FROM CASH-CROPS TO CARBON SINKS:

A NEW IDENTITY TO VIRTUAL LAND ALIENATION IN ODISHA

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Note on the revised edition

A/R CDM has multiple aspects of controversy, be it the species selected, or the definition of afforestation, or the reliability of the validation, or the actual benefits received by the farmers involved. Since the e-publication of the first version of this report we have received, besides the positive feedback from our development partner Misereor-KZE that our report was appreciated in Indonesia, information about some interesting developments in the state which prompted us for this revised edition. First of all, the R&D findings refuting the objections against Eucalyptus have been shared with us by Dr. H.D.Kulkarni, Vice-President(Plantation), ITC PSPD, Bhadrachalam in a consolidated manner. Secondly, in a rather extraordinary development the Directorate of Horticulture, Government of Odisha has published an advertisement asking farmers to grow horticultural/fruit crops and earn carbon credits. Thirdly, information pertaining to the CDM proposal of Mangalam Timber Products Limited(MTPL), has been accessed and analysed. Although MTPL is not a paper mill, its plantation activities are similar to those of the paper mills. And fourthly, the CDM link to the BILT-promoted project has been discovered and discussed, thanks to the contribution of Sri Praveen Kumar Tripathy, Chief Executive Officer, Patneswari Agri-Cooperative Limited and the Assistant General Manager, NABARD, Koraput. The present edition is enriched with such new information including thee more annexures, and we hope the report would now be more beneficial to various stakeholders than the first edition.

BIKASH RATH

A Summarizing Note

Growing cash crops is not a new thing in Indian tradition, but considered in the context of efficient land use, food- & fodder security, environmental- & ecological security, and of course the socio-economic security land use changes for growing cash crops that are incompatible to all or most of such factors definitely becomes a matter of concern particularly when India, overburdened with its population, is fast losing its land- and other natural resources to mining, industrialization, or other such 'developmental'(?) projects without an efficient & effective land use policy and planning. This has resulted in a number of adversities: animal husbandry faces acute shortage of pasture; deforestation leads to loss of biodiversity, increase in man-animal conflicts, decrease in rainfall, and a loss of the base of a sustainable livelihood; water scarcity is becoming acute in many areas with severe impacts on life & livelihood as agriculture has become quite vulnerable to crop failure; and the natural characteristics of land, both at micro- and macro level are being fast altered under the expansion of urbanization as well as modern farming practices thereby leading to a substantial change in its intricate and inherent relationship with other biotic- and abiotic elements that helped sustain a healthy life of flora & fauna including humanity. Under such a critical situation, the paper & pulp industry has been promoting pulpwood plantations in the name and style of social- and farm forestry, and has succeeded in converting about 0.25 million hectares of land into its raw material factories. It has claimed that these lands were mostly degraded, and could not be efficiently used for socio-economic purposes because of the poor capacity of the farmers. The ownership of most of these lands lies with the respective farmers, but virtually the industry has become the owner thereof particularly in cases where it has provided support for that. In the recent years, the industry has taken further advantage of this virtual possession by claiming carbon credits against the same. When the country is facing a critical failure in efficient & sustainable land use, the paper & pulp industry has created further chaos by creating what is called 'green deserts' in farm lands. Ironically, the flawed international policy regime on climate change mitigation strategy, under the aegis of UNFCCC, recognizes such land use changes eligible for carbon credits; and we grow Eucalyptus here, at the cost of our own food security, ecological security, and biodiversity to not only feed the expanding paper & pulp industry but also to help sustain the pollution elsewhere. The present report is a small and partial attempt to expose the fraud of such 'green initiatives' based on some primary studies and secondary research, and we acknowledge the contribution of the villagers, organizations(including VCCSL, JKPL, BILT, and LIVING FARMS), and individuals who have helped during this study. It is likely that the findings & conclusions of this report may not withstand the political apathy, industrial tactics, ignorance of the vulnerable, and attitudinal change of the farmers. After all, who cares for biodiversity when a better gain is promised? We can't therefore simply condemn the industries; we can't see this case in isolation. It is a collective responsibility requiring a broader and integrated approach, and it will be really great if this report inspires atleast some people that way.

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ABBREVIATIONS

A/R	Afforestation & reforestation
ADt	Air dry ton
BILT	Ballarpur Industries Ltd.
CDM	Clean Development Mechanism
CER	Certified emission rate
Cha-1yr-1	Carbon per hectare per year
CSE	Centre for Science & Environment
CSR	Corporate Social Responsibility
DISHA	Society for Direct Initiative for Social and Health Action).
DNA	Designated National Authority
EIA	Environmental Impact Assessment
FAQ	Frequently Asked Questions
FRA	Forest Rights Act, 2006
INBAR	International Network for Bamboo & Rattan
INR	Indian rupee
IPPTA	Indian Pulp & Paper Technical Association
IRL	Information Reference List
ITC	Indian Tobacco Company
JKPL	JK Paper Ltd.
Kton	Kiloton
lCER	Long-term CER
MT	Metric ton
NCDMA	National CDM Authority
NESPON	North Eastern Society for Preservation of Nature and Wild Life)
NFFPFW	National Forum for Forest People & Forest Workers
NPC	National Productivity Council
OBDA	Odisha Bamboo Development Agency
OECD	Organization for Economic Cooperation and Development
PESA	The Panchayats (Extension to the Scheduled Areas) Act, 1996
SPCB	State Pollution Control Board
t/ha	ton per hectare
tCER	Temporary CER
tCO2	ton carbon dioxide
TPA	Ton per annum
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VCCSL	Veda Climate Change Solutions Ltd.
VCS	Voluntary Carbon Standard
VSS	Vana Samrakshan Samiti

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1. The crisis of land alienation:

Alienation has been a more expressive and representative term for acquiring the lands of the disadvantaged/marginalized communities, particularly of the tribals, by non-tribal individuals and/or the corporate houses; and is widespread in India. The alienation takes place both formally and informally, and it may be done through a mutual negotiation or tactfully or by force.

The history of many countries tells stories of all such kinds of alienation of land. In India the tribals either lost their lands to the invaders or left their plane lands for the hilly terrains so as to escape the financial impositions on their crops, or temporarily handed over their land for some money or other benefit. The issue assumed much more importance in the hilly terrains where plane and productive land is scarce and critical to the tribal but still it is virtually snatched away from him in some tactful way. Understanding that this gave rise to many conflicts between the tribals and non-tribals the British authorities of colonial India started facilitating legal mechanisms to stop such tactful alienations[1], and some feudal rulers also followed this in their areas of jurisdiction(like, the King of Keonjhar made a law, the **Bhuyan and Juangapirh Immigration Act, 1947** to stop alienation of tribal land to non-tribals in the Bhuyan-Juang pidha tribal region)(Rath, 2005). After independence more such laws were promulgated like the **Odisha Scheduled Areas Transfer of Immovable Property (by Scheduled Tribes) Regulation, 1956**, but it could not completely stop informal land alienation though the risk was now reduced. However, the intention of the state itself was not so reliable because some of these laws contained provisions which created scope for otherwise objectionable alienations. For instance, the Provision of Panchayats (Extension to Scheduled Areas) (PESA) Act respects the customary rights of local communities over their local resources, but when it comes to land acquisition by the government for 'developmental activities', it doesn't give the local communities to take the final decision whether their land will be diverted for the projected purpose or not. It only provides for a say on their part in the matter, and nothing more. As such, in the name of development the government acquires, through its Land Acquisition Act, productive and valuable land and allows diversion of the same for other purposes that ultimately creates displacements not only from land alone but also from livelihood, culture, and socio-environmental relationships which has far reaching and long-lasting impacts on the displaced people. Those having poorly defined or no tenurial

[1] Even the much highlighted incident of Kandhamal riots in Odisha, religiously and politically projected as a religious conflict, was actually and originally caused because of this land alienation and related conflicts between the local tribals and non-tribals which started long back, even during the 19th century as British records would reveal. The British found the Kandhas' strong sense of ownership over their territory remarkable, and observing that the latter were gradually being displaced by outsiders, the former felt and accepted(in 1893-94) the need of a survey & settlement operation in the Kandhamal tract atleast for its Angul side(vide Proceedings of the Lt. Governor of Bengal: July 1896, Pol. K/10 7, Proc.139P-D; courtesy Vasundhara, Bhubaneswar). Unfortunately, for political reasons and under international pressure this core factor was almost ignored though few people still spoke of that.

rights are likely to get little or no compensation, and have to suffer the most. And it pains still more deeply when the government finally allocates such land to some private agency to serve the vested interest of the latter[2].

Survey & settlement operations led to a major land alienation in many parts of the country, particularly in tribal areas. Hilly areas and forests were often settled in the name of the government without caring for the local community's traditional rights over the same. Quoting the Renuka Ray Committee, M.S.Sivaraman, Advisor to the Programme Administration of Planning Commission remarked during a visit to the north-east frontier region(north-eastern states of India) in 1957 that "the extension of the rule of law in the field of land rights has resulted in the progressive extinction of the original rights of the tribals which were theirs, at least by virtue of first occupation"(GoI 1960 quoted in Rath, 2005). And curious examples of the same were available long back even in the Kandhamal tract of Odisha where the survey & settlement operation was initially intended to prevent alienation of the lands of the Kandhas[3] but what practically happened was that while attempting demarcation of certain areas as reserve forests, the divide-up of the tract was done so 'carelessly'(intentionally?) that great areas were given to the smart non-tribals while hill sides consecrated in the Kandha sentiment by centuries of use had been reserved(forest)(Elwin,1944). On one hand the smart non-tribals ensured better land rights for themselves in nexus with the settlement officials and on the other hand the feudal states of British India often reserved forests as and when they wished, without caring for the forest settlement procedures that required any enquiry into and subsequent compensation for the rights of the tenants. This was clearly pointed out by a senior civil servant of Government of India Sri R.K.Ramadhyani in his report on the Land Tenures & land Revenue System of Odisha and Chattisgarh States towards early 1940s, but ironically the government of independent India ignored this and legalized all such reserved forests through an amendment in the Indian Forest Act in 1954. Obviously this, alongwith other factors, caused a conflict with the local communities. Finally, after a successful civil society campaign 'Survival for Dignity' the Government of India promulgated the historic **Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** which mandates for grant of rights to both individuals and communities over the land they have been traditionally using in forest areas, even if it belongs to a Reserve Forest or a sanctuary.

The 2007-2008 Annual Report of the Ministry of Rural Development, Government of India states, "Reports received from various States, indicate that 5.06 lakh cases of tribal land alienation have been registered, covering 9.02 lakh acres of land, of which 2.25 lakh cases have been disposed off in favour of tribals covering a total area of 5.00 lakh acres. 1.99 lakh cases covering an area of 4.11 lakh acres have been rejected by the Courts on various grounds".

[2] Like in Odisha, the state acquired land for mining purposes in the name of the public sector undertaking Odisha Mining Corporation but ultimately let it to be used by private companies, in some cases.
[3] Vide, for example, Proceedings of the Lt. Governor of Bengal, July 1896, Pol.K$_{/10}$ 7.

According to this report of the Ministry, a total of 105,491 cases alleging alienation of 104,742 acres of land had been filed in the court in Odisha. An estimated 104,644 cases were disposed of by the court. Out of these 61,431 cases were disposed of in favor of tribals and 56,854 acres of land was restored to tribals. These were however all related to the revenue lands for which the settlement records have a list.

The process of granting rights in forest lands started much later (about 2007) after the FRA was enacted. Although by now a large number of individual grants have been made under this Act, the progress is drastically poor so far community right is concerned. Very few communities have received their forest rights and it is now an open fact that the government has intentionally delayed the process of recognizing community rights under FRA.

However, this process of restoring the land rights seems to have lagged behind the process of alienation. The Land Acquisition Act is still strong enough to formally acquire private lands, but veiled attempt to acquire more and more land in the name of development is a matter of major concern. This attempt is made both openly or secretly. The case of Vedanta acquiring huge area of ecologically sensitive land in the Puri district for a university has been questioned with a simple logic that when some of the best universities of the world could be established in relatively small areas, why does Vedanta ask for such a huge area?

Pulp wood plantations have come up as another major form of indirect land alienation in which the farmer lets the paper mill use his/her land for the pulp wood plantation with an assurance that this would help him/her gain substantially(financially) without much trouble, unlike in conventional agriculture. The company not only gets its raw material from such land, but also gets the advantage of projecting such plantations as carbon sinks under the so-called Clean Development Mechanism for additional financial benefits through carbon credits. We shall discuss in the following sections some of the realities of this form of indirect alienation.

2. Access to data, and analysis of the state of land alienation:

The preliminary study for this report was done by the consultant M/S Ascent Development Services, engaged for this purpose towards the end of the year 2010. The consultant submitted few versions of its draft report in different phases of the 1st half of 2011, based on RCDC's feedback for further improvements. It shared also the fact that the access to data for analysis and action by practitioners and researchers, from the Revenue Department (Tehsil office, for example, that has the local land records) and other linked departments like Agriculture and Directorate of Industries, is very limited. These departments and the industrial houses keep such data very confidential and inaccessible to commons which is often protected by various Acts relating (or citing) to confidentiality of data. Getting such data by the use of RTI Act becomes imperative, but this Act has its limitations (like, it is not normally applicable for the private sector).

Subsequent and supplementary inputs were then provided by Mr. Binimaya Mohanty, then a Programme Manager with RCDC, as per the instructions of the present editor of this report.

He made some field visits, established contacts with officials of JKPL, BILT, Mangalam Timbers, VCCSL, and OFSDP, etc.; and even attended a workshop organized by VCCSL that helped him realize the technical complexities associated with the CDM projects.

However, while correlating the information thus provided it was found that coherence was critically lacking. The realities were definitely much more complex than the inferences drawn from such information. Hence, fresh research was necessary for a holistic and comprehensive presentation and conclusion of the primary data. Although certain updations could not be still made due to various constraints, that doesn't affect the overall relevance of the information and conclusion of this report.

3. Land use by Pulpwood and Wood based Industries

There has been an increasing demand for wood fibres by both the paper as well as by other wood based industries like compressed wood board industries. Pulpwood based paper mills were initially dependent on bamboo and later on adopted new technologies to derive pulp from other crops like eucalyptus, casuarina, subabool, sugarcane bagasse and other soft woods whereas the compressed wood board industries depend solely on eucalyptus for the source of their raw material. To meet their increasing regular demands, the wood based industries have tried to increase the plantation cover of their required crops both in private- as well as common property lands. J.K.Paper mill, BILT Paper Mill, and Mangalam Timber have taken up this plantation program since 1990. The basic objectives of their plantation programs are:

- Establish wood and pulpwood plantation for future raw material requirement.
- Meet their environmental safety standards and absorb carbon dioxide and other pollutants emitting to the atmosphere.

With these objectives they also claim that the plantations would help improve the socio-economic conditions of rural people to get higher returns from hilly lands and degraded waste lands. Their plantation programme targets private lands as well as common property resources, and agricultural lands, pastures, or otherwise used lands having potential for further holistic development keeping the local socio-economic, environmental, and other factors in mind thus become vulnerable to turn into environmentally, socio-economically or otherwise incompatible plantations that virtually alienate the control from the indigenous owners/communities to the industrialists.

4. Carbon emission and sequestration in paper industries

The pulp and paper industries are considered to be one of the most energy intensive and polluting units. However, it is essential to distinguish between pulp and paper manufacturing units since these are not always integrated in nature. The paper production process consists of five stages like raw material preparation, pulping, bleaching, chemical recovery and paper-making. Substantial part of the energy is consumed in the form of heat during pulping process (digester, evaporator and washing) when raw materials are cooked mechanically and

chemically treated for further use in the production chain. In the United States, for example, the pulping process consumes about a quarter of all primary energy required for paper production (World Energy Council, 1995 quoted in Schumacher, Katja and Jayant Sathaye,1999).

In India, around 905.8 m^3 ton of water is consumed and around 695.7 m^3 of wastewater is discharged annually by this sector (NPC, 2006). The major pollutants from a pulp and paper mill are the toxic effluents and stinking gases, and being categorized under the chemical process industry, it leaves a deep footprint on the environment.

The big paper mills, with their big carbon footprints, have also been one of the biggest users of timber and bamboo. Bamboo requires, unlike timber, annual harvesting failing which the bamboo stock loses its viability. Thus, huge amounts of bamboo are to be produced from the bamboo forests annually; and the paper mills are one of the few good options to dispose of such a huge stock through a single deal. Thus, bamboo harvest for the mills, if managed scientifically, has almost little or no carbon footprint in comparison to the harvest of pulpwood.

In the recent decades paper mills have modernized their units to abandon the obsolete technology that was a major cause of their heavy pollution. Some of the big old mills have even been closed permanently. Technical upgradation has led to reduced pollution, but prioritizing pulpwood as their raw material reversing the previous trend of bamboo-dependency has created a kind of fluctuating carbon footprint because of the raised plantations on one hand and the clearnings of these plantations on the other hand. More complex is the matter of their socio-economic as well as ecological footprints. We shall discuss in the following sections few aspects of this complexity in the context of the so-called carbon capitalism.

The installed capacity of paper and pulp industries in India increased from 0.137 million tons/annum in 1951 to 6.5 million tons per annum in 2005-06(Anonymous, undated). Paper industry in India is expected to see an average growth of 7 per cent during the 2012-13 according to prediction by the Indian Pulp and Paper Technical Association (IPPTA). From about Rs 30,000 crore size turnover in 2011-12, the industry is likely to touch 60,000 mark by 2025. By 2011-12, the Indian industry accounted to about 2.5 per cent of the global production of paper. However, IPPTA is confident that the paper, paperboards and newsprint consumption in the country will also grow to 17 million tonne from the current(2011-12) 12 million tonne in the next five years. This is against the fact that the global production of paper in 2011-12 was expected at 400 million tonne, while in India it was around 11 million tonne although our consumption is about 12 million tonne. It is obvious that India imports 1.6 million tonne of paper per year, in which 1 million tonne comes under newsprint(The Business Standard, 2012). With such a voracious target the paper & pulp industry not only implies to a substantially higher requirement of raw material but also a higher carbon – and ecological footprint, despite their modernization[4]. The so-called farm forestry however offers

[4] For instance, a survey by the Centre for Science & Environment towards 2009 found that specific emissions of CO_2 from the surveyed industries were 2.5 MT CO_2/ADt paper which was several times higher than the OECD average of 0.7 MT CO_2/ADt(CSE, undated).

them a multi-advantageous solution to all these issues: it ensures their raw material, and at the same time serves as a carbon sink(thereby earning carbon revenue). International Finance Corporation, which has been promoting this kind of farm forestry in India in partnership with the paper industries, estimated that while "the farm forestry operations of IFC's pulp and paper investment clients account for 25%-50% of added income for 1,70,000 poor farmers", the "Carbon Sequestration associated with these investments was estimated at 2 million tCO_2 in 2007 and is expected to increase to 3.5 million tCO_2 by 2010"(Devex, 2012).

The CSE survey(2009) found that the Indian paper industry used about 0.25 million hectares of 'degraded'(?) land belonging to marginal farmers to raise such farm forestry. The 8 industries it surveyed, were found to have a forestry-based carbon sequestration ranging from 0.3 MT CO_2/ADt to 9.2 MT CO_2/ADt which helped three of them(including JK Paper which had the lowest negative footprint) negative carbon footprints(CSE, undated). Andhra Pradesh Paper Mills recorded the highest negative net specific CO_2 emission.

ITC's paper mill at Bhadrachalam has been the national pioneer among the paper & pulp industry in India in carbon sequestration initiatives. In 2003-04 the mill emitted about 1013 Kilo ton of CO_2 against a carbon sequestration capacity of only 311 Kton. However, through technological upgradations and plantations it claims to have substantially reversed the position by 2008-09 when the carbon sequestration exceeded(3695 Kton) the emission(1572 Kton)(ITC, 2009).

While the claims of being carbon neutral or negative can be debatable[5], the initiatives of the paper & pulp industry to reduce their pollution level are definitely praise-worthy. However, the implications of the large scale land use changes they have induced are a matter of concern. Of course, not all the paper mills are responsible for this as we will understand from sections 5 and 6.

5. Classification of Pulp and Paper Mills

5.1 Based on capacity

The pulp and paper mills based on the scale of operation are classified as those having an installed capacity of 25,000 tonnes per year & above as large scale and less than 25,000 tonnes but greater than 5,000 tonnes per year as medium scale and up to 5000 tonnes per year as small scale(NPC, undated).

5.2 Based on raw materials used

Based upon the raw materials used, the paper industries can be categorized into three groups like forest based mills, agro waste/ residue based mills and recycled fiber based mills. The forest based industries consume the materials like bamboo, hardwood like eucalyptus, agro waste/ residues based mills consume materials like rice straw, wheat straw and bagasse whereas the third category uses the waste papers and card boards(NPC, undated).

[5] See, for example, the discovery by the Rainforest Action Network that the Asia Pulp & Paper company of Indonesia was not actually carbon neutral despite an international certification(http://ran.org/asia-pulp-papers-hidden-emissions).

6. Pulp and Paper Mills' scenario in Odisha

Odisha, because of its huge bamboo resources, have been an attraction for paper & pulp industries since the colonial period. The oldest paper mills of the state, Orient Paper Mill, Brajarajnagar and Titagurh Paper Mill, Choudwar have been permanently closed down.

JK Paper at Rayagada and Ballarpur Industries-SEWA paper mill at Jeypore are presently the two major paper & pulp manufacturing units in the state. These are forest-based units having a capacity of 75000 TPA for BILT (2004) and 125000 TPA for JKPL (2011). However, JKPL was planning to increase its capacity to 2.4 lakh tonnes per annum(The Financial Express, 2004; The Hindu, 2011).

The detail of the mills along with their raw material consumption pattern as estimated in the State of Environment Report-Orissa in 2006 is in Table-1:

Table-1: Capacity versus raw material consumption of paper mills

Sl.	Name of the Industry	Production Capacity (Ton/Day)	Raw Material Consumption(ton/day)		
			Wood, Bamboo	Straw	Waste Paper
1.	J.K. Paper Mill, Rayagada	300	800	--	--
2.	Emami Paper Mill, Balasore	100[6]	1	40	130
3.	SPA Straw Board, Titlagarh	20			
4.	COSBOARD Industries, Jagatpur	30	--	--	65
5.	BILT (SEWA), Jeypore	240	650	--	--
6.	JB Agro Industries, Kalahandi	20	16		1.0 (Pulp)
Total		**730**	**1467**	**40**	**196**

(Source: SPCB, 2006)

The major raw materials used by paper mills in Odisha are eucalyptus, casuarinas, bamboo, sugarcane bagasse and waste papers and cardboards, etc.

Table-2 gives an idea of the increasing in demand (in MT) of bamboo in the state between 1991 and 2001:

Table-2: Increasing demand of bamboo

Demand by utilization pattern (lakh MT)	1991	1996	2001
Domestic use	2.08142	2.6	2.29465
Paper pulp	2.6	2.48842	2.6
Total	4.68142	4.89465	5.08842
(Source: Govt of Odisha: Forest Department, *Orissa Forest 1999*, p.33)			

[6] As revealed on the company's website, Emami has planned to install a bamboo/wood pulp mill with production capacity of 1.5 lakh tons/annum (http://www.emamipaper.in/chairmans-desk.html , accessed 8-8-12). Its plantation promotion programme can be linked with this decision.

During early '90s, the adopted proportion of raw material to paper was 2.5:1. However, practically it varies for different situations (Rath, 2005_1).

In case of naturally dry bamboo having around 20% moisture content, the raw materials to paper output ratio is 3.67:1. When this bamboo is machine dried, it is called bone-dry (BD) bamboo and the paper output ratio becomes 2.2:1. Though paper mills used wood as one of the key raw materials, the ratio of bamboo and wood was about 90:10 but due to shortage of raw materials, during late '90s[7], the ratio of bamboo to hardwood changed to 50:50 in some paper mills and by 2003, it changed to 20:80 in cases like JK Paper(Rath, 2005_1).

Bamboo was advantageous because of its long fibres as against the short fibres of hardwood, but in 1998, JK Paper Ltd. adopted, for the first time in India, the RDH(Rapid Displacement Heating) technology which claimed to solve the short-fibre problem of hardwood. Brought from Germany, this technology was expected to enable the paper industry to use 100% hardwood as the raw material, thus completely eliminating, in principle atleast, the scope of using bamboo(Rath, 2005_1).

6.1 Bamboo as a source of pulp

Bamboo is one of the most abundantly available and rapidly renewable forest resources of Odisha spread over around 30% of the total forest area of the state. Around 9% of the total bamboo forest cover of India and 7% of growing stock is present in Odisha. It is available in two forms such as mixed crop associated with Sal and other species covering around 17,795 sq. km and as pure bamboo covering around 375 sq. km. In Odisha the majorly found bamboo is *Dendrocalamus strictus* (80%), and *Bambusa bambos* (10%). The major cultivated species are *Bambusa vulgaris*, *Bambusa nutans. Bambusa tulda*, *Dendrocalamus lorgispathus*, *Schizostachyum pergraicile*, *Thyrostachys oliveri*, *and Gigantachloa rostrata* that are occurring in localized area in different parts of the state(OBDA, undated).

The major use of bamboo extracted from the forest is for industrial use and in particular, the pulp and paper industries. However this trend is decreasing over the period of time due to several related reasons like price, availability, management policy etc. Long-term leases were

[7] The planning versus practice has been quoted in FAO(undated) as under:
"In percentage terms, bamboo pulp maintained its position as the most important fibrous raw material throughout all the planning periods, although it showed a slightly declining trend. Agricultural residues accounted for 20 percent of the total fibre furnish 30 years ago, but this was decreased to 12 percent in the 1974-1978 five-year plan. Wood pulp, on the other hand, was not used at all until the 1960s. In the 1969-1974 planning period, its share was forecast to rise up to 19 percent. It seems, however, that the supply of hardwoods did not meet the expectations for that period and, accordingly, for the planning period 1974-1978 it was put as low as 10 percent. As for waste paper, the planned use has been fairly constant, between 8 and 10 percent, except in the period 1969-1974, when it was as low as 3 percent."

granted to the paper mills till 1st October 1988, when the forest bamboo was nationalized to be harvested and marketed by the state and its agency. Even after that, 98 percent of bamboo, extracted from the state forests, was supplied to paper mills. Around 2 lakh MT of bamboo is harvested every year in Odisha and of which 50,000 MT is produced from private lands. In India, for most of the bamboo forests, the prescribed cutting cycle is kept at 3 or 4 years(OBDA, undated;Rath, 2005_1). Production figures of forest bamboo have been furnished in annexure-1.

The paper mills project that the cost of forest bamboo traded by the government is significantly higher than that of plantation wood. On the other hand, forest bamboo is supposed to have a higher silica content that causes technical problems, the lower the silica content the lower is the risk of pollution. Hence, paper mills are interested for developing low-silica bamboo through R&D. Otherwise, bamboo as a source of paper pulp has been qualitatively quite advantageous in its fibrous- and other properties(Andtbacka, 2004).

Interestingly, JKPL in its presentation [8] in the **National Consultation on Corporate Initiatives in Developing the NTFP Sector: Scope & Strategies**, organized by RCDC on 14th March 2012 at Bhubaneswar, shared a quite different perspective that seems important in context of the discussion of this report. The company's representative said that the official availability/production of bamboo in the state has been reduced to such an extent that the present supply to the two bamboo-consuming paper mills has been insufficient, thereby forcing the mills to go for options such as farm forestry. As he explained, reduced volume of supply alongwith scattered availability and poor quality is adding to the operational cost. He said the mills require sufficient supply of bamboo to be sourced within a distance of 200 km which will help reducing not only the transportation cost but also the carbon foot print(lesser fuel burning). Further, the quality of bamboo which the mills seek, i.e. high solid matter per unit of cross-sectional area (solid bamboo, e.g. *Bambusa balcoa* of North East India and *Chusquea* of Chile & Brazil) with low silica content is hardly available in the state.

JKPL's arguments have been supported by some ground realities though this may not be the whole side of the truth. A number of potential bamboo production areas of the state are now under the sanctuaries where commercial extraction has been banned. There are other complexities like rights of the local communities, etc. which the paper mills are not comfortable with, particularly when they find that the local demand against this stake varies from place to place. However, with due respect to all genuine concerns of the company it is still not understood why it prioritized fast growing pulpwood species like Eucalyptus in farm forestry, and why not the preferable species of bamboo? There are many other issues which we will discuss in section 16.

[8] The presentation titled 'Bamboo As Paper Industry Raw Material in Odisha: Status and Options' was presented by Mr. Sushil Gaikwad, Sr. Manager(Forest), JKPL, Rayagada.

6.2 Eucalyptus: taking on bamboo

First introduced to India in 1843 as *Eucalyptus globulus* in the Nilgiri Hills, as an experiment to find high yielding species for fuel and timber (quoted from Penfold and Willis, 1961), this genus became a favoured one of the colonial rulers. However, after trials on the Mysore Plateau, *E.tereticornis* was found to be more productive, and the hybrid became the most popular choice for afforestation(Lawbuary, undated).

In case of Eucalyptus, total biomass produced in one year is greater than many of the slower growing native species. As claimed by Prabhakar (1998), on eight year rotation, the mean annual growth of *Eucalyptus* per hectare, is about 8 cubic metres (cu.m.), though has been known to reach as much as 40 cu.m, while for indigenous trees, the average is 0.50 cu.m. (Lawbuary, undated).

Eucalyptus hybrid is the preferred species for plantations now. It can be a combination to *E. tereticornis* and *E. grandis /E. urphaylla/ E. camaldulensis*(NABARD,2007). For instance, Mangalam Timber Products Limited has used the hybrid of *E. tereticornis* and *E. camaldulensis*, as per their Project Design Document(sub-section A.5.3) submitted for CDM.

6.3 Other Raw Material Consumption in Paper Industries (demand and supply)

Apart from bamboo and Eucalyptus, other raw materials used are Casuarina, Acacia, Subabool, Sugarcane bagasse and waste paper. As per discussion with the officials of J.K Paper, BILT and Emami paper mills, the demand of raw material is met (supplied) from both Odisha and other states.

Table-3: Raw material sourcing by paper mills

Sl.	Name of the Industry	Production Capacity (Lakh MT/Annum)	Raw Mat/ Annum (LMT)	Sourcing (Odisha: Outside)	Acre Area Equiv @ 30 ton/ac, 4 yr cycle)
1	J.K. Paper Mill, Rayagada	1.46	2.92	30:70	38000
2	Emami Paper Mill, Balasore	1.28	1.57	72:27 (India: Outside)	waste paper
3	SPA Straw Board, Titlagarh	0.073	0.1825	NA	2500
4	COSBOARD Industries, Jagatpur	0.1095	0.27375	NA	3650
5	BILT (SEWA), Jeypore	0.803	2.0075	15:85	26000
6	JB Agro Industries, Kalahandi	0.073	0.1825	NA	2500
Total		**3.796**	**7.13625**		

Emami paper mill uses old paper as a raw material, which the mill collects from Odisha, other states of India (India- 1.139 Lakh MT), and also from outside India (0.437 lakh MT) with production capacity of 1.28 lakh MT. The industry has in the recent years started plantation promotion programme in private lands which, as per field reports from the Dompada area in the Cuttack district, primarily focuses on Eucalyptus only. This may be linked with the company's expansion plan. J.K Paper mill and BILT- Sewa paper mill collect pulp wood and hard wood crops from plantation in private land and bamboo from private suppliers as well as government agency (Odisha Forest Development Corporation/Forest Departments).

Total area planted by J.K Paper mill for year 2010-11 is reported to be 37000 acres and each acre produces nearly 30-35 MT of raw material. BILT-Sewa paper mill is expected to promote plantation in 26000 acres.

7. Captive plantations versus private plantations:

Almost all the pulpwood and wood based industries like JK Paper Mills, Rayagada, Ballarpur Industries Ltd(BILT, Sewa), Jeypore or Mangalam Timber Products Ltd, Nabarangpur all depend chiefly on private farmers engaged in plantation. They usually do not prefer contract farming even though in a way farmers raise plantations for them informally. The limitation that forces these industries to depend on private plantations has been explained in the following statement of Harsh Pati Singhania of JK Paper Ltd. which he gave in December 2010:

> "Raw material is the single-biggest challenge. In India, you are not allowed captive plantations and we do not have a policy for industrial plantations for pulp wood. Therefore, we have to resort to the farmers. The limitations for us are that farmers have limited farm holdings that are scattered; so efficiency and cost remain a factor. Brazil and Indonesia have developed large-scale sustainable man-made forests/plantations that are in the radius of mills, which means lower cost, better management of plantations and much higher yields. "(The Financial Express, 2010)

He further went on to say that, they(JKPL) had already planted about 75,000 hectares of land all over India and were increasing the cover @4000-5000 hectares per year.

The exact area under pulpwood plantations in Odisha could not be ascertained. However, these plantations exist in both coastal and other adjoining districts. Farmers are told that they will gain substantially from this in comparison to conventional crops like rice, and are then provided with clonal seedlings. So, there is a looming danger that people could divert many of their productive cultivable land to the plantation of Eucalyptus for the industrial purposes at the cost of food security.

In India captive plantation is not allowed, as alleged by the paper mills. "Many paper mills have received permission to grow trees but cutting them for using as raw material is not allowed. Result! A lot of land owned by paper mills is lying idle"(Devesh Kumar, 2007).

8. Socio-economic and Environmental Impact of Pulp wood based Paper Industries

8.1. Socio-economic impact of Pulp wood based Paper Industries:

The paper industries have been claiming of substantial economic benefits for farmers from pulpwood plantations promoted by them. The economics of plantation is estimated with following assumptions:

Production Plan:

Felling (harvesting) cycle: 4-5 years

Yield of wood/ Acre: 30-35 MT/ Acre

Purchase Rate:

Debarked Eucalyptus- Rs 2700/- per MT

Acacia- Rs 2700/- per MT

Subabool- Rs 2300/- per MT

Casuarina- Rs 2700/- per MT

Bamboo- Rs 5800/- without moisture

Barked Wood: Less by Rs.150/ per MT

Cost of Production Crops (10 acre unit, 4 year cycle/ 30Ton per acre):

1.	Land preparation, Plantation, Watch-Ward for 4 years	- Rs.20000/
2.	Sapling, Fertilizer etc	- Rs.10000/
3.	Harvesting per Acer (Rs.300/Ton)	- Rs. 9000/
4.	Transportation and Permit (Rs.400/Ton)	- Rs.12000/
	Total	**- Rs.51000/-**

Value of sales: 30 Ton * Rs.2600 (advantage if 35 ton/acre) **- Rs.78000/-**

Net Benefit: (per Acre/4 yr) **- Rs.27000/-**

Rotation Crop in case of Eucalyptus (2 cuttings) less 40% of - Rs.38000/-

Cost-a & Cost-b

Sales value for Year-2 and Year-3 are estimated at 90% and 85%

	Year-1	**Year-2**	**Year-3**
Cost of Prod.	51000	38000	38000
Gross Sales Value	78000	70200	66300
Net Profit	27000	32200	28300
Total Benefit			**87500**
Benefit/Acre/ Year			**Rs.29166/**

8.2 The environmental impact of pulpwood plantations:

Pulpwood plantations, as paper mills claim, not only help rehabilitate degraded lands and reduce pressure on forests, but also work as carbon sinks. However, the plantation crop that is actually adopted consists of the species that are either not supposed to be ecologically justified because of their individual ecological characters, or are found to be incompatible with the local indigenous biodiversity. What is more important here is that Eucalyptus, the chief of the species promoted by the mills, has been known for its dubious characteristics like adverse impacts on the ground water table. That a technology known as the Root Trainer Technology had to be developed so as to limit the length of the hybrid/clonal Eucalyptus to 3 meters so that it doesn't touch the ground water table, is an indication in itself that adverse impacts of the original species on the ground water table has not to be ignored. Even if this technology helps solve this problem, the allelopathic impacts of Eucalyptus still continues to be a matter of concern, and even the Eucalyptus-based agro-forestry models need to be developed with due care to such concerns because chemical impact of the leachates of various parts of *E.citriodora, E. globules,* and *E.tereticornis* have been found to inhibit the growth of some crops like greengram, blackgram, rice, and tomato (Paramathma *et al,* 2000).

CDM is a concept that ideally proposes to ensure both environmental and economic benefits from plantations, in addition to the conventional benefits enjoyed.

9. CDM (Clean Development Mechanism):

The impact of climate change will be felt immediately in the country having less convergent economic growth and politically most unstable. It is clear that it is not possible to mitigate climate change unless we address the poverty of those who are least responsible but will be hardest hit. To address this, CDM at ideology level is linked with poverty saying that mitigation and adaptation need to be integrated into developmental projects to benefit rural and urban poor in a developing country such as India, and the carbon finance business

including CDM and VCS [9] providing thereby an opportunity to enhance livelihoods of resource poor communities while contributing to global environmental benefits (see inbox).

CDM and sustainable development

"The CDM projects should also be oriented towards improving the quality of life of the poor from the environmental standpoint.

Following aspects should be considered while designing CDM project activity:

1.	Social well being: The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.
2.	Economic well being: The CDM project activity should bring in additional investment consistent with the needs of the people.
3.	Environmental well being: This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general;
4.	Technological well being: The CDM project activity should lead to transfer of environmentally safe and sound technologies that are comparable to best practices in order to assist in upgradation of the technological base. The transfer of technology can be within the country as well from other developing countries also.

(Source: National CDM Authority 2009,

http://www.cdmindia.gov.in/approval_process.php

Forest acts as a big carbon sink having immense potential of carbon mitigation through the carbon sequestration process. On 11 December 1997 the Kyoto Protocol was adopted in Kyoto, Japan, and entered into force on 16 February 2005. The Clean Development Mechanism (CDM) was introduced to implement carbon reduction and sink projects under the Kyoto Protocol. Afforestation and Reforestation (A/R) CDM projects intend to generate forestry carbon credits. In addition to projects in the industrial and energy sectors, A/R CDM sector claims to offer a mix of carbon and sustainable development benefits.

Basically CDM could be implemented in two different ways : 1. Technological innovations/modifications that help reduce the emission and/or reduce raw material consumption, etc.; and 2. Plantations that can work as carbon sinks. Plantations can be done either purely as a carbon sink or as a source of raw material that can also work as a carbon sink.

[9] Voluntary carbon standard(credit), a system working parallel to and quite similar to CDM with a difference that being voluntary it has a relatively poor legal- and market stand than CDM. More details available at http://www.allens.com.au/pubs/cc/foccsep08.htm.

According to UNFCCC, "Small-scale afforestation and reforestation project activities under the CDM" are those that are expected to result in net anthropogenic greenhouse gas removals by sinks of less than 16 kilotonnes of CO_2 per year and are developed or implemented by low-income communities and individuals as determined by the host Party. If a small-scale afforestation or reforestation project activity under the CDM results in net anthropogenic greenhouse gas removals by sinks greater than 16 kilotonnes of CO_2 per year, the excess removals will not be eligible for the issuance of tCERs or lCERs" (http://cdm.unfccc.int/about/limitations/index.html).

The UNFCCC FAQ however mentions that any project activities other than those focusing on renewable energy or energy efficiency, that result in emission reductions of less than or equal to 60 kilotonnes of carbon dioxide equivalent annually are treated as small scale projects whereas any CDM project activity not possessing the above mentioned characteristics is considered a large-scale CDM project activity (https://cdm.unfccc.int/faq/index.html).

10. Size of the CDM market

CDM is essentially a market-based mechanism in which CER is the instrument for marketing. The more the CER, the greater is the turnover; but this too is subject to market fluctuations.

> "The *CDM* allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO_2. These CERs can be traded and sold, and used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol".(UNFCCC, http://cdm.unfccc.int/about/index.html)

The larger unit of CER is the kCER which implies to total reduction recognized in officially sellable Certified Emission Reduction issued by UNFCCC in 1000 tons of CO_2 equivalent.

An analysis of the CDM market value in 2007 suggested it at nearly $20 billion, and some analysts said global carbon trading has the potential to reach some $100 billion by 2020. The bulk of global demand for CDM carbon credits (CER) comes from companies participating in the European emissions trading scheme – the 27-nation bloc's main policy tool to help member states meet their international and regional targets. However, uncertainty prevails over both demand for credits and how a future UN offsetting scheme might be shaped after 2012 (First Climate, 2011).

As reported by CDM-Watch, "currently, the two largest market-based mechanisms, the European Emissions Trading System (EU-ETS) and the CDM are on the brink of collapse. The economic crisis in Europe has lead to a dramatic decline in CO_2 emissions. As a result, the demand for allowances has fallen and prices have dropped. In 2011, the price for EU-ETS allowances fell by about half, to around €7. Because the EU is also the largest buyer of CDM offsets (CERs), the prices of CERs have also dropped significantly to around €4. The reason there is no demand for credits is that most countries have made very weak mitigation pledges. They simply will not need many credits to meet their commitments. So who will buy credits

from new market-based mechanisms, if there is no demand for the existing ones? Some people argue that having new market-based mechanisms will motivate countries to take on more stringent pledges because they will be able to meet those pledges with cost-efficient market-based credits. But if there is already an oversupply of cheap credits, why aren't countries upping their pledges now?"

The future of carbon markets therefore appears uncertain now, reported Anja Kollmus, a Carbon Market Expert of CDM-Watch in her e-mail dated 8th May 2012 to the network members.

After China, India is the major CDM player in Asia. A seminar on Clean Development Mechanism (CDM) organized by Confederation of Indian Industry (CII)-Odisha discussed the potential in the eastern states of India to gain from CDM projects. Accordingly, by 2012 these states will have a potential of Rs.1,000 crore for carbon trading. Odisha's share out of it was expected to be around Rs.250 crore. Power, steel and chemical, mining, transport and agriculture sectors are the high potential areas eligible for this (The Business Standard,2007).

The State Pollution Control Board (SPCB) in Odisha has estimated about 82 million tonnes of CO_2 is emitted from energy generation and major industrial and mining activities. As its report on "Green House Gas Inventory of Orissa from Energy and Industry Sector - A Quick Estimation" suggests, "Out of the total emission, 68 per cent emission takes place in thermal power generation and 14 per cent is generated from iron making process through blast furnace and DRI kilns sponge iron facilities," while "processes associated with iron and steel making, like sintering, pelletisation, coke making contribute three per cent of the total emission. Aluminium smelting and ferro-alloy production contribute two per cent each. In non-industrial sector transport contributes seven per cent of the total emission". The Board finds that energy and industry sector in Odisha contributed about six per cent to the national emission. However, these estimations carried out in the said report were made on the basis of installed capacities of respective industrial units.(The Hindu, 2011_1).

Internal rate of return (IRR) is a vital consideration for taking up projects under CDM where solid waste management (methane recovery) has a high IRR(The Business Standard,2007). Carbon as a compliant commodity has also been listed in the commodity exchange making the trading of carbon units more attractive.

11. CDM in India:

India has the high potential of realizing carbon credits to capture more than 10% of Global CDM market at estimated annual revenue ranging from US$10 million to 330 million. Some of the attributes which are working in favour of the India are the wide spectrum of projects with different sizes, vast technical human resource, strong industrial base and relatively speedy processing by Indian DNA (NCDMA) for host country approval(Bhaskaran and Narayanan, undated; Singh, J.K., undated). Moreover India went on to become one of the first CDM countries to have a baseline in place for CO_2 emissions from the Power Sector. As has been indicated by CDM-Watch, the number of projects registered under CDM is not insignificant in the country though it is also true that in comparison to the actual potential this is not large enough. In fact, UNFCCC data quoted in a joint study and analysis by NFFPFW,

NESPON, and DISHA on Indian CDM suggests that by May 2011, India had about 26% of the world's total number of CDM projects with Tamilnadu, Maharastra, and Karnataka having the highest No. of CDM projects in the country. Gujurat recorded the highest CER issued(about 44.26% of the country total), and wind energy accounted for the largest sector(33.62%) in Indian CDM.

12. Land Use, Land Use Change, and Forestry(LULUCF):

As it is acknowledged that about one quarter of all the increase in free carbon dioxide derives from land use changes (essentially deforestation) (Skutsch, 2004), UNFCCC also considers Land Use, Land Use Change, and Forestry(LULUCF) projects under carbon financing with a belief that activities in the LULUCF sector "can provide a relatively cost-effective way of offsetting emissions, either by increasing the removals of greenhouse gases from the atmosphere (e.g. by planting trees or managing forests), or by reducing emissions (e.g. by curbing deforestation). However, there are drawbacks as it may often be difficult to estimate greenhouse gas removals and emissions resulting from activities of LULUCF. In addition, greenhouse gases may be unintentionally released into the atmosphere if a sink is damaged or destroyed through a forest fire or disease"(UNFCCC, 2012).

LULUCF activities are related to articles 3.3 and 3.4 of the Kyoto Protocol. The rules for LULUCF activities have been agreed as part of the Marrakesh Accords, the principles of which attempt to respond to concerns that the use of LULUCF activities should not undermine the environmental integrity of the Kyoto Protocol. These principles underscore, for example, the need for sound science and consistent methodologies, as well as the importance of conserving biodiversity. They also specify that naturally-occurring removals, including removals as a consequence of indirect anthropogenic effects, should be excluded from the system and that any re-release of greenhouse gases (e.g. through forest fires) must be promptly accounted for(UNFCCC, 2012).

The LULUCF activities include:

- Afforestation
- Reforestation
- Forest management;
- Cropland management;
- Grazing land management; and
- Revegetation (UNFCC, 2012).

Concerns and criticism have been raised over the scope, practice, and implications of LULUCF. And these are obvious. For instance, the way 'forest' has been defined(vide annexure-6) in this Accord, the essential attributes of forest as an ecosystem as well as a biodiversity base have totally been ignored thereby creating scope that plantations that are devoid of such attributes can also be considered as 'forest'. Further, its affirmation that all LULUCF activities must be based on 'sound science' limits the scope to include indigenous community forestry and other such activities of land use management that are environmentally important but not based on a 'sound science'.

However, this Accord also affirms that one of the principles governing LULUCF activities should be that "the implementation of land use, land-use change and forestry activities

contributes to the conservation of biodiversity and sustainable use of natural resources". We will see in section 16 how this principle was ignored in approving the CDM project of VCCSL and JK Paper.

13. Plantation-based Clean Development Mechanism:

In an attempt to bring convergence of various initiatives taken by the government and non-government organizations for elimination of poverty and to achieve Millennium Development Goal (MDGs), there has been proposed projects of plantation taken up by the industries and various other agencies to address poverty by focusing on small and marginal farmers who could be linked to ongoing programmes of Central and State Government, Development organization and financial institutions.

The plantation activities are supposed/claimed to generate additional income stemming from carbon sequestration through the improvement in land use and land use practices and thereby increasing the revenues. The choice of species differs according to the project objectives: the Forest Department may prefer commercially valuable (for timber) species like teak in a reserve forest while firewood species in social forestry. NGOs have suggested plantations of important non-timber species under the Mahatma Gandhi National Rural Employment Guarantee Scheme. The industries have usually preferred fast growing species as a part of their environmental compliance, and pulp & paper industries have focused specifically on the pulpwood species.

However, only a small part of the existing forests and plantations have been registered as a part of CDM or REDD+. The NFFPFW study of the Indian CDM sector suggested that forestry CDM projects accounted for only 0.56% of Indian CDM in May 2011. The international position was also not quite different even after a year as by 1st May 2012 out of the total 8416 CDM projects in the world only 65 (0.77%) were on afforestation & reforestation sharing a CER of 2941(0.25%) only out of the total 1168229, as reported by CDM Pipeline in its website.

In Odisha, the adopted species for carbon sink plantation has been primarily Eucalyptus chiefly because the paper mills promoted this to secure their raw material supply. Although they may(like, JKPL) show bamboo as one of the species for which they offer support but in practice, they prioritize Eucalyptus because of its fast growth rate and bamboo is otherwise available from forests and private lands.. However, ITC's PSPD unit, which so far has no Eucalyptus plantation in Odisha, is considering bamboo plantation in about 2500 hectares of land of the state(source: Dr. H.D.Kulkarni, *personal communication*).

The paper mills consider Eucalyptus more economical than bamboo. On this basis the mills also in a way blackmailed the Odisha Forest Development Corporation(OFDC), which sells them forest bamboo on behalf of the government, that unless the price is within the range acceptable by them they would not procure forest bamboo. This resulted in a standstill situation in early 2000 when huge quantity of bamboo got rotten in OFDC depots due to non-

lifting by the paper mills. Finally the government had to yield to this pressure. However, it was also a reality that ensuring the quantity of pulpwood they required was not so easy. Hence, even though the industries tried to increase the area under pulpwood plantations, dependency on bamboo still continues.

Though the exact assessment has been difficult to be sourced, according to M/S VCCSL, about 600 hectares of eucalyptus plantations in Odisha have been considered under CDM by July 2011(*personal communication*). Interestingly, the NCDMA website as on 18th May 2012 reported that out of the total 16 A/R CDM projects in the country not a single one belonged to the state of Odisha, neither large scale nor small scale. On the other hand, it also reported no large scale project but two small scale projects of A/R in the neighbouring state of Andhra Pradesh, and of these two projects one is a multi-state project covering the Koraput, Kalahandi, and Rayagada districts of Odisha and Srikakulum, Vishakhapatanam, and Vizianagaram districts of Andhra Pradesh. This multi-state project has been proposed jointly by Veda Climate Change Solutions Ltd. and JK Paper Ltd..

As of any A/R CDM project by BILT, Project Design Documents(PDDs) of both JK and Mangalam Timber Products Limited confirm that till 2011 its plantation activities were not linked to CDM or carbon financing. On the other hand, Mangalam Timber has engaged itself in a multi-state plantation-based CDM activity some details of which are available in annexure-7.

Very recently, the Directorate of Horticulture, Government of Odisha has proposed the farmers of the state to go for horticulture-based A/R CDM plantations in degraded lands. In principle this is definitely a good and viable eco-friendly alternative (if the species are accordingly selected and the farmers' rights are safeguarded by the government) that can have atleast some direct or indirect contributions to food security and effective use of degraded lands. A small note on this initiative is available in annexure-8.

14. Carbon trade off advantage:

As understood from the local paper mills the carbon revenue share for farmers in the A/R CDM is about Rs.150-200/ per ton. It is not included in the normal plantation Benefit-Cost analysis, and would add Rs.5000-7000/- extra per acre.

The plantation crops in hilly lands with unsecured irrigation and rainfed situation have certain advantages over conventional crops. Combined with Carbon Revenue of Rs.5000-7000/- per acre, the pulp wood plantation program apparently seems to be a highly remunerative and environmentally responsible initiative.

However, in practice such an advantage has hardly materialized, as we will discuss later. For tribal areas the loss may be in terms of food & nutritional security, alongwith a halting period of 4 years or so. Conventional hill crops consist of various millets that provide food & nutritional security to the framers. The income from conventional crop is seasonal, and one doesn't have to wait for 4-5 years to get a harvest and encash the same. For small and

marginal farmers such things matter significantly whether they are able to recognize it or not. The loss to soil productivity because of the plantation is another factor that goes against the interest of the farmer even if he wants to revert back to conventional farming. All these factors are however ignored totally when making the cost-benefit analysis of pulpwood plantations, and this makes the claim of high returns at low investment a superficial one.

15. Environmental impact- Carbon sequestration:

Release and absorption of green house gases like carbon dioxide and methane plays an important role in the ecosystem. Storing large quantities of carbon in living vegetation and soils leads to significant global carbon sink. Plants remove CO_2 from the air and convert it into sugars (carbon compound) that is required for their growth and development. CO_2 derived products such as lignin and cellulose constitutes the body part of the plants and exist in large quantities in woody tissues of trees and shrubs. Hence, as long as these plants are alive and growing, they actively remove carbon from the air around them which is called carbon sequestration by the plants.

Forests and plantations therefore work as natural factories that use CO_2 in the atmosphere as a raw material and covert the same into safe and useful elements. And the invisible but highly valuable product in this process is oxygen. All this takes place in an eco-friendly manner compatible with the local biodiversity, unless otherwise manipulated by humans.

But the question is: which species is best for carbon sequestration? Kaul *et al* (2010) have stated that "for a tropical country like India, having vast range of forest types, weather and soil conditions, it is not possible to select one forest type that is most suitable for carbon sequestration." However, given the fact that the Forest Department in Odisha has, like its counterparts in other states of India, raised commercial plantations of teak, eucalyptus, bamboo, and other miscellaneous species whereas the paper mills have promoted plantations of acacia, casuarina, and mostly eucalyptus; we need to understand to what extent bamboo(that has been used as a raw material by the paper industries since the colonial period), sal(a major species of Indian/Odishan forest that occurs as multipurpose natural forests), teak (a major species of commercial plantation), and eucalyptus (the most preferred species promoted by the paper mills to take on bamboo) are comparable in carbon forestry.

15.1 Bamboo in carbon sequestration

Bamboo is one of the most productive and fastest growing plants on the planet. The fastest-growing species may grow up to 1.2 m a day. Bamboo is also an environmentally friendly plant and net carbon sink; its stands release 35% more oxygen than equivalent stands of trees. Some bamboo even sequester up to 12 tons of carbon dioxide from the air per hectare (Bamboojungle, 2005).

Unlike other grasses bamboos are C_3 plants which is a reference to the photosynthesis pathway in which the carbon dioxide is initially bound in molecules of phosphoglyceric acid containing three carbon atoms as against C_4 plants in which the photosynthesis initially binds the CO_2 in molecules of oxaloacetic acid with four C atoms. Since C_3 plants are more

responsive to CO_2 concentration in the atmosphere the effect of CO_2 enrichment would be felt more in bamboos than in other grasses resulting in higher Net Primary Productivity and greater carbon sequestration for bamboos similar to the trees(INBAR, undated).

Bamboo has several advantages over tree species in terms of sustainability and carbon fixing capacity. Available studies conclude that bamboo biomass and carbon production may be 7-30% higher compared to the fast growing wood species. For instance tropical *Bambusa bambos* has been measured at a total above ground biomass 287 t/ha with a mean annual production of around 47.8 t/ha/yr, almost twice that of the Eucalyptus clones. Interestingly, the total biomass of mature *Bambusa* at 6 years is in fact higher than that of teak at 40 years: 149 t C/ha versus only 126 t C/ha for teak. Sub-tropical moso bamboo (*Phyllostachys pubescens*) reaches above ground biomass of 137.9 t/ha and is generally harvested at 5-8 years intervals. Every 5 years it would produce at least 86 t/ha biomass and sequester 43 t/ C/ha, almost twice as much as a teak plantation under the same conditions. This includes total biomass as well as products (INBAR, undated).

Besides higher biomass, bamboo has other advantages over wood as a carbon stock. Unlike woody crops bamboo offers the possibility of annual selective harvesting and removal of about 15-20% of the total stock without damaging the environment and stock productivity. Over 90% of bamboo carbon can be sequestered in durable products such as boards, panels, floors, furniture, buildings, cloth, paper and activated charcoal. These products have a very long life span and may retain carbon for several decades(INBAR, undated).

A typical risk associated with bamboo is that flowering in bamboo species results in the loss of all carbon in the biomass of the plant. Although little is known about the flowering determinants, relatively fixed flowering cycles are known for important species.

Both in tropical and sub-tropical areas the annual biomass and carbon sink per hectare of many bamboo species are comparative to wood tree crops, such as eucalyptus or teak. The rotation cycle of bamboo should be also considered when comparing it to such species. Bamboo will be harvested annually (say 20% of the growing stock) and will continue producing new culms throughout its life. Every five years the amount of carbon sequestered on one ha will be the same, and the tremendous productivity of the bamboo will not be reflected in living biomass. After 30-40 years (at the age of teak or eucalyptus harvesting) the bamboo's biomass will still be as high as it was at 5-8 years old. (INBAR, undated).

A literature review indicated that the carbon stock in vegetation (including understory species and other mixed vegetation) of Moso bamboo is within the range of 27-77 t C/ ha. The majority of carbon appears to be sequestered in the arbour layer accounting for 84-99%; the shrub layer and the herbaceous layer accounted for very small contributions, especially in intensively managed bamboo forests. When looking at the whole ecosystem, including the soil, Moso bamboo forest ecosystem carbon storage capacity was reported to be between 102 t C/ha and 289 t C/ha, of which 19-33% was stored within the bamboo culms and vegetative layer and 67-81% stored within the soil layer (rhizomes, roots and soil carbon). This indicates that the soil layer carbon content is likely to be about 2-4 times greater than the vegetative layer. Bamboo ecosystems were found to have an equal or somewhat lower carbon stock (between 102- 288 t C/ha) when compared with other forest types (between 122 - 337 t C/ha).

The total carbon stock in bamboo forests is obviously affected by climatic factors. The carbon stock of bamboo in Fujian province (quoted from Qi, 2009), where the climate is more suitable for bamboo growth than in Zhejiang province (quoted from Zhou, 2004), surpassed *Pinus elliottii* in its 19th year, Chinese Fir in its 15th year, and showed comparable carbon stock to broad-leaved forest (262.5 t C/ha) and tropical forest (230.4 t C/ha)(INBAR, 2010).

INBAR has quoted the argument of Magel et al (2005) that growth of the new shoots in a bamboo forest occurs as a result of transfer of the energy accumulated in culms through photosynthesis in the previous year. As such, the growth of a bamboo culm is not driven by its own carbon sequestration, but by sequestration in previous seasons in other parts of the bamboo system, and as such growth of new shoots is not an indicator of sequestration rate. On the other hand, Zhou (2009) argues that as the bamboo system requires more inputs in the shooting season of young culms (when new shoots grow), high growth in bamboo shoots can be equated with a high rate of carbon sequestration(INBAR, 2010).

It can be argued of course that as long as carbon sequestration is determined by measuring the difference in standing carbon between Year (t+1) and Year (t) (a stock change approach), it doesn't matter whether and how the relocation of carbon between old and new culms occurs. Bamboo culms of most species reach maturity after approximately 7-10 years, after which they deteriorate rapidly, releasing carbon from the above-ground biomass back into the atmosphere (Liese, 2009 quoted in INBAR, 2010). Therefore in a natural state, bamboo will reach a stable level of above ground carbon relatively quickly, where carbon accumulation through sequestration is offset by carbon release through deterioration of old culms. In order for the bamboo system to continue to be a net sink, carbon has to be stored in other forms, so that the total accumulation of carbon in a solid state exceeds the carbon released to the atmosphere(INBAR, 2010).

As per an experiment conducted in Assam, India on home garden bamboo plants of *Bambusa cacharensis*, *Bambusa vulgaris*, and *Bambusa balcooa*, the carbon (C) estimate in aboveground vegetation ranged from 6.51 (2004) to 8.95 (2007) Mg ha–1 with 87%, 9% and 4% of the total C stored in culm, branch and leaf respectively. The rate of C sequestration was 1.20–1.46 Mg ha–1 yr–1, with a mean of 1.32 Mg ha–1 yr–1. Carbon assimilation ratio, an index to evaluate C sequestration potential per unit of C stock, exhibited bamboo farming as an efficient(16-20%) C sequester than other pure plantations(*Dalbergia sissoo* -11.11%, and *Terminalia arjuna* -12.07%) or natural forests *(Shorea robusta* -3.34%). Promotion of smallholder bamboo farming systems to reduce atmospheric greenhouse gas levels to receive certified emission reduction is therefore recommended (Nath & Das, 2011).

A study on *Dendrocalamus strictus*(salia) in Nepal reveals that the above and below ground biomass carbon sequestration in bamboo was found as 1.66 t/ha and 0.08 t/ha., respectively, whereas the soil carbon sequestration was found to be 230.32 t /ha. Total C sequestration for *D. strictus* forest was found to be 232.06 tons/ha (Dhruba Vijay & Bhandari, 2010).

15.2 Eucalyptus and other species in carbon sequestration

Carbon sequestration potential of *Eucalyptus camaldulensis* Dehn and *Acacia salicina* Lindl. planted in 1973,1975 was studied at the age of 30-28 years in the elimation plain western

areas of Fars province. This study showed that the amount of carbon sequestrated by *E. camaldulensis* in the productive site and poor site was about 7.80 and 1.13 ton / ha / year, respectively. On the other hand, for *Acacia salicina* in the poor site of this figure was 1.5 ton / ha / year. The highest amount of sequestrated carbon in *E.camaldulensis* was in 35 centimeter diameter class. This figure for Acacia was in 25 centimeter diameter class(Pajouhesh and Sazandegi, 2006).

Way back in 2000, a scientific team from Colorado State University that researched carbon storage on a former sugar cane farm which had been turned into a plantation for Eucalyptus trees (*Eucalyptus saligna*) in Hawaii, discovered that the acres which were interplanted with albizia trees (*Albizia falcataria*) were able to sequester more carbon than areas where eucalyptus trees were planted alone. The researchers believe that this is due to the nitrogen-fixing qualities of the albizia trees. They found that in stands where the two species were interplanted, the forest contained twice as much carbon in trees as monocrop areas. In addition, areas of pure albizia sequestered about 20 percent more carbon in soil than did the pure eucalyptus stands(ScienceDaily, 2000).

Carbon sequestration rate in trees is calculated for two parts like above ground biomass and below ground biomass. This rate/capacity trees varies from species to species depending upon various internal and external factors like the age, and agro-climatic conditions. Management practices can also affect the overall capacity of a forest or plantation. For instance, studies have concluded that extended rotation lengths and reduced thinning intensity could enhance the long-term capacity of forest ecosystems to sequester carbon(Kaul et al, 2010).However, the simple understanding is that faster the rate of growth of a species quicker is its carbon sequestration rate. After a certain age the tree attains maturity which then decreases this capacity. Usually warmer climatic conditions are supposed to accelerate the growth rate and hence carbon sequestration rate of the trees.

Kaul *et al*(2010) have found that long rotation forests(like that of *Shorea robusta*) have larger long-term carbon storage in forest biomass and product pools and short rotation plantations, in addition to carbon storage rapidly produce biomass for meeting the demand for fuel and fibre, and thus have higher carbon emission mitigation potential. As per their analysis, the net annual carbon sequestration rates were achieved for fast growing short rotation poplar(*Populus deltoids*) (8 Mg Carbon/hectare per year) and *Eucalyptus tereticornis* (6 Mg Cha−1yr−1) plantations followed by moderate growing teak forests (2 Mg Cha−1yr−1) and slow growing long rotation sal forests (1 Mg Cha−1yr−1).

An Indian study on four young species of trees suggested that the carbon sequestration rate (mean) from the ambient air during winter season as obtained by *Shorea robusta, Albizzia lebbek, Tectona grandis* and *Artocarpus integrifolia* were 11.13, 14.86 and 2.57 g/h in overcast skies and 4.22 g/h respectively. The annual carbon sequestration rate from ambient air were estimated at 8.97 t C /ha by *Shorea robusta,* 11.97 t C /ha by *Albizzia lebbek,* 2.07 t C /ha by *Tectona grandis* and 3.33 t C /ha by *Artocarpus integrifolia.* The percentage of carbon content (except root) in the aboveground biomass of *Shorea robusta, Albizzia lebbek, Tectona grandis* and *Artocarpus integrifolia* were 47.45, 47.12, 45.45 and 43.33, respectively. The total aboveground biomass carbon stock per hectare as estimated for *Shorea robusta,*

Albizzia lebbek, Tectona grandis and *Artocarpus integrifolia* were 5.22, 6.26, 7.97 and 7.28 t C /ha, respectively in these forest stands(Jana *et al*, 2009).

A study in Thailand calculated the capacity of *Eucalyptus* plantation age class 1, 2, 3, 4 and 5 to store carbon at 1.68, 9.09, 15.60, 25.62 and 25.90 tons C/ha, respectively, while the amount of annual carbon accumulation or the sequestration rate was quantified at 1.68, 4.55, 5.20, 6.41 and 5.18 t C/ha/yr for age classes 1, 2, 3, 4, and 5 respectively(Iglesias, 2007).

However, faster rate is sequestration doesn't necessarily mean the average capacity of sequestration to be proportionately higher always. Chavan *et al* (2010) have shown that the mean organic carbon stock in *Ficus religiosa* was 4.91 ton/tree, *Mangifera indica* 3.59 t, *Butea monosperma* 2.41 t, *Terminalia indica* 1.43 t, *Pongamia pinnata* 1.80 t, and *Eucalyptus citriodora* 1.01 t.

Similarly, Kaul *et al*(2010) have found that the largest carbon stock in biomass and products was achieved in sal forests (101 Mg Cha−1). The long-term average stocks in forest biomass and wood products respectively for Eucalyptus, poplar and teak was 41, 55 and 50 Mg Cha−1. A mean annual biomass accumulation of 11 Mg ha−1yr−1, 16 Mg ha−1yr−1, 4 Mg ha−1yr−1 and 2.6 Mg ha−1yr−1 was observed for Eucalyptus, poplar, teak and sal, respectively.

Soil carbon also needs to be considered while assessing the potential of different species in carbon sequestration. Even grasses can contribute to soil organic carbon(SOC), so a higher contribution is definitely expected from plantations including that of Eucalyptus(vide for example, Lemma *et al*, 2006). Land use changes can significantly alter the net SOC and all adverse changes can therefore reduce the potential of soil as a major carbon pool/stock. Negi & Gupta(2012) have shown from their study on three different land uses(forest, grassland, and horticulture) in the Chamoli district(India) that SOC was 121.81 t per ha in deodar(*Cedrus deodara*) forest as compared to 56.73 t per ha in Chir(*Pinus roxburghii*) forest, 52.48 t/ha in miscellaneous/scrub forest, 99.27 t/ha in mango orchards, and 162.87 t/ha in grass lands.

Thus, a holistic carbon forest management is a complex matter that involves efficient landuse planning and species selection. Unless an integrated approach is adopted in sequestration management, there can be negative results too.

> "Methane (CH_4) and nitrous oxide (N_2O) are potent greenhouse gases that are also important to consider for forests, croplands and grazing lands. Practices that maintain and sequester carbon can have both positive and negative effects on CH_4 and N_2O emissions. The relationship among practices that affect CO_2, CH_4, and N_2O can be especially complex in cropping and grazing systems. For example, if nitrogen-based fertilizers are applied to crops to increase yields, this would likely enhance soil carbon but the benefit could be partially or completely offset by increased emissions of N_2O. The practice of rotational grazing can be beneficial across all three major gases: soil carbon can be maintained and enhanced; livestock CH_4 emissions should decline due to improved forage quality; and N_2O emissions can be avoided by eliminating the need for fertilizer applications on the pasture. These complex interactions among gases mean that it is important to consider not only carbon but all the greenhouse gas effects for certain sequestration practices."(USEPA, 2010)

We have thus seen that taking into consideration the SOC, the total carbon sequestration potential of many indigenous species including bamboo can be quite significant in comparison with that of some fast growing species like eucalyptus. Further, when considered in context of local ecosystem, biodiversity, and sustainable local livelihoods many of these indigenous species, their plantations or natural forests offer a much better option than the eucalyptus plantations. Therefore, it is quite reasonable to doubt the sincerity behind eucalyptus-based CDM projects for environmental, ecological, and socio-economic security.

16. Carbon economy of plantations: the superficialities:

To meet the raw materials requirement, private plantation of pulp wood varieties like eucalyptus and casuarinas are being promoted by the paper mills. This approach mainly focuses on plantation in 'wastelands'(?) and 'degraded lands'(?). Plantations are also being promoted along the bunds of the fields and in some cases , the conventional agricultural lands are being diverted for this purpose. Unlike conventional agricultural crops monoculture plantation of fast growing and hybrid crops do not allow crop rotation since the same crop is repeated on the same patch of land over a period of land which might lead to soil nutrient imbalance. However, the socio-economic impacts can be as significant and dangerous as the environmental impacts. Corbera & Friedli(2012) have concluded from their study on the A/R CDM projects worldover that these activities may actually increase social conflicts:

> "xxx we are inclined to think that the further development of A/R carbon activities under the CDM, combined with forest enrichment activities through the REDD+ framework, can result in environmental and social conflicts. Our review already suggests that projects' design gaps are too wide to be addressed through regulation and safeguards, while their implementation will very likely fail to guarantee short- and long-term benefits for their participants and the global climate, except under very particular circumstances."

Such a concern has to be linked with the existing flaws in CDM approval process. A CDM project, before receiving final approval, has to be put to public opinion; but unlike the EIA public hearing is not mandatory here nor is the applicant required to notify its intent alongwith relevant project briefs, in the local newspapers for public responses. The application is put only on some specific website(s) for public access, and since most of the people are unaware of CDM and the related processes it is almost unlikely that the public would access the project report from the concerned website, analyse it, and give its response. Thus, the existing mechanism of CDM doesn't support in practice a transparent and participatory process with public accountability. As such, the negotiations/deal remains confined practically between the applicant, the CDM authorities, and the CDM company; and the whole thing takes place keeping the local communities in dark.

16.1 The JK story:

Hardly anybody knew that JK Paper had submitted a CDM project covering about 3000 hectares(practically much less than that) of land for plantation in 6 districts in Odisha and

Andhra Pradesh. The company proudly declared this to be 'first of its kind in South East Asia under LULUCF' (Sharda, 2008). The stated objectives were to 'reforest' degraded lands to control soil & water erosion, and to reclaim lands; and also economic development through carbon revenue. The company described the target land type at 'degraded farm land'. The CDM project is said to have started in 2004, but the actual plantation project seems to have started much earlier, probably in 2000, as understood by Living Farms.

Some salient features of this A/R CDM project are as under[10]:

- Total land for plantations: 1,600 ha.
- No. of farmer participants: 1580 (6 districts)
- Carbon Sequestered: 60 t/ha (assuming 120 MT yield/ha)
- Value of traded CO_2: 4 USD/t.

The basic questions that arise here are:

- How can one call raising a plantation of Eucalyptus an activity to 'reforest'? A monoculture plantation, particularly when not compatible with local ecosystem and biodiversity, will remain a plantation and not exactly a 'forest'. So, the claim for reforestation itself is a fraud from the beginning.
- Who certifies that the target land is actually 'degraded'? 'Degraded farm land' can mean either a degraded forest land used for cultivation or a degraded agricultural land? In each case however the parameters would change significantly. If the company means any of these two, then it should provide adequate and neutral scientific certification in support of that.

But the major scam seems to be at the socio-economic level. Living Farms, a non-government organization with its field office at Bissam Katak in the Rayagada district did a careful survey of the villages having Eucalyptus plantations raised in and around them under the active facilitation of JK Paper Ltd., and found that whereas in the JKPL-Veda-farmer contractual agreement, validated by World Bank, a certain percentage(80%) of the carbon credits are supposed to accrue to farmers as additional income[11] , farmers in at least seven villages in Rayagada district who were "tricked and trapped" (as they described it) to plant eucalyptus were never even told about their role in carbon sequestration[12], the credits they could earn,

[10] This is based on a presentation prepared and made by VEDA MACS in the international workshop to determine the land eligibility for project development under the Clean Development Mechanism (CDM) of UNFCCC and the Verified Carbon Standard (VCS) on August 11th 2011. The workshop was organized by the VEDA group that includes VEDA MACS, VCCSLL, and Socio-eCO2NOmix-Global. Details are available at http://www.forestcarbonasia.org/country-profiles/india/ .

[11] "Validation of the CDM-Project: Improving Rural Livelioods Through Carbon Sequestration By Adopting Environment Friendly Technology Based Agroforestry Practices", The World Bank, Validation Report, 21 February 2011. http://cdm.unfccc.int/UserManagement/FileStorage/YZC0GL12XOEW4Q5TR7UP6M3JVH9ABN

[12] By the time of e-publication of this report, Living Farms was awaiting confirmation from the World Bank as to whether the farmers under its survey were actually in the list of beneficiaries in the JKPL-VCCSL CDM project. Lack of transparency by the company was obviously the cause of this confusion though one thing is certain that the Eucalyptus plantations in the concerned area have directly or indirectly been promoted by JKPL. RCDC however interacted with a non-tribal and educated farmer of Muniguda who shared that although he was told

and the income they could receive from it. The loss and gain that the local farmers reported revealed that the whole plantation project hardly resulted in any net economic development. On the contrary, the farmers actually lost in terms of not only cash income but also food security, nutritional security, and health security(see inbox). These poor, innocent and tribal farmers were not able to understand the nexus between JKPL and the local Bank, they did not understand that JKPL was using the Bank so as to reduce its(JKPL) burden of investment and also to secure the investment. They were certainly not the people to understand also what the terms & conditions they were asked to accept would imply for their future. The result: some of them now have huge amounts of loan against them which they are just unable to repay. Neither JKPL nor the Bank comes to their rescue.

about the carbon revenue and was asked to sign the agreement paper some two years back, his copy of the agreement was yet to be received from the company while the share in carbon revenue was also not received.

Tricked and tapped in Eucalyptus

In Majhialama village, farmer Nari Praska used to get eight hundred kilos of finger millet, four hundred kilos of sorghum and one hundred kilos of pigeon pea from his 4-acre (1.6 hectare) of land every year. His six-member family got sufficient types of nutritious food from this. He even could make INR 2000 from selling the surplus grain. Malnutrition or food crisis was never a problem, and he owed it to his mix-cropping system – different varieties of food like grain crops, pulses and oil seeds could be had from a single piece of land. He hardly depended on externally supplied & marketed food until he planted eucalyptus. Now his family faces four months of food crisis every year. Family members, especially the children, fall sick frequently (thanks to be marketed food?). After seven years of planting eucalyptus, he got INR 48,000 from the harvest. From this, JKPL deducted INR 24,000 against the seedlings he used. In short, in seven years, he only earned INR 3,500 per year. Comparing this amount with his earlier production of food crops, it was a big loss.

In Sanabrundabadi village, Apparao Hikoka says he was planting six varieties of millets and two varieties of pulses and oil seeds in his 4-acre land before eucalyptus. His harvest from these crops was sufficient to keep his family food secure (food grain and oil needs) for 4-5 months. But, just like Nari Praska, he now buys food for his family from the market.

Not only that. In the course of 11 years, he has observed some peculiar things happening in his farm. The water level seems to have been depleted as the natural stream dried up since the eucalyptus trees were planted. Paddy and millet grown in fields near the eucalyptus trees would also have problems with germination, thereby producing lesser yield. He has also observed that he might not be able to use his land again for other purposes; the residual roots of the eucalyptus needed to be dug otherwise they will grow again. With a 4-acre farm, he would need additional labour to do it. But where would he get the money to pay for it? JKPL has already taken the value of his land for 11 years and, according to him, this will continue for more than 20 years as stipulated in his contract. (Source: Living Farms 2011 draft. Tricked, trapped and land-grabbed: *Farmers' experience with eucalyptus in Rayagada, Orissa, INDIA. A formal publication of this draft is available at* [*http://leisaindia.org/wp-content/uploads/2012/01/LEISA-India-December-2011-pages-13-15.pdf*](http://leisaindia.org/wp-content/uploads/2012/01/LEISA-India-December-2011-pages-13-15.pdf) *)*

Back to the project 'ideologies'', the World Bank's validation report[13](dtd.21 February 2011) of the CDM-project: 'Improving rural livelihoods through carbon sequestration by adopting environment friendly technology based agroforestry practices' mentions a lot of things that portray a very decent objective of the applicant(s) JKPL and VCCSL in the larger interest with necessary processes(like stakeholder consultations) followed quite nicely. It also claims of onsite audit by the CDM validators who reportedly found most of the claims made by the applicants correct. While the local communities themselves including the local NGOs like

[13] Available at : http://cdm.unfccc.int/UserManagement/FileStorage/YZC0GL12XOEW4Q5TR7UP6M3JVH9ABN

Living Farms have enough ground evidence[14] to refute all such validations, we can simply start with the dubious statements made in the report itself, as under:

- "The project is carried out in cooperation between the NGO "VEDA Climate Change Solutions Ltd.", which is organizing the farmers, the paper company "JK Paper Ltd", providing technical support for the plantation and buying the timber from the farmers afterwards and the World Bank."(3.4). The question is: what kind of an NGO this VCCSL Ltd. is? Our enquiry with VCCSL confirmed that they have not, unlike most NGOs in India, registered themselves under the Societies Registration Act. Rather, it is registered under the Companies Act. Practically, the term NGO is used in India to imply to voluntary non-government and non-for-profit organizations, but VCCSL seems to be a company dealing in carbon business. So, why has the term 'NGO' been used to introduce VCCSL? Why not the term 'private company'?
- "The **investment barrier** is sustained by the low income of the participating farmers on the limited land holding (IRL 8, 14, 53-55). Combined with a delay of the income stream (harvest and financial return only after 5 years) this would not be feasible without the project set-up. Further the farmers do not have access to loans from banks to pay for the establishment of the plantation (IRL 38, 39, 40, 41). Due to the involvement of the World Bank's Bio Carbon Fund early money streams are available".(3.6.3) The last two statements of this quote lacks clarity.
- "Both VCCSL and JKPL do not have any revenues from the project other than from sales of carbon certificates. VCSS main business is supporting climate change project; JKPL would alternatively acquire their raw material on the open market. As per contract with the farmers JKPL is paying a minimum price for the wood to the farmers, adapted to market condition at time of sales (IRL 9). Thus their income from carbon is mainly covering the transaction costs for working with small farmers in this project (average size of parcel is 1 hectare) xxx"(3.6.3). The question here is: can we simply believe that JKPL doesn't have any financial interest in the whole project(that goes beyond CDM) other than carbon credit?
- "No Environmental Impact Assessment is required for afforestation activities in India (IRL 47). However, an environmental and social impact assessment according to the requirements of the World Bank was carried out (IRL 30). Both environmental and social impacts of the project were analyzed in detail in this study. In essence, the audit team concluded that no negative environmental and social impacts are expected. This conclusion was also sustained by the results of the field visit of the audit team as well as positive comments on the project by the consulted stakeholders(3.10)". The question is: who now will be answerable to the environmental and social impacts observed in the concerned villages, as discovered by Living Farms? Will the World Bank take any responsibility and beg apology for such an injustice?
- The report mentions that 60 randomly selected farmers were interviewed. No list of these farmers was provided. Given the fact that these farmers were intellectually vulnerable people lacking the capacity to understand the complexities of the project, how can the World Bank satisfy itself that stakeholder consultations including farmer interviews were quite useful in terms of ensuring social and environmental justice?

An on-spot appraisal by RCDC in November 2011 in the Ratatikiri village near Bissak Katak revealed that the situation is very complex indeed. Most of the farm lands have been alienated

[14] One can., for instance, easily verify if the Eucalyptus plantations are actually yielding enough grass as fodder, as claimed.

to non-resident outsiders who have converted the same into Eucalyptus plantations. Many of the present generation of poor tribal villagers may not even know properly how their forefathers' land was alienated, but the simple and common explanation seems to be mortgaging. Now, with very meagre land the villagers have but few options left, like share cropping (cultivating others' land for a share in the final harvest), wage labour, and forest collection. World Bank needs to see whose economic development after all has been ensured through the JKPL-promoted plantations.

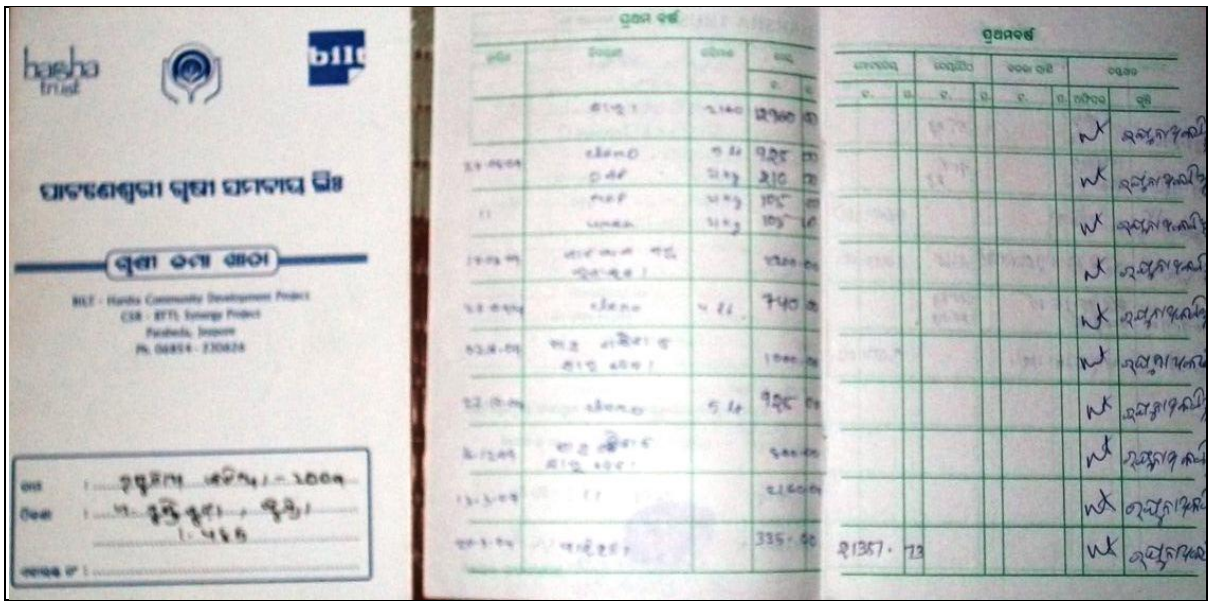
A copy of the tripartite agreement (annexure-5) signed between JKPL, VCCSL, and the farmer has been analysed by RCDC. Clause 12 under article-II of the said tripartite agreement requires the farmer to alienate irrevocably his rights on carbon to the CDM company(VCCSL). Why is this irrevocability necessary?

Both these images have a close link. This tree marks the location of a natural spring in the Ratatikiri village that used to irrigate the surrounding paddy field(s). However, after some years of Eucalyptus plantations(promoted by JKPL) in the lands just on its backside but at a height, the spring has lost itself to such an extent that a channel had to be dug to fetch water from the nearby water body. Poor quality of these cell phone photos regretted.

16.2 The BILT way of socio-economic development:

As mentioned earlier, RCDC has not been able to access so far any official confirmation of an A/R CDM project by Ballarpur Industries Ltd. though the company has been carrying out plantation activities or promotion thereof, like its counterpart JKPL. Interestingly, the validation report of JKPL's A/R CDM project, discussed in the previous section, clearly states that BILT's plantations activities were not linked to carbon finance, i.e. these were not registered as CDM project. This appears to be a little surprising, but one has also to understand that a simple plantation and a CDM-plantation are to be technically different from each other in several respects. Several additional parameters, often complex, are to be considered for applying for a CDM project whereas a non-CDM plantation doesn't need all such formalities and responsibilities. However, RCDC's own case study in the Mundiguda village of Koraput district revealed that the kind of non-transparent ploy that JKPL adopted in the Rayagada district was more or less the same adopted by BILT with a major exception that the latter projected it as a CSR project and implemented it through an NGO.

Mundiguda is a tribal village in the Baipariguda Block of Koraput district. Raghunath Katia, a resident of this village owns both low land and uplands. He used to cultivate conventional crops in both types of land, but due to increasing water scarcity agriculture in the uplands(that lack irrigation facility) became difficult. At this juncture he, like many others in that area, was motivated to make a 'comfortable and profitable' use of this land through Eucalyptus plantation. An NGO, which partnered with BILT, facilitated the whole process under the latter's corporate social responsibility(?). A farmers' cooperative(Patneswari Agri Cooperative Ltd) was formed, and the 'beneficiaries' received loan as members of this cooperative. One can see from their pass book that it contains details of how much loan accrued against what activity(like, supply of saplings, land preparation, etc.). The passbook also contains a slogan suggesting to grow Eucalyptus for better income. Raghunath has confined paddy cultivation to the low lands only, and has diverted the uplands for Eucalyptus since 2009.



The farmer's passbook. BILT's logo appears on the top right corner of the cover page with that of the NGO on the left corner.

Somnath Chalan is a co-villager of Raghunath who has a similar story. He has diverted about 1.5 acres of his upland for Eucalyptus keeping the low lands for paddy. The first setback he suffered was about half of the saplings initially planted died and he received no support against that. In fact, the pulpwood promoter companies are normally known to have set such norms in the agreement with farmers that they would not take any responsibility in case of sapling mortality.

The so-called CSR project of BILT has been able to divert many farm lands for a crop that serves the company more than the society. The company quite tactfully invests its CSR fund for its own purpose in this case. The farmers are not in a position to understand the nitty-gritty of the matter; they have gone more by the verbal assurances & commitments of the facilitators/promoters than the written documents. And, when we asked for the written agreement and other such papers Raghunath and Somnah could show us only the passbooks

that confirm only their liabilities and no responsibility of BILT. Although they legally own the land, the rights have been virtually alienated in one way or the other through the Eucalyptus plantation that makes them dependent on the company(BILT) and subject to the terms & conditions of the latter.

Their lands were not exactly degraded. These are uplands requiring irrigation facility and agricultural inputs. Even without such inputs millets could have grown. Instead of helping the farmers through land development and irrigation facilities BILT rather implemented a strategy that suited its own interest first and foremost though farmers' interest was the plea. What is more unfortunate is that an NGO helped the company to implement such a ploy.

An Eucalyptus plantation near Mundiguda. The paddy field by its side definitely suggests that it was not a degraded land.

Other than Mundiguda, villages like Gumar, Karamguda and Barangpali in the Baipariguda Block and some villages in the Kundura Block have reportedly been affected by this so-called CSR project. The BILT factory is not too far from these areas.

Interestingly, NABARD has collaborated with Ballarpur Industries Ltd. providing loan-cum-grant support to the Patneswari Agri Cooperative Ltd. 'for propagation of agro- forestry (Eucalyptus plantation with intercropping) in dry land/upland of Koraput district'. It is claimed that 815 farmers are benefiting under this programme, and that the plantation programme is running smoothly. Most importantly, NABARD, which claims this programme as the 'Umbrella Programme for Natural Resources Management', also says that a "project to

provide CDM benefits under carbon trading to the farmers is in the pipeline" (source: http://koraput.nic.in/new/nabard/upnrm.htm accessed on 10 August 2012).

A discussion with the Chief Executive Officer, Patneswari Agri-Cooperative Ltd. revealed the following information:

- With support of NABARD, the Cooperative has applied for the carbon credit in January 2010. BILT(which initially promoted the plantation activity under its CSR project) is not supposed to be a direct party to this deal, and individual farmers of the Cooperative would be the main beneficiaries.
- The plantations started in 2006, and in the 1st phase of the CDM proposal only 496 farmers registered by 2009 have been enlisted in the proposal.
- The Cooperative was registered in 2008. Harsha Trust worked as a facilitator, and helped in capacity building and other such things for the farmers.
- The validation of the CDM proposal has been completed, but registration will take some more time. At present there is no clarity about the net financial benefit to the farmers from this CDM deal.
- The proposal has been submitted to UNFCCC.

The CEO agreed to the observation of RCDC that the lands in which the plantations have been taken up are degraded not from the technical point of view, but from the socio-economic point of view only; that is, it is a farmer's perspective based on his/her individual capacity and is therefore a relative one.

More details on this CDM project are available in annexure-9.

17. Eucalyptic gain: the fallacy:

While it is true that in a situation where farmers get poor returns from paddy(that too when the market price of rice is increasing ironically), diverting agricultural land for pulpwood plantation definitely seems promising for them, particularly because it doesn't require regular labour work or inputs and hence is quite convenient. However, of late some of them seem to understand also that while paddy or other conventional crops gave them returns every year, the plantation takes about 4-5 years to encash. Further, although eucalyptus produces coppices the growth rate, quality of production gradually decreases with the next generation crops of the same plantation.

In terms of biodiversity exotic plantations have often been found to be like almost a No Biodiversity Zone. There is hardly any undergrowth of indigenous species, and there are hardly any bee hives or bird nests[15]. After each rotational cutting the canopy cover totally disappears(in average practices seen) instantly proving all claims of environmental benefits a fallacy.

[15] There are, like in all other cases, exceptions here also. For instance, nests of the common myna have been found by the RCDC team in an avenue plantation(old) of Eucalyptus in the Mayurbhanj district.

What is more unfortunate is that the International Finance Corporation (IFC) under the World Bank has partnered with BILT "to encourage more rice farmers to engage in forestry programmes." It has claimed that the participating communities "are clearly benefiting from the income received from selling trees grown on previously non-cultivated degraded land after the 3-year growing period"(IFC, 2011).

JK Paper is also a partner of IFC in the India Farm Forestry programme. And one can see from various media reports and IFC's own proclamations, that this partnership programme took the plea of improving the livelihood conditions of small subsistence farmers though it is also a fact that such small farmers are quite vulnerable both socially and socio-economically because of their poor capacity and small lands, and any vested interest initiative that works under a mask of social service is likely to exploit this vulnerability thereby increasing it further in the long run. As we have seen in section 16 several case studies can be found confirming this apprehension in the areas under shadow industrialization by BILT and JKPL so far Odisha is concerned, and similar cases are likely to exist in other states too.

ITC has taken care to distinguish between its farm forestry and social forestry programme[16]. It has clarified that social forestry programme provides support to marginal farmers whereas farm forestry programme is for those who can invest in the plantation. It is ironical that an international agency like IFC did not seem to have taken such a care so as to have a different approach for the marginal land holders.

NABARD(2007), which provides financial support for Eucalyptus plantations, has however cautioned that "though Eucalyptus is an excellent industrial species, providing timber for poles, pulp and fuelwood, it cannot be used as fodder plant and provide other non-timber uses, limiting its role as a social forestry tree. Thus, plantations of eucalyptus may be limited as industrial plantations with management regime drawn parallel to any intensively produced crop."

[16]See for ex., http://www.itcgreenpapers.com/Plantations.aspx

IFC's India Farm Forestry Programme:

Excerpts from IFC's Request for Expression of Interest for Phase-I in 2009

"The Farm Forestry sector in India is projected to grow and play an increasingly important role in providing fibre for the forest product sector ("FPS") for years to come, given the increasing local wood shortage and Indian law limiting the availability of sizable land plots. Today, farm forestry accounts for 5 million of the global 11 million jobs related to forestry in India with most of the farmers involved being rural subsistence small –holder (less than 1 HA) farmers, living on less than $1.00/day.

The farm forestry operations of IFC's pulp and paper investment clients account for 25%-50% of added income for 1,70,000 poor farmers. The Carbon Sequestration associated with these investments was estimated at 2 million tCO2 in 2007 and is expected to increase to 3.5 million tCO2 by 2010.

In order to further support this sector, IFC organised a two-day farm forestry advisory workshop in Delhi in September 2008. Forty participants including corporates, government, research organizations, forest departments, and national and international experts in agro-forestry discussed the main constraints to farm forestry and identified ways to overcome these constraints. In particular, the workshop discussed the following barriers to the development of a farm forestry approach:

-Low productivity: xxxx

- Absence of adequate financing: xxxx

- Technical constraints at smallholder level: xxxx.

In order to address these constraints, IFC, in partnership with its investment clients, is currently developing the India Farm Forestry Advisory program. This program will focus on increasing the productivity and yield of the farm forestry programs and enable farmers to generate greater income through capacity building, exposure to new planting techniques and better access to finance."

(Source: http://www.dgmarket.com/tenders/np-notice.do~4420209)

18. Natural forests & CDM:

Whereas there is a vast area of natural forests under the control of Forest Department in Odisha, there is no clear information to suggest that the Department has actually tried to formally link it with carbon credits for financial gain. Authorities of the Japan government assisted Odisha Forestry Sector Development Project deny that any such initiative have been taken by them. On the other hand Odisha Forest Development Corporation, which trades in important forest produce on behalf of the state government also declines to pursue any such proposal, chiefly because of its controversial nature.

A good part of the natural forests are under community control, and while there are reports that in one or two cases in other parts of India forests jointly managed by the Forest Department and the communities have been attempted to be linked with REDD+, amidst mixed reactions to the same(some welcome this whereas other oppose saying community initiatives should not be monetized this way).

Recently, under a Government of India multi-state project, the Forest Department of Odisha has started a REDD+ pilot project in the Jerengbudhi Pahad VSS in the Chhendipada Block of Angul district(The Khabar, 2012). However, before this government initiative RCDC has started a similar pilot project[17] in 33 villages of Saintala Forest Range of Balangir district where the local communities are protecting the forest. RCDC's pilot project is experimental in the sense that it will help verify the myths & realities relating to REDD+, and is essentially linked with the voluntary carbon finance sector that is less bureaucratic and more liberal than UNFCCC, and is supposed to honor the rights of the local communities alongwith the national interest. RCDC believes that when the conventional value system of community forestry is facing trouble under the pressure of changing times, REDD+ can, under suitable norms, provide some help to successfully face the challenge. RCDC's pilot project is essentially subject to such community-friendly suitable norms(to be adhered by the carbon financer), and in case of any deviation to that the project is likely to be dropped.

19. Conclusion:

Increasing monetization of life, livelihood, and the resources; and increasing commoditization of even the basic ecosystem services have become one of the unfortunate and unwanted realities of the present world which are fast becoming a compulsion for the developing and

[17] In fact this is still in a preparatory state by the time of publication of this report, and before actually/formally implementing the project RCDC will review the experiences of this preparatory stage so as to decide whether to go for the formal/actual implementation. Because, RCDC can't accept any undue imposition on the rights of the community, even if that is financially profitable. A useful document in this context may be downloaded at http://rcdcindia.org/PbDocument/281e41936fd22e9-2ef8-41fe-bd58-f9e63e8db9c4w-report.pdf .

underdeveloped countries where such a process has long-term adverse effects despite some short term benefits. CDM and REDD+ seem to be byproducts of this process.

On the other hand, the natural-resource-based life & livelihood is fast becoming a tradition of the past with the new generation focusing on careers and livelihood options that relate to a synthetic and artificial world. Resources are abandoned or alienated in this process, CPRs are ignored/neglected/encroached, and household/rural economy is more & more controlled by alien actors. Conventional cropping being replaced by pulpwood plantation is but a reflection of this misery.

Weak/dubious political commitment, opportunistic attitude among the people, and the evolutionary change process: all contribute to such unfortunate trends. However, there is still some scope to prevent a totally frustrating situation, and to safeguard a minimum essential security in respect of our life & livelihood, ecosystem, national interest, and global climate change. A/R CDM, if conceived in a holistic way and implemented with sincerity, can still be in larger interest of the humanity. Our analysis in the previous sections suggests however that neither the government, nor the World Bank or UNFCCC is serious about this, not to speak of the applicant company and the ignorant communities. Validation reports may be different from the ground realities. The so-called carbon forestry may not exactly be a forest or ecosystem in itself, but a mere plantation incompatible with the larger ecosystem in the locality. Moreover, the farm land converted into such plantations may lose its fertility/viability in the long run. .

Even if such concerns and apprehensions are sidelined for the time being, the immediate realities do not support an optimistic picture. RCDC's findings suggest that in the whole plantation and/or CDM business the farmers' position is most vulnerable because of the following reasons:

- Lack of transparency at the provider(company) level
- Complex process of validation & other things
- Ignorance at the farmers' level to secure their rights in this new form of business.

On the other hand another concern is that, by increasing the area under pulpwood plantations the paper mills seem to be ensuring what we may call 'shadow industrialization' because although the farmers own the land the landuse is reserved for the mills. When productive land is fast decreasing in area, diverting the same for non-food cash crops is definitely a threat to the food security. Unfortunately, there is hardly any promising mechanism that can stop the farmers in doing this, nor is there any effective government initiative to put things under control. RCDC believes that by promoting natural regeneration and plantations of indigenous species of multipurpose use, and also by taking the people in confidence through a transparent & people-friendly mechanism interest of both sides can be secured, and the so-called carbon capitalism can turn into carbon socialism. The NCDMA of India, UNFCCC, and the World Bank alongwith the volunteer buyers are hereby urged therefore to make CDM a holistic and community-friendly mechanism that can really contribute to the climate change adaptation &

mitigation initiatives of humanity with clear ground-level accomplishment. Otherwise, it would remain, as it is now, a flawed & superficial arrangement in which the vested interest groups realize the maximum benefits at the cost of local and global interests of humanity.

REFERENCES

1. Andtbacka, Stig (2004). A fibreline designed for bamboo pulping. http://www.tappsa.co.za/archive2/Journal_papers/Bamboo_pulping/bamboo_pulping.html
2. Anonymous(undated). India's Pulp & Paper Industry-1990-2010. http://www.slideshare.net/Harijan29/indian-paper-industry19902010
3. Bamboojungles(2005). Bambooinsights. ttp://www.bamboojungle.net/pages/bamboo_insights.html
4. Bhaskar, L. and S.Narayanan(undated). Economics of clean development mechanism (CDM) and carbon trading in India. http://www.indjst.org/archive/vol.3.issue.11-12/GESIS2010-Part-I-II.pdf
5. Chavan, B.L. & G.B.Rasal(2010). Sequestered standing carbon stock in selective tree species grown in University campus at Aurangabad, Maharashtra,India. International Journal of Engineering Science and Technology.Vol. 2(7), 2010, 3003-3007. http://www.ijest.info/docs/IJEST10-02-07-133.pdf
6. Corbera, E. and Charlotte Friedli(2012). Planting trees through the Clean Development Mechanism: A critical Assessment. Ephemera. Volume 12(1/2): 206-241. http://www.ephemeraweb.org/journal/12-1/12-1corberafriedli.pdf
7. CSE(undated). Paper & Pulp. http://www.cseindia.org/userfiles/91-104%20Paper(1).pdf
8. Devesh Kumar(2007). http://qna.rediff.com/questions-and-answers/should-plastic-bags-be-banned-all-over-india/2606352/answers/2704831)
9. Devex(2012). India Farm Forestry Programme Phase I. http://www.devex.com/en/projects/india-farm-forestry-program-phase-i
10. Dhruba Bijaya G.C. and Jyoti Bhandari (2010). Carbon sequestration potential and uses of *Dendrocalamus strictus* - A case study from Baglung District Sigana V.D. C, Nepal. In IUFRO World Series Vo. 27. www.iufro.org/download/file/6996/153/ws27-complete_pdf/
11. Elwin, V.(1944). *Notes on a Kondh Tour*. Man in India, Vol. 24, 1944
12. FAO(undated). Changing patterns in India: A report on pulping prospects. http://www.fao.org/docrep/q7885e/q7885e09.htm
13. First Climate (2011). First Climate in Point Carbon: Kyoto carbon credit buyers need post-2012 agreement for price guidance, http://www.firstclimate.com/press-events/news-details/article/2008/05/02/first-climate-in-point-carbon-kyoto-carbon-credit-buyers-need-post-2012-agreement-for-price-guidanc.html
14. Goel, M.C. et al(2011). Clean Development Mechanism for Pulp and Paper Industry, and JKPL Experience. Journal of Indian Pulp & Paper Technical Association, Vol. 23, No.1, January-March 2011.

15. IFC(2011). The Challenge of Farm Forestry in India. Monitor. Issue No.10, January 2007. http://www.ifc.org/ifcext/sme.nsf/AttachmentsByTitle/monitor_issue10/$FILE/Monitor_issue10.pdf
16. Iglesias, C.(2007). Determination of carbon sequestration and storage capacity of eucalyptus plantation in Sra kaew province, Thailand using remote sensing. Mahidol University. http://www.li.mahidol.ac.th/thesis/2550/cd410/4937964.pdf
17. INBAR (undated). Bamboo: Roles in climate change, carbon sequestration..... http://www.inbar.int/show.asp?NewsID=373
18. INBAR 2010. Bamboo and Climate Change Mitigation. http://www.inbar.int/publication/TXT/Carbon%20Publication_final_151110.pdf
19. ITC(2009). ITC Sustainability Report. *Quoted in* http://www.itcgreenpapers.com/Energy.aspx
20. Jana, B.K.(2009). Carbon sequestration rate and aboveground biomass carbon potential of four young species. Journal of Ecology and Natural Environment Vol. 1(2), pp. 015-024, May, 2009. http://www.academicjournals.org/jene/PDF/Pdf2009/May/Jana%20et%20al.pdf
21. Kant, P.(2010). Should Bamboos and Palms be included in CDM Forestry Projects? , IGREC Working paper, No. IGREC- 07: 2010, Institute of Green Economy, New Delhi
22. Kaul, M. et al(2010). Carbon storage and sequestration potential of selected tree species in India. Mitigation & Adaptation Strategies for Global Change, Vo.15, No.5(2010).
23. Lal, M. & Roma Singha(2000). Carbon Sequestration Potential of India's Forests. http://www.deepdyve.com/lp/springer-journal/carbon-sequestration-potential-of-indian-forests-ZY50XagEkL?key=springer_journal
24. Lawbuary, Jo(undated). Eucalyptus Planting in 'Social Forestry' in India: Boon or Curse?. http://www.ganesha.co.uk/Articles/Eucalyptus.htm
25. Lemma, B. et al (2006). Soil carbon sequestration under different exotic tree species in the southwestern highlands of Ethiopia. Geoderma (2006) Volume: 136, Issue: 3-4, Pages: 886-898. http://www.mendeley.com/research/soil-carbon-sequestration-different-exotic-tree-species-southwestern-highlands-ethiopia-5/
26. Living Farms (2011 draft). Tricked, trapped and land-grabbed: Farmers' experience with eucalyptus in Rayagada, Orissa, INDIA*)*
27. Nath, A.J. and A.K.Das(2011). Carbon storage and sequestration in bamboo-based smallholder homegardens of Barak Valley, Assam. CURRENT SCIENCE, vol. 100, no. 2, 25 January 2011. http://cs-test.ias.ac.in/cs/Volumes/100/02/0229.pdf

28. NABARD(National Bank for Agriculture & Rural Development)(2007). Model Bankable Projects: Eucalyptus. http://www.nabard.org/modelbankprojects/forestry_eucalyptus.asp

29. Negi, S. and M.K.Gupta(2012). Carbon sequestration through Soil Organic Carbon Pool under different forest covers in Chamoli district of Uttarakhand. *The Indian Forester*. Vo. 138, No.3, March 2012.

30. NFFPFW et al(2011). The Indian CDM: Subsidizing & Legitimizing Corporate Pollution.

31. NPC (2006). Final report on development of guidelines for water conservation in pulp and paper sector. http://cpcb.nic.in/newitems/45.pdf

32. NPC(undated). Final Report on Water Conservation in Pulp & Paper Sector. http://www.docstoc.com/docs/26133712/DEVELOPMENT-OF-GUIDELINES-FOR-WATER-CONSERVATION-IN-PULP-AND#

33. OBDA(undated). Bamboo resource. http://www.odishabamboo.org/oscenario.php

34. Pajouhesh and Sazandegi (2006). Carbon Sequestration Potential of *Eucalyptus camaldulensis* Dehnh. and *Acacia salicina* Lindl. Plantation In Western Areas of Fars Province. http://agris.fao.org/agris-search/search/display.do?f=2008%2FIR%2FIR0811.xml%3BIR2007003216

35. Paramathma, M. , J.A.Amal, and M.Rajkumar (2000). Tree Allelopathy in Agro-forestry. *In.* Allelopathy in Ecological Agriculture & Forestry. Kluwer Academic Publishers, Dordrecht, The Netherlands. http://books.google.co.in/books?id=FfZJ9V0SjhwC&printsec=frontcover&dq=Allelopathy+in+Ecological+Agriculture+%26+Forestry&source=bl&ots=vaG74FPRaV&sig=yECFz-xzlUERVt8Mp858agtq4u4&hl=en&sa=X&ei=D-gkUMX7B4jsrAfhmoHoBA&ved=0CDAQ6AEwAA#v=onepage&q=Allelopathy%20in%20Ecological%20Agriculture%20%26%20Forestry&f=false

36. Rath, B.(2005).Vulnerable Tribal Livelihood and Shifting Cultivation: The Situation in Orissa. Vasundhara. Bhubaneswar. http://www.vasundharaorissa.org/Research%20Reports/VulnerableTribalLivelihoodandShiftingCultivation.pdf

37. Rath, B.(2005_1). Bamboo in Orissa: Trade & Livelihood Perspective. Vasundhara. www.vasundharaorissa.org/Research%20Reports/BambooInOrissa.pdf

38. Schumacher, Katja and Jayant Sathaye(1999). India's Pulp and Paper Industry: Productivity and Energy Efficiency. http://ies.lbl.gov/iespubs/41843.pdf

39. ScienceDaily(2000). Carbon Sequestration: Seeing The Forest For Its Trees. http://www.sciencedaily.com/releases/2000/12/001219074241.htm

40. Sharda, A.K.(2008). Improving Rural Livelihood through Carbon Sequestration(CDM A/R) Project: JK's Path Breaking Initiative on CDM. IPPTA journal. Jan.-March 2008. http://www.ipptaonline.org/Jan-March%202008/Abstract_2008_Issue_1_IPPTA_Article_12.pdf
41. Singh, J.K.(undated). Clean Development Mechanism(CDM) and Carbon Trading in India. http://www.tce.co.in/Downloads/bro_pdf/papers/cdm_carbon_trading.pdf
42. Skutsch, M.(2004). CDM and LULUCF: what's in it for women? A note for the Gender and Climate Change Network. http://www.uneca.org/acpc/resources/cc_gender/docs/Skutsch_CDMandLULUCFwhatinitforwomen.pdf
43. SPCB(2006). State of Environment Orissa 2006. Table 2.15
44. The Business Standard(2007). Huge potential in carbon trading for eastern states. August 13, 2007. http://www.business-standard.com/india/news/huge-potential-in-carbon-trading-for-eastern-states/294327/
45. The Business Standard(2012). Indian paper industry eyes 7 % growth by next year. 1st March 2012. http://www.business-standard.com/india/news/indian-paper-industry-eyes-7growth-by-next-year/466272/
46. The Financial Express(2004). Going back to the roots. June 19, 2004. http://www.financialexpress.com/news/going-back-to-the-roots/108129/0
47. The Financial Express(2010). Studies show paper is far more ecofriendly than electronics. http://www.financialexpress.com/news/studies-show-paper-is-far-more-ecofriendly-than-electronics/719587/5
48. The Hindu(2011). JK Paper plans to raise Rs 246 cr via rights issue. July 20, 2011. http://www.thehindubusinessline.com/companies/article2277038.ece
49. The Hindu (2011_1). 68 p.c. emission of CO2 takes place in thermal power generation: report. http://www.hindu.com/2011/02/16/stories/2011021661330300.htm
50. The Khabar(2012). RDDD+ Pilot Jojanara Subharambha, p.13, 14th May 2012
51. UNFCCC(2012). Land Use, Land-Use Change and Forestry (LULUCF). http://unfccc.int/methods_and_science/lulucf/items/3060.php
52. UNFCCC(undated). The Marrakesh Accord & the Marrakesh Declaration(draft). unfccc.int/cop7/documents/accords_draft.pdf
53. USEPA(2010). Carbon Sequestration in Agriculture and Forestry. http://www.epa.gov/sequestration/faq.html

Annexure-1

Production of forest bamboo in Odisha

Year	Yield in lakh MT
1980-81	3.48
1981-82	3.02
1982-83	2.95
1983-84	2.63
1984-85	3.88
1985-86	2.89
1986-87	2.15
1987-88	2.54
1988-89	2.61
1989-90	2.39
1990-91	2.20
1991-92	2.38
1992-93	2.45
1993-94	2.41
1994-95	2.40
1995-96	2.18
1996-97	2.46
1997-98	2.08
1998-99	1.20
1999-2000	1.12
2000-01 to 2003-04	0.7 – 0.9
2004-05	82804 (MT)

2005-06	124037 (MT)
2006-07	97357 (MT)
2007-08	105188(MT)
Source: The Bamboo of Odisha, Forest Department. Govt. of Odisha	

Annexure-2

The raw material crisis as projected by the paper industry

(Excerpts from an article in Paper Mart)

This is the most important and crucial issue of the industry. Whenever we talk of the demand growth and create matching supply end, deliberations invariably end up with the focus on raw material availability, be it woods, agro residues or recycled fiber. So far as wood is concerned, prospects of its availability has been at the forefront of the discussions at any forum and all concluding that the best possible economic solution lies in the decades old proposals of the industry to harness the degraded forest lands which will result in multiple advantages apart from the raw material need of the industry. Lot of stress is now being given on an organized system of collection of waste paper too. This is an area for which a concerted move from the Government, particularly the civic bodies, with involvement of local civil societies supported by an initiative and drive from the Industry will get some results.

Thus, the best way to secure raw material for the Industry lie in immediate decision by the Government to allow use of degraded forestlands by the industry for captive plantation with necessary safeguards and due control of regulatory authorities, and the need to develop moves to socially and culturally change the mind-sets of people to help improve collection of waste paper for recycling it back to paper making.

Indian Paper Mills Wood Requirement & Generation

India has a total forest area of about 75 million ha which forms only 22.8% of the total geographical area (328 million ha) of the country. Forests in India are fast disappearing. At the time of independence more than 22% of India's geographical area was covered by dense forests. Recent satellite surveys show that hardly 11% of the area now supports closed forests, i.e. forest with 40% crown cover even though the national forest policy enunciated soon after independence in 1952 that at least 33% of geographical area of the country should be under forest cover. Further, the per capita forest area in India is only 0.064 ha against the world average of 0.64 ha. Out of 69.09 million ha of the forest cover recorded, nearly 28.84 million ha are degraded forestlands. The productivity of Indian forest is only 1.34 m3/ha/yr against the world average of 2.1 m3/ha/yr. Earlier forests were the main resource for wood and bamboo based raw material for paper industry. Depletion of forest areas and reduction in volume of extraction has hit badly supply of raw material to the wood based industry.

In recent times, the demand for the fire wood, timber and industrial wood in the country continues to grow because of increasing population and the growth of economy. The Indian Forest Act-1927, The Forest Conservation Act-1980, The National Forest Policy-1988 and The National Forest Commission 2003 are the umbrella legislation and framework for forest protection and conservation. Under these acts, rules and policy, the supply of raw material to wood based industries is phased out from forests. Participation of the private sector, even in reforestation of 28.84 million ha degraded forestlands and Joint Forest Management is not allowed as per the policy guidelines. In the National Forest Policy 1988, the wood based industries have been advised to encourage agro forestry for raising plantation to meet the raw material demand. Agriculture sector in the country covers about 143 million ha out of which 40 million ha is classified as degraded. Hence, non-forestlands such as private lands are explored for raising tree crops to augment the available wood resources. In the course of time social and farm forestry emerged for meeting the wood demand of the paper industry.

The wood based paper mills in India continue to face challenges with forest-based raw material. Pulp and paper industry consumes 3% of total national requirement of wood while, the major consumption being fuel wood (89.5%) and timber (7.5%). Presently the annual pulp production is 2.71 million tonnes from 9.83 million tonnes of wood. Nearly 20% of wood is procured from government sources while, 80% is from agro farm forestry sources. The bamboo and wood requirement is 0.82 and 9.01 million tonnes per annum respectively. The strategy adopted by the industry to meet the ever-growing demand of wood on a sustainable basis is to obtain wood from social and farm forestry plantations. Over a period of 22 years the paper industry has promoted nearly 642,208 ha plantations, which is estimated to produce 38.53 million tonnes of wood at 60 tonnes per ha yield. However, if we consider last 11 years plantations of Eucalyptus, Casuarina, Leucaena and Acacia as standing crop, it is to the tune of 321,104 ha which can produce 19.26 million tonnes of wood. At the felling cycle of 4 years, the wood production annually is 4.8 million tonnes. The current level of planting by the paper mills is 50,000 ha per annum. Apart from the industrial efforts, farmers on their own are raising plantations. In the recent years several private eucalyptus clonal nurseries have sprang up and an additional 20,000 ha area every year is planted. This is adding to the general availability of wood to the industry. Hence, the industries wood demand of 9.83 million tonnes annually is met through farm forestry plantations only. Paper companies are aggressively looking at farm forestry to cut down on the landed cost of wood. With transportation cost accounting for nearly 30 to 50% of the wood cost, developing farm forestry plantations near the manufacturing units are being pursued vigorously by the mills. Considering the future demand of paper of 24 million tonnes by 2025, an additional 12 million tonnes of wood is required from 1.2 million ha of pulpwood plantations. To meet its ever-growing demand of wood on continuous and sustainable basis the industry has to enlarge its social and farm forestry plantation programme following agro-forestry models for wood and food security in addition explore plantation programme with forest development corporations. ITC promoted 125,000 ha farm forestry plantations using R&D to increase productivity to 20-58 t/ha/yr compared to 4 to 6 t/ha/yr from seedling plantations which goes in favour of fast wood forestry. Hence, strengthening Private-Private partnership appears to be the answer to meet its fiber requirement.

(Source: Paper Mart, 2012. How the future will be for Indian paper industry http://papermart.in/2012/03/22/how-the-future-will-be-fir-indian-paper-industry/ , 22 March 2012)

Annexure-3

Industries eye forest land for plantations

EVEN WHILE the government is privatising and cutting subsidies, paper and forest-based industries are about to receive in response to their clamouring the biggest bankroll of all: natural wealth. At a recent seminar in Delhi on raw material supply for these industries, the ministry of environment and forests (MEF) hinted it would allow investment in plantations on degraded forest land. The objective is to augment domestic supply of pulpwood and timber and cut import bills. If the proposal goes through, it will be at the expense of millions of rural poor, who depend on forests for fuelwood, fodder, building material and medicinal herbs.

The MEF proposal for industrial plantations departs from the national forest policy of 1988, which states forest land cannot be leased to industries and they must tie up with farmers for supply of raw material. Ironically, the proposal follows the MEF replacing a forestry privatisation programme in Himachal Pradesh with a joint forest management scheme, responding to environmentalists who had criticised it as a land-grab effort disguised as afforestation (Down To Earth, March 15, 1993).

According to the Indian Institute of Forest Management (IIFM) in Bhopal, which co-sponsored the seminar with MEF, of the 158 million ha of wastelands in the country, 113 million ha can be regenerated. And, Piare Lal, a vice president of ITC''s Bhadrachalam paper mills in Andhra Pradesh, says all the raw material needs of the country''s forest-based industries can be met from just 2 million ha.

Not only is there a drastic shortfall of raw material for the wood-based industry, imports are also becoming costlier because of currency devaluation. An IIFM paper showed a deficiency of 629,000 tonnes in 1990 and the Development Council for Pulp, Paper and Allied Industries, an autonomous body set up by the Union government, anticipates a shortfall of 1.06 million tonnes against a projected demand of 3.16 million tonnes of raw material in 1995. The situation with other forest-based industries, such as plywood and paperboard, is reportedly equally grim.

The government allowed liberal import concessions in 1985 hoping to keep industry out of forests and this resulted in large-scale imports of cheap pulp and timber. But with the fall in the rupee value and increasing resistance to wanton tree-felling, forest-based industry has begun to feel the pinch. J C Tiwari, a vice president of Orient Paper Mills in Madhya Pradesh, says, "We expect a decline in international timber trade as there is pressure from the global environmental lobby to reduce tree-cutting." However, while Tiwari''s fear may be premature because Canada and other Western countries have an abundance of raw material for supply to paper mills worldwide, the plywood industry may be affected by environmental pressures. Even though it is switching to substitutes, hardwood is essential to make the outer face of plywood. Concedes P V Mehta, executive director of the Federation of Indian Plywood and Panel Industry, "Timber imports, mainly from southeast Asian countries, have gone up to Rs 1,000 crore annually, compared to Rs 500 crore before 1988."

Environmentalists say paper and plywood industry lobbyists have been working hard to change the national forest policy so as to allow them forest land for plantations. They maintain the lobbyists distort trade statistics to this end and disregard the fact that their raw

material needs can be met without using forest land.
Farm forestry Although the industry realises import of raw material cannot go on forever, it ignores a scheme for sustainable supply of such material through farm forestry. This scheme would require farmers across the country to grow commercial wood species for the industry, which, in turn, would organise credit, provide seedlings and establish extension services. Such a scheme would benefit both farmer and industry.

But industries such as WIMCO in Punjab and Haryana, ITC Bhadrachalam, Andaman Timber in the Andaman and Nicobar islands and Kitply in Arunachal Pradesh say they have attempted farm forestry -- and burned their fingers. "Coordinating with thousands of farmers is quite onerous," Piare Lal explains. "It is also difficult to enlist farmers for bank loans as most of them are defaulters or already indebted."

But Piare Lal"s complaint only exposes the industry"s boast of scientific management skills. Says Gurnam Singh, principal chief conservator of forests in Haryana, the sugar industry, which coordinates with farmers all over the country and has no problem coordinating with its branch offices and buyers all over the country, would be justified in demanding forest land to grow sugar cane.

Another grievance, according to N S Adkoli, a former forestry adviser to Harihara Polyfibres, is that forest farmers sell trees to third parties. "It must be ensured trees are sold to promoter companies on a priority basis." Under NABARD loan schemes, farmers are not required to sell trees to the promoter companies. Environmentalists disregard this objection, too, saying if farmers are encouraged to grow enough trees, there would be no third-party demand. Several foresters also disagree with industry. "Farm forestry in India has suffered largely because industry does not cooperate," asserts Gurnam Singh.

In the early 1980s, farmers in Gujarat, Punjab and Haryana raised large eucalyptus plantations but found no takers for the wood, as the industry preferred cheaper imports. As a result, many farmers actually pulled out eucalyptus saplings. Says S K Kapoor, principal chief conservator of forests in Punjab, "After 45 million eucalyptus seedlings were planted in 1983-84, only 15.1 million seedlings were planted in 1991-92. The demand from Himachal Pradesh for eucalyptus wood to make apple crates is not enough to support what our farmers produce."

Gurnam Singh says third-party sales take place because "obviously, people are willing to pay the right price. If industry paid the right price, the farmers of Haryana and Punjab could support all the forest-based industries in the country."

Industry, on the other hand, explains the failure of farm forestry in terms of "local imbalances". Says Piare Lal, "There aren"t enough industries to utilise the raw material base. Paper mills in the south do not benefit because of the high transportation costs of timber." But forest officials in Punjab ask, "If import concessions are allowed, why can"t transport subsidies be given?"

A highly placed Punjab official says "local imbalances" can be corrected if the industry stops manipulating the market. For instance, when Grasim India Ltd proposed setting up a pulp unit in Yamuna Nagar in Haryana, the Thapar group"s Ballarpur paper mills objected, saying there wasn"t enough raw material in the area, even though the forest department had stated otherwise.

WIDENING GAP

Raw material for paper and pulp industry will be increasingly in short supply. (all figures in million tonnes)							
Year	Raw material from					Demand	Deficit
1990	1.2	0.18	0.20	0.21	1.79	2.4	0.61
1995	1.2	0.36	0.22	0.28	2.06	3.1	1.04
2000	1.2	0.60	0.25	0.48	2.53	4.1	1.57
2005	1.2	0.72	0.25	0.56	2.73	5.0	2.27
2010	1.2	0.84	0.25	0.83	3.12	603	3.18

Pampered industry

Pricing is a major issue in both farm forestry and import subsidies. "In farm forestry," says R D Kutty, managing director of ITC Bhadrachalam, "the industry will have to deduct input costs from the price." The IIFM report maintains forest-based industry has been pampered for long. The 1952 and 1984 forest policies authorised forest departments to supply the industry"s need at concessional rates and the industry continues to expect lower rates. Says Kutty, "We want raw materials at `realistic" prices." But, a forest official noted, "Industries do not want competition as it will raise raw material prices."

The issue is whether industrial plantations should be allowed on forest land. At the seminar, MEF minister Kamal Nath asked, "Why does industry want only forest land? It can utilise abandoned mines and degraded wastelands outside the forest land." But industry eyes forest land for definite reasons. Piare Lal explains, "Most of the 40 million ha of non-forest wastelands is heavily encroached upon or not easily identifiable. It falls within the purview of the Land Ceiling Act and reclamation is prohibitively expensive." On the other hand, forest land is free of such hitches.

Another reason for industry wanting forest land is that it believes it can be used for plantations. Says Adkoli, "The Forest Conservation Act allows joint-sector plantation on forest land. But in 1988, MEF discontinued the practice by issuing a letter to state governments. What is the legal validity of this letter?" Karnataka Pulpwood Ltd, he adds, was formed by the Karnataka Forest Development Corp and Harihara Polyfibres, "but the promised land never came." Even though industry ignored environmentalist questioning its curbing access of local people to the forests, the project ultimately had to be abandoned.

The government, however, has yet to take a final decision on leasing forests to the industry. Kamal Nath said at the seminar, "While we must help the industry overcome the shortage, it would be wrong to consider captive plantation as an Aladdin"s lamp and disregard the social complexities involved." He promised, however, that bottlenecks in forest policies hindering raw material supply would be removed.

Industry"s insistence on using forest land aroused the suspicions of NGO participants at the seminar, who expressed concern that poor people would be denied access to vast stretches of forest land. But industry representatives contend grass and lops and tops from plantations are enough to take care of their needs. And, they warn, "Industry cannot subsidise the public in a big way, if it is to remain viable."

The paradox remains: Farm forestry can adequately supply the wood-based industry"s raw material needs, but the industry insists that its craving for forest land must be fulfilled, even at the expense of local populations and diverse vegetative systems.

(Source: Roy Chowdhury A. 1993, The Down to Earth, 29-4-93, http://www.indiaenvironmentportal.org.in/news/industries-eye-forest-land-plantations,)

Annexure-4

Self-declaration by Mangalam Timber Ltd.

In anticipation of the huge gap between the demand and supply of timber in the years to come, our Company has taken a proactive step by concentrating on a large-scale plantation under the Farm Forestry and/or Private Public Partnership (PPP) Scheme. Our Company has done a commendable job in plantation activity by taking plantation in 45135 acres, planting 39.98 million trees so far. Year-wise details of plantation undertaken are given below :

Year of plantation	Acres planted	Number of trees planted in lakhs
1999–2000	451	4.68
2000 – 2001	625	6.23
2001 – 2002	2538	24.05
2002-2003	5061	45.85
2003–2004	6744	60.40
2004– 2005	12216	106.80
2005–2006	16500	143.13

The plantation activity spreads over the states of Orissa,Chattisgarh and Andhra Pradesh. At Mangalam Timber, we not only safeguard environment but also enrich the forest resources by extensive plantation under our FARM FORESTRY SCHEME /PUBLIC PRIVATE PLANTATION SCHEME.

(Source: http://www.scribd.com/doc/18020135/Mangalam-Timber)

Annexure-5

Tripartite agreement(format) between the JKPL, VCCSL, and the farmer

Preamble

(To be Stamped as an Agreement)

THIS TRIPARTITE AGREEMENT concluded at _____ on this _____ day of _____ (among)

1. Sri/Smt. _____ _____ son/daughter of _____ aged _____ years residing at _____ P.O. _____ P.S. _____ Dist. _____(hereinafter called the "Farmer/ Borrower"), which expression shall unless repugnant to context and the meaning thereof include the Farmer assigns of the "FIRST PART" and

2. JK Paper Limited, a company incorporated under the Companies Act, 1956 and having its registered office at Central Pulp Mills, Fort-Songadh, Dist-Tapi (Gujarat) and hereinafter called "INDUSTRY/COMPANY" (which expression shall unless inconsistent with the context meaning and include its successors, whether by reconstitution, merger, amalgamation or take over or otherwise) hereby represented by Sri _____ and Sri _____ _____ (Designation with address) of the "SECOND PART"

and

3. Veda Climate Change Solutions Limited, a company registered under Indian Companies Act, 1956 and having its registered office at B3A, HUDA Complex, Tarnaka, Hyderabad-500017 and herein after called "CDM Company" (which expression shall unless inconsistent with the context, meaning and include its successors, whether by whether by reconstitution, merger, amalgamation or take over or otherwise) hereby represented by Sri _____ (Designation with address) of the "SECOND PART"

WHEREAS the farmer is agreeable to grow fast growing Clonal/ seed root Eucalyptus/ Casuarina plantation on his land by investing his own resources

AND

WHEREAS the Industry is engaged in the manufacturing of various grades of quality paper and is desirous of getting supplies of Hardwood for manufacture of paper

AND

WHEREAS the Industry is prepared and willing to purchase and effect payment for Hardwood so purchased & removed from the farmer to the farmers as per the prevailing market rate, all in accordance with the terms and conditions hereinafter set forth

AND

WHEREAS the CDM COMPANY is engaged in Clean Development Mechanism projects to generate Carbon revenues for the Bio-mass produced by the farmer

AND

WHEREAS, the VEDA MACS LIMITED, promoter of CDM Company and Industry have sponsored and proposed to Bio-Carbon Fund for generating Carbon Revenue and now CDM COMPANY and INDUSTRY propose to share it with farmers after meeting the costs related to generating Carbon Revenue and further liabilities that may arise, if any, in this regard

IT IS HEREBY NOW MUTUALLY AGREED TO BY AND AMONG THE PARTIES HERE TO AS FOLLOWS

ARTICLE-1

INDUSTRY'S OBLIGATIONS

SUPPLY OF SEEDLINGS

The Industry agrees to supply good quality clonal Eucayptus plants raised from specific mother plants with minimum height of 30 cm at the time of planting at site to the farmers at a cost of Rs.6/- (Six per plant) for planting in farmer's land

1. For the other plantations like Eucalyptus/ Casuarina, seed route saplings will be provided from the decentralized nursery of the company nearer to the farmers field at the rate of Rs.1/-(One per sapling) (Ex-Nursery)

PROVIDE MONITORING, EVALUATION & SUPERVISION SERVICES

2. The Industry agrees to provide technical guidance, assistance and services relating to planting and maintenance of such plantation till they are harvested on the request of the farmers and also agrees to undertake the supervisory role in the implementing the scheme for clonal/seed route Eucalyptus/ Casuarina Plantation in the farmers field. However, it is specifically understood and agreed to by the partners that the industry will not be liable for any damage or loss sustained by the farmers on account of low yield or any other losses for any reasons whatsoever

TIMBER EXTRACTION & REMOVAL

3. The harvesting of trees shall be on maturity usually after 5 (five) years and before expiry of 7 (seven) years from the date of planting. The size of billets should be 6 ft. long and girth should not be less than 15 cms or any other specifications not higher than above decided by the industry from time to time

PAYMENT FOR TIMBER REMOVAL

4. The user industry agrees to pay to the farmer the proceeds of the sale of debarked Eucalyptus/ Casuarina pulpwood received at a minimum rate of Rs.1700/- (transportation included)per Metric Ton or at prevailing market price whichever is higher to be delivered at mill gate where in to specific size of billets and debarked

PROTECTION OF TREES & AID TO GROWTH

5. The farmer or his representative may attend the sale proceedings at Industry's factory at Jaykaypur-765017, Dist-Rayagada (Odisha). It is further understood and agreed by the parties that the position of the industry in the instant case is not that of a guarantor to the farmer. The farmer will protect or provide watch & ward to the trees/plantations raised by him, in any case Industry or CDM Company are not liable for any kind of damages by cattle or theft by any person.

MAINTENANCE OF RECORDS

6. The Industry agrees to maintain proper and adequate records of wood received from the farmer, which shall be open for inspection by any agency involved in this CDM A/R project.

FARMER, JK & VEDA Agreement

NO OBJECTION CERTIFICATE

7. The Industry shall assist as far as possible to obtain necessary permissions/No Objection Certificate for Plantation, Felling, Cutting and Billeting of the trees and transportation of timber from the farmers' site to the factory of the industry from the competent authority of the Forest Department of Odisha within the ambit of prevailing Act/Rules applicable. <u>However, the sole responsibility vests with farmers to perform this obligation.</u>

TECHNICAL ASSISTANCE

8. The industry shall render technical assistance to the farmers as and when required on his request in writing

CARBON REVENUE UNDER CLEAN DEVELOPMENT MECHANISM

9. The Industry will help the Farmer to realize the additional revenue through CDM mechanism with the help and coordination of CDM Company

10. The Industry will facilitate/ coordinate in association with CDM Company the activities required to get the Carbon Revenue including the selection of the farmer as required, collection of data periodically or one time as the case may be on Farmer, Land, Practices followed, Growth, Sample plots visit of validating agency, funding agency etc for which expenses so incurred shall be reimbursed to the industry from the carbon credit proceeds and available in Escrow account

11. The Industry will in association with CDM Company determine the Farmer's share of Carbon Revenue and also distribution amongst CDM Company and Industry, of the remaining amount.

ARTICLE-II

FARMER'S OBLIGATION

PLANTING OF SEEDLINGS

1. The Farmer agrees for release of the cost of the planting material directly to the industry through Demand Draft/ Cash during collection of plants from Mist Chamber/ Nursery
2. The farmer undertakes to prepare the land, dig pits, apply pesticides, fertilizer etc and plant the clonal and seed root plants given to him by the industry at his own cost under the guidance of the industry's supervisory staff.

PROTECTION OF TRESS & AID TO GROWTH

3.The Farmer agrees to protect the trees in the said land from damage by cattle or other animals and also theft or other damages, remove under growth at suitable intervals, do soil working and ploughing, apply insecticides at appropriate time and take such steps as are necessary for the

survival and proper growth of tress as per advice of Industry's supervisory staff under proper technical guidance.

4.The Farmer agrees not to sale or deal with or part with, fell or permit any other person or agency to fell the plants or trees in the said land or sell the land on which the crop is standing at any time during the currency of the agreement and right of felling the trees, billeting, stacking of the wood and its removal from the farm. The farmer will be at liberty to sale the bark and lops ad tops less than 15 cm girth left behind in the farm after removal of the timber. The cost of such felling shall be borne by the farmer. However, in the event of any damage to the trees in the farm due to unavoidable natural causes beyond his control, the farmer shall inform the industry of such damage immediately but not later than 3 days of its occurrence.

The farmer shall arrange for the services of Amin for the purpose of joint survey, i.e. identification and demarcation of land wherever necessary for the representative of the industry and CDM Company. The said service charges and other related documentation charges shall be charged at the rate of Rs.150/- (Hundred Fifty) only per Farmer and the same will be paid by debiting to the Farmer's sale proceeds.

INSPECTION OF THE FARM BY THE INDUSTRY/ CDM COMPANY

5. The Farmer shall permit the industry or CDM Company or their representatives for free access to the said farm for assessment of growth by observation, measurement or any other means or for study or for giving advice to the farmers to augment the growth of trees or for collecting data for Carbon Project including sample plots if any, during the currency of the agreement

6. The Farmer shall pay all rents, taxes, cess and other outgoing in respect of the land on which the trees may be standing and growing or may for the time being cut and stacked there on.

SUPPLY OF PARTICULARS CALLED FOR BY INDUSTRY

7. The farmer shall give full particular to the industry or CDM Company/ its officers for inspection of the crop and of all records in reference there to and also allow the industry for its officers to value the trees standing and growing on the farm.

GUARANTEE FOR NON-DISPOSABLE

8. The Farmer hereby declares and guarantees that the crop of trees are and will remain the absolute and un-encumbered

OF PROPERTY

property of him but prior permission from Industry or CDM Company, farmer can't sell the same to any other agencies prior to expiry of the project period.

9. In the event of the failure of the agreement for supply of wood/crop to Industry, the Farmer will pay to the Industry for the technical guidance/ services provided @Rs.500/ per Ha of plantation

10. In the event of failure on the part of user Industry in the discharge of their obligations set out here under or in the event of insolvency, liquidation/winding up/ dissolution of the user industry and for whatsoever other reason, the user industry is not capable of discharging its obligation, the farmer shall be free to appoint any other agent/ agencies to sale the produce to any other third party at any time hereafter.

CARBON REVENUE RAISING

11. The Farmer hereby consents to CDM Company and Industry to arrange Carbon Revenue for the plantation raised by him/her.

ALIENATION OF CARBON RIGHT TO FACILITATE GENERATION OF CARBON REVENUE

12. The Farmer hereby authorizes the CDM Company and the Industry to facilitate Carbon Revenue for the Carbon Sequestered on his plantation by **alienating irrevocably his rights on Carbon** to CDM Company to prepare CDM Projects, approach various authorities of World Bank Bio-Carbon Fund, DNA, CDM Board, Validating agencies, research institutes, generate carbon credits, receive them on his behalf, commit sale on his behalf, receive proceeds on his behalf and transfer to him after deducting expenses incurred on this account by the CDM Company and Industry subject to that the Farmer will not be asked to bear any such cost in advance and Farmer shall receive not less than 80% of the revenue, irrespective of the expenses incurred by CDM Company and Industry on this account.

ARTICLE-III

CDM COMPANY'S OBLIGATIONS

PROJECTISATION & COORDINATION

1. The CDM Company agrees to projectise, coordinate with Bio-Carbon Fund of Carbon Business unit of World Bank, Designated National Authority (DNA), CDM Board and other relevant institutions to

materialize Carbon Credits for the plantations raised by farmers.

GOOD FAITH APPROACH TO APPLY

2. The CDM Company agrees to provide the relevant technical guidance, assistance and services relating to clean development project till they are harvested on the request of the farmer and also agrees to undertake the supervisory role in implanting the CDM Project scheme for Eucalyptus/ Casuarinas Plantation in the farmer's field. However, it is specifically understood and agreed to by the parties that the CDM Company will not be liable for any failure to generate Carbon Revenue to Farmer on account of any due diligence, validation and certification failure r for any other losses for any reasons whatsoever.

RECEIPT AND SHARING

3. The CDM Company shall receive the Carbon Credit proceeds from Bio-Carbon fund to an Escrow account opened for the purpose and shall transfer at least 80% of the amount to the Farmers account opened with bank(s) for the purpose and shall use the balance 20% to meet the expenses incurred for the CDM Project both by it and Industry as mutually decided between CDM Company and Industry including future liabilities if any with regard to this project. Any balance amounts if any with regard to this proposal after the above will be shared as mutually decided by the CDM Company and the Industry.

ARTICLE-IV

GENERAL

PERIOD OF AGREEMENT

1. This agreement is effective from the date specified in the preamble and is valid for a period of 14 years thereafter or till the trees in the farm are felled, billeted, wood removed and payment effected.

ARBITRATION	2.	In the event of any dispute or difference of opinion amongst the parties here to arising out of or in connection with this agreement or with regard to performance of any obligation hereunder by any party, the parties here to shall use their best efforts to settle their dispute or difference of opinion amicably by mutual negotiation. Should an agreement not be reached, any party hereunder may forthwith give to the other parties notice in writing of the existence of such dispute or difference of opinion and the same shall referred to arbitration of single arbitrator to be appointed by the Industry and the decision of such arbitrator shall be final and binding on all the parties hereto. The provisions of the Arbitrator Cancellation Act-1996 and the rules framed there under or any statutory modifications thereof for the time being in force shall be deemed to be applied to and be incorporated in this agreement.
GOVERNMENT LAWS & REGULATIONS	3.	This Agreement shall be governed by Indian Laws and Regulations. The Courts at Rayagada shall be exclusive Jurisdiction in all matters.
MATTERS TO BE HANDLED IN WRITING	4.	All matters consequential to the conclusion of this agreement or which form part of the obligations of any party to this agreement shall be in written

FARMER, JK & VEDA AGREEMENT

SCHEDULE

Whereas and Parcels of land or ground recorded in the name of _____ S/o. _____ situated at Plot No. _____ Khata No. _____ of Mouza _____ Tahsil _____ P.S. _____ Dist. _____and bounded on the.

DETAILS OF LAND

Mouza	**Khata No**	**Plot**	**Kissam**	**Area**

1) _____

(FARMER/ BORROWER)

2) _____

(FOR & ON BEHALF OF JK PAPER LIMITED)

Authorized signatory with full name address & designation

3) _____

(FOR & ON BEHALF OF VEDA CLIMATE CHANGE SOLUTIONS LIMITED)

Authorized signatory with full name address & designation

Annexure-6

Definitions related to A/R CDM

Definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under the Kyoto Protocol

A. Definitions

1. For land use, land-use change and forestry activities under Articles[1] 3.3 and 3.4, the following definitions shall apply:

(a) "Forest" is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest;

(b) "Afforestation" is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources;

(c) "Reforestation" is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989;

(d) "Deforestation" is the direct human-induced conversion of forested land to non-forested land;

(e) "Revegetation" is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here;

(f) "Forest management" is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner;

(g) "Cropland management" is the system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production;

(h) "Grazing land management" is the system of practices on land used for livestock production aimed at manipulating the amount and type of vegetation and livestock produced.

(Source: UNFCCC,undated. The Marrakesh Accord & the Marrakesh Declaration(draft). unfccc.int/cop7/documents/accords_draft.pdf)

Annexure-7

A/R CDM by Mangalam Timber Products Limited

Mangalam Timber Products Limited(MTPL), Nabarangpur (Odisha) which produces wood products such as medium density fibre board, has reportedly taken up plantation programme since 2001. It has attempted to earn carbon credits against these plantations under the project titled "Reforestation of degraded land by MTPL in India" in the Srikakulam, Vizianagaram and Visakapatnam districts of Andhra Pradesh; Koraput, Malkangiri, Nabarangpur, Kalahandi, Nuapada, and Bolangir districts of Odisha; and Durg, Bastar, Mahasamund, Raighar, Bilaspur, Raipur, and Kanker districts of Chhatisgarh. Although this project covers three states, about 83% of the project area(originally about 18000 hectare land in three states which was later reduced to about 15000 hectares as per the revised PDD, dtd. 14th June 2011) is in Odisha(Monitoring Report dated 12th January 2012, Sub-section A1/1).

The validation report dated 8th July 2011 and prepared by TÜV SÜD Industrie Service GmbH, Germany for this project says that the company decided in April 2001 to start an A/R CDM project, and the project started in June 2001. Year-wise plantation activity by the company has been provided as under (in hectares of plantation):

Districts	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Nabarangpur	198.93	460.68	480.20	899.75	971.09	811.73	1180.87
Koraput	322.52	461.70	712.42	1211.32	1624.32	1612.47	1551.82
Malkangiri	3.84	13.91	56.09	153.55	171.68	156.08	201.13

(Source: PDD dated 30th January 2009, Sub-section A.4.2)

Like others, this company(MTPL) also uses farmers' lands which it says were in a degraded condition. Ruling out any other better option or alternative for such lands (like, land development for better productivity) it says the following:

> The degraded condition of the land would not support agricultural practices. The farmers would not afford the costs for preparation of land for carrying cultivation. Thus this alternative is not feasible.(PDD, Section C-6)

The species selected for plantation is Eucalyptus hybrid. However, there is an interesting remark on this species made by the company as under:

> The species used were fast -growing Eucalyptus with a relatively high economic return and they are managed as short rotation commercial plantations. However, eucalyptus requires good site conditions and cannot adapt on degraded or poor sites. Also, to reduce cost , these commercial plantations have been in easily accessible

> lands with good nearby transportation infrastructure. Without these features plantations are not economically attractive.
>
> xxxxx
>
> Eucalyptus, fast growing species, is used in the proposed A/R CDM project activity to raise the overall economic return rate of the project. Otherwise, even with the carbon benefit, it will not be economically attractive.(PDD, Section C-6)

The validation report says that whereas no Environmental Impact Assessment is required for afforestation activities in India,, MTPL however carried out an Environmental Impact Assessment describing the main activities of the plantation activity and the potential impacts caused in the environment and at the socio-economic level; and that although there might be possible impacts on water and soil due to the plantation of *Eucalyptus spp*; the evidence provided indicates that no negative impacts are expected at the time of validation. It further states that nonetheless MTPL has a monitoring plan in place specifically for soil and water.

> The social impacts were also discussed and analysed in the brief EIA submitted to the audit team . In light of the socio-economic situation of the farmers at the time the project started, it is expected that the proposed project activity will provide additional labour opportunities and income from the sale of the pulpwood to the PP as well as revenues from the carbon sequestered in their trees.(Validation report, Section 3.10)

Certain statements made in the PDD were questioned by Mr. Keshav C Das, Regional Director, Business Operation, CTG Advisory Services India Pvt. Ltd, Clean Trade Group, New Delhi. The company clarified on some of those points and revised the PDD on the basis of the queries. One important revision was regarding the use of the term 'waste land'.

> The terminology 'waste land' was used in the same meaning as degraded land. However it has been removed and PDD corrected accordingly.(Validation Report, Section 4)

Regarding financial investments, the Validation Report says the following:

> It is true that investment for reforestation is done by the farmers through bank loan. MTPL is not investing directly on plantation activity. But MTPL's role is like a facilitator in the project activity. Unless MTPL is involved the farmers would not be able to get loan and the project would not have come up at all. MTPL is committed to provide all supports like providing quality seedlings including its transportation, arranging bank loan, training & technical guidance, arranging manures & fertilizers, transport for harvested crop and over and above the entire monitoring activity is done by MTPL that requires infrastructure and huge investment on the part of MTPL. As a matter of fact there are two investments, one by farmers directly on plantation and the other by MTPL for supporting plantation, combined together establish the project activity with MTPL as facilitator. Therefore neither of the investments can be excluded from investment analysis. In absence of investment by either of MTPL or the farmers the project activity would not have happened at all.(Validation Report, p.74)

Regarding the farmers' involvement in claiming the carbon credit, the PDD says the following:

> In this proposed project farmers have agreed into a Tripartite Agreement with MTPL and Bank. According to this agreement MTPL have agreed to supply good quality seedlings and fertilizers on competitive rate to farmers. The industry also agrees to provide technical, assistance and services relating to planting and maintenance of such plantation till they are harves ted. The plantation done under this Agreement is eligible for claiming Carbon Credit under the prevailing Laws, Rules & Regulations. Since it may not be possible for the farmer to claim of such Carbon Credit, the farmer hereby authorizes the company viz., Mangalam Timber Products Limited (hereby referred to as industry) to take necessary steps for getting the Carbon Credit due on such plantation. All other matters relating to claim of such Carbon Credit may be mutually decided by the farmer and the Industry.(Sub-section G.1)

Further, the revised PDD says:

> Since land for reforestation under the project activity is owned by poor down trodden farmers & tribal, its not possible for them to claim carbon credit on such reforestation. As such they individually authorize MTPL to claim carbon credit on their behalf and the company agrees to share a part of carbon revenue with them.(Sub-section A.2).

The revised PDD says also that in India there is no specific regulation on rights to carbon credits, and describes how the company proposes to share the credit benefits with the farmers in absence of such a regulation, as under:

1. Entire cost incurred on development, documentation, mapping, measurement, validation, verification and registration of CDM project will be borne by the company. The farmers will not be required to pay on this account. However any incidental expenses which may require additionally in future during the crediting period may be charged to the farmers with prior notice to them.
2. The farmers will get proportionate share in the CER revenue earned by the company on prorate basis in lieu of their plantation included in CDM project boundary. The company agrees to pay 12% of the CER revenue earned per acre to the farmers at present or as mutually agreed upon from time to time in future.
3. The sum due to the farmers under CDM will be paid normally through bank within three months of realization of CER revenue by the company for which they will be required to furnish a SB account in their name when asked for by the company. However mode of payment may change on the basis of mutual agreement.
4. The farmers will not be entitled for CER revenue in the event of failure of their plantation and /or opting out from the scheme and / or other plantation (s) which is not included in the project boundary.
5. The farmers will not claim for carbon credit for the plantations included in the subject project boundary through any other agency (ies) or organization (s). (Sub-section A.6)

One can draw the following inferences from the above-quoted statements:

1. MTPL claims to have thought of a CDM-oriented plantation activity even in 2001.

2. During 2001-02 and 2007-08, the maximum plantation was done in Koraput district and the minimum in Malkangiri district.
3. On one hand the company says that it promotes plantations in degraded land, on the other hand it says Eucalyptus can't grow on degraded lands or poor sites. This in fact coincides with the fact that many of the Eucalyptus plantations have been done in lands which are not so degraded actually though the concerned companies claim the same to be degraded.
4. The company itself indicates that the major objective behind growing Eucalyptus is better economic returns. This implies that sustainable development is not the actual objective, rather for the purposes of obtaining carbon finance sustainable development and social benefits are given importance.
5. The Validation Report says, "no negative impacts are expected at the time of validation". This seems to be a carefully drafted statement to hide some reality or risks, because the project impact is not limited to the 'time of validation'. That the report is silent about the long term impact is dubious.
6. While it is clear that the company has obtained authorization from the farmers to itself claim the carbon credit, the benefit sharing(for such credits) mechanism between the farmer and the company seems to be differently formulated than that mentioned in the tripartite agreement between JK Paper, VCCSL, and the farmer.
7. The company ensures minimum risk for itself by involving banks which finance the plantation activity for the farmers. The actual beneficiary is the company itself, but arrangement is such that the farmers are treated as the real beneficiaries and are linked with Bank loans, thereby increasing their liability.

Overally it seems that like in other similar cases MTPL manages to have a CDM proposal that is validated to have conformed to almost all the requirements. From the company to the validator, from the CDM Authority to the UNFCCC, all try to play a clean role in the matter although the actual dynamics doesn't seem to be that simple and clean.

More information on this is available at http://cdm.unfccc.int/Projects/DB/TUEV-SUED1310638384.3/view .

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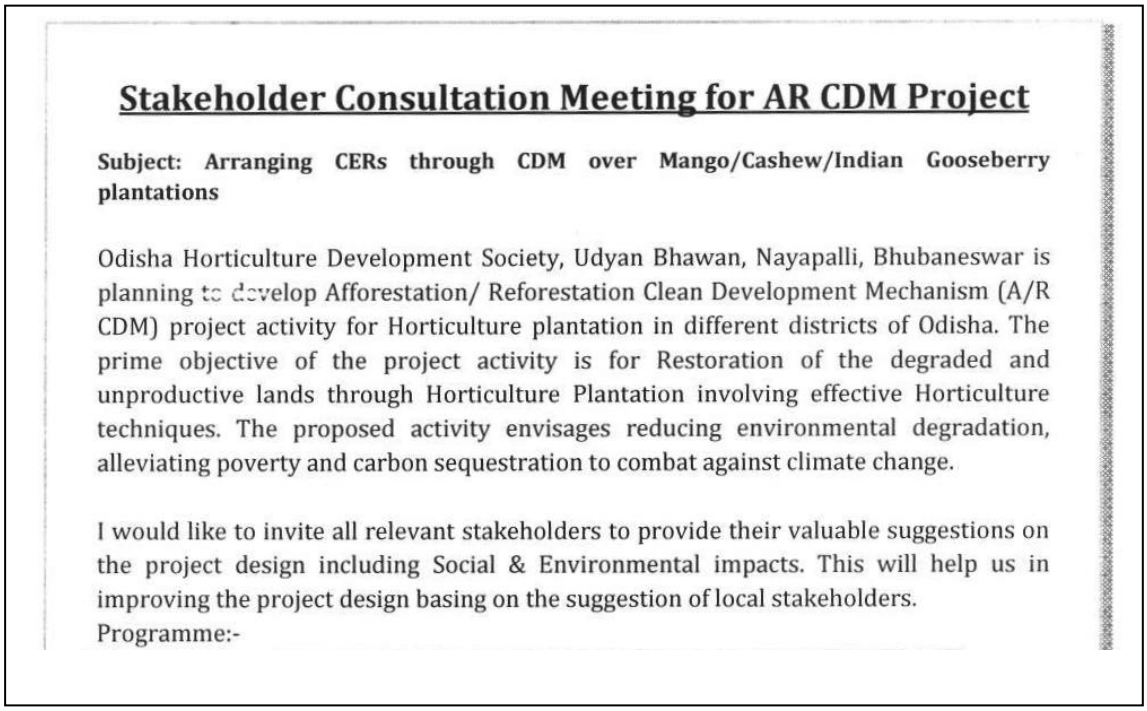
Annexure-8

Horticulture-based A/R CDM initiative by the Odisha government

The Directorate of Horticulture, Government of Odisha published on its website a public notice for stakeholders consultation on horticulture-based A/R CDM. A part of the web-notice has been reproduced here as under, but the version published in the newspaper specified the stakeholders to be farmers. The consultation was to be done at three places in the state: Khurdha, Berhampur, and Sambalpur which seems inadequate and unevenly distributed.



Stakeholder Consultation Meeting for AR CDM Project

Subject: Arranging CERs through CDM over Mango/Cashew/Indian Gooseberry plantations

Odisha Horticulture Development Society, Udyan Bhawan, Nayapalli, Bhubaneswar is planning to develop Afforestation/ Reforestation Clean Development Mechanism (A/R CDM) project activity for Horticulture plantation in different districts of Odisha. The prime objective of the project activity is for Restoration of the degraded and unproductive lands through Horticulture Plantation involving effective Horticulture techniques. The proposed activity envisages reducing environmental degradation, alleviating poverty and carbon sequestration to combat against climate change.

I would like to invite all relevant stakeholders to provide their valuable suggestions on the project design including Social & Environmental impacts. This will help us in improving the project design basing on the suggestion of local stakeholders.
Programme:-

(Source: http://www.orihort.in/Download/stakeholder.pdf accessed on 8-8-2012)

While it seems that something regarding this initiative has been kept in dark by the government, what is still appreciable is that it encourages for non-eucalyptus based A/R CDM in 'degraded lands' though only three horticultural species have been identified and one of them, cashew, has its own controversy.

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Annexure-9

CDM proposal by Patneswari Agri-Cooperative Limited

We reproduce below, as per a format designed by us, some salient features and information as quoted from the Project Design Document(PDD) of PACL, dtd. 13-2-2012:

1. Name of the project: Agro-forestry Interventions in Koraput district of Orissa
2. The total area of the project: 380.8 hectares (941.1 acres)
3. Scale/type: Small (conversion of non-forest waste lands to forest land through agro forestry
   Interventions).
4. Overall project objective: "The overall objective of the A/R CDM activity is to mitigate climate change while contributing to sustainable environmental management, community development and poverty alleviation of tribal farmers in five blocks of Koraput district in the state of Odisha".

5. Specific objectives:
   - *Encourage agro-forestry carbon models for poor communities*
   - *To establish and manage the forest plantation*
   - *To promote environmental conservation*
   - *To facilitate socio-economic development*

6. Sharing of carbon revenue:
   "The farmers have ownership of the products harvested on the land and therefore all carbon pools in the land are owned by the farmers. Thus, the farmers have legal rights over the tCERs issued to the project. However, since the farmers individually lack capacity to solely undertake CDM related administrative processes, they have signed a MoU with PACL to undertake the CDM activities and take ownership of the CERs on behalf of the farmers. The farmers have also authorized PACL to be the project participant in the proposed A/R CDM activity. PACL, after using a portion of the revenues to support their administrative and other CDM expenses incurred for undertaking the project, will distribute the CERs amongst the farmers".(PDD, A.6)

7. Dubious statements/claims:
   - "The agro-forestry project is being undertaken by poor farmers through a co-operative society. PACL is the project participant for the proposed CDM project. In absence of the project activity, the current land use would have been continued, i.e. the land would have remained barren".(B.7)

   - "There are no negative impacts identified as significant in the proposed A/R CDM project activity".(D.2)

More information is available at http://paclkoraput.org/index.html
and
http://cdm.unfccc.int/Projects/Validation/DB/OV736B5Z6FTBARE2RCOQOPTCHP3KRE/view.html .