

## **ECO-FRIENDLY PRACTICES/REMEDIAL MEASURES FOR ENVIRONMENTAL SUSTAINABILITY**

**4<sup>th</sup> International R&D Conference on  
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## **ECO-FRIENDLY PRACTICES/REMEDIAL MEASURES FOR ENVIRONMENTAL SUSTAINABILITY**

**M.Sudhakaran Pillai**

### **ABSTRACT**

Forests are regarded as a “renewable resource,” but the extent to which forest composition and growth can be maintained is a function of the abilities of individual forest sites to provide nutrients to forest species. The concept of sustainability in forestry practices generally includes the desire to restrict offsite, downstream detrimental effects to some level acceptable to society while maintaining long-term productivity of forest products

In Sanskrit the coconut palm is called “kalpa vriksha”, which is defined as “the tree which provides all the necessities of life.” Coir is a versatile hard fibre obtained from the husks of coconut. The Coir fibre is one of the hardest natural fibres because of its high content of lignin, Coir is much more advantageous in different application for erosion control, reinforcement and stabilization of soil and is preferred to any other natural fibres Coir is a sufficiently Eco-friendly product and so its application will never sustain any damages to environment and so is far free from resentments. The paper deals with the usage of coir for eco friendly practices

### **INTRODUCTION**

There is a clearly emerging consensus that the world’s coastlines and watersheds are of fundamental importance to human well-being, that these systems are increasingly threatened by economic change and environmental degradation, and that consequentially, urgent attention is needed. To provide this effectively, it is important to accurately assess the current state, and to predict the consequences of policies for improvement. Addressing these needs requires quantitative approaches, through which the sustainability of relevant systems can be measured.

### **FORESTRY**

In India itself, forest cover is coming down by thousands of acres a year. The climatic and environmental impact of this is already being felt. Mean temperatures have risen many times. The ozone layer is fast depleting. Incidence of drought, cyclones, hurricanes and such vagaries of weather are also increasing. The world over environmental consciousness plays major role in all business, Political and social decisions.

Timber harvesting practices inevitably cause some measure of downstream effects. These effects can be categorized in terms of alterations of: hydrologic characteristics, water yield and storm flows, water quality characteristics, dissolved load and suspended sediment, sediment budgets.

Among the above factors, sedimentation induced directly or indirectly from timber harvesting is perhaps the most pressing concern in terms of potential ecological sustainability. Changes in sediment budgets can result in onsite degradation from soil erosion or accelerated channel erosion, or excessive sedimentation.

Relating the consumption of wood based boards to the depletion of forest cover can be done as follows:

- A team of carpenters would roughly use about 50 sheets a day.
- If 1 sheet = 0.518 cu.m this is equal to 2.59 cu.m of wood a day.
- Average recovery of timber from a tree of height 15 m and width 0.5m=2.25 cu.m of planks and sheets
- Therefore No. of trees used up every day by the carpentry team =  $2.59/2.25=1.14$
- In a year of roughly 300 working days this is equal to an annual consumption of 342 trees per carpenter team
- If you consider 500 carpenters teams across India, this would relate to an annual consumption of 171000 trees.
- Corresponding to the above one unit of coir based boards with a capacity of 40 cu.m per day will be able to save approximately 5000 trees a year.
- This means that 50 such units spread across the country would virtually save every tree that is cut for timber.

## SOIL EROSION

Degradation affects 25% of India's agricultural land. Erosion associated with shifting cultivation has denuded approximately 2.7 Mha of land east of Bihar. At least 2 Mha of saline land have been abandoned. The change from forest to city is a massive one, for all to see, but invisibly, the water cycle is changed too, resulting in local climate change and loss of water.

When forests are converted to crop fields, run-off and seepage) increase, whereas evaporation decreases. At the same time, fertility is disappearing by a substantially increased dissolved matter (nutrients) flow. Another effect of deforestation with subsequent farming, cropping and urbanisation is that of disrupting the recycling of water. In the pre-human situation, coastal rains would be soaked up by the forest, only to be re-evaporated, forming new clouds. These then rained down further inland, and so on. The rainwater was recycled many times before flowing back to sea.

But today, the situation has changed. Rains now immediately drain back to sea, and the little amount of re-evaporated water forms clouds which are more reluctant to release their rains because the rising air has lifted them higher. As a result, less water falls inland and droughts become permanent. Further inland, deserts spread. This hardly visible deterioration of the water cycle is most noticeable above large continents.

## COCONUT TREE

*Cocos nucifera* is the scientific name of the common coconut. This very tall palm tree is always an inviting symbol of the tropics. The plant is one of the most valuable plants to man. It is a primary source of food, drink, and shelter.

Man can use every part of the coconut. The white nut-meat can be eaten raw or shredded and dried and used in most cooking recipes. A single coconut has as much protein as a quarter pound of beefsteak. Copra, the dried meat of the kernels, when crushed is the source of coconut oil. The husk, known as coir, is short, coarse, elastic fibers. This very diverse plant is also an excellent charcoal, which is produced from the shells, not only does it work as a cooking fuel, but also in the production of gas masks and air filters.

### ALL INDIA FINAL ESTIMATE OF COCONUT - 2000-2001

STATE / UNION TERRITORIES	A R E A (Thousand Ha.)		P R O D U C T I O N (Million Nuts)		P R O D U C T I V I T Y (Nuts / ha)	
	1999-2000 (Revised)	2000-2001	1999-2000 (Revised)	2000-2001	1999-2000 (Revised)	2000-2001
Andhra Pradesh	101.7	102.5	1051.8	1092.7	10342	10660
Assam	20.2	20.9	150.0	135.9	7426	6502
Goa	25.0	25.0	121.6	125.1	4864	5004
Karnataka	321.2	333.8	1671.8	1754.2	5205	5255
Kerala	899.1	936.3	5167.0	5496.0	5747	5870
Maharashtra	15.8	16.8	218.2	244.4	13810	14548
Orissa	17.8	17.7	50.5	109.9	2837	6209
Tamil Nadu	304.0	323.5	3222.0	3158.4	10599	9763
Tripura	9.1	9.1	7.5	7.0	824	769
West Bengal	24.2	24.5	324.3	330.5	13401	13490
A & N Islands	25.0	24.7	88.2	87.2	3528	3530
Lakshadweep	2.8	2.8	28.3	28.0	10107	10000
Pondicherry	2.2	2.2	27.8	28.0	12636	12727
ALL INDIA	1768.1	1839.8	12129.0	12597.3	6860	6847

Source: Directorate of Economics & Statistics, Ministry of Agriculture, Government of India.

Every plant needs for growth is:

- **Sunlight:** to obtain the energy for photosynthesis.
- **Carbon dioxide:** necessary input for photosynthesis. The atmosphere cycles this effectively.
- **Oxygen:** when plants rest at night, they need oxygen, while producing carbon dioxide. In slow-growth areas such as the Boreal forests, respiration during the long winters is almost equal to photosynthesis during the short summers.
- **Warmth:** to be able to perform the biochemical processes of life. Plants have adapted to a wide range of temperature, but the warmth of the tropics promotes highest productivity.
- **Water:** the biochemical process of photosynthesis requires much water. Water or the lack of it, causes problems in most geographic areas.
- **Macronutrients:** the main nutrients N,P,K,S,Ca,Mg and micronutrients

The Carbon dioxide is rather scarce in our atmosphere, where it is found as one molecule in every 30,000. All plants on the planet compete for this resource, since all places on earth connect to the same atmospheric pool of carbon dioxide. The most successful plants, living in warm tropical areas scavenge it more successfully than plants living in cool areas with less light trace elements.

## COIR

Coir fibre is obtained from the fibrous husk covering the inner shell of the coconut fruit and is the raw material for the coir Industry. The coir fibre is one of the hardest natural fibres available. Because of its high content of lignin; coir is much more advantageous in different Application for erosion control, reinforcement and stabilization of soil and is preferred to any other natural fibers. The fibers are hygroscopic, with a moisture content of 10% to 12% at 65% humidity and 22% to 55% at 95% relative humidity.

Chemical Composition Of Coir		Physical Properties Of Coir	
Lignin	45.84%	Length in inches	6-8
Cellulose	43.44%	Density (g/cc)	1.40
Hemi-Cellulose	00.25%	Tenacity (g/Tex)	10.0
Pectin's and related Compound	03.00%	Breaking elongation%	30%
Water soluble	05.25%	Diameter in mm	0.1 to 1.5
Ash	02.22%	Rigidity of Modulus	1.8924 dyne/cm <sup>2</sup>

## COIR GEO-TEXTILE

In India, it is estimated that 27% of land area is subject to soil erosion leading to a loss of about 6000 million M.Ts. of topsoil annually. The consequences of such large scale soil erosion are causing serious concern to the very question of sustainable development. Geo-textiles as a media for soil reinforcement has been known from early civilizations. Products made out of coir, like meshes and nettings, needled felts and pads, erosion control blankets and mulch blankets, geo rolls vegetation fascines, geo cushions and geo beds, braided ropes, anti weed blankets etc. can be effectively used enabling speedy growth of vegetation. It is being used in slope stabilisation, erosion control treatment, sub-base layer in road pavement, in drain works and similar soil bio engineering applications. The coir geo-textiles can be customised to specific requirements according to the topographical conditions. Being biodegradable and eco friendly it is an excellent substitute for geo-synthetics. The advantage of coir geo textiles are

- The high tensile strength of coir which protects steep surface from heavy flows and debris movement.
- Five to ten years longevity that allows for full plant and soil establishment, Natural invasion and land
- Coir functions as a soil amendment because it is 100% natural and biodegradable
- Water absorbent coir acts as a mulch on the surface and as a wick in the soil mantle
- It provides an excellent micro climate for plant establishment, natural invasion and balanced healthy growth
- Coir re-vegetation meshes encourage the restoration of terrestrial and aquatic riparian habitat
- Coir geo-textile as whole are environmentally responsible and aesthetically Pleasing
- Can be customised to specific requirements according to the topographical conditions

The economic feasibility factor of geo-textiles is related to the cost of material, installation cost as well as its impact on eco system and aesthetics. Taking those factors into consideration the coir geo-textiles has established as a very competitive and suitable substitute for synthetic geo-textile.

## COIR PITH

Coir pith a waste product obtained during the extraction of coir fibre from husk is very light, highly compressible and highly hygroscopic. It is used as a soil conditioner, surface mulch/rooting medium and desiccant. Composted coir pith is excellent organic manure for indoor plants as well as for horticulture crops. Several firms are manufacturing composted coir pith in the country. Compressed coir pith in the form of briquettes for easy transportation is also manufactured in the country.

## COIR PLY BOARDS

Wood and wood based product are inherent part of Man's existence. To overcome the depletion in the forest resource it is necessary to find a substitute for wood/wood products. Coir Board at its Research Institute developed a substitute for wood products Wood can never be replaced in its entirety. Considering the depletion to tropical forest and wood, using renewable material like Coir will keep up the ecological balance. Usually substitute like plywood are manufactured with imported logs. These logs are over 90 years old from tropical forest. Whereas, in coconut renew ability is only 45-60days. This will help the cultivation of the coconut trees to be improved and would create a direct impact on economy of the rural sector. This would help the rural sector to generate wealth from the waste. These industries will increase the direct employment to the rural sectors.

## REMEDIAL MEASURES

Plantation of coconut trees in the non traditional areas will enhance the utility of coconuts to the nations by the way of economy to the rural sectors by utilising coconut fruit for oil conversion, shell for carbonisation, husk for coir –coir products, geo-textiles, coir ply-boards, etc and saving the environment. The plants, living in warm tropical areas scavenge it more successfully than plants living in cool areas with less light. More number of coconut trees will save the environment by the way of photosynthesis, converting carbon dioxide to oxygen. The coconut tree plantations will be the long term sustainability for the nature and saving the environment, increasing the economy of the rural sectors and more employment.

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