CI)
1304	ASK05EC0008	Andhra Pradesh	Srikakulam	Euc(CI)
1305	ASK05EC0009	Andhra Pradesh	Srikakulam	Euc(CI)
1306	ASK05ES0071	Andhra Pradesh	Srikakulam	Euc(Sr)
1307	ASK05ES0072	Andhra Pradesh	Srikakulam	Euc(Sr)
1308	ASK05ES0073	Andhra Pradesh	Srikakulam	Euc(Sr)
1309	ASK05ES0074	Andhra Pradesh	Srikakulam	Euc(Sr)
1310	ASK05ES0075	Andhra Pradesh	Srikakulam	Euc(Sr)
1311	ASK05ES0075	Andhra Pradesh	Srikakulam	Euc(Sr)
1312	ASK05ES0076	Andhra Pradesh	Srikakulam	Euc(Sr)
1313	ASK05ES0077	Andhra Pradesh	Srikakulam	Euc(Sr)
1314	ASK05ES0078	Andhra Pradesh	Srikakulam	Euc(Sr)
1315	ASK05ES0080	Andhra Pradesh	Srikakulam	Euc(Sr)
1316	ASK05ES0081	Andhra Pradesh	Srikakulam	Euc(Sr)
1317	ASK05ES0082	Andhra Pradesh	Srikakulam	Euc(Sr)
1318	ASK05ES0083	Andhra Pradesh	Srikakulam	Euc(Sr)
1319	ASK05ES0084	Andhra Pradesh	Srikakulam	Euc(Sr)
1320	ASK05ES0085	Andhra Pradesh	Srikakulam	Euc(Sr)
1321	ASK05ES0086	Andhra Pradesh	Srikakulam	Euc(Sr)



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1322	ASK05ES0088	Andhra Pradesh	Srikakulam	Euc(Sr)
1323	ASK05ES0089	Andhra Pradesh	Srikakulam	Euc(Sr)
1324	ASK05ES0091	Andhra Pradesh	Srikakulam	Euc(Sr)
1326	ASK05ES0093	Andhra Pradesh	Srikakulam	Euc(Sr)
1327	ASK05ES0094	Andhra Pradesh	Srikakulam	Euc(Sr)
1328	ASK05ES0095	Andhra Pradesh	Srikakulam	Euc(Sr)
1329	ASK05ES0096	Andhra Pradesh	Srikakulam	Euc(Sr)
1330	ASK05ES0097	Andhra Pradesh	Srikakulam	Euc(Sr)
1331	ASK05ES0098	Andhra Pradesh	Srikakulam	Euc(Sr)
1332	ASK05ES0099	Andhra Pradesh	Srikakulam	Euc(Sr)
1333	ASK05ES0100	Andhra Pradesh	Srikakulam	Euc(Sr)
1334	ASK05ES0101	Andhra Pradesh	Srikakulam	Euc(Sr)
1335	ASK05ES0102	Andhra Pradesh	Srikakulam	Euc(Sr)
1336	ASK05ES0103	Andhra Pradesh	Srikakulam	Euc(Sr)
1337	ASK05ES0104	Andhra Pradesh	Srikakulam	Euc(Sr)
1338	ASK06CA0444	Andhra Pradesh	Srikakulam	Casurina
1339	ASK06CA0445	Andhra Pradesh	Srikakulam	Casurina
1340	ASK06CA0446	Andhra Pradesh	Srikakulam	Casurina
1341	ASK06CA0447	Andhra Pradesh	Srikakulam	Casurina
1342	ASK06CA0448	Andhra Pradesh	Srikakulam	Casurina
1343	ASK06CA0450	Andhra Pradesh	Srikakulam	Casurina
1344	ASK06CA0451	Andhra Pradesh	Srikakulam	Casurina
1345	ASK06CA0452	Andhra Pradesh	Srikakulam	Casurina
1346	ASK06CA0453	Andhra Pradesh	Srikakulam	Casurina
1347	ASK06CA0454	Andhra Pradesh	Srikakulam	Casurina
1349	ASK06CA0456	Andhra Pradesh	Srikakulam	Casurina
1350	ASK06CA0461	Andhra Pradesh	Srikakulam	Casurina
1351	ASK06CA0462	Andhra Pradesh	Srikakulam	Casurina
1352	ASK06CA0464	Andhra Pradesh	Srikakulam	Casurina
1353	ASK06CA0465	Andhra Pradesh	Srikakulam	Casurina
1354	ASK06CA0466	Andhra Pradesh	Srikakulam	Casurina
1356	ASK06CA0470	Andhra Pradesh	Srikakulam	Casurina
1357	ASK06CA0471	Andhra Pradesh	Srikakulam	Casurina
1358	ASK06CA0473	Andhra Pradesh	Srikakulam	Casurina
1359	ASK06CA0474	Andhra Pradesh	Srikakulam	Casurina
1360	ASK06CA0475	Andhra Pradesh	Srikakulam	Casurina
1361	ASK06CA0476	Andhra Pradesh	Srikakulam	Casurina
1362	ASK06CA0477	Andhra Pradesh	Srikakulam	Casurina
1363	ASK06CA0478	Andhra Pradesh	Srikakulam	Casurina
1364	ASK06CA0479	Andhra Pradesh	Srikakulam	Casurina



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1365	ASK06CA0480	Andhra Pradesh	Srikakulam	Casurina
1366	ASK06CA0481	Andhra Pradesh	Srikakulam	Casurina
1367	ASK06CA0482	Andhra Pradesh	Srikakulam	Casurina
1368	ASK06CA0483	Andhra Pradesh	Srikakulam	Casurina
1369	ASK06CA0484	Andhra Pradesh	Srikakulam	Casurina
1370	ASK06CA0485	Andhra Pradesh	Srikakulam	Casurina
1371	ASK06CA0486	Andhra Pradesh	Srikakulam	Casurina
1372	ASK06CA0487	Andhra Pradesh	Srikakulam	Casurina
1373	ASK06CA0488	Andhra Pradesh	Srikakulam	Casurina
1374	ASK06CA0489	Andhra Pradesh	Srikakulam	Casurina
1375	ASK06CA0490	Andhra Pradesh	Srikakulam	Casurina
1376	ASK06CA0491	Andhra Pradesh	Srikakulam	Casurina
1377	ASK06CA0492	Andhra Pradesh	Srikakulam	Casurina
1378	ASK07CA0524	Andhra Pradesh	Srikakulam	Casurina
1379	ASK06CA0497	Andhra Pradesh	Srikakulam	Casurina
1380	ASK06CA0498	Andhra Pradesh	Srikakulam	Casurina
1381	ASK06ES0105	Andhra Pradesh	Srikakulam	Euc(Sr)
1382	ASK06ES0106	Andhra Pradesh	Srikakulam	Euc(Sr)
1383	ASK06ES0107	Andhra Pradesh	Srikakulam	Euc(Sr)
1384	ASK06ES0108	Andhra Pradesh	Srikakulam	Euc(Sr)
1386	ASK07CA0500	Andhra Pradesh	Srikakulam	Casurina
1387	ASK07CA0501	Andhra Pradesh	Srikakulam	Casurina
1388	ASK07CA0503	Andhra Pradesh	Srikakulam	Casurina
1389	ASK07CA0504	Andhra Pradesh	Srikakulam	Casurina
1390	ASK07CA0506	Andhra Pradesh	Srikakulam	Casurina
1391	ASK07CA0507	Andhra Pradesh	Srikakulam	Casurina
1392	ASK07CA0510	Andhra Pradesh	Srikakulam	Casurina
1393	ASK07CA0512	Andhra Pradesh	Srikakulam	Casurina
1394	ASK07CA0513	Andhra Pradesh	Srikakulam	Casurina
1395	ASK07CA0514	Andhra Pradesh	Srikakulam	Casurina
1398	ASK07CA0518	Andhra Pradesh	Srikakulam	Casurina
1399	ASK07CA0519	Andhra Pradesh	Srikakulam	Casurina
1400	ASK07CA0520	Andhra Pradesh	Srikakulam	Casurina
1402	ASK07CA0522	Andhra Pradesh	Srikakulam	Casurina
1403	ASK07CA0523	Andhra Pradesh	Srikakulam	Casurina
1404	ASK07CA0524	Andhra Pradesh	Srikakulam	Casurina
1405	ASK07CA0525	Andhra Pradesh	Srikakulam	Casurina
1406	ASK07CA0528	Andhra Pradesh	Srikakulam	Casurina
1407	ASK07CA0529	Andhra Pradesh	Srikakulam	Casurina
1408	ASK07CA0530	Andhra Pradesh	Srikakulam	Casurina



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1409	ASK07CA0531	Andhra Pradesh	Srikakulam	Casurina
1410	ASK07CA0532	Andhra Pradesh	Srikakulam	Casurina
1411	ASK07CA0533	Andhra Pradesh	Srikakulam	Casurina
1412	ASK07CA0535	Andhra Pradesh	Srikakulam	Casurina
1413	ASK07CA0536	Andhra Pradesh	Srikakulam	Casurina
1414	ASK07CA0537	Andhra Pradesh	Srikakulam	Casurina
1415	ASK07CA0538	Andhra Pradesh	Srikakulam	Casurina
1416	ASK07CA0539	Andhra Pradesh	Srikakulam	Casurina
1417	ASK07CA0540	Andhra Pradesh	Srikakulam	Casurina
1418	ASK07CA0541	Andhra Pradesh	Srikakulam	Casurina
1419	ASK07CA0542	Andhra Pradesh	Srikakulam	Casurina
1420	ASK07CA0543	Andhra Pradesh	Srikakulam	Casurina
1421	ASK07CA0545	Andhra Pradesh	Srikakulam	Casurina
1422	ASK07CA0546	Andhra Pradesh	Srikakulam	Casurina
1423	ASK07CA0547	Andhra Pradesh	Srikakulam	Casurina
1424	ASK07CA0548	Andhra Pradesh	Srikakulam	Casurina
1425	ASK07CA0549	Andhra Pradesh	Srikakulam	Casurina
1426	ASK07CA0550	Andhra Pradesh	Srikakulam	Casurina
1427	ASK07CA0551	Andhra Pradesh	Srikakulam	Casurina
1428	ASK07CA0552	Andhra Pradesh	Srikakulam	Casurina
1429	ASK07CA0553	Andhra Pradesh	Srikakulam	Casurina
1430	ASK07CA0554	Andhra Pradesh	Srikakulam	Casurina
1431	ASK07CA0555	Andhra Pradesh	Srikakulam	Casurina
1432	ASK07CA0556	Andhra Pradesh	Srikakulam	Casurina
1433	ASK07CA0559	Andhra Pradesh	Srikakulam	Casurina
1434	ASK07CA0560	Andhra Pradesh	Srikakulam	Casurina
1435	ASK07CA0561	Andhra Pradesh	Srikakulam	Casurina
1436	ASK07CA0562	Andhra Pradesh	Srikakulam	Casurina
1437	ASK07CA0563	Andhra Pradesh	Srikakulam	Casurina
1438	ASK07CA0564	Andhra Pradesh	Srikakulam	Casurina
1442	ASK07CA0567	Andhra Pradesh	Srikakulam	Casurina
1445	ASK07CA0570	Andhra Pradesh	Srikakulam	Casurina
1446	ASK07CA0571	Andhra Pradesh	Srikakulam	Casurina
1449	ASK07CA0574	Andhra Pradesh	Srikakulam	Casurina
1450	ASK07CA0575	Andhra Pradesh	Srikakulam	Casurina
1451	ASK07CA0576	Andhra Pradesh	Srikakulam	Casurina
1452	ASK07CA0577	Andhra Pradesh	Srikakulam	Casurina
1453	ASK07CA0578	Andhra Pradesh	Srikakulam	Casurina
1454	ASK07CA0579	Andhra Pradesh	Srikakulam	Casurina
1455	ASK07CA0580	Andhra Pradesh	Srikakulam	Casurina



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1456	ASK07CA0581	Andhra Pradesh	Srikakulam	Casurina
1457	ASK07CA0582	Andhra Pradesh	Srikakulam	Casurina
1458	ASK07CA0583	Andhra Pradesh	Srikakulam	Casurina
1459	ASK07CA0584	Andhra Pradesh	Srikakulam	Casurina
1460	ASK07CA0585	Andhra Pradesh	Srikakulam	Casurina
1461	ASK07CA0586	Andhra Pradesh	Srikakulam	Casurina
1462	ASK07CA0587	Andhra Pradesh	Srikakulam	Casurina
1463	ASK07CA0588	Andhra Pradesh	Srikakulam	Casurina
1464	ASK07EC0010	Andhra Pradesh	Srikakulam	Euc(CI)
1465	ASK07EC0011	Andhra Pradesh	Srikakulam	Euc(CI)
1466	ASK07EC0012	Andhra Pradesh	Srikakulam	Euc(CI)
1467	ASK07EC0013	Andhra Pradesh	Srikakulam	Euc(CI)
1468	ASK07EC0014	Andhra Pradesh	Srikakulam	Euc(CI)
1469	ASK07EC0015	Andhra Pradesh	Srikakulam	Euc(CI)
1470	ASK07EC0016	Andhra Pradesh	Srikakulam	Euc(CI)
1471	ASK07EC0018	Andhra Pradesh	Srikakulam	Euc(CI)
1474	ASK05CA0222	Andhra Pradesh	Srikakulam	Casurina
1475	ASK07EC0022	Andhra Pradesh	Srikakulam	Euc(CI)
1476	ASK07EC0023	Andhra Pradesh	Srikakulam	Euc(CI)
1477	ASK07EC0024	Andhra Pradesh	Srikakulam	Euc(CI)
1478	ASK07EC0025	Andhra Pradesh	Srikakulam	Euc(CI)
1479	ASK07EC0027	Andhra Pradesh	Srikakulam	Euc(CI)
1480	ASK07EC0028	Andhra Pradesh	Srikakulam	Euc(CI)
1481	ASK07EC0029	Andhra Pradesh	Srikakulam	Euc(CI)
1482	ASK07EC0030	Andhra Pradesh	Srikakulam	Euc(CI)
1483	ASK07EC0031	Andhra Pradesh	Srikakulam	Euc(CI)
1484	ASK07EC0032	Andhra Pradesh	Srikakulam	Euc(CI)
1485	ASK07EC0033	Andhra Pradesh	Srikakulam	Euc(CI)
1486	ASK07EC0034	Andhra Pradesh	Srikakulam	Euc(CI)
1487	ASK07EC0035	Andhra Pradesh	Srikakulam	Euc(CI)
1488	ASK07EC0036	Andhra Pradesh	Srikakulam	Euc(CI)
1489	ASK07EC0037	Andhra Pradesh	Srikakulam	Euc(CI)
1490	ASK07EC0038	Andhra Pradesh	Srikakulam	Euc(CI)
1491	ASK07EC0039	Andhra Pradesh	Srikakulam	Euc(CI)
1492	ASK07EC0040	Andhra Pradesh	Srikakulam	Euc(CI)
1493	ASK07EC0041	Andhra Pradesh	Srikakulam	Euc(CI)
1494	ASK07EC0041	Andhra Pradesh	Srikakulam	Euc(CI)
1495	ASK07EC0042	Andhra Pradesh	Srikakulam	Euc(CI)
1496	ASK07EC0043	Andhra Pradesh	Srikakulam	Euc(CI)
1497	ASK07EC0044	Andhra Pradesh	Srikakulam	Euc(CI)



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1498	ASK07EC0045	Andhra Pradesh	Srikakulam	Euc(CI)
1499	ASK07ES0110	Andhra Pradesh	Srikakulam	Euc(Sr)
1500	ASK07ES0111	Andhra Pradesh	Srikakulam	Euc(Sr)
1501	ASK07ES0112	Andhra Pradesh	Srikakulam	Euc(Sr)
1502	ASK07ES0113	Andhra Pradesh	Srikakulam	Euc(Sr)
1503	ASK07ES0114	Andhra Pradesh	Srikakulam	Euc(Sr)
1504	ASK07ES0115	Andhra Pradesh	Srikakulam	Euc(Sr)
1505	ASK07ES0116	Andhra Pradesh	Srikakulam	Euc(Sr)
1506	ASK07ES0117	Andhra Pradesh	Srikakulam	Euc(Sr)
1507	ASK07ES0118	Andhra Pradesh	Srikakulam	Euc(Sr)
1508	ASK07ES0119	Andhra Pradesh	Srikakulam	Euc(Sr)
1509	ASK07ES0120	Andhra Pradesh	Srikakulam	Euc(Sr)
1510	ASK07ES0121	Andhra Pradesh	Srikakulam	Euc(Sr)
1511	ASK07ES0122	Andhra Pradesh	Srikakulam	Euc(Sr)
1516	ASK07ES0127	Andhra Pradesh	Srikakulam	Euc(Sr)
1517	ASK07ES0128	Andhra Pradesh	Srikakulam	Euc(Sr)
1519	ASK07ES0130	Andhra Pradesh	Srikakulam	Euc(Sr)
1520	ASK07ES0131	Andhra Pradesh	Srikakulam	Euc(Sr)
1521	ASK07ES0132	Andhra Pradesh	Srikakulam	Euc(Sr)
1522	ASK07ES0133	Andhra Pradesh	Srikakulam	Euc(Sr)
1523	ASK07ES0134	Andhra Pradesh	Srikakulam	Euc(Sr)
1524	ASK07ES0135	Andhra Pradesh	Srikakulam	Euc(Sr)
1525	ASK07ES0136	Andhra Pradesh	Srikakulam	Euc(Sr)
1526	ASK07ES0137	Andhra Pradesh	Srikakulam	Euc(Sr)
1527	ASK07ES0138	Andhra Pradesh	Srikakulam	Euc(Sr)
1528	ASK07ES0140	Andhra Pradesh	Srikakulam	Euc(Sr)
1529	ASK07ES0141	Andhra Pradesh	Srikakulam	Euc(Sr)
1530	ASK07ES0142	Andhra Pradesh	Srikakulam	Euc(Sr)
1531	ASK07ES0143	Andhra Pradesh	Srikakulam	Euc(Sr)
1532	ASK07ES0144	Andhra Pradesh	Srikakulam	Euc(Sr)
1533	ASK07ES0145	Andhra Pradesh	Srikakulam	Euc(Sr)
1534	ASK07ES0146	Andhra Pradesh	Srikakulam	Euc(Sr)
1535	ASK07ES0147	Andhra Pradesh	Srikakulam	Euc(Sr)
1536	ASK07ES0148	Andhra Pradesh	Srikakulam	Euc(Sr)
1537	ASK07ES0149	Andhra Pradesh	Srikakulam	Euc(Sr)
1538	ASK07ES0150	Andhra Pradesh	Srikakulam	Euc(Sr)
1539	ASK07ES0151	Andhra Pradesh	Srikakulam	Euc(Sr)
1540	ASK07ES0152	Andhra Pradesh	Srikakulam	Euc(Sr)
1541	ASK07ES0153	Andhra Pradesh	Srikakulam	Euc(Sr)
1542	ASK07ES0154	Andhra Pradesh	Srikakulam	Euc(Sr)



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1543	ASK07ES0155	Andhra Pradesh	Srikakulam	Euc(Sr)
1544	ASK07ES0156	Andhra Pradesh	Srikakulam	Euc(Sr)
1545	ASK07ES0157	Andhra Pradesh	Srikakulam	Euc(Sr)
1546	ASK07ES0158	Andhra Pradesh	Srikakulam	Euc(Sr)
1547	ASK07ES0159	Andhra Pradesh	Srikakulam	Euc(Sr)
1548	ASK07ES0160	Andhra Pradesh	Srikakulam	Euc(Sr)
1549	ASK07ES0161	Andhra Pradesh	Srikakulam	Euc(Sr)
1550	ASK07ES0162	Andhra Pradesh	Srikakulam	Euc(Sr)
1551	AVS04CA0017	Andhra Pradesh	Visakhapatnam	Casurina
1552	AVS04CA0019	Andhra Pradesh	Visakhapatnam	Casurina
1553	AVS04CA0021	Andhra Pradesh	Visakhapatnam	Casurina
1554	AVS04CA0022	Andhra Pradesh	Visakhapatnam	Casurina
1555	AVS04CA0024	Andhra Pradesh	Visakhapatnam	Casurina
1556	AVS04CA0025	Andhra Pradesh	Visakhapatnam	Casurina
1557	AVS04CA0027	Andhra Pradesh	Visakhapatnam	Casurina
1558	AVS04CA0029	Andhra Pradesh	Visakhapatnam	Casurina
1559	AVS04CA0030	Andhra Pradesh	Visakhapatnam	Casurina
1560	AVS04CA0031	Andhra Pradesh	Visakhapatnam	Casurina
1561	AVS04CA0032	Andhra Pradesh	Visakhapatnam	Casurina
1562	AVS04CA0033	Andhra Pradesh	Visakhapatnam	Casurina
1563	AVS04CA0034	Andhra Pradesh	Visakhapatnam	Casurina
1567	AVS04CA0054	Andhra Pradesh	Visakhapatnam	Casurina
1568	AVS04CA0055	Andhra Pradesh	Visakhapatnam	Casurina
1569	AVS05CA0058	Andhra Pradesh	Visakhapatnam	Casurina
1570	AVS05CA0059	Andhra Pradesh	Visakhapatnam	Casurina
1571	AVS05CA0059	Andhra Pradesh	Visakhapatnam	Casurina
1574	AVS05CA0064	Andhra Pradesh	Visakhapatnam	Casurina
1575	AVS05CA0065	Andhra Pradesh	Visakhapatnam	Casurina
1576	AVS05CA0067	Andhra Pradesh	Visakhapatnam	Casurina
1577	AVS05CA0068	Andhra Pradesh	Visakhapatnam	Casurina
1578	AVS05CA0069	Andhra Pradesh	Visakhapatnam	Casurina
1579	AVS05CA0070	Andhra Pradesh	Visakhapatnam	Casurina
1582	AVS05CA0073	Andhra Pradesh	Visakhapatnam	Casurina
1583	AVS05CA0074	Andhra Pradesh	Visakhapatnam	Casurina
1584	AVS05CA0075	Andhra Pradesh	Visakhapatnam	Casurina
1585	AVS05CA0076	Andhra Pradesh	Visakhapatnam	Casurina
1586	AVS05CA0077	Andhra Pradesh	Visakhapatnam	Casurina
1587	AVS05CA0079	Andhra Pradesh	Visakhapatnam	Casurina
1588	AVS05CA0082	Andhra Pradesh	Visakhapatnam	Casurina
1591	AVS05CA0085	Andhra Pradesh	Visakhapatnam	Casurina



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1592	AVS05CA0086	Andhra Pradesh	Visakhapatnam	Casurina
1593	AVS05CA0087	Andhra Pradesh	Visakhapatnam	Casurina
1594	AVS05CA0088	Andhra Pradesh	Visakhapatnam	Casurina
1595	AVS05CA0100	Andhra Pradesh	Visakhapatnam	Casurina
1596	AVS05CA0101	Andhra Pradesh	Visakhapatnam	Casurina
1597	AVS05CA0102	Andhra Pradesh	Visakhapatnam	Casurina
1598	AVS05CA0105	Andhra Pradesh	Visakhapatnam	Casurina
1599	AVS05CA0106	Andhra Pradesh	Visakhapatnam	Casurina
1600	AVS05EC0001	Andhra Pradesh	Visakhapatnam	Euc(CI)
1601	AVS05EC0002	Andhra Pradesh	Visakhapatnam	Euc(CI)
1602	AVS05EC0003	Andhra Pradesh	Visakhapatnam	Euc(CI)
1603	AVS05EC0004	Andhra Pradesh	Visakhapatnam	Euc(CI)
1604	AVS05EC0006	Andhra Pradesh	Visakhapatnam	Euc(CI)
1605	AVS06CA0108	Andhra Pradesh	Visakhapatnam	Casurina
1606	AVS06CA0110	Andhra Pradesh	Visakhapatnam	Casurina
1607	AVS06CA0111	Andhra Pradesh	Visakhapatnam	Casurina
1608	AVS06CA0112	Andhra Pradesh	Visakhapatnam	Casurina
1609	AVS06CA0113	Andhra Pradesh	Visakhapatnam	Casurina
1610	AVS06CA0114	Andhra Pradesh	Visakhapatnam	Casurina
1611	AVS06CA0115	Andhra Pradesh	Visakhapatnam	Casurina
1612	AVS06CA0116	Andhra Pradesh	Visakhapatnam	Casurina
1613	AVS06CA0117	Andhra Pradesh	Visakhapatnam	Casurina
1614	AVS06CA0118	Andhra Pradesh	Visakhapatnam	Casurina
1615	AVS06CA0119	Andhra Pradesh	Visakhapatnam	Casurina
1616	AVS06CA0120	Andhra Pradesh	Visakhapatnam	Casurina
1617	AVS06CA0121	Andhra Pradesh	Visakhapatnam	Casurina
1618	AVS06CA0122	Andhra Pradesh	Visakhapatnam	Casurina
1619	AVS06CA0124	Andhra Pradesh	Visakhapatnam	Casurina
1620	AVS06CA0125	Andhra Pradesh	Visakhapatnam	Casurina
1621	AVS06CA0126	Andhra Pradesh	Visakhapatnam	Casurina
1622	AVS06CA0127	Andhra Pradesh	Visakhapatnam	Casurina
1623	AVS06CA0128	Andhra Pradesh	Visakhapatnam	Casurina
1624	AVS06CA0129	Andhra Pradesh	Visakhapatnam	Casurina
1625	AVS06CA0130	Andhra Pradesh	Visakhapatnam	Casurina
1628	AVS06CA0134	Andhra Pradesh	Visakhapatnam	Casurina
1629	AVS06CA0135	Andhra Pradesh	Visakhapatnam	Casurina
1630	AVS06CA0136	Andhra Pradesh	Visakhapatnam	Casurina
1631	AVS06CA0137	Andhra Pradesh	Visakhapatnam	Casurina
1632	AVS06CA0138	Andhra Pradesh	Visakhapatnam	Casurina
1633	AVS06CA0139	Andhra Pradesh	Visakhapatnam	Casurina



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1634	AVS06CA0141	Andhra Pradesh	Visakhapatnam	Casurina
1635	AVS06CA0142	Andhra Pradesh	Visakhapatnam	Casurina
1636	AVS06CA0143	Andhra Pradesh	Visakhapatnam	Casurina
1637	AVS06CA0144	Andhra Pradesh	Visakhapatnam	Casurina
1638	AVS06CA0145	Andhra Pradesh	Visakhapatnam	Casurina
1639	AVS06CA0145	Andhra Pradesh	Visakhapatnam	Casurina
1640	AVS06CA0146	Andhra Pradesh	Visakhapatnam	Casurina
1641	AVS06CA0147	Andhra Pradesh	Visakhapatnam	Casurina
1642	AVS06CA0148	Andhra Pradesh	Visakhapatnam	Casurina
1643	AVS06CA0149	Andhra Pradesh	Visakhapatnam	Casurina
1644	AVS06CA0150	Andhra Pradesh	Visakhapatnam	Casurina
1645	AVS06CA0151	Andhra Pradesh	Visakhapatnam	Casurina
1646	AVS06CA0152	Andhra Pradesh	Visakhapatnam	Casurina
1647	AVS06CA0153	Andhra Pradesh	Visakhapatnam	Casurina
1648	AVS06CA0154	Andhra Pradesh	Visakhapatnam	Casurina
1649	AVS06CA0155	Andhra Pradesh	Visakhapatnam	Casurina
1650	AVS06CA0158	Andhra Pradesh	Visakhapatnam	Casurina
1651	AVS06CA0161	Andhra Pradesh	Visakhapatnam	Casurina
1652	AVS06CA0162	Andhra Pradesh	Visakhapatnam	Casurina
1653	AVS06CA0163	Andhra Pradesh	Visakhapatnam	Casurina
1654	AVS06CA0164	Andhra Pradesh	Visakhapatnam	Casurina
1655	AVS06CA0165	Andhra Pradesh	Visakhapatnam	Casurina
1656	AVS06CA0168	Andhra Pradesh	Visakhapatnam	Casurina
1657	AVS06EC0007	Andhra Pradesh	Visakhapatnam	Euc(CI)
1658	AVS06EC0008	Andhra Pradesh	Visakhapatnam	Euc(CI)
1659	AVS06EC0009	Andhra Pradesh	Visakhapatnam	Euc(CI)
1660	AVS06EC0013	Andhra Pradesh	Visakhapatnam	Euc(CI)
1661	AVS06EC0014	Andhra Pradesh	Visakhapatnam	Euc(CI)
1662	AVS07CA0170	Andhra Pradesh	Visakhapatnam	Casurina
1663	AVS07CA0171	Andhra Pradesh	Visakhapatnam	Casurina
1664	AVS07CA0172	Andhra Pradesh	Visakhapatnam	Casurina
1665	AVS07CA0173	Andhra Pradesh	Visakhapatnam	Casurina
1666	AVS07CA0175	Andhra Pradesh	Visakhapatnam	Casurina
1667	AVS07CA0177	Andhra Pradesh	Visakhapatnam	Casurina
1668	AVS07CA0179	Andhra Pradesh	Visakhapatnam	Casurina
1669	AVS07CA0181	Andhra Pradesh	Visakhapatnam	Casurina
1670	AVS07CA0182	Andhra Pradesh	Visakhapatnam	Casurina
1671	AVS07CA0183	Andhra Pradesh	Visakhapatnam	Casurina
1672	AVS07CA0184	Andhra Pradesh	Visakhapatnam	Casurina
1673	AVS07CA0185	Andhra Pradesh	Visakhapatnam	Casurina



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1674	AVS07CA0187	Andhra Pradesh	Visakhapatnam	Casurina
1675	AVS07CA0188	Andhra Pradesh	Visakhapatnam	Casurina
1676	AVS07CA0189	Andhra Pradesh	Visakhapatnam	Casurina
1677	AVS07CA0190	Andhra Pradesh	Visakhapatnam	Casurina
1678	AVS07CA0191	Andhra Pradesh	Visakhapatnam	Casurina
1679	AVS07CA0192	Andhra Pradesh	Visakhapatnam	Casurina
1682	AVS07CA0196	Andhra Pradesh	Visakhapatnam	Casurina
1683	AVS07CA0199	Andhra Pradesh	Visakhapatnam	Casurina
1684	AVS07CA0201	Andhra Pradesh	Visakhapatnam	Casurina
1685	AVS07CA0202	Andhra Pradesh	Visakhapatnam	Casurina
1686	AVS07CA0203	Andhra Pradesh	Visakhapatnam	Casurina
1687	AVS07CA0204	Andhra Pradesh	Visakhapatnam	Casurina
1688	AVS07CA0205	Andhra Pradesh	Visakhapatnam	Casurina
1689	AVS07CA0207	Andhra Pradesh	Visakhapatnam	Casurina
1690	AVS07CA0209	Andhra Pradesh	Visakhapatnam	Casurina
1691	AVS07CA0210	Andhra Pradesh	Visakhapatnam	Casurina
1692	AVS07CA0211	Andhra Pradesh	Visakhapatnam	Casurina
1693	AVS07CA0212	Andhra Pradesh	Visakhapatnam	Casurina
1694	AVS07CA0214	Andhra Pradesh	Visakhapatnam	Casurina
1695	AVS07CA0215	Andhra Pradesh	Visakhapatnam	Casurina
1696	AVS07CA0216	Andhra Pradesh	Visakhapatnam	Casurina
1697	AVS07CA0217	Andhra Pradesh	Visakhapatnam	Casurina
1698	AVS07CA0218	Andhra Pradesh	Visakhapatnam	Casurina
1699	AVS07CA0221	Andhra Pradesh	Visakhapatnam	Casurina
1700	AVS07CA0222	Andhra Pradesh	Visakhapatnam	Casurina
1701	AVS07CA0228	Andhra Pradesh	Visakhapatnam	Casurina
1702	AVS07CA0230	Andhra Pradesh	Visakhapatnam	Casurina
1703	AVS07CA0231	Andhra Pradesh	Visakhapatnam	Casurina
1704	AVS07CA0232	Andhra Pradesh	Visakhapatnam	Casurina
1705	AVS07CA0234	Andhra Pradesh	Visakhapatnam	Casurina
1706	AVS07CA0236	Andhra Pradesh	Visakhapatnam	Casurina
1707	AVS07CA0240	Andhra Pradesh	Visakhapatnam	Casurina
1708	AVS07CA0243	Andhra Pradesh	Visakhapatnam	Casurina
1626,1627,1589,1590	AVS06CA0131	Andhra Pradesh	Visakhapatnam	Casurina
1626,1627,1589,1590	AVS06CA0132	Andhra Pradesh	Visakhapatnam	Casurina
1626,1627,1589,1590	AVS05CA0083	Andhra Pradesh	Visakhapatnam	Casurina
1626,1627,1589,1590	AVS05CA0084	Andhra Pradesh	Visakhapatnam	Casurina
1021, 1023, 1022	AVZ07EC0184, AVZ07EC0186, AVZ07EC0185	Andhra Pradesh	Vizianagaram	Euc(CI)
1028, 1029	AVZ07EC0191, AVZ07EC0192	Andhra Pradesh	Vizianagaram	Euc(CI)
1056, 1057	AVZ07EC0218, AVZ07EC0218	Andhra Pradesh	Vizianagaram	Euc(CI)



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1122, 1121	ASK04ES0057, ASK04ES0056	Andhra Pradesh	Srikakulam	Euc(Sr)
1199, 1397	ASK05CA0321	Andhra Pradesh	Srikakulam	Casurina
1199, 1397	ASK07CA0516	Andhra Pradesh	Srikakulam	Casurina
1204, 1214	ASK05CA0324, ASK05CA0340	Andhra Pradesh	Srikakulam	Casurina
1225, 1401	ASK05CA0364, ASK07CA0521	Andhra Pradesh	Srikakulam	Casurina
1253, 1258	ASK05CA0393, ASK05CA0399	Andhra Pradesh	Srikakulam	Casurina
1325, 1133	ASK05ES0092	Andhra Pradesh	Srikakulam	Euc(Sr)
1325, 1133	ASK04ES0069	Andhra Pradesh	Srikakulam	Euc(Sr)
1348, 1198	ASK06CA0455	Andhra Pradesh	Srikakulam	Casurina
1348, 1198	ASK05CA0320	Andhra Pradesh	Srikakulam	Casurina
1355, 1177	ASK06CA0468	Andhra Pradesh	Srikakulam	Casurina
1355, 1177	ASK05CA0290	Andhra Pradesh	Srikakulam	Casurina
1385, 1518	ASK06ES0109	Andhra Pradesh	Srikakulam	Euc(Sr)
1385, 1518	ASK07ES0129	Andhra Pradesh	Srikakulam	Euc(Sr)
1396, 1441	ASK07CA0515, ASK07CA0566	Andhra Pradesh	Srikakulam	Casurina
1439, 1440	ASK07CA0565, ASK07CA0565	Andhra Pradesh	Srikakulam	Casurina
1443, 1444	ASK07CA0568, ASK07CA0569	Andhra Pradesh	Srikakulam	Casurina
1447, 1448	ASK07CA0572, ASK07CA0573	Andhra Pradesh	Srikakulam	Casurina
1473, 1472	ASK07EC0020, ASK07EC0019	Andhra Pradesh	Srikakulam	Euc(CI)
15, 188	OKL04EC0009	Orissa	Kalahandi	Euc(CI)
15, 188	OKL07EC0101	Orissa	Kalahandi	Euc(CI)
1512, 1513	ASK07ES0123, ASK07ES0124	Andhra Pradesh	Srikakulam	Euc(Sr)
1514, 1515	ASK07ES0125, ASK07ES0126	Andhra Pradesh	Srikakulam	Euc(Sr)
1564, 1565, 1566	AVS04CA0035, AVS04CA0036, AVS04CA0037	Andhra Pradesh	Visakhapatnam	Casurina
1572, 1573	AVS05CA0060, AVS05CA0061	Andhra Pradesh	Visakhapatnam	Casurina
1580, 1581	AVS05CA0071, AVS05CA0072	Andhra Pradesh	Visakhapatnam	Casurina
1680, 1681	AVS07CA0194, AVS07CA0195	Andhra Pradesh	Visakhapatnam	Casurina
203, 200	OKL07ES0201, OKL07ES0198	Orissa	Kalahandi	Euc(Sr)
262, 154	OKL07ES0268	Orissa	Kalahandi	Euc(Sr)
262, 154	OKL06ES0183	Orissa	Kalahandi	Euc(Sr)
304, 343	ORG04ES0118	Orissa	Rayagada	Euc(Sr)
304, 343	ORG05ES0139	Orissa	Rayagada	Euc(Sr)
411, 382	ORG07EC0061	Orissa	Rayagada	Euc(CI)
411, 382	ORG06EC0060	Orissa	Rayagada	Euc(CI)
439, 440	ORG07EC0083, ORG07EC0083	Orissa	Rayagada	Euc(CI)
465, 466	ORG07EC0105, ORG07EC0105	Orissa	Rayagada	Euc(CI)
553, 564	OKP05EC0016, OKP05EC0026	Orissa	Koraput	Euc(CI)
595, 599	OKP07EC0042, OKP07EC0042	Orissa	Koraput	Euc(CI)
627, 628	OKP07ES0085, OKP07ES0085	Orissa	Koraput	Euc(Sr)
638, 639, 641	AVZ04EC0005, AVZ04EC0006, AVZ04EC0008	Andhra Pradesh	Vizianagaram	Euc(CI)



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647, 923	AVZ04EC0015	Andhra Pradesh	Vizianagaram	Euc(CI)
647, 923	AVZ06EC0122	Andhra Pradesh	Vizianagaram	Euc(CI)
673, 677	AVZ05CA0286, AVZ05CA00289	Andhra Pradesh	Vizianagaram	Casurina
679, 945	AVZ05CA0291	Andhra Pradesh	Vizianagaram	Casurina
679, 945	AVZ07CA0506	Andhra Pradesh	Vizianagaram	Casurina
690, 691	AVZ05CA0306, AVZ05CA0307	Andhra Pradesh	Vizianagaram	Casurina
710, 809	AVZ05CA0344	Andhra Pradesh	Vizianagaram	Casurina
710, 809	AVZ06CA0442	Andhra Pradesh	Vizianagaram	Casurina
740, 836	AVZ05CA0391	Andhra Pradesh	Vizianagaram	Casurina
740, 836	AVZ06CA0476	Andhra Pradesh	Vizianagaram	Casurina
775, 705	AVZ06CA0403	Andhra Pradesh	Vizianagaram	Casurina
775, 705	AVZ05CA0337	Andhra Pradesh	Vizianagaram	Casurina
788, 715	AVZ06CA0418	Andhra Pradesh	Vizianagaram	Casurina
788, 715	AVZ05CA0349	Andhra Pradesh	Vizianagaram	Casurina
791, 786	AVZ06CA0421, AVZ06CA0416	Andhra Pradesh	Vizianagaram	Casurina
794, 795	AVZ06CA0425, AVZ06CA0426	Andhra Pradesh	Vizianagaram	Casurina
827, 730	AVZ06CA0467	Andhra Pradesh	Vizianagaram	Casurina
827, 730	AVZ05CA0374	Andhra Pradesh	Vizianagaram	Casurina
846, 847	AVZ06EC0045, AVZ06EC0044	Andhra Pradesh	Vizianagaram	Euc(CI)
848, 916	AVZ06EC0046, AVZ06EC0116	Andhra Pradesh	Vizianagaram	Euc(CI)
864, 899	AVZ06EC0063, AVZ06EC0097	Andhra Pradesh	Vizianagaram	Euc(CI)
888, 905	AVZ06EC0089, AVZ06EC0103	Andhra Pradesh	Vizianagaram	Euc(CI)
900, 901	AVZ06EC0098, AVZ06EC0099	Andhra Pradesh	Vizianagaram	Euc(CI)
903, 904	AVZ06EC0101, AVZ06EC0102,	Andhra Pradesh	Vizianagaram	Euc(CI)
909, 910	AVZ06EC0108, AVZ06EC0109	Andhra Pradesh	Vizianagaram	Euc(CI)
913, 763	AVZ06EC0112	Andhra Pradesh	Vizianagaram	Euc(CI)
913, 763	AVZ05EC0035	Andhra Pradesh	Vizianagaram	Euc(CI)
914, 927, 928	AVZ06EC0114, AVZ06EC0126, AVZ06EC0127	Andhra Pradesh	Vizianagaram	Euc(CI)
939, 940	AVZ07CA0499, AVZ07CA0500	Andhra Pradesh	Vizianagaram	Casurina
988, 989, 995	AVZ07EC0147, AVZ07EC0148, AVZ07EC0154	Andhra Pradesh	Vizianagaram	Euc(CI)



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History of the document

Version	Date	Nature of revision
04	EB35, Annex 20 19 October 2007	<ul style="list-style-type: none">• Restructuring of section A;• Section “Monitoring of forest establishment and management” replaces sections: “Monitoring of the project boundary”, and “Monitoring of forest management”;• Introduced a new section allowing for explicit description of SOPs and quality control/quality assurance (QA/QC) procedures if required by the selected approved methodology;• Change in design of the section “Monitoring of the baseline net GHG removals by sinks” allowing for more efficient presentation of data.
03	EB26, Annex 19 29 September 2006	Revisions in different sections to reflect equivalent forms used by the Meth Panel and assist in making more transparent the selection of an approved methodology for a proposed A/R CDM project activity.
02	EB23, Annex 15a/b 24 February 2006	Inclusion of a section on the assessment of the eligibility of land and the Sampling design and stratification during monitoring
01	EB15, Annex 6 03 September 2004	Initial adoption
