

## **Project : BIOENERGY SOURCE FROM SUSTAINABLE BAMBOO**

### **A. Introduction to project bioenergy source from sustainable bamboo**

According to the report of Ministry of Agriculture and rural development, Lam Dong province, bamboo forest in Lam Dong province now is about one fourth of the total forest area with an area of over 134.000ha, mainly in rural areas where people's economic life is more difficult. Located in the tropical and subtropical areas in Lam Dong, bamboo species contribute to increase the biodiversity of forests in Lam Dong.

However, in recently years, bamboo resources in Lâm Đồng and Tây Nguyên encounter some difficulties and risk in investment to preserve and development:

The development of bamboo forest in Lam Dong province is still facing several major challenges such as the lack of markets information, lack of technology and investment. Thus the diversity of products is limited; leading to the limited market competition within the country is not high, too. The using of bamboo is low (only 25-30% bamboo will be used for some main traditional products such as bamboo chopsticks, toothpicks, incense, products wicker rattan bamboo or household use whole trees for building materials). So bamboo is considered a non-timber products and their value is not high as those of other economic trees.

The exploitation and use of bamboo in local management units are just stop at the level of silvicultural cutting method with the allowed percent each year for the preparation, maintenance of forest structure. The people in rural areas mainly cut bamboo and manual processing only the culms to make their houses or daily items, some communities make traditional crafts as their career, but on a small scale. In order to attracting investment, some poor communities have to converted bamboo forest to other economic wood trees, i.g pine trees, tea or coffee which have higher values. So bamboo forest in Lam Dong area is reduced and destroyed, accompanied by a decline in biodiversity and environmental protection function. The opportunities for people to escape from poverty using bamboo have not been fully utilized.

Currently, Vietnamese Government issued Decision No. 11/2011/QĐ-TTg on 18/02/2011 to encourage the development of bamboo and Lam Dong province is known as one of pioneer province who launched "pilot projects of planting, management and protection *Thyrsostachys siamensis* bamboo, *Dendrocalamus* bamboo resources, associated with the national project "Development of a new countryside". With the willing to invest and contribute technical and financial resources for Lam Dong to the conservation and development of bamboo forest because bamboo is a very suitable species of the province's forest ecology, making bamboo become a more economic interest and environmental practice among community and farmers.

### **B. Project Objectives:**

Biological material is a commercial product in the field of energy, and current biofuel demand is increasing to substitute for other energy with high emissions affecting climate change. Biological materials from bamboo are known for its work in many fields of industry, agriculture, medicine, environment, health care services etc.

Vietnam is a country ranked 4th in the world for production of bamboo. Most of the planted bamboo is only focused on a few species which have high economic value, the remaining of other species is natural forests which take the majority portion. Their economic value has not been noticed nor properly exploited and used wasted because the using ratio is not high in handicraft making or timber or charcoal. This is also the general situation of bamboo forest in Lam Dong.

So generating bioenergy from sustainable bamboo from these forest areas will help create the economic value of local bamboo and help protect and improve natural forest areas, cooperate with increasing income for poor people living near forests. Moreover when there is no opportunity to exploit the economic value, bamboo is going to degradation naturally or burned, so that biological material from bamboo will play an active role in balancing the greenhouse effect. Implementation of the project "bioenergy source from sustainable bamboo," we aim to:

a / Contribute to the development of new economic activities for rural communities in Lam Dong. Improving the economic value of bamboo;

b / Development of sustainable biofuels with the potential to export bamboo through support of the Council certified forest management (FSC) is a proven standard for economic development actions associated with the maintenance the environment;

c / Contributing to conserve and improve the quality of bamboo forest status in Lam Dong.

### **1. The project area:**

After surveying the situation of bamboo resources in the province, the proposed implementation of the Project "bioenergy source from sustainable bamboo" the bamboo forests in 03 districts of Bao Lam, Di Linh Dam Rong has about 20,000 ha of mixed and pure bamboo forest. In which there are 03 focus areas for each district around (6000-7000) ha. The project area is mainly poor forest, degraded or poor quality of production forests and protection forests. These are appropriate forest which is suitable with the recovery solutions through material handling bio-sustainable bamboo.

The proposed project is also associated with the need to support poor livelihoods; there is labor resources farmers need training to improve silvicultural capacity. Geographical location has provincial highway, convenient Highway connect between 3 regions. We intend to work with the forest owners who have concentrated forest area. That is the Di Linh and Bao Lam Forestry Co Ltd and office of Management forests of Serepok.

### **2. The stages and the project plan**

- Phase 1: Complete feasibility study on the project

Give conclusions on the feasibility of the project, and factors affecting the sustainability of the project. Conclusion is made whether or not to perform the update and

review the to-do list of the project. Especially clarify the approach and the involvement of the communities in the forest unit in the project area.

Phase 2: Training and providing protection system and to manage their bamboo with at least 05 training field staff and five demonstrate pilot sites. Training at least 500 farmers/workers in the management of projects and harvesting. Establishment of collection system.

- Phase 3: Get forest certification

FSC Certified or NTA 8081, or other certificates are internationally recognized.

- Stage 4: Start the production of biomass

Construction and production of biomass in pilot scale, the proposed project will produce at least 10,000 tons of bamboo biomass bio fuels are produced and marketed internationally.

- Stage 5: Preparing for the next steps

Complete assessment report and shared projects for the community, local government units as a basis for forest owners to expand the business plan in the context of regional resources and the relative status of bamboo forest application.

Estimated time to complete the phase of the project study in the period 03 (three) years, 20 (twenty) years following the period of sustainable development.

### **3. The technical solution to restore sustainable bamboo forests:**

- Status of bamboo forest is now in degradation stage which has low quality bamboo, thus this project will apply silviculture management to restore the forest in a sustainable way in order to increase the productivity of natural forests. Beside, the project also have plan of planting some bamboo varieties such as Tam Vong, Manh Tong and Tre gai (are the bamboo with high-value economy).

- The solution taken to restore the bamboo forest, strengthen the protection of natural bamboo forests mentioned above to achieve the dual goals of environmental protection and livelihood security. Studies have shown that the clearing of natural forests and poor bamboo forest (mixed or pure state type) to establish a bamboo plantation is not only expensive but hardly has any meaning any environment. Necessary to protect the vegetation layer of the ecosystem as they interact dynamically with the bamboo.

Bamboo is considered as valuable resources in Lam Dong Province. However, the improper exploitation of silvicultural method make bamboo becomes degraded. People often exploit the wild bamboo in this area. Moreover, the native species, such as bamboo grow themselves, self-development without the need of taking care of or management.

The rapid resource degradation coupled with the permissive management affect significantly the livelihoods and incomes of local people. Therefore, the need to grow and harvest and collection system to contribute to sustainable bamboo increases the value of bamboo.

There are many systems sustainably harvested bamboo such as bamboo Tectonics rich, natural rejuvenation of the bamboo will help maximize performance and soil is most important natural bamboo forest and play an important position to the carbon cycle. The bamboo forest will absorb carbon dioxide in the air and store them in the form of plant biomass and in the ground. The bamboo forest will help reduce the carbon dioxide in the

atmosphere, and indirectly alleviate the phenomenon of climate change. Currently, There are a large number of bamboo alternating grow in natural forests, this situation would reduce the amount of harvesting. However, foresters faltered methods such as extraction methods reasonably selected, fertilization biology, etc. will contribute significantly to the enrichment of bamboo, while the traditional methods such as forest clearing has not brought effective and cause environmental landscape.

**4. The bio-fuel products from bamboo:**

The purpose of the project is also follow the orientation of development of forest resources of the province, maximize harvest product from bamboo resources economically and ecologically.

This is a chance that the project would like to bring to the bamboo forests in Lam Dong province to preserve, strengthen and create conditions for the development of bamboo forests with current management policies and reasons for bamboo harvesting of forest products. The end result of the project to reach a firm contribution in reducing carbon dioxide emissions and improve public awareness, people on bamboo forest exploitation area has developed sustainable biomass, increase productivity and the value of using bamboo. In addition, further objectives of the project is to create conditions to promote sustainable production process of bamboo bioenergy

Project want to demonstrate the feasibility of value from bamboo waste resources when develop the solutions of biomass product and bamboo charcoal is seen as a new product is certified for permanent nature and export potential through pilot programs in three areas of forests in Lam Dong province. During project implementation, we always perform with the motto protect forest resources and forest land in Vietnam.

With the goal of improved livelihoods linked to conservation and development of bamboo forest situation of Lam Dong. The objective of our business towards the common problems that local Lam Dong province is also focus on: sustainable forest exploitation, balance between environmental issues and economic development in bamboo.

**5. Funding for the phase 1 and phase 2 of project:**

We called for the investment for phase 1 and 2 of the project:

Phase 1	Title of research	Budget (\$ USA)	Status
1	<b>Nutrient partitioning , fuel properties and biomass estimation of <i>Bambusa procera</i> (Lo O) in natural stands</b>	NG	Finished
2	Research on the nutrient turn over and the fertilizer application to maintain and increase the yields of <i>B.procera</i>	5000	Not begin
3	Research on the Research on the factors affect to the generation of	5000	Not begin

	new shoots of <i>B.procera</i>		
Phase 2	Training and providing protection system and to manage bamboo with at least 05 training field staff and five demonstrate pilot sites. Training at least 100 farmers/workers in the management of projects and harvesting. Establishment of collection system	15000	Not begin

### C. Partnerships

3.1 Biocandeo Company (Netherlands)

3.2 Bamboo Matters Co., Ltd:

3.3 International University, Vietnam National University at Ho Chi Minh City (IU-VNU)