PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-Size Project
THE GEF TRUST FUND

Submission Date: 18 September 2009

PART I: PROJECT IDENTIFICATION

GEFSEC PROJECT ID:
PROJECT DURATION: **84** months
GEF AGENCY PROJECT ID: XX/SRL/09/XXX
COUNTRY: Sri Lanka
PROJECT TITLE: Bamboo Processing for Sri Lanka
GEF AGENCY: UNIDO
OTHER EXECUTING PARTNER: Sri Lanka Cleaner Production Centre
GEF FOCAL AREA: Climate Change /Technology Transfer
GEF-4 STRATEGIC PROGRAM: CC-SP4- Biomass
NAME OF PARENT PROGRAM/UMBRELLA PROJECT: TT-Pilot (GEF-4)

INDICATIVE CALENDAR	
Milestones	**Expected Dates**
Work Program	November 2009
CEO Endorsement/Approval	September 2011
Agency Approval	October 2011
Implementation Start	November 2011
Mid-term Review	March 2015
Implementation Completion	November 2018

A. PROJECT FRAMEWORK

Project Objective: To develop a bamboo supply chain and product industry in Sri Lanka, leading to reduced global environmental impact from GHG emissions and a sustainable industry base.

Project Components	Type*	Expected Outcomes	Expected Outputs	Indicative GEF Financing		Indicative Co-financing		Total (US$)
				(US$)	%	(US$)	%	
1. Policy framework	STA	Assessment of existing framework and shortcomings. Recommendations for a supportive framework	1. National forestry policy adjustments 2 Land use policy adjustments 3 Supportive policies and regulations on a local and regional level	90,000	38	150,000	63	240,000
2. Bamboo tissue reproduction	INV/ TA	Bamboo reproduction technology transfer National capacity to provide bamboo planting material on a large scale	Acquisition and installation of laboratory equipment Functional laboratory and availability of high quality planting material	250,000	26	700,000	74	950,000
3. Plantation establishment	INV /TA	Potential feedstock for bamboo industry National know-how for bamboo plantation establishment	Sustainable bamboo plantations **Indicator:** 10 000 ha planted	435,000	9	4,500,000	91	4,935,000
4. Plantation operation	INV/ TA	National know-how how to maintain bamboo plantations	Functional plantation. **Indicators:** 150 kt/yr bamboo culm 20 kt/yr bamboo shoots by-product	175,000	18	800,000	82	975,000
5. Bamboo processing	INV/ TA	Bamboo processing technology transfer	Bamboo processing machinery bought and	900,000	31	2,000,000	69	2,900,000

equipment		to Sri Lanka	installed Establishment of bamboo flooring production capacity **Indicator:** 360 thousand m^2 bamboo flooring (parquet) per year					
6. Pelletising	INV/ TA	Biomass pelletising technology transfer	Pelletsing machinery bought and installed Establishment of 25 kt/yr pelletising capacity	255,000	10	2,200,000	90	2,455,000
7. Local project management and support				250,000	42	350,000	58	600,000
Total project costs				**2,355,000**	**18**	**10,700,000**	**82**	**13,055,000**

* INV = Investment; TA = Technical Assistance; STA = Scientific & Technical Analysis

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and BY NAME (in parenthesis) if available, **($)**

Sources of Co-financing	Type of Co-financing	Amount
Project Government Contribution	In-kind	2,000,000
GEF Agency (UNIDO)	Cash	100,000
Bilateral Aid Agencies	--	0
Multilateral Agencies	--	0
Private Sector	Cash & in-kind	8,600,000
NGOs	--	0
Others	--	0
Total co-financing		10,700,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT ($)

	Previous Project Preparation Amount*	Project	Total	Agency Fee
GEF financing		2,355,000	2,355,000	235,000
Co-financing		10,700,000	10,700,000	
Total		13,055,000		235,000

* Amounts being requested for the PPG and the PPG-related agency fee are to be found in the PPG Request.

PART II: PROJECT JUSTIFICATION

A. THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

The Issue: Any degradation of the forest resource in Sri Lanka is dynamically related to the increasing demand for timber and fuel wood. Central to the sustainability of the forests of Sri Lanka in the future is the rate of population pressure and economic growth. Not only will a growing population demand more fuel, they will also place a higher demand for housing construction materials with wood. The demand for logs and poles is estimated to increase to 2.7 million m^3 in 2020, and the requirement for biomass energy will increase to 9.7 million tons. As a reflection of these growing pressures, the forest cover in Sri Lanka is rapidly decreasing.

At the same time, a sizeable part of the agricultural lands in different parts of the country have become marginal or uneconomic. There are now 1.2 million hectares of land that are unproductive or put to limited use. At least 30% of the tea land can also be considered as marginal or uneconomic. The Forestry Master Plan has identified 1.6 million hectares of

scrub land which urgently need some kind of cover to prevent further degradation. This can be done by introducing energy plantations on these lands.

Globally the urgency of GHG reduction is increasing. A limit of 2 degrees temperature change implies deep emission cuts in all sectors, including industry. Biomass feedstock is one of the few options that can reduce GHG emissions in industry substantially, and energy plantations can be the source of this feedstock.

Sri Lanka has an established wood industry, but this industry is facing a shortage of feedstock. Moreover, most of its products today generate only limited value added. The wood working clusters will be used as a basis to build a bamboo processing industry.

The proposed response: The growing of bamboo on the degraded lands in Sri Lanka is an ideal solution. The bamboo can both halt land degradation and can be a sustainable energy source. However, halting land degradation and generating energy are not sustainable targets by themselves. It is imperative to tackle the root of the problem. An industry must be created whose continued profitability depends on a sustainable feedstock resource. Such an industry then has a self-interest to ensure sustainability and widen its feedstock base by expanding the planted area as it grows. Experience in China and India has shown that a bamboo industry can be such a sustainable industry. The fact that the economic activity is profitable and requires substantial capital investments will ensure continued operation beyond the time horizon of this project. The availability of degraded land is sufficient to allow a hundred-fold replication.

Bamboo is already a key product of forestry and agriculture on a world scale. 17 million hectares of bamboo are grown worldwide (about 1-3% of all tropical and subtropical forest area). This yields about 300-400 Mt of bamboo per year, equal to 400-600 Mt CO_{2eq}. The yield ranges from 5 to 40 dry tonnes per hectare. The yield of bamboo is significantly higher than for most wood plantations because it is a grass type plant with a C-4 metabolism. Bamboo can grow in hilly terrain, on degraded lands (and therefore does not compete with food production), and its harvesting in difficult terrain is easier than for trees. Bamboo can also have an important use in the rehabilitation of watersheds as soil stabilizers. Through the planting of useful bamboos and regular harvesting of mature culms, all these functions can be linked to productive industrial activities (however, management and protection schemes do need to be in place for the populations to follow).

About 1200 species of bamboo can be discerned, which means that bamboo can be used in a wide range of applications. Globally, about 40% is used for fuel wood and charcoal, but significant amounts are also used for construction, flooring, fodder and food. For industry, bamboo is a good feedstock for engineered wood products because of its mechanical and physical properties. This requires advanced processing equipment, to split the stem and subsequently bond into engineered wood panels. Such panels can serve as material for the production of flooring, furniture and construction. The fact that bamboo has a high growth rate increases its utility as an industrial feedstock.

With respect to Sri Lanka specifically, bamboos occur naturally in all three of its major climatic zones. Among the ten endemic species, seven are found in the high altitudinal montane area of the central hill country, two are strictly confined to the dry zone, and one occurs in the wet zone moist lands, cleared rain forests and forest gaps. Ochlandra Stridula represents 80% of the existing bamboo forest in Sri Lanka. Bamboo resources could meet the subsistence needs and provide a source of cash income among the country's rural population. Yet today only 2500 ha of bamboo plantation exist in Sri Lanka, and the bamboo is mainly used locally as fuel and in low quality construction. Sri Lanka has an established wood plantation and wood processing industry, which could benefit from increased feedstock supply. The goal, therefore, of this project is to develop for this industry sector an economically viable agro-forestry-industrial complex based on bamboo, which also results in a reduction of GHG emissions (the fact that a wood processing industry already exists reduces the risk from this project). Moving the industry to processed and engineered wood products will increase the quality and value of bamboo production in Sri Lanka, which in turn will increase the value added and the profitability of this industrial sector, both important for the long term viability of such agro-forestry-industrial complexes. Residues from bamboo processing can be used for energy purposes. Bamboo sprouts, another by-product, constitute an important food crop. Today, no significant market exists for such sprouts, but an ongoing project by the International Network of Bamboo

and Rattan (INBAR) in Sri Lanka is aiming to develop such an industry and the markets. The target is to develop 10,000 hectare new bamboo plantations in a specific region that can serve an industry cluster. It should be stressed that these plantations will be strictly on degraded land.

In sum, this industry would have three products:

- Engineered bamboo materials for structural applications
- Bamboo pellets for local energy use and for export markets
- Bamboo sprouts for food

As a plantation takes 7 years to mature, this is a project with a long life span. After 4-5 years cropping starts and the first products will become available, sufficient to cover operation and maintenance cost and generating revenues. Part of this funding will be re-invested in order to sustain the project. This is part of the co-financing.

As already mentioned, today Sri Lanka has no bamboo processing industry. Countries such as China and India have established such industries, with the help of UNIDO. This project involves the transfer of bamboo processing technology from India and possibly also China to Sri Lanka (depending on the choice of bamboo species). This is therefore a South-South type of technology transfer.

Development of a bamboo industry in Sri Lanka will particularly require technology transfer from these countries for key steps in the bamboo processing chain. This includes investment in equipment, capacity building in operating and maintaining this equipment, and development of a network of local service providers. One could envision the development of a local equipment supply chain once this project has proven the viability of the economic model, but such development is not part of this proposal. For the successful development of this industry sub-sector it is also necessary to ensure the availability of high quality planting material. Tissue reproduction is the most effective and efficient method to generate planting material, as bamboo blooming only occurs sporadically. Therefore, a centre of excellence (laboratory) will be established for bamboo reproduction.

Thus, the following three main technology transfer components are targeted:

- Transfer of bamboo tissue reproduction technology from India;
- Transfer of bamboo processing technology from India and possibly China to Sri Lanka;
- Transfer of bamboo pelletising technology, which can also be used for other residues, e.g. from rubber wood plantations;

The work will have a capacity building, demonstration and financing component. All three components are needed to complete the project successfully. It will also be necessary to develop a policy framework that is supportive of dedicated or mixed bamboo plantations and develop a market for the products of this industry.

UNIDO has well established relations on the Bamboo technology provider side (in China, India and Mexico) and on the technology receiver side (in Sri Lanka, the UNIDO National Cleaner Production Centre and the woodworking industry). UNIDO has established a bamboo reproduction center in Mexico. Also, two bamboo development centers have been established, one in North-East India and one in China. These centers provide technology assistance to the regional industries. They help in bamboo product development and serve as cluster center.

UNIDO has also good working relations with equipment supply industries and bamboo processing companies in China and India. The option to involve them will be further investigated in the project development phase. This may be done though exchange of expertise and training, or through investments in Sri Lanka. In order to allow for competition and better prices, several potential partners will be approached. A study tour is planned as part of the project preparation that serves the purpose of establishing relations and exploring interest.

One dimension that must be considered in the partner selection is the bamboo feedstock quality. Many different bamboo qualities exist that require different processing equipment. For example Indian Bamboo is considerably harder than

Chinese bamboo, which required development if new processing machinery. The best international match for the Sri Lanka will be further analyzed as part of the project preparation stage.

A description of centers and key industries is provided in Annex A.

Global Environmental Benefits: The development of a bamboo industry will also generate CO_2 benefits. Six types of GHG benefits can occur:

- Bamboo substitutes other (non-wood) materials, therefore the CO_2 emissions in the production of these other materials are avoided;
- In case bamboo replaces tropical timber products, the CO_2 emissions from deforestation are substantially reduced;
- As bamboo can be harvested without clear cutting it raises the soil carbon content more than other crops;
- Bamboo processing results in 30-50% biomass waste by-products that can be used for energy production. Because of the high yield of bamboo, there is a net gain in sustainable bioenergy production compared to conventional forest plantations such as rubber;
- If bamboo pellets are used for co-combustion in coal fired power plants or in coal fired industrial boilers, emissions are reduced. A global market is emerging for these pellets, about 10 Mt per year in 2008. Europe is the largest consumer. The pellets are used for residential heating and for co-combustion in coal fired power plants. Currently much of Europe's demand is being met by the shipping of significant volumes of pellets from Western Canada. However, new supply is needed as the US is emerging as a major new market because of tightened GHG policies.
- If bamboo pellets are used for household cooking and heating instead of firewood, the improved combustion conditions result in a reduction of black carbon and methane emissions.

As already mentioned, a by-product of such plantations is bamboo shoots, typically 2 tons/ha.yr, which are edible. This crop eases the pressure on land use for food production and helps therefore to reduce deforestation, a secondary benefit. The shoots also have a local benefit, since they contribute to the revenue stream.

Bamboo can be planted in mixed cultures with rubber wood or teak. This helps further to reduce the risk of crop failure and results in a more constant flow of revenues. However, the management of such mixed crops requires a more sophisticated processing system. The optimal choice will need to be assessed in more detail in the project preparation stage.

B. THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS:

Sri Lanka does not have a technology needs assessment document. The report "Initial report under the UNFCCC" (2000) and Project Terminal Report Climate Change Enabling Activity (Phase II) Project (2003) on technology transfer, submitted by the Sri Lanka government to UNFCCC, both stress the impact of climate change on forestry, notably rubber plantations, and the need to develop alternative forest types and reverse deforestation trends.

The latest National Forestry Plan dates back to 1995. It stresses the need for better forest management and the development of new forest types for degraded land. The Forest Department, a subsidiary body of the Ministry of Environment and Natural Resources, is responsible for the management of forest areas under its jurisdiction including the production and protection of forests, as well as forest policy development and implementation. The Forestry Master Plan has identified 1.6 million hectares of scrub land which urgently need some kind of cover to prevent further degradation. The Plan states that this can be done by introducing energy plantations on these lands.

The National Energy Policy and Strategy of Sri Lanka (2006) targets the promotion of indigenous energy sources: "Biomass-based energy projects will be developed in areas where land resources are available, enabling new industrial activities in such areas, emphasizing on creating rural income generating avenues....Initiatives of other sectors and institutions to enhance biomass supplies and other waste to energy will be encouraged and supported where appropriate".

C. THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS:

The project is fully consistent with GEF's strategic programme on technology transfer. The project aims to bring about the transfer and diffusion of new technologies related to the processing of bamboo, which will lay the ground for a new industrial sub-sector in Sri Lanka and promote bamboo plantations as sources of feedstock for this sector. The GHG emission reductions linked to this are fully consistent with the goals of the Climate Change Focal Area.

Some of the products (pellets) will promote biomass as a source of renewable energy. This is fully consistent with Strategic Program 4 (SP-4) "Biomass as a source for Renewable Energy".

D. THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

The activities outlined above are best catalyzed by the use of a grant from GEF. On the one hand, it is the best tool to assist the government in creating the necessary policy framework that will stimulate the creation of a national market. It is also the best mechanism for demonstrating the feasibility of a new industry concept. GEF help is needed for the capacity building and the development of a supporting environment, and ensure sufficient equity.

E. COORDINATION WITH OTHER RELATED INITIATIVES:

This activity will build on the INBAR project titled "Transfer of Technology in bamboo shoot production, processing and marketing from China to Bangladesh and Sri Lanka". This project aims at growing bamboo for shoots, while the proposed new project will broaden the product range to engineered wood products and pellets. The project will also build on the GEF project for support of the government forestry planning. The proposed new project will help to put the forestry planning goals into practice.

UNIDO has a well established cluster approach that has been applied in many projects, and this project will draw on the cluster development expertise. Cluster development is approached as a multi-disciplinary value chain problem. For technology transfer this means not only installation of hardware, but development of supporting services, establishing relations for national and international equipment suppliers, involve national, regional and local authorities, centers of expertise and industry associations.

F. THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT:

Without GEF support, the development of the bamboo industry will not come off the ground. This would imply a continued land degradation, reduced access and increased cost of fuel for the population, higher GHG emissions and no development of new industries with their positive impact on economic development and poverty alleviation.

The goal of this project is to develop an internationally competitive industry. The GEF funding will serve as seed money for this industry. The projected leverage is a factor five.

G. THE RISK, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE FROM BEING ACHIEVED, AND THE RISK MEASURES THAT WILL BE TAKEN:

Risk Type	Description	Risk Level	Potential Impact	Proposed Mitigation Measure
Technical risks	Plantation fails because of adverse weather conditions, fires or insects.	Moderate	Replanting needed/ adjust machines for other types of wood feedstock	Work with different species in 100 ha plots spread over a larger area.
Economic risks	Local population does not share plantation benefits	Moderate	Illegal logging	Work with local population and make them co-owners of the industry
Market risks	Price of pellets drops in the international market	Low	Project becomes uneconomic	Develop a local and an export pellet market

Regulatory framework	Local policies favour other land use	Moderate	10 000 ha target becomes infeasible	Capacity building and outreach. Locals become shareholders in the enterprise.

H. THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT:

For the following analysis an average yield of 15 t dry matter/ha.year has been assumed, once the plantation reaches maturity. This is based on experience with plantations in eastern India that consist of a mix of six bamboo types. While individual bamboo species can reach higher yields, this mixed species approach reduces the risk of bamboo blooming and diseases.

10,000 ha with 15 t/ha yields 150 kt of dry bamboo biomass per year. Once the project is fully operational about half of this biomass will end up in materials, while the other half can be used for energy production.

The CO_2 effect calculation depends on the assumptions made. A first estimate is the carbon content of the bamboo, assuming that this would replace fossil carbon on a mass equivalent basis. In CO_2 equivalents, 150 kt biomass equals 0.275 Mt CO_2. This excludes any soil carbon improvement effects, which may double this. Some correction is required for nitrogen fertilizer use, so the net effect would be around 0.25 Mt CO_2 per year.

A second, more sophisticated method, considers that the net CO_2 reduction effect depends on the type of product that is replaced. For plastic materials, the typical CO_2 intensity (including waste incineration) is 4-5 t CO_2/t material. How much bamboo is needed to replace a tonne of plastics depends on the application. Assuming that one quarter of all the bamboo ends up in materials, and 1 tonne of bamboo replaces ½ tonne of plastics (e.g., nylon carpets), the net materials CO_2 saving effect would be 0.09 Mt per year.

As for the remainder of the bamboo (from the plantation and residues from flooring production), they are used for pellet production. It is assumed that half is used for international markets (substitution of coal in power plants) and half for cooking within Sri Lanka.

Biomass pellets replace coal on a thermal par basis. 0.025 Mt of biomass pellets can reduce CO_2 emissions by 0.045 Mt CO_2 per year.

Pellets can also be used for cooking and heating within Sri Lanka. It is assumed that traditional biomass use is substituted by pellet use. The pellets represent a superior fuel with better combustion properties and substantially lower emissions. Traditional biomass use is a major source of methane and black carbon emissions. 18% of all black carbon emissions originates from biomass used for cooking and heating. It is a major contributor to global warming. In a 450 ppm CO_{2eq} scenario a reduction of black carbon emissions by 3 kt per year reduces the need for CO_2 reduction by 21 ppm. 21 ppm equals 500 Gt CO_2, or 10 Gt per year over a 50 year period. Based on these data, the climate change mitigation effect of 0.0125 Mt biomass pellets reduction of black carbon amounts to 0.06 Mt CO_2 per year. Furthermore, 1 kg of wood emits 4 gr of methane. This means 0.0125 Mt of biomass pellets can reduce methane emissions by 0.001 Mt CO_{2eq} per year.

The remaining 0.05 Mt of biomass is directly used as cooking fuel, thereby reducing deforestation. The exact CO_2 emission benefit is unclear but substantial. For this analysis, 0.05 Mt emissions reduction is assumed.

This more detailed approach yields again a total CO_2 saving effect of materials, electricity and cooking fuel production of 0.25 Mt per year. However, the black carbon effect benefit in particular is uncertain.

In conclusion, the net GHG reduction effect would be around 0.25 million tonnes of CO_2 per year, once the plantation reaches maturity after 7 years. This excludes the beneficial effects for soil carbon that may increase the GHG reduction effect by 40-100%. It also excludes the CO_2 benefits from the secondary deforestation benefits that may accrue from the production of bamboo shoots easing pressure on land use.

Promoting bamboo also has advantages regarding land degradation, as it can be harvested without clear cutting, and as such the soil stitching effect of root system remains in place and so reduces soil erosion.

The total investment is US$13.425 million. Assuming credits are granted for a 20 year period from the project start, including 13 of which when full production capacity is reached, the (undiscounted) cost per tonne of CO_2 reduced for GEF is less than US$ 1/t CO_2.

I. UNIDO'S COMPARATIVE ADVANTAGE:

GEF Council document GEF/C.31/rev.1 gives UNIDO comparative advantage for industrial development and technology transfer. UNIDO has been nominated as co-convenor for technology transfer for Climate Change by the UN Secretary General. UNIDO has established bioenergy projects in Sri Lanka. It has a long-standing involvement in the development of bamboo growing and processing industries in countries such as China, India and Mexico. UNIDO has helped to establish bamboo centres of excellence in these countries.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT AND UNIDO

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT ON BEHALF OF THE GOVERNMENT:

Anura Jayatilake Secretary, Ministry of Environment & Natural Resources	Date: 8 September 2009

B. GEF AGENCY CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Dmitri Piskounov Managing Director UNIDO GEF Focal Point		Sep. 11, 2009	Dolf Gielen	+43-1-9 584838	D.Gielen@unido.org

Annex A
Description of prospective partners and technology suppliers

Expertise will be needed for tissue culture (plant material), bamboo harvesting and pre-processing, and bamboo processing into materials, energy and food. The main expertise will come from Vienna from the Energy and Agro Branch.

For the plantation feasibility study international consultants will be used. For tissue culture know-how European expertise will also be used www.oprins.be and there will be collaboration with Indian and possibly Chinese laboratories. The Cane and Bamboo Technology Centre (CBTC) in Guwahati (India) will be used to train the farmers on bamboo pre-processing technologies wwww.caneandbamboo.org. The machinery will be selected by UNIDO and will be imported from India and China. An overview of contacts is provided below. The choice of partners will be made at a later stage, in order to assure competitive pricing.

A significant share of the project cost is related to pelletising. Andritz, an Austrian engineering company, is the largest producer of pelletising machines worldwide.

CBTC (Cane and Bamboo Technology Centre) Guwahati India
Training of farmers on bamboo pre processing and handicrafts
Cluster formation
Quality control monitoring
Product design and marketing (handicrafts)

NCPC Sri Lanka
Logistics and local coordination
Product design and quality control
Certification

Indian wood and bamboo processing machinery manufacturers

Woodmaster (India) Machines Pvt. Ltd.
St. no. 7, Bachittar Nagar,
Ludhiana
Punjab
Mb: +91-98156-27422
Tel.: +91-161-2814169, 5034422, 5031422
Fax: +91-161-2814168
Email: info@woodmasterindia.com
Website: http://www.woodmasterindia.com/

Anil Enterprises, Dewas
Shed No. 11, Ujjain Road Industrial Area
Dewas - 455 001
Madhya Pradesh
Phone: +(91)-(7272)-228956 / 406660
Fax: +(91)-(7272)-228956
Email: anilbamboomachines@gmail.com

B. S. Engineering Corporation
Manufacturer & exporter of bamboo saw splitting machines, belt sanders, double end cutting machines, glue squeezer cum spreader and knot removing machines
Address: 117, Raja Dinendra Street

Kolkata – 700004
West Bengal
Phone: 91-33-25557142/25558976
Mobile: +919433437759
Fax: 91-33-25558976/25557142

Niranjan Singh & Sons
Manufacturer & exporter of stick sizing machines, wood working machinery, inside knot removing machines, cross cut saws
Address: St. No. 7, Bachittar Nagar
Gill Road
Ludhiana – 141006
Punjab
Phone: 91-161-2814169/5031422/2814464
Mobile: +919815627422
Fax: 91-161-2814168

Dhanjal Mechanical Works Pvt. Ltd.
Manufacturer & exporter of removing machines, slicer, splitter, flattening machines, briquetting machines, glass machines, belt machines, revolving machines, groove machines
Address: 90, Phears Lane
Near Shilpa Bhawan
Kolkata – 700012
West Bengal
Phone: 91-33-22377916/22375183/26593211
Mobile: +919831009071
Fax: 91-33-22375183/22157647

Jbc Group
Manufacturer & exporter of plywood, bamboo plywood, waterproof plywood, melamine faced particle board, plain particles boards, veneered particle boards
Address: 501, Queensgate
Hiranandani Estate
Patlipada
Thane (West)
Mumbai – 400607
Maharashtra
Phone: 91-22-25861876
Mobile: +919810008381

B. S. Engineering Corporation
Manufacturer & exporter of plywood machines, bamboo processing machines, veneer machines, rubberized coir foam machines, wood working machinery, boilers
Address: 117, Raja Dinendra Street
Kolkata – 700004
West Bengal
Phone: 91-33-25557142/25558976
Mobile: +919433437759
Fax: 91-33-25558976/25557142

Tissue culture labs in India

1 A V Thomas Group Companies, Cochin
2 Aarooran Biotech, Coimbatore
3 Agrigene International, Shimla
4 Agriland Biotech Pvt Ltd, Vadodara
5 Arayana Micropropagation, New Delhi
6 Arya-Luxgene Plant Technology Ltd, Mumbai
7 Ajeet Seeds Pvt. Ltd, Aurangabad
8 Ag Bioteck Laboratories (India) Pvt Ltd, Hyderabad
9 Beena Nursery (P) Ltd, Trivandrum
10 Bilt Tree Tech Pvt Ltd, New Delhi
11 Biotech Tissue Culture Ltd, Surat
12 Biotech Labs Pvt Ltd, Vishakapatnam
13 Biotissue Labs Pvt Ltd, Hyderabad
14 Cadila Laboratories Ltd (Modi Group), Ahmedabad
15 Costford, location not known
16 Dabur Research Foundation, Ghaziabad
17 Dalmia Centre for Biotechnology, Coimbatore
18 Decor Plant Culture, Mumbai
19 DLP High Tech Research Centre, Nasik
20 DRS Bioflora Pvt Ltd, Hyderabad
21 Duncans Biotech Ltd, Calcutta
22 East West Biotech Ltd, Mumbai
23 Elengical Biotech Centre, Ernakulam
24 Enzo-Chem Laboratories Pvt Ltd, location not known
25 EPC Irrigation Ltd, Nasik
26 Florida Plant Culture (I) Pvt Ltd, Pune
27 Flower & Tissue India Ltd, New Delhi
28 Frontier Biotech, location not known
29 Godavari Fertilisers, Hyderabad
30 Godrej Plant Biotech Ltd, R R District AP
31 Greenearth Biotechnologies Ltd, Bangalore Rural District
32 GrowMore Bio-Tech Pvt Ltd, Hosur
33 Gujarat State Fertilizers Co Ltd, Gujarat
34 Harihar Poly Fibres & Grasilene Division, Harihar
35 Harrisons Malayalam Ltd, Hosur
36 Hema Agro Impex Ltd, Hyderabad
37 Hindustan Agrigenetics Pvt Ltd, New Delhi
38 Hindustan Lever Ltd, location not known
39 Indagro Tissue Tech Ltd, Mumbai
40 Indo-American Hybrid Seeds, Bangalore
41 Indo-Dutch Biotech Ltd, New Delhi
42 Indo-French Biopharma Pvt Ltd, Hyderabad
43 Indrayani Biotech Ltd, Pune
44 In Vitro International Pvt Ltd, Bangalore
45 ITC Bhadrachalam Paperboards Ltd, Secunderabad
46 Jain Rahan Biotech Ltd (Jain Irrigation), Jalgaon
47 Jyothi Tissue Culture Pvt Ltd, Calcutta
48 Khoday Biotek - Palm Grove Nurseries, Bangalore
49 Kothari Biotech Limited, Chennai
50 Krishnendra Nursery, Bangalore

51 Kumar Gen Tech & Tissue Cultures Co, Pune
52 Lab Land Biotechs Pvt Ltd, Mysore
53 Lupin Laboratories Ltd, Mandideep
54 Madras Fertilizers ltd, Chennai
55 Maharashtra Hybrid Seeds Co Ltd, Mumbai
56 Manjushree Plantations Ltd, Bangalore
57 Mericlone Biotek Ltd, Hyderabad
58 Microplantae Ltd, Pune
59 Midas Plant Laboratories, Chennai
60 Nagarjuna Bio-Tech Farms, Hyderabad
61 Nath Biotechnologies Ltd, Auarangabad
62 Nat. Ag. & Sci. Res. Foundation (Eastern General Agencies), Calcutta
63 National Chemical Laboratory (NCL), Pune
64 Nupur Biotech Pvt Ltd, Calcutta
65 Oasis Agritech Ltd, Vadodara
66 Parasrampuria Plantations Ltd, Nasik
67 Parry Agro (E I D Parry India Ltd), Bangalore
68 Phyto Biotech International, Guwahati
69 Phytoclone Laboratories, Guwahati
70 Plantgene Seeds (Cosmo Plantgene Ltd), Chandigarh
71 Pocha Seeds, Pune
72 Pro-Agro, location not known
73 Pudumjee Plant Laboratories Ltd, Pune
74 Rariflora Biotechs, Bangalore
75 Rallis India Ltd, Bangalore
76 Shaily Polymers Pvt Ltd, Ahmedabad
77 Sheel Biotech Ltd, New Delhi
78 Shobha Farm, Pune
79 Shri Ramco Biotech, Rajapalayam
80 SIV Industries Ltd, Coimbatore
81 SPBP Tea Industries Limited, New Delhi
82 SPIC (Southern Petrochemical Industries Corporation Ltd), Coimbatore
83 Spinner Plantations, location not known
84 Sterling Tissue Culture Pvt Ltd, Ahmedabad
85 Southern Tissue Culture Pvt Ltd, Hyderabad
86 Sun Floricult Biotech Ltd, Hyderabad
87 Synthite Industrial Chemicals Ltd, Kolenchery
88 Tata Energy Research Institute (TERI), New Delhi
89 Tata Tea Ltd, Munnar P O
90 Thapar Corporate R & D Centre, location not known
91 Transgene Agritech Ltd, Bangalore
92 Tissue & Floritech India Ltd, New Delhi
93 TEAM (Titanium Equipment and Anode Manufacturing Co Ltd), Chennai
94 Vashishta Biotech Pvt Ltd, Bangalore
95 Western India Tissue-Tech Ltd, Pune
96 Whitefield Agrotech Pvt Ltd, Bangalore
97 Zeolite (I) Pvt Ltd, Calcutta

Chinese wood and bamboo processing machinery manufacturers

Anji Bamboo & Wood Products Co., Ltd.
Liujiatang Industry Area
Shangshu
Anji County
Huzhou
Zhejiang 313300
Phone: 86-0572-5245661

China Panda Bamboo Ltd.
602, Unit 1, Building 7, Wangfu Wenxin Apartment
Changping District
Beijing 102209
Tel: 86-631-6775-716
Fax: 86-631-6775-716

Alafaa Machinery
Bamboo flooring processing machinery
Yiwu futian market,
Yiwu
Zhejiang 322000
Phone: 86-579-8765-1234

Chin Kun flooring Co. Ltd
Bamboo flooring processing machinery
Sima District, Changping Town
Dongguan City
Guandong Province
China
Phone: 86-769-3391188, 3393698
Fax: 86-769-339-2898
PT: 523570
http://www.ckbambooflooring.com/e/home.htm

Wujiang I/E Ltd.
Bamboo Pallets-Manufacturer and Exporter
Room 1309, Gaoxiang Building
No. 335, Futexi Rd
Pudong
Shanghai 200000
Phone: 86-21-65068836
Fax: 86-21-65062119

Shanghai Welford Ltd
Bamboo Pallets Manufacturer
Room 402, No. 13-3, Industrial Zone
Shanghai 200000

Quanzhou Qunfeng Machinery Manufacture Co. Ltd
No.11, Zhitai Road, Eco. & Tech.

Industrial Area
Quanzhou
Fujian 362005
Tel: (86 595) 22356782 (86 595) 22356777
Fax: (86 595) 22356788

http://www.globalsources.com/qunfeng.co
http://www.qunfeng.com

Xuzhiu Orient Industry co., Ltd.
Biomass Briquette Press
Suite 1, 17/F Success Blvd.
Zongshan South Rd
Xuzhou
Jiangsu 221002

Zhe Cheng Jingxin Machinery Co., Ltd.
Biomass, Briquette Press
Shangdu Road
Zhengzhou
Henan
China

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சுற்றாடல் இயற்கை வளங்கள் அமைச்சு
Ministry of Environment and Natural Resources

04/03/06/425iii

2009.09.08

Mr. Dmitri Piskounov
Managing Director
Programme Development and Technical Cooperation Division
United Nations Industrial Development Organization
Vienna International Centre
Wagramerstr. 5, P.O. Box 300, A-1400 Vienna,
Austria

Dear Sir,

Endorsement of Project Concept on 'Bamboo Processing for Sri Lanka'

This has reference to above proposal submitted dated 8th September 2009 seeking financial support from GEF Trust Fund.

The growing of bamboo on the degraded lands in Sri Lanka is an ideal solution. The bamboo can both halt land degradation and can be a sustainable energy source. In this regard this project will have the capacity to address the serious environmental and rural socio-economic issues in the country.

Therefore, in my capacity as the GEF focal point for Sri Lanka, I hereby formally re-endorse the component of Sri Lanka of the project proposal on Bamboo Processing for Sri Lanka' which is supposed to be executed in Sri Lanka. I also would like to confirm that the Government of Sri Lanka will support this project to receive amount of US$ 2,700,000 from GEF Trust Fund.

Further I wish to ensure full collaboration by the Ministry of Environment and Natural Resources as the GEF National Focal Point together with other relevant government institutes to make this project a success.

Yours sincerely,

Anura Jayatilake
Director, Air Resource Management & International Relations
For Secretary - National GEF Focal Point
Ministry of Environment & Natural Resources
Government of Sri Lanka

Anura Jayatilake
Director
Air Resource Management & International Relations
Ministry of Environment and Natural Resources
Sri Lanka