

Doubling Down on Inclusive Green Growth with Phase II of the Sino-Dutch-East Africa Bamboo Development Programme

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Abstract

The Sino-Dutch-East Africa Bamboo Development Programme is a trilateral cooperation initiative brokered by the International Bamboo and Rattan Organization (INBAR), which since 2016 has been harnessing Chinese and Dutch financial and technical assistance to kickstart bamboo value chains in Ethiopia, Kenya, and Uganda. Given the immense natural resource endowment in the region, and the encouraging achievements of the program's Phase I, a second phase was recently launched to further assist with the upscaling of the budding bamboo sectors and to further contribute to the simultaneous pursuits of various Sustainable Development Goals (SDGs)—ranging from poverty reduction, social inclusion, and responsible production and consumption to climate action, life on land, and affordable clean energy.

Keywords: SDGs, bamboo, sustainable development, trilateral cooperation, South–South, East Africa, China

1. Introduction

The value of the global market for bamboo and rattan products, including both domestic and international trade, has been estimated to have been between USD 50 and 60 billion in the 2010s and is expected to experience compound annual growth of 5.7% from 2021 to 2028 (Grand View Research, 2021). In this global market, the lion's share is undoubtedly that of the People's Republic of China, which ranks as the biggest producer and exporter of bamboo and rattan products, followed by the European Union (EU), ahead of the Philippines, Canada, and Mexico (INBAR, 2021). In particular, the Netherlands is a leading player within the European market, where over the years it has pioneered the development of the bamboo industry (Van der Lugt & Lobovikov, 2008). The EU is the world's top importer of bamboo and rattan products, followed by the USA and Japan.

Potentially, African nations could also become major players in the expanding bamboo and rattan market, considering the ecological settings that many of them feature—especially south of the Sahara—that naturally favor bamboo growth, as well as a wealth of bamboo species across the continent: out of 115 bamboo species found in Africa, 89.6% are indigenous, growing in 48 African countries and covering 4.56 million hectares in total

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(Bahru & Ding, 2021). Nevertheless, Africa has not yet fully tapped into this rich natural resource endowment: in stark contrast with its 12.3% share of the world's overall existing bamboo resources, Africa's share in the market of bamboo products is less than 1%, or USD 19 million worth of products (Bahru & Ding, 2021; INBAR, 2021). The vast untapped opportunities that the bamboo sector presents have been increasingly drawing attention from national and international development actors, within the region and beyond.

In this regard, from 2016, the Sino-Dutch-East Africa Bamboo Development Programme, brokered and implemented by the International Network for Bamboo And Rattan (INBAR)—a 44 member-strong, Beijing-based intergovernmental platform dedicated to the study and promotion of bamboo and rattan use for green and inclusive development—has been addressing precisely the shortcomings of bamboo value chain management in Ethiopia, Kenya, and Uganda (United Nations Office for South-South Cooperation [UNOSSC], 2022).

The first phase of the program was conducted between 2016 and 2019. Building on the experience and achievements of Phase I, a 2020–2023 Phase II of the Sino-Dutch-East Africa Bamboo Development Programme was recently launched so as to continue the harnessing of both Chinese and Dutch expertise in support of the further development of bamboo value chains in East Africa. This article briefly reviews the relevant properties that make bamboo an excellent simultaneous contributor to multiple Sustainable Development Goals (SDGs) and introduces the rationale of this unique cooperation program, employing a trilateral “South–North–South” paradigm. It then looks broadly at both the accomplishments of Phase I and the objectives of Phase II, in an ultimate attempt to further contribute to the growing debate over the holistic social, economic, and environmental benefits that could emerge from leveraging bamboo resources across the Global South.

2. Bamboo's Uses, Properties, and Contribution to the Global Sustainable Development Agenda

A fast-growing woody grass rather than a tree, bamboo is a non-timber forest resource that lends itself to a wide array of uses. It grows throughout the world's South, covering an estimated total of 40 million hectares globally (Lobovikov et al., 2007; Vorontsova et al., 2016). There are more than 1,600 known species of bamboo, mostly located in Africa, Asia, and Latin America, heavily utilized and cherished for both their cultural and economic value (Widenoja, 2007).

Today bamboo is employed as a raw material for a diverse range of value-added products—spanning from woven baskets to handicrafts and utensils, from furniture to mats, from flooring to pipes, from pulp, paper, and solid biofuel to textile fibers and more (Lobovikov, 2007)—thereby contributing to livelihood generation and employment opportunities at the household and enterprise levels (Mishra, 2015). Some bamboo species have been utilized as construction materials due to their versatility and high resistance (Ogunbiyi et al., 2015), while others have served as nutritious food or fodder (INBAR & UNOSSC, 2018). Functioning as a preserver of soil and water and as an effective carbon sequestration agent, bamboo provides crucial ecosystem services (INBAR & Tsinghua

University 2018; Song, 2011; Zhou, 2005). It also contributes to biodiversity conservation, as it serves as an essential habitat for wildlife (Linderman et al., 2005).

Over the years, some ecologists have addressed also the possible disruptive effects that bamboo farming may have on the ecological properties of an original ecosystem into which bamboo species are introduced, suggesting that bamboo cultivation may produce imbalances in the pH levels, nutrient cycling, microbial community composition, and respiration rates of the soil (Bai et al., 2016; Chang and Chiu, 2015; Umemura and Takenaka, 2015). Some scholarly work has also highlighted the potential reduction in plant density (Lima et al., 2012; Nelson et al., 2001) as well as the original forest ecosystems' lower resilience to diseases and insect attacks due to decreased biodiversity.

Notably, though, said studies are so far limited, indicating that informed, sustainable management of bamboo resources with proper invasion control would actually generate far more benefits than harm, from both an ecological and a socioeconomic standpoint. The ecological risks of bamboo farming appear to be especially manageable in vast tropical areas of the world, where most indigenous bamboo tends to be of the sympodial type, which is not particularly invasive (Durai & Long, 2019), compared with the monopodial type, which is found commonly in temperate regions and instead tends to compete more with other plants for soil nutrients, water, and sunshine due to its greater crown length and higher canopy position (Loewenstein, 2020; Xu, et al., 2020).

If expertly harnessed, much of the worldwide bamboo resources could significantly contribute to the successful pursuit of the global sustainable development agenda, including the UN Agenda 2030 for Sustainable Development and its SDGs, the 2015 Paris Agreement, and targets of the Post-2020 Global Biodiversity Framework. In particular, bamboo's versatility and many possible value chains (see Figure 1) could foster poverty reduction, clean energy use, sustainable housing, efficient and sustainable consumption and production, climate action, life on land, and effective global partnerships—in other words, SDGs 1, 7, 11, 12, 13, 15, and 17, respectively.



Figure 1. The contribution of bamboo to multiple Sustainable Development Goals

3. The Sino-Dutch-East Africa Bamboo Development Programme: Unlocking Green Growth Potential

The Sino-Dutch-East Africa Bamboo Development Programme is a unique “South–North–South” trilateral cooperation scheme that INBAR first initiated and then implemented. The program has relied on the financial and technical assistance of the State Forestry Administration (SFA) and Ministry of Commerce (MOFCOM) of the Chinese government (South) and of the Dutch Ministry of Foreign Affairs (North), with the aim of benefiting the infant bamboo industry in Kenya, Uganda, and Ethiopia (South), therefore mobilizing multiple local government agencies and private sector stakeholders. The program was launched in 2016 and, upon its conclusion in 2019, all actors involved agreed to keep working on the upscaling of bamboo value chains in the region until 2023. East Africa has 4% of the known global bamboo coverage and the largest share of bamboo present on the African continent (Durai et al., 2018; INBAR, 2016). Home to 1.47 million hectares of bamboo, Ethiopia possesses the largest bamboo resource stocks in Africa (Sebrala, 2021). Kenya and Uganda also host a wide range of bamboo-growing areas: approximately 133,273 hectares and 55,000 hectares, respectively (INBAR, 2022; Kenyan Ministry of Environment and Forestry, 2019). In Ethiopia, most of the naturally available bamboo is present in state forest and belongs to the species of “lowland” bamboo, while another species of bamboo, the so-called “highland” bamboo, is usually grown by smallholders on their farmland for its ease of processing and management (INBAR, 2018). In Kenya, bamboo coverage is concentrated in mountain ranges and forest areas under the management of the national government (Kenyan Ministry of Environment and Forestry, 2019). Similarly, the majority of bamboo resources in Uganda are located in located national parks and in forest reserves (INBAR, 2022).

However, the full potential to deliver socioeconomic development for sizable communities of these rich bamboo resources has not yet been harnessed. The population of Ethiopia is estimated to have reached 113 million in 2022 (Central Intelligence Agency [CIA], 2022), which makes it the second-largest country in Africa, after Nigeria. Both Kenya and Uganda are among the ten most-populous countries on the African continent, with estimated respective populations of 56 million and 48 million in 2022 (World Population Review, 2022). All three countries experienced rapid economic growth at the dawn of the 21st century. The average yearly growth rate of Ethiopia’s gross domestic product (GDP) in the decade between 2006 and 2016 was 10.3% —almost double the regional average of 5.4% (World Bank, 2022a). From 2015 to 2019, Kenya’s economy achieved broad-based growth, averaging 4.7% per year (World Bank, 2022b), while Uganda recorded a 6.3% growth rate in 2019 (International Monetary Fund, 2019).

Despite the remarkable trends of market output expansion, these East African countries are still faced with steep development challenges, including poverty, inequality, heavy reliance on agriculture, and the slow growth of high-value-adding sectors (World Bank, 2022). In 2022, the United Nations Development Programme’s Human Development Report indicated that the Human Development Index of ranked Ethiopia, Uganda, and Kenya 173rd, 159th, and 143rd respectively out of 188 countries. Around one-third or more of the locals lived on less than USD 1.90 per day (at purchasing power parity): 30.8% in Ethiopia, 37.1% in Kenya, 41.3% in Uganda (United Nations Development Programme

[UNDP], 2022). The proportion of the population living in multidimensional poverty is even larger: 68.6%, 37.5%, and 57.2% of the populations in Ethiopia, Kenya, and Uganda respectively (UNDP, 2022).

Based on World Bank data, more than half of the population in any of these countries was employed in agriculture in 2019: 66.63% in Ethiopia, 54.34% in Kenya, and 72.13% in Uganda. Yet the ratio between workforce and land-based activities appears to hide both inefficiencies and opportunities. For instance, Ethiopia's agricultural land, accounting for 36% of the total, contributes more than 40% to Ethiopian GDP, whereas forests, covering 12.5% of the national land, contribute less than 6% (CIA, 2022; Wondimu, 2018).

Over time, the main reasons behind the limited utilization of the bamboo resources in the region have included lack of reliable data on bamboo coverage and species availability (Bahru & Ding 2021; Durai et al., 2018; Food and Agriculture Organization [FAO], 2010; Lobovikov et al., 2007), as well as on production and trading of bamboo products—taking place mostly in the informal economy; insufficient production factors such as electricity (Eshetu, 2021), which have restricted bamboo utilization to small communities in rural areas, where this resource is confined to catering to sustenance needs in the informal economy, thus generating minimal wealth (INBAR, 2018); lack of a specific policy framework targeting bamboo resources, too often assimilated with the broad, generic discipline of “non-timber forest resources” (Monaco, 2019); various natural and human-related causes, such as human resettlement and agricultural expansion into bamboo-growing areas (Embaye, 2000; Lobovikov et al., 2007; United Nations Industrial Development Organization, 2009); and poor resource management and know-how concerning, in particular, seed collection, preservation, and processing, which hinder bamboo cultivation (Bahru, Mulatu, & Kidane, 2015). This inevitably results in a context where backward and forward market linkages are weak, and where micro and small enterprises that have access to bamboo raw materials and those that can reach a significant customer base appear dramatically distant and disconnected (Kalyan et al., 2018). In the global bamboo market, East African countries frequently encounter hurdles in regard to product originality, marketing outreach, and compliance with international trade and forestry standards (Musau, 2016).

The Sino-Dutch-East Africa trilateral cooperation program was conceived to intervene precisely on such criticalities. The participation of the Netherlands and China has been significant in achieving the intended goals: the Netherlands is a pioneer in industrial bamboo development and the largest bamboo market within the EU (Van der Lugt & Lobovikov, 2008). China itself is home to the world's largest bamboo forest coverage—around 6.7 million hectares in 2020—and to the broadest diversity of species—over 500, according to data from China's National Forestry and Grassland Administration (Xinhua News Agency, 2021). In 2020, the Chinese bamboo market reached an output of around USD 50 billion, and it is expected to reach USD 110 billion by 2025 and top USD 157 billion by 2035 (Beijing Review, 2022). This market-leading role has inevitably brought China to develop vast know-how on virtually every aspect of bamboo value chains' establishment, management, and upscaling.

4. How did Phase I Fare?

Overall, the performance evaluation conducted at the end of Phase I, in January 2020, confirmed the relevance, clear design, and coordinative partnerships of the program, yet it highlighted the need to further strengthen aspects such as gender inclusiveness as well as monitoring and evaluation frameworks (Government of the Netherlands, 2020). By developing bamboo value chains, the program's Phase I broadly and ambitiously aimed at poverty reduction and green economic growth; increased volumes of trade and investment in the bamboo sector; and land restoration and climate change mitigation (see Figure 2).

In the end, the trilateral “South–North–South” partnership paradigm—employing funding and expertise from the Netherlands and China—was effective not just at providing physical infrastructure and equipment but also at building overall capacity via technology transfer and training for sustainable bamboo resource management and use.



Figure 2. Objectives of the Sino-Dutch-East Africa Bamboo Development Programme—Phase I

According to the January 2020 evaluation report, Phase I partially achieved Objective 1 and entirely fulfilled Objectives 2 and 3.

The pursuit of Objective 1 (“Pro-poor, green economic growth”) consisted of, among other things, bamboo resource assessment through remote sensing, value chain, and market analysis as well as training sessions for local people. Throughout Phase I, in fact, a mobile application (“INBAR Global Survey”), a web platform documenting bamboo resources in Ethiopia, Kenya, and Uganda, and an online bamboo mapping system were developed and activated. These datasets provided practitioners across beneficiary countries with easy-to share information on bamboo locations, species, and density, as well as experiences and best practice. Additionally, a set of studies were conducted in the early stages of the program’s implementation, including preliminary, country-specific bamboo resource assessments and value chain and market analyses. In general, these studies highlighted that most resources in the region were underutilized and not sustainably managed; only a few firms were producing complex, industrial bamboo products (such as flooring, panels, stick-based products, or pulp and paper), while most existing bamboo products remained traditional in nature and confined to rural and traditional market segments. Moreover, bamboo value chains in Ethiopia, Kenya, and Uganda appeared fragmented and de-structured, with virtually nonexistent intermediary processing, resulting in the stuttering supply of raw materials and the inefficiency of the

entire bamboo sector. Despite acknowledging bamboo's potential for green and inclusive growth, the governments of Ethiopia, Kenya, and Uganda had not yet delivered on comprehensive policies for the specific and systematic exploitation of their vast bamboo resources: they largely limited themselves to issuing occasional transportation permissions to bamboo farmers and sporadic licenses to private companies that occasionally applied for access to public forest bamboo, rather than coordinating and nurturing value chain actors or supporting capacity diffusion among intermediary, value-adding businesses.

Overall, Phase I helped develop value chains for five bamboo products, increasing by 10–15% the income of more than 5,000 locals —60% of whom were based in Ethiopia, 30% in Kenya, and 10% in Uganda. However, there was an evident gender gap among beneficiaries: despite coming very close to its target, Phase I did not reach the desired goal of 50% female representation among farmer beneficiaries, due in large part to local socio-cultural contexts still heavily affected by patriarchal mindsets and land ownership systems. Gender imbalance also persisted at enterprise and industrial levels, where few women traditionally participate in decision-making processes or take managerial positions. Although the program was able to achieve an increase in women's participation in household and community production of items such as edible shoots and trinkets, returns from these small-scale productions were not sufficient to significantly boost women's income: in this regard, though, a substantial lack of baseline data posed significant obstacles to the conclusive evaluation of the program's results.

Inputs and activities concerning Objective 2 (“Expansion of trade and investment in the bamboo sector”) included the development of guidelines and standards for bamboo products in target countries, as well as the promotion of national awareness campaigns and regional workshops encouraging bamboo consumption and investment. As a result, Ethiopia's National Bamboo Strategy and Action Plan 2019–2030, Kenya's National Bamboo Policy, and Uganda's National Bamboo Strategy and Action Plan 2019–2029 were adopted in 2019. The adoption of these national bamboo development strategies is particularly important, considering the substantial lack of any such policy in beneficiary countries prior to the trilateral program itself (INBAR, 2019). These plans—crucially distinguishing bamboo from other non-timber forestry resources and prioritizing its very contribution to sustainable national development—signal new public governance efforts aimed at harnessing untapped bamboo resources, diversifying people's livelihoods (Kenya News Agency, 2019), promoting the private sector's involvement in the bamboo economy (Gashaw, 2021), and utilizing bamboo for climate action (The EastAfrican, 2021).

Additionally, Kenya and Uganda have obtained membership of the International Organization for Standardization (ISO)/Technical Committee (TC) 296 (on bamboo and rattan), which will facilitate the compliance of national standards with international requirements. A total of 14 bamboo product processing guidelines were established, resulting in 18 national standards and codes of practice in Ethiopia, Kenya, and Uganda. The program also witnessed 15 international and national bamboo conferences, forums, trade fairs, and exhibitions, and one investor tour, which contributed to greater awareness and business connections.

Overall, these efforts mobilized new grants and investment of more than USD 3.5 million from public and private actors (such as the Inter-Africa Bamboo Development Programme; SA Bamboo Works PLC; Common Fund for Commodities; and the China

International Development Cooperation Agency – Ministry of Commerce of China Bamboo Bio-energy Project) to projects affiliated with the program, which contributed to a 10% increase in bamboo trade across Ethiopia, Kenya, and Uganda.

The results achieved in pursuit of Objective 3 (“Land restoration and climate change mitigation”) were also positive and included the establishment of bamboo nurseries, the delivery of training programs on bamboo resource management, and the completion of several land restoration and carbon credit demonstration and projects: 18 large-scale nurseries and 15 small-scale nurseries were established; 118 training courses, some of which were provided by China’s MOFCOM and universities such as Zhejiang Agricultural and Forestry University, were organized for 5,073 beneficiaries; around 1,250.39 hectares of bamboo was brought under sustainable management, while a total of 1,465.9 hectares of degraded land was restored, benefiting 3,342 households, and 2,000 hectares of bamboo forest was demarcated as bamboo carbon credit demonstration projects. The outcomes exceeded expectations and indicated a positive trajectory toward sustainable utilization of bamboo resources.

5. Phase II and the Way Forward: Gender Inclusiveness and Monitoring Frameworks

The 2020–2023 Phase II of the Sino-Dutch-East Africa Programme builds on the experience of Phase I, with revisited objectives that include poverty alleviation through upscaling and diversification of bamboo value chains; ecological and livelihood resilience through bamboo restoration and sustainable management; and increased investment in the bamboo sector via enhancing market development and policy and regulatory frameworks (see Figure 3).



Figure 3. Positioning of Phase II objectives in relation to sustainable development domains

To better incorporate gender inclusion into the livelihood improvement process, Phase II focuses on grassroot community engagement, as well as on activities and platforms that specifically target women’s participation, such as craft making, bamboo nurseries, and household charcoal briquetting enterprises. Promoting women’s participation in capacity-building events such as training sessions—for instance by disseminating information and best practice from successful women-led bamboo businesses in the region and beyond—is a priority, with the aim, ultimately, of promoting increased access to managerial and decision-making positions. For instance, INBAR has been cooperating closely with Arba Minch University in Ethiopia to provide targeted support on bamboo nursery and product

selling for 100 households led by widowed women in five kebeles in rural Chenchu Wereda. This project provides beneficiary women with training that strengthens their skills in managing bamboo nurseries, designing traditional bamboo handcrafts with higher added value, and marketing and financial operations.

Another improvement expected in the implementation of Phase II is the enhancing of monitoring and evaluation frameworks—complete, wherever possible, with more solid baselines and tracking and reporting systems, to inform a more rigorous future assessment of results and shortcomings.

Despite the dramatic challenges posed so far by the ongoing civil conflict in Ethiopia and the global COVID-19 pandemic, the program seems, in general, to have entered its second phase with better awareness and renewed confidence: the new set of objectives appears even more holistic and synergistic in nature, as each objective contributes to a least two of the four dimensions of sustainable development—i.e. economy, society, environment, and governance—thus reflecting the very nature of the modern global quest for sustainability and signaling a qualitatively improved, not merely extended, Sino-Dutch-East Africa Bamboo Development Programme.

6. Conclusion

The significant aspects of the ongoing Sino-Dutch-East Africa Bamboo Development Programme are multiple, and all deserving of further research and academic debate—both now and, perhaps more importantly, upon the full completion of the program. Translating the often immense natural resource endowments of some of the poorest, most marginalized communities on the planet into real simultaneous opportunities for poverty reduction, climate action, and international trade in line with the principles of the Agenda 2030 and its SDGs is a undertaking the relevance of which transcends the mere bamboo sector, and the limited geographical scope of China, the Netherlands, and East Africa. Identifying paradigms possibly applicable elsewhere and to other natural resources is imperative to ignite the inclusive, pro-poor “green” growth that much of the world today requires from both the public and the private sectors. Bamboo certainly is not a miracle plant able to heal all the development woes of the tropical and subtropical South. It is but one of many resources that, with proper financial and technical capacity—and thus with injections of not only mere capital but also, most crucially, knowledge and expertise—*can* be harnessed to the advantage of those who need livelihood improvement the most, in harmony with the very environment that gifts such precious resources in the first place.

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