Bamboo – The Millennium Grass of Ethiopia

Ushering in a New Prosperity through a Million Bamboo Homesteads

By Eastern Africa Bamboo Project (funded by CFC, executed by UNIDO, supervised by INBAR, and implemented by MoARD & MoTI-FeMSEDA)

Eastern Africa Bamboo Project

The Eastern Africa Bamboo Project, executed by UNIDO and implemented by MoARD & MoTI-FeMSEDA has made real and tangible interventions since the start of its implementation in January 2006. It has made led towards the exploration of bamboo's vital role in providing employment and economic growth opportunities in Ethiopia. Bamboo is a commodity indigenous to various countries in Africa; Ethiopia for example hosts over 1.0 million hectares of bamboo representing the largest bamboo source in Africa accounting 67% of the African bamboo resources and about 7% of the world total. In spite of the lack of skills and technology beyond some traditional uses and applications, the economic and development potential of bamboo as an alternate "cash" crop can be enhanced through use of its comparatively rich endowments in natural resources as a platform to stimulate growth and development.

The long-term objective of the Eastern Africa Bamboo Project is to promote the development of the sustainable production and use of bamboo products in East African countries with a focus on markets as the driving force behind such sectoral development. The project will contribute to the reduction of poverty in rural, degraded and marginalized areas by turning bamboo - the " poor man's timber" - into a cash crop for wood substitution and for food processing creating rural and urban employment and value-addition to ultimately improve the economy of LCDs.

The project will do this by addressing technical input requirements in present bamboo product production systems to increase quality and value by the development of new products with large sustainable markets, by providing increased access to markets for producers and by enabling more equitable sharing of benefits amongst stakeholders. Supports will be developed to ensure long term sustainability of the options trailed and to promote greater dissemination of the results. Options trialed in one location can then be replicated in other locations as part of the project and models produced for replication outside the project.

The specific objectives of the project are targeting employment and income generation for poverty alleviation and sustainable development:

- Improving the technological and skills inputs in bamboo processing.
- Developing capacity for the sustainable supply of raw bamboo materials.
- Improving technical, functional and aesthetic aspects of bamboo products and diversifying into new markets.

The project in its successful implementation has been addressing issues of market access and information, development of products better suited to growing markets, and helps provide a sustainable basis for future activities after project completion. It focuses on upgrading of the capacity and technical facilities of existing bamboo institutions in the country, Federal Micro and Small Enterprises Development Agency (FeMSEDA), a support institution which is forecasted to function as a regional bamboo training and demonstration center (by procuring state-of-the-art equipment and machinery for manufacturing industrial bamboo products) individual and group training and empowerment at the community level and particularly supporting small-scale entrepreneurs to develop or improve their bamboo based industries. It thereby directly addresses the three key strategic issues of technology, markets and enabling environment thus, its impact in the country's economy will be quite significant.

Constraints and common problems which have been addressed by the Eastern Africa Bamboo project for bamboo product production systems include:

- The lack of skill and technological inputs into the production chain, resulting in poor quality products that do not command the attention of potential purchasers,
- A complete lack of marketing infrastructure to enable products to reach out and find new markets
- Additional cross-national problems included policy restrictions on harvesting (in Kenya) and/or transport, and a lack of a viable support infrastructure such as centres of excellence where interested people could go for information, or training programmes.
- Low quality of products
- Very limited availability of processing equipment
- Lack of storage space and lack of working capital
- The availability of plastic chairs and wooden items with low cost which is limiting the demand for products made from bamboo
- The shortage of raw material supply and the lack of direct access to the raw material
- Lack of promotion activities and skill
- The long distance to important markets
- Lack of effective village group programmes to support activities.

Overview on bamboo

Bamboo is a perennial plant that belongs to the grass family. There are over 1500 species of bamboo in the world, out of which 43 species are found in Africa and two of these species are found in Ethiopia. i.e. highland and lowland bamboo with estimated total coverage area of 1 Million hectares; in Amharic highland bamboo is commonly known as **"Kerekeha",** and lowland bamboo is called **"Shimel" . '**Bamboo is versatile with a very short growth cycle. It is the fastest growing woody plant on this planet; some species can grow up to 1 meter per day. One can almost "watch it grow". This growth pattern makes it easily accessible in a minimal amount of time, and therefore can be harvested in 3-5 years versus 10-20 years for most soft woods. Its size ranges from miniatures to towering culms of 60 meters. Bamboo is a high-yield renewable natural resource for agro-forestry and engineering based products' (Oscar H. L, 2003).

Bamboo & Environment

Bamboo can offer innumerable opportunities for environmental improvement by sequestration of carbon (absorb up to 12 tones/ha), lowering light intensity and offering protection against ultraviolet rays, yielding 35% more oxygen than equivalent stand of trees and working as a natural environmental cleansing system. Bamboo is the fastest growing canopy for the re-greening of degraded areas. It holds 100 tones of water per hectares. Because of its critical element in the balance of oxygen/carbon dioxide in the atmosphere, bamboo acts as an atmospheric and soil purifier. Bamboo can be a substitute for wood-base fiber in the future. It can substitute wood in nearly all its uses and can help avoid future shortages and hardships caused by deforestation. Bamboo is an exquisite component of landscape design. Its anti-erosion properties create an effective watershed, forming a kind of soil bundle along river banks (binds $6m^3$ of soil), deforested areas and in places prone to earthquake and land slides.

Technical, Functional and Aesthetic Value of Bamboo

Bamboo is applicable in a variety of engineering fields including landscape, civil and chemical engineering. 'Bamboo is a strong raw material for construction. Its tensile strength is 28,000 per square inch versus 23,000 for steel. It is an essential structural material in earthquake architecture' (Oscar H. L, 2003). The fact that bamboo is flexible and lightweight enables the structures to ''dance'' in earthquakes. This has been proven in Limon, Costa Rica, only the bamboo houses from the National Bamboo Project stood after their violent earthquake in 1992. Bamboo is a landscape design element providing shades, wind break, acoustical barriers and aesthetic beauty for the human environment. Bamboo has found uses in manufacturing pulp and paper, panel products, construction material, high strength fiber composites and an array of modern new generation bamboo products, used whole for construction and scaffolding, used as roofs and walls of houses, used as fencing, used as domestic and agricultural implements, such as water containers, baskets, trays, mats, etc, high-quality woven handicraft products, such as food and drink containers, hats, arrows, quiver, etc, used as livestock shelters and temporary dwellings, used as parts of traditional houses, durable mats for building construction & fencing material.

Bamboo as Medicine

Extracts of bamboo leaves (Ebl) can be used for lowering concentration of blood triglyceride and cholesterol and acting as a positive control of high blood-lipid. The powdered hardened secretion from bamboo is used internally to treat asthma, coughs and can be used an aphrodisiac. In China and in some parts of Ethiopia, ingredients from the root of the black bamboo help treat kidney disease, roots and leaves have also been used to treat venereal disease and cancer, sap is said to reduce fever and ash will cure prickly heat. Current research points to bamboo's potential in a number of medicinal uses. Bambusa breviflora Munroe or Phyllostachys nigra: clears and transforms phlegm and heat: for heat in the lungs with thick sputum, a stifling sensation in the chest, or coughing up blood. Clears heat and stops vomiting: for vomiting of bitter or sour material due to heat in the stomach with bad breath, aversion to heat and a yellow, greasy tongue. This herb is very effective in stopping vomiting and can be used with other appropriate herbs in treating other types of vomiting including that associated with morning sickness. Cools the blood and stops bleeding: to stop nosebleed and the vomiting of blood (Oscar H. L, 2003).

Bamboo – Art and Culture

Bamboo is integrally connected with culture and arts. It is mystical plant known for its symbol of strength, flexibility, tenacity, endurance, luck and comprise. In Asia and ancient African Countries like Ethiopia, bamboo has for centuries been an integral element to religions ceremonies, art, music and daily life. It is the paper, the brush and the inspiration of poems and paintings. Among the earliest historical records, 2nd century B.C. was written on green bamboo strips strung together in a bundle with silk thread. Instruments made of bamboo create unique resonance and melody.

Bamboo and Energy

Bamboo bio-mass is a potential alternative source for bio-energy and opportunity to pioneer another industrial usage through gasification to produce electricity. As it have very favorable characteristics for gasification and the synthesis of gasoline and diesel. Bamboo has a number of desirable fuel characteristics such as low ash content and alkali index. Its heating value is higher than most agricultural residues, grasses and straw. Besides, bamboos have high biomass productivity, self-regeneration, sustainable basis and environmental friendly functions. This means for countries like Ethiopia can exploit their untapped bio-fuel potential from bamboo fully and effectively to propel their economy hence defeating poverty and achieving the Millennium Development Goals (MDGs) before long.

Bamboo Charcoal and its multiuse

Bamboo charcoal and active carbon is an item of a new product developed in recent years. Small sized and old tops and roots of bamboo which are not fit for making other bamboo products and residues from bamboo processing industry can be used in the production of charcoal. Bamboo charcoal can be used: for absorbing unpleasant odors; as a deodorant in refrigerators, bathrooms and pools; for refining wines of high grade and edible oil; for purifying water due to its micro-porous structure; to treat drinking water in eliminating organic impurities and offensive smell; for purifying air and to absorb harmful chemicals such as phosphorous dioxide, carbon monoxide and hydrogen sulfide released to the atmosphere.

Bamboo and Industrial Engineering

Bamboo board possesses physical and mechanical properties on a same level with waterproof plywood and has excellent internal bond strengths, a high plane rigidity and hence high racking strength. They are as durable as phenolic-bonded plywood and are resistant to boiling water, weather and biological agencies (decay, insects and termite attack). They have better scratch and stain resistance properties than plywood. They resist fire with the same degree as fire-retardant treated plywood. They have a rich natural appearance. Bamboo boards can be used for making bottom boards of trucks and buses (ply bamboo and laminated bamboo strips), bottom boards of railway wagons, bottom boards of railway flatcar, furniture, prefab houses, flooring, partitioning for commercial and industrial buildings, and ceiling for residential and commercial buildings. Some of the main industrial products of bamboo are pulp and paper, ply bamboo, bamboo medium density fiber boards, laminated bamboo flooring, bamboo particle boards, corrugated bamboo roofing boards, bamboo strand boards, bamboo cement particle boards, bamboo curtains, incense sticks, tooth picks, tool handles, umbrella, broom handles, wine storage barrels, sport and musical instruments , canes, brushes & buttons. Bamboo is also used in a brewery plant to produce beer through fortification of extracts of bamboo leaves (EBL). Bamboo beer is known for its typical aroma of bamboo leaves as well as a refreshing and mellow taste and it can also help lower blood-lipid when consumed frequently.

Bamboo and Economy

Bamboo is a potential economic resource capable of generating employment for rural poor and skilled and semi-skilled farmers and entrepreneurs in plantation and in semi industrial and industrial ventures. Bamboo and its related industries already provide income, food and housing to over 2.2 billion people worldwide. Bamboo and its related industries provide income, food and housing to over 2.2 billion people worldwide. The investment return for a new bamboo plantation is 3-5 years thereby signifying that it is a critical element of an economy. Today of the overall world market over US $10 billion trade as many substantial uses of bamboo exist. The potential of bamboo as an economic resource capable for generating employment for rural poor and skilled and semi-skilled in plantation and in semi industrial and industrial ventures should be fully exploited. Bamboo is an enduring natural resource. Bamboo can be selectively harvested annually. Bamboo provided the first re-greening in Hiroshima after the atomic blast in 1945. Thomas Edison successfully used a carbonized bamboo filament in his first experiment with the light bulb.

Bamboo and the Fashion world

The fashion world is constantly seeking and latching into new materials, bamboo to make hot fabrics. The merits of bamboo for use in textile fiber are its breatheability, the ease of processing them into fabric, their high functionality and their beauty. The fashion world is becoming more and more fascinated with all things oriental and bamboo is attracting the interest of a growing number of designers. With time, it is expected that more of this material will find its way in stores. Characterized by its good hygroscopic, excellent permeability, soft feel, easiness to straighten and dye and splendid color, bamboo fiber fabric is made of 100% bamboo pulp fiber. It is also a new environment friendly raw material that enjoys a splendid prospect for application as its predecessor wood pulp fiber. Towel and bathrobes made of bamboo fiber have a soft and comfortable feel and a special luster. It is highly absorptive to water and is also sparkling and beautiful when dyed. Bamboo foot mats are also popular for their health benefits as they do not provide a suitable medium for bacteria to breed. Bamboo fabrics need fewer dyestuffs than cotton, modal or viscose. It seems that the absorption of dyestuffs is remarkably better. Bamboo absorbs the dye stuffs faster and shows the colors better. Bamboo is considered as a much superior fiber and playing in a category of its own.

Bamboo as food and food preservative

Bamboo shoots are rich in fiber, protein and minerals. The processed product developed from bamboo shoots can provide food and nutritional security. Every year, over 2 million edible bamboo shoots – rich in vitamins and low in carbohydrates, fats and proteins are consumed around the world. In some parts of the world, bamboo is used as a natural food preservative as the antioxidant properties of pulverized bamboo bark prevents bacterial growth. Bamboo also makes fodder for animals and food for fish.

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