The development of a bamboo utilization tool for Ghana

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In many tropical forests the sustainable use of bamboo resources is an important part of forest management. Bamboo has about 1500 documented uses worldwide (INBAR 2006). While its use in Southeast Asia is widespread, the extent of bamboo utilization in Ghana is relatively low. This is due largely to a lack of knowledge about the technical properties of native bamboo species and also poor processing techniques (UNIDO 2001). Nevertheless, the creation of a sound bamboo industry would help ease the pressure on Ghana's natural forests.

In an effort to address the under-utilization of bamboo resources in Ghana, ITTO's Fellowship program supported work to obtain data and information on the essential technological properties of bamboo species and their relationships in different ecological zones of southern Ghana. Specifically, the ultramicrostructural, physical, thermogravimetric behaviour, chemical and phytochemical properties of bamboo species were studied (Tekpetey *et al.* 2007; Tekpetey 2006).

Simply knowing technical properties is insufficient for the creation of a viable bamboo-based industry. It was clear that a tool to help determine the most appropriate uses for bamboo resources (both in natural stands and plantations) in a specific area and at particular times was needed in African tropical countries in which bamboo is common. This article introduces the Bamboo Utilization Tool (BuT), which has been created to bridge the knowledge gap on bamboo use; it is hoped it will help underpin a process towards the sustainable use of bamboo resources.

The BuT approach

BuT involves the integration of geographical, technological and socio-cultural information pertaining to the quality, quantity and consumption patterns of native bamboo resources in Ghana. A review of earlier research on bamboo resources identified some commonalities as well as significant variations in bamboo parameters among bamboo-growing countries (Ebanyenle and Oteng-Amoako 2007; Hartter and Boston 2006, Smith *et al.* 2006). A number of these parameters interact to determine the uses to which a bamboo resource in a developing country like Ghana can be put.

A BuT analysis proceeds in four steps. The first three of these involve the collection of values for three indices: 1) an 'availability and accessibility' index; 2) a 'technological property' index; and 3) a 'socio-cultural' index. The fourth step in the process involves the use of an integration module. BuT can be represented by the following equation:

BuT = (AAi + TPi + SCi), where:

AAi = the availability and accessibility index

TPi = the technological properties index

SCi = the socio-cultural index.

Each index is described below.

AAi: This index is a numerical summation of the ranking of the extent and quality of bamboo resources in a geographical location at a specific time. It considers both natural and planted stands of bamboo as well as bamboo species diversity and the accessibility of the resource.

ITTO fellowships offered

ITTO offers fellowships through the Freezailah Fellowship Fund to promote human resource development and to strengthen professional expertise in member countries in tropical forestry and related disciplines. The goal is to promote the sustainable management of tropical forests, the efficient use and processing of tropical timber, and better economic information about the international trade in tropical timber.

Eligible activities include:

- participation in short-term training courses, training internships, study tours, lecture/demonstration tours and international/regional conferences;
- technical document preparation, publication and dissemination, such as manuals and monographs; and
- post-graduate studies.

Priority areas: eligible activities aim to develop human resources and professional expertise in one or more of the following areas:

- improving transparency of the international tropical timber market;
- promoting tropical timber from sustainably managed sources;
- supporting activities to secure tropical timber resources;
- promoting sustainable management of tropical forest resources;
- promoting increased and further processing of tropical timber from sustainable sources; and
- improving industry's efficiency in the processing and utilization of tropical timber from sustainable sources.

In any of the above, the following are relevant:

- enhancing public relations, awareness and education;
- sharing information, knowledge and technology; and
- research and development.

Selection criteria: Fellowship applications will be assessed against the following selection criteria (in no priority order):

- consistency of the proposed activity with the Program's objective and priority areas;
- qualifications of the applicant to undertake the proposed fellowship activity;
- the potential of the skills and knowledge acquired or advanced under the fellowship activity to lead to wider applications and benefits nationally and internationally; and
- reasonableness of costs in relation to the proposed fellowship activity.

The maximum amount for a fellowship grant is US$10 000. Only nationals of ITTO member countries are eligible to apply. The next deadline for applications is **14 August 2009** for activities that will begin after 1 January 2010. Applications will be appraised in November 2009.

Further details and application forms (in English, French or Spanish) are available from Dr. Chisato Aoki, Fellowship Program, ITTO; Fax 81–45–223 1111; fellowship@itto.or.jp (see page 2 for ITTO's postal address) or go to www.itto.int.

BuT testing: Sample collection at Assin Fosu *Photo: S. Tekpetey*

TPI: This index measures the quality of the bamboo stands, encompassing the evaluation of anatomical properties, type of bamboo, extractive content, cellulose content and photochemical results of extractives. Other components of the index include the physical (basic density and moisture content), morphological and mechanical properties of interest.

SCI: This index captures the level of interest and awareness of the communities, their belief systems, and the land tenure issues surrounding bamboo resource use. Others factors include technical know-how, skilled labour and the availability of experts in the region of interest.

For all three indices, rankings are assigned in the range 1–5, where 1 or 2 = high, 3 or 4 = moderate, and 5 = low.

Integration module

The integration module synthesizes and analyzes interactions among the three BuT indices; it uses the assigned values to select the most appropriate management strategy for a given area. Strategy options include: product diversity and marketing (which would be indicated by a total score of 1–3); industrial processing (premium-value, medium-value, low-value and bulk processing), indicated by a score of 4–7; education and awareness creation, indicated by a score of 8–10; and ecotourism, the conservation of natural resources, and plantation management, indicated by a score of 11–15.

Rapid assessment of BuT in Assin Fosu

A preliminary rapid assessment of BuT was undertaken at Assin Fosu in southern Ghana (Figure 1). Although a proper bamboo inventory is yet to be undertaken in Ghana, *Bambusa vulgaris var. vulgaris* was identified as the main bamboo species in the area; it is available in the district on farmland and in forest reserves. Assin Fosu's bamboo resource AAi was assigned a value of 4 and, based on earlier technical work (Tekpetey *et al.* 2007) its TPI scored 3. Although the level of awareness about bamboo was generally low among the local people, the region has a bamboo factory with highly skilled staff; the SCI, therefore, received a score of 3. Overall, the BuT value (AAi +TPI+ SCI) was 10. This suggests that an appropriate management strategy for the area would be one that creates awareness and diversifies products.

Conclusion

BuT is a location-specific and time-bound decision-making tool for the sustainable utilization of bamboo resources. It can assist stakeholders in Ghana and other countries to deploy scarce financial resources in a bid to find economically and socially viable uses for their bamboo resources. Further collaboration among bamboo-growing countries and relevant governmental and non-governmental organizations is recommended to further develop BuT to ensure its wide and effective use.

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Study towns:

Figure 1. Location of three bamboo-growing areas in southern Ghana