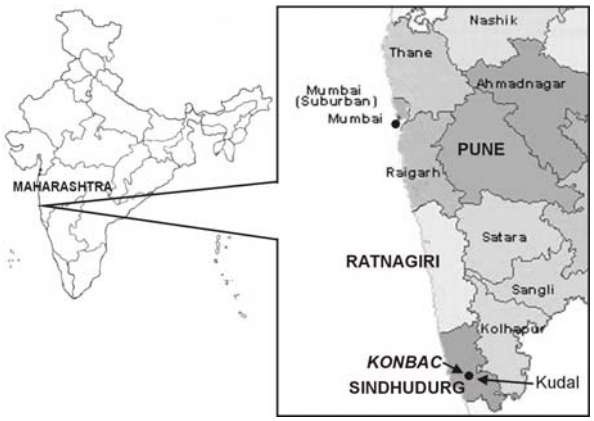
TECHNICAL ADVISORY NOTE (TAN)

Accessing High-Value Markets for Livelihood Enhancement: Bamboo Crates for Fruit Packing Markets

INBAR
INTERNATIONAL NETWORK FOR BAMBOO AND RATTAN

INTRODUCTION

In Kudal, Sindhudurg district, Maharasthra, KONBAC, an INBAR-established community-based NGO, has successfully developed bamboo packaging for the local mango fruit market. The crates, which were designed in consultation with mango growers, are made locally, using simple technology and processing techniques. Through the pilot production phase (2005-07), two work units have been established, providing livelihoods to around 90 local unemployed youths. During the growing season, these youths are able to make incomes of around US$ 100 per month.



In addition to KONBAC, the project receives support from NMBA, which originally provided a subsidy of INR 6 (approx. US$ 0.12) per crate to support development costs and enable the crates to compete with wooden alternatives. As production capacity and techniques improve, costs of bamboo crates will fall, enabling them to match wooden crate prices without a subsidy. The crates have already been positively reviewed by local farmers, who are willing to use them as long as prices are competitive.

The Context

Due to the presence of a large local market for mango packing in Konkan, INBAR and KONBAC decided to pilot bamboo crates as an alternative to wood-based production. The project aimed to changed local wood-based production patterns, which are unsustainable and often exclude the rural poor.

The decision to work with local bamboo resources was also promoted by the long tradition of rural bamboo artisanship in Konkan. There are an estimated 8,861 families engaged in bamboo-related activities in Sindhudurg district alone. Therefore, a number of local community members already possess primary and secondary bamboo processing skills, which facilitates the implementation of bamboo-based research programmes.

However, the local bamboo sector is heavily under-developed, with minimal institutional support available for local producers. This has resulted in the production of a number of utilitarian bamboo products, which cater solely to local markets. Owing to lack of local technical capacity, these products rely on simple designs and are often of low quality. With the emergence of plastics, many bamboo producers are now being forced to leave the sector. Therefore, this research aimed to diversify production by targeting a large mainstream market.

The bamboo species used for the crates is Bambusa bambos, a species shunned by local people owing to a cultural bias. Thus, the activity made use of a resource that was otherwise ignored. Development of bamboo crates for packing has also helped to address imbalances in the region's gender distribution ratio. A large number of male youths have migrated to urban centres due to the lack of local livelihood opportunities. Through developing bamboo crate production units and providing rural youths with capacity building, KONBAC is therefore generating enhanced livelihood opportunities for young males.

The Process: bamboo crate production

Harvesting bamboo

Transportation of bamboo culms

Drilling holes for treatment

Chemical treatment of culms

Cutting culms into kit form

Pneumatic stapling the slivers

Pneumatic stapling the slivers

Assembling

Handling the boxes to mango growers

Packaging in final stage

Packaging in final stage

Finished product in transport

Main Successful Technical Components of the Research Programme:

- Successful development and prototyping of bamboo packing crates for transporting *Alphonso* mangoes.
- Extensive field-trialling of the prototype bamboo crates.
- Local youth trained in production techniques required to produce bamboo crates.
- Equipping of the Kudal CFC with processing machinery for bamboo crate production: cross-cutter, external node remover, splitter, bamboo strip sizer & pneumatic stapler.
- Developing functional work units.
- Creating marketing links with local mango growers.

Scope for Replication

***Scaling-up*:** With the demand for packaging in the local mango sector being huge, ample scope exists for up-scaling current bamboo crate production. Local mango growers are estimated to consume 3 million wooden crates per year, with the resultant packaging market valued at US$1.9 million. In recent years, increasing pressure on timber resources has seen the cost of wood products rise significantly. Crates made from a fast-growing, sustainable resource base like bamboo (picture left) will be an increasingly competitive alternative. In addition, bamboo crates can be made directly by the rural poor following two-week training courses. This provides livelihoods for rural youth, promoting local enterprise. However, despite bamboo's numerous advantages, production costs for the crates still need to be lowered to make them competitively priced against wooden equivalents. At present, it costs Rs 32 to produce one bamboo crate. In comparison, a wooden crate sells for between Rs 25-28. Currently, bamboo crates are being supported through a subsidy from NMBA, which enables rural producers to sell at competitive prices. In order to ensure long-term sustainable expansion of the research project, production processes and design will need to be modified to lower costs. Diversification of bamboo packaging products could significantly aid up-scaling efforts. Importantly, owing to increasing shortages of timber, the cost of wood crates will also continue to raise, making bamboo alternatives increasingly competitive over time.

***Scaling out*:** In India alone, damage that occurs in handling, storage and packaging is responsible for 40% of post-harvest losses and accounts for extra costs of US$890 million per annum. Significant potential exists for out-scaling production of durable, strong bamboo crates to meet the demand for improved packing in the fruit and vegetable sector. Furthermore, Since 1996, the Supreme Court of India has enforced a commercial tree-felling ban, which is now making wood packaging increasingly expensive. In the future, this will provide bamboo producers with greater opportunities to enter the packaging market. As a worldwide industry, bamboo crate production could also be adaptively replicated in a number of countries across Africa, Asia and Latin America, where timber resources are being placed under increasing pressure. As with local up-scaling, diversification of bamboo packaging products will aid replication efforts in other regions of India, as well as other countries. In Tanzania, for example, INBAR has already developed collapsible crates, which can carry up to 10 kg of tomatoes.

SECTION ONE: THE INSTITUTIONAL CONTEXT

- The project is one of several INBAR ARS programmes developed by the INBAR Livelihood and Economic Development Programme, under IFAD grants TAG 774

SECTION TWO : THE PROGRAMME IMPLEMENTATION

Target Groups and Outputs

Target groups: The project targets local unemployed youths

The main project outputs are:

- Development of bamboo packaging, which met local mango growers quality demands
- Successful community training programme established for bamboo packaging
- A trial batch of 3,500 crates was produced and field-validated in 2005-06.

Impacts

Tangible Impacts

Impacts on the human capital:

- 94 young men were trained in bamboo crate production.

Impacts on the social capital:

- Formation of community partnerships between KONBAC and local mango growers.
- Changing general perception of the bamboo species *Bambusa bambos* as a material unfit for use in production.
- Equipping the CFC for bamboo crate production.
- Establishing a subsidy system with NMBA to promote access to local markets (picture above right).

Impacts on the natural capital:

- Increased demand for bamboo, reducing pressure on local timber resources.

Intangible Impacts

- During 2006-07, 24,000 crates were sold to 140 mango growers.
- Work units, which have a maximum production capacity of 10,000 crates per mango growing season, have now been established at the CFC in Kudal
- One working shift at the work unit provides employment to between 20-25 local youths, with producers earning incomes of INR 4,500 (US$ 90) per month.

Constraints Faced During the Programme Implementation

Internal:

- Poor artisan production capacities due to a lack of access to new technology & training.
- Inadequate linkages between community producers and commercial markets.
- Rural communities unable to access market information or conduct market research.
- No community infrastructure in place to support development of the bamboo sector.

External:

- Small producers have difficulty gaining access to credit financing, thus constraining attempts to up-scale production.
- Inconsistent policies and legal regimes limit access to available bamboo resources.
- Continued lack of local awareness about bamboo's economic potential as a raw material for packaging.
- Lack of institutional price regulation for raw bamboo in the region, leading to unstable production costs.

Accessibility

Owing to KONBAC's linkages with CIBART and INBAR, technical and research outputs from the programme are available for replication at both the national and international level. In India, institutional linkages are established through CIBART, which manages four Indian ARS (Tripura, Tamenglong, Himachal, and Konkan). Internationally, action research from Konkan can be adaptively replicated across INBAR's 34-country network. Research outputs are available at low, or no cost to individuals and community groups operating in member countries.

Institutional Sustainability and Degree of Farmers' Involvement in the Research Programme

The programme is run by KONBAC, a community-based NGO, established by CIBART in 2004. Community stakeholders (master trainers and development professionals) play an active role in decision-making, with external partners (CIBART, NMBA and INBAR) providing technical and logistical support. Community ownership of KONBAC ensures that the organization remains directly rooted to the local area, thus promoting long-term sustainability.

The Kudal CFC, which is owned and run by KONBAC, provides rural youths with access to processing technology for making bamboo crates. Rural community members are able to participate directly in community trainings at the CFC. The facility also serves local farmers as a base for marketing their bamboo products. The packaging was developed at the CFC in close consultation with local mango growers, who defined the working requirements of the crates. At each stage of prototyping, the growers' feedback was sought. This has resulted in the development of crates that meet all functional criteria. A number of farmers have expressed interest in switching from wooden to bamboo crates, if it proves cost-effective.

The Gender Dimension

Although the bamboo crate programme has specifically targeted male youths, it has had indirect benefits for local women. Through generating local livelihoods, the programme has contributed to a reduction in male migration to urban centres. This has alleviated pressure on rural women, by increasing net household incomes. In addition, women often supply primary processed bamboo, used for crate production.

Dissemination Pathways

Communication strategies at the village level:

- CFC-based training courses led by Master Trainers
- Face-to-face meetings
- Artisan-to-artisan communication

Communication strategies at the National and International levels

- Trade Fairs and product workshops
- Technical reports and publications

Further Research Needs

- Encourage Private-CSO Partnerships to enable rural communities to access working credit funds, such as bank loans. This will enable community enterprises to meet growing working capital needs, based on their positive cash flow and annual growth.
- Expand training programmes to more local youths.
- Conduct further prototyping to refine production methods and lower costs.
- Develop new product ranges for bamboo packaging to diversify into other fruit and vegetable markets.

Annex One: Data Box

The Research Programme

The research programme helps rural communities develop technologies and processing techniques for local bamboo resources, thereby generating enhanced livelihood and income-earning opportunities. At the local level, the programme is implemented by KONBAC, a community-based NGO. KONBAC focuses on developing bamboo products and business models for community enterprise. The Kudal CFC, established through a grant from the Development Commissioner of Handicrafts, operates as the programme's base for community training, production, and marketing.

At the village level, participatory approaches are encouraged through the SHGs and a Joint Forest Management Committee. Women are also heavily involved, with KONBAC employing Women's Officers to liaise with key stakeholders in the local community.

Bamboo Crate Production: The bamboo crates were developed and prototyped at the Kudal CFC. Production involves processing bamboo culms using CFC equipment. Firstly, the bamboo culms are crosscut. Following machine crosscutting, the culm sections then have their external nodes removed. Next, the sections are split into uniform-sized strips, which are then bent to form crates. A numeric stapler is used to hold the strips together.

SECTION THREE: USEFUL INFORMATION

Keywords:

Konkan, KONBAC, bamboo, crate, mango, packing, packaging

Useful links:

www.inbar.int

www.inbar.int/livelihood/ldmain.htm (INBAR's Livelihood Development Programme)

http://www.cibart.org/tribac.asp

References:

Livelihood Impact Assessment of Rural Enterprises at Kudal, Maharashtra

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Acronyms:

ARS	: Action Research Site
CFC	: Common Facility Centre
CIBART	: Centre for Indian Bamboo Resource and Technology
CSO	: Civil society organization
IFAD	: International Fund for Agricultural Development
INBAR	: International Network for Bamboo and Rattan
KONBAC	: Konkan Bamboo and Cane Development Centre
NGO	: Non-governmental organization
NMBA	: National Mission on Bamboo Applications
SHG	: Self-help group