



Urban Agenda Platform

The global platform for sharing progress, action and knowledge on the implementation of the New Urban Agenda to achieve sustainable urban development.

# Using Native Bamboo for Sustainable Bicycle Transportation

Partner	Using Native Bamboo for Sustainable Bicycle Transportation
Region	Sub-Saharan Africa
Sustainable Development Goals	Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable

## Summary

The Initiative designs, develops, and markets bamboo bikes and frames and related products and services. It addresses the quadruple problems of climate change, poverty, rural-urban migration and high unemployment by creating sustainable livelihood job skills for the youth to build high quality multipurpose bikes that are suitable for the high terrain and purposeful for the local needs using bamboo.

## Background and Objective

Situation before initiative began Most bikes imported to Ghana's 22million population are brought by traders who dump bicycles cheaply in price and quality. Designs have not improved in decades and are appropriate only for personal transport on good road conditions. They do not provide customer service, nor do they create jobs or teach skills. Establishment of priorities 1. Building capacity of rural dwellers that lack the skills and knowledge necessary to create wealth from the abundant bamboo raw materials found around them by training them as bamboo bike builders. 2. Manufacturing multi-purpose bikes suitable for the high terrain in Ghana that can be used for personal or cargo transportation, as well as for commercial purposes. 3. Assembling of bamboo bike frames for export to generate foreign exchange. Prioritization was done in collaboration with the local people at the grassroots, opinion leaders, international development agencies, government and other stakeholders in the industry. Formulation of Objectives and Strategies In consultation with beneficiaries, community and opinion leaders, objectives were established as follows: 1. To produce cheaper multi-purpose bamboo bikes suitable for the high terrain in Ghana. 2. To use it as a means of creating cottage industries and creating self-employment opportunities for the youth. 3. To create awareness on the use of bamboo as well as their benefits in poverty alleviation and socioeconomic development of rural communities in Ghana. 4. To export bamboo bike frames internationally and reinvest the proceeds back into poverty reduction projects in Ghana thus contributing to the fight against global warming and climate change. Mobilization of resources Resource mobilization including human, financial and technical resources has been mobilized from all stakeholders for the successful implementation of the project with Bright Generation Community Foundation managing and accounting for its judicious use. 1. Local Community: Land for development of bamboo plantation and communal labor for building of bamboo bike factory. 2. International Bamboo and Rattan Network- Assorted bamboo species and technical support for the development of the bamboo plantation. 3. UNEP Seed Initiative- Seed funding for the establishment of the project 4. UNDP-Small Grants Program-Invested funds for the expansion of the project 5. Bikes For Africa Initiative-Bicycles parts and accessories and marketing of bamboo bike frames in the US market. 6. Shanghai Bamboo Bikes- Bicycle tools and accessories and marketing of bamboo bike frames internationally. 7. GIZ (Formerly GTZ)-Grants for tools acquisition 8. World Partners for Development-Grants for training bamboo bike builders 9. Architects for Humanity (Seattle Chapter)-Probono designing and architectural services 10. Cornell University- Probono consultancy services on business growth and development and assisting with strategies to build visibility to attract corporate and individual customers in for the bamboo bike frames. 11. GreenAer Mobility- Transferring technology for building electric bamboo bike ambulance

## Actions and Implementation

The project started as a novelty which we pioneered in Ghana. It requires us to modify existing well-established techniques and approaches, and connect various stakeholders to form a new system. There is some amount of risk with trying out something new and some of the challenges we faced in implementing the initiative include the following: 1. Funding: The major obstacle was enough funding. In our part of the world, it is very tough getting the needed financing for the implementation of innovative social enterprises such as ours that are too big for microcredit, too small for banks and venture capitals and too risky for commercial lenders. Our response to this challenge was to participate in international business plan competitions, responding to call for project proposals and participating in events such as Dubai International Award for best practices. 2. Slow market development for our bamboo bikes -Our communication designers explore different ways of strategic communication, advertisement and publicity. We also market the products as high durability and cost-efficient products. Their being made from bamboo and by people from rural communities is just a "story" behind the products. Most of our products cannot be identified as made from bamboo unless specified. This attracts a larger audience as well. 3. Labour related problems: There were no existing bamboo bike builders to start with so we have to invest in the training of highly skilled bamboo bike builders and identify alternative people who can perform the functions of the existing bamboo bike builders. We trained some of our bamboo bike builders with multiple skill sets, so that they



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can replace other positions for a short period of time when necessary. 4. Perception about NGO's: Often, communities are used to NGO give aways and we have to ensure a shift from this to ensure that the initiative is perceived as a business opportunity since we operate as a for profit social enterprise to empower rural dwellers and their communities. There still exist funding for expansion challenges.

## Outcomes and Impacts

From the very onset of our intervention, mechanisms are being put in place to ensure that the bamboo bicycle production will be a sustainable social enterprise in Ghana. This includes putting in a well dedicated and commitment team of professionals who are passionate about the transformation of this vision into reality. This team envisions the project as neither charity nor experiment but a growth centric and self sustainable model benefitting all the stakeholders. Branding and marketing of the bamboo bikes are carried on in such a way to ensure that buyers clearly see the difference in quality between the brand new bamboo bikes which are more robust and multi-purpose than the inferior imported ones from the far east and the quality ones from Western nations that are not suitable for the high terrain in the country. The increased cultivation and use of bamboo as an alternative to wood is helping the preservation and rehabilitation of Ghana's dwindling forests. Bamboo bicycles have positive impact on the environment in both the early and a late stage of production. It has a number of environmentally friendly qualities and a lower negative environmental impact than metal bicycles. Bamboo helps improve air and water quality in areas where it is harvested. Its root system is constructed in such a way as to reduce soil erosion, a major concern for many farmers. It does not leach many nutrients from the ground, as it pulls silica from the soil. Less electricity is needed to build a bamboo bike hence our resolve to use solar powered appliances. Bamboo used for bamboo bikes is not treated with the same chemicals used for other bamboo treatment. As a result, there is no need to dispose of chemicals, and people do not come into contact with chemically-treated bamboo.

## Gender and Social Inclusivity

We offer basic course and practical lessons on building bamboo bikes as a way of encouraging entrepreneurship and providing sustainable livelihood job skills for the youth. We believe that young people from rural communities and disadvantaged peri-urban areas need to increase their incomes and sees the utilization of the resources that surround them as the key to introducing them to new employment opportunities. It was founded with a vision to be part of a green movement, a desire to have a positive impact on the environment and to provide the freedom to choose alternative forms of transportation that are innovative, affordable, functional, fun and responsible. As bicycle affectionados and specialists, our aim is to bring smart transport solutions for a cleaner world. Road transport emissions could be greatly reduced if even a portion of journeys were replaced with smart, clean, efficient forms of transportation to minimize the effects of climate change and pollution caused by motoring. Our 100 hour bike mechanics apprenticeship course also teaches the youth how to fix their bamboo bikes in addition to selling bikes, parts, and accessories and graduate participants into jobs at local area bike shops and other bike related businesses upon completion. Our bicycle library rent bikes and train adults bike riding and safety issues. Any community with abundant bamboo found around them can easily replicate this project by taken advantage of the bamboo found around them to manufacture and assemble bamboo bikes. Bamboo is grown locally in Ghana, and the manufacturing of bicycle frames does not require costly infrastructure or electricity so there is potential for the creation of a unique and sustainable business that provides local employment. Building a bicycle frame does require skills but they can be acquired through demonstration training without any formal education. To date we have proven that a bamboo bicycle can be built in Ghana from local materials. Bamboo bicycles are estimated to have a better replacement rate of approximately once every five years. Furthermore, bamboo bicycles are easier to repair, since the replacement material is locally grown, and the knowledge and tools needed for repairs are often locally available

## Initiative Contribution

Test Initiative

## Innovative Initiative

1. As with any innovative product introduced, bamboo bikes still have perception problems on its quality and durability. It takes patience and persistence to bring a new way of doing things to a community. There are early adopters who immediately embrace the bamboo bike concept and there are traditionalists who resist the change that the bamboo bikes concept seeks to bring. 2. Bamboo bikes are not only more cost effective than metal bikes since there is no need to import bike frame parts but they are also a positive investment in the local economy helping to improve livelihood and creating jobs. With growing mobility needs, it will be a challenge in developing countries to provide sustainable and low carbon transport solutions since bikes are constructed out of natural materials, the initiative does not only have impacts on transport emissions but but also reduces emissions in bike production process. The construction of bamboo bikes is much less energy intensive than the production of steel bikes. During the production of a steel frame, about 5kg carbon dioxide are emitted while bamboo can be directly recycled, steel requires additional energy inputs for recycling. Bamboo minimizes CO2 gases and generates up to 35% more oxygen than equivalent stand of trees. Trees that are not cut for the production of bike frames support the sequestration of CO2. 3. Often, communities are used to NGO give-aways and we have to ensure a shift from this mindset to ensure that the Bamboo



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Bikes Initiative is perceived as a true business opportunity that seeks to bring smart transport solutions for a cleaner world. 4. Road transport emissions could be greatly reduced if even a portion of journeys were replaced with smart, clean, efficient forms of transportation to minimize the effects of climate change and pollution caused by motoring.

## Conclusion

By exporting bamboo frames to international markets, the initiative assists in Ghanaian Government's efforts to develop the bamboo industry and its quest to export products to earn foreign exchange. The Ashanti Regional Health Services have agreed to the use of our bamboo bike ambulance for Obstetric Emergencies to improve the referral of expectant mothers to health clinics in situations where motorized transport is unavailable and address the existing gap in emergency health transport, due to the unaffordability of motorized transport systems by expectant mothers, coupled with the unavailability of a sufficient number of motorized emergency transports serving referral hospitals and medical centres in the rural areas. These bicycle ambulances have virtually zero running costs and capable of providing numerous lifesaving journeys. According to the World Bank, 10 bamboo bike ambulances can save 30 lives per month (10 lives per day x 30 days per month) while creating sustainable livelihood jobs and income for bamboo bike builders. In addition to the above, UNICEF Ghana has approached us on the possibilities of building bamboo bikes for girls thus shifting from their practice of importing steel bikes to support education in Ghana and contracting to build it locally for them using bamboo.