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Prof. Rao is deeply involved in articulating design for economic development. In the project 'Design Inputs in Craft Areas' he is trying to find a direction for craft in today's design context.

AN APPROACH TO BAMBOO CRAFT

A. G. Rao

A well crafted bamboo product stands out as an example of human ingenuity. In 1975, I bought a bamboo basket of astonishing quality in Ranchi (India) for Rs 1.60. Later I found that the basket was actually a sieve used by local tribals for making rice wine. The tetrahedron shaped sieve is intact till today even after 19 years. The integrated geometrical shape of the container reminds us of one of those sophisticated, experimental forms generated at the famous design school of Ulm (Germany). My later involvement with bamboo brought more surprises. India has the second largest resources

of bamboo in the world. The bamboo craft has reached its heights only in the north Eastern parts of the country. Though as many as 13 lakh persons are involved in bamboo work all over the country.

In the other bamboo growing countries like China, Japan, Korea and Malaysia it is well respected craft integrated widely and deeply into their cultures. In Korea, the nobilities of a person are compared with qualities of bamboo. In Japan, bamboo products are a part of many rituals like Tea ceremony and marriage. Even



today one can find bamboo products in shops all over Japan being sold at premium prices. China and Taiwan with their efficient production base are able to sell their bamboo products in the world markets.

The surprising thing in India is that even when bamboo offers a high employment potential in the craft sector, much of the bamboo is supplied to paper industry at a subsidized rate. Unconcerned exploitation of bamboo forests has led to ecological damage.

Can we integrate the incredible knowledge, skills and attitudes inherent in a traditional craft into our Education? Is it possible to use the vast resources of bamboo in the country intelligently without causing ecological damage? Can we offer a meaningful, attractive "craft employment" to our bamboo craftsmen? can our bamboo products reach international markets? It is attempted to answer these queries under three broad heads.

- 1.0 Bamboo craft in Education
- 2.0 Bamboo resources: appropriate use
- 3.0 Bamboo craft Industry.

1.0 Bamboo craft in Education.

Today our general education is in a dismal state in terms of developing values, aptitudes and originality. Scientists and engineers passing out of our system, who are in large numbers, have great difficulty in conceiving original solutions to our problems. Low status for "working with ones hands" has hampered our engineering education to an extent that we have yet to make a mark in producing innovative, relevant technologies. Failure to recognise "technology"

as an extension of craft, has resulted into segregation and neglect of craft.

This aberration has historical roots. In India, crafts were practised by certain communities for generations. But these craft communities belonged to the so called lower castes. The modern education introduced by British attracted the socially dominating upper castes in general and the brahmnical class in particular. Thus people who took to modern education had little traditional family background of crafts and socially disadvantaged craftsmen couldn't get the modern educational inputs. The colonial government had little concern in educating the craftsmen in modern technologies as they saw craftsmen as potential threats to their industries.

The educational pattern and thinking, set at the time of British has continued even after independence. The loss of respect for hand skills and crafts got reinforced over the years making even technical education bookish and examination oriented. As a result even today our educational planners do not recognise the importance of craft learning in the general education.

Once again we need to look at Japan for its ability to link crafts with modern technological progress. Sheridan Tatsumo in his book "Created in Japan from imitators to world class innovators", attributes much of Japanese success in creating miniaturised modern electronic gadgets, to the training given in Origami - papercraft to every Japanese child.

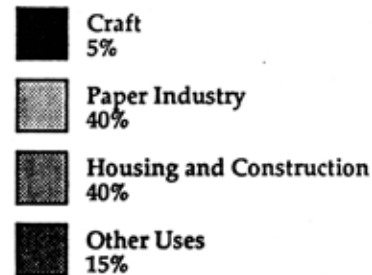
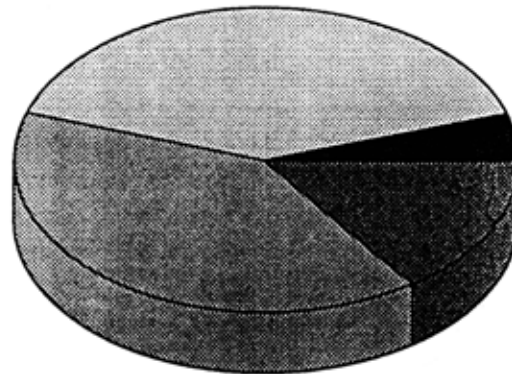
It is high time that we recognise the potentials of craft learning in general education. Specialists in the development of creativity in children, have



2.0 Bamboo resources: appropriate use

India stands second in the world among bamboo growing countries, China having the largest resource of bamboo. We have in India 10.03 million hectares of bamboo forests producing 3.2 million tonnes of bamboo annually. Of this 40% goes to paper industry at subsidized rate of Rs 50/- to Rs 160/- per tonne. Only 5% of bamboo goes to the craft sector. Craftsmen have to pay as much as Rs 1000 to 3000/- per tonne of bamboo in the open market.

Total number of persons dependent on bamboo are estimated to be 13.5 lakhs out of which 5-6 lakh workers are involved in bamboo craft. Paper industry has been a poor employment generater. Poorly conceived subsidies to paper industry has caused many ills. Forests have dwindled with insufficient incentive for replantation. Paper Industry which gets long term leases has seen bamboo as one time exploitable resource. With the result, industries don't not care to leave the one foot high stump while cutting to ensure the regrowth of bamboo.



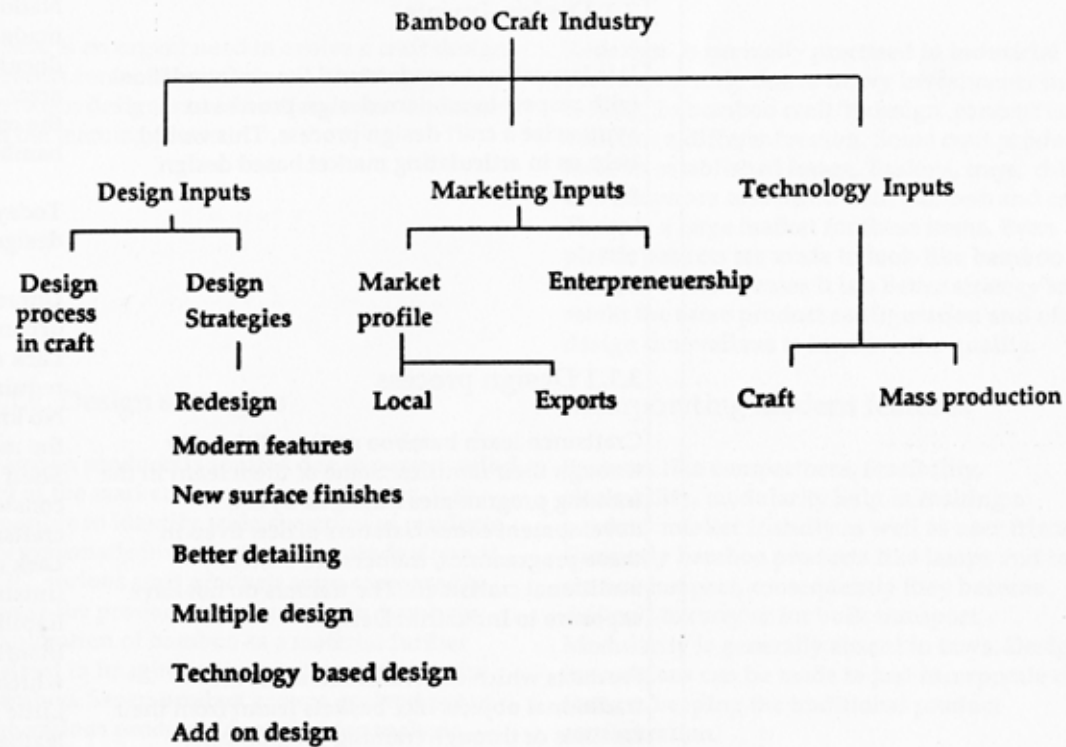
Bamboo Resource Utilisation



A minimum charge of Rs 500/- per tonne, would ensure commercial growing of bamboo. Bamboo is a fast growing plant. As a biodegradable natural material with excellent mechanical properties, it is a better choice for making products than paper. Removing the current subsidies can lead to a stabilised market rate of Rs 500/- tonne, either for product use or for making paper.

3.0 Bamboo craft industry

With the general material crunch and raise in demands for eco-friendly materials, it is strategically advantageous to increase the use of bamboo in products. Little attention has been paid to this aspect so far. Neglect of bamboo craft as well as industry has made bamboo work unattractive. We need to take a fresh look at the bamboo craft industry, with a view to utilise the exquisite craft skills of the north eastern parts for better economic growth and to generate





meaningful employment in bamboo work in the country at large.

It is also imperative that our bamboo products become internationally competitive. For such a quantum change we need to treat bamboo work not merely as a craft but as a craft industry. Let us look at the basic inputs in Design, Management and training required for bamboo craft industry to survive and compete in the world markets.

3.1 Design Inputs

It is important to understand the craft traditions with respect to modern design process to synthesize a craft design process. This would help us in articulating market based design strategies.

3.1.1 Design process

Craftsmen learn bamboo craft traditionally through their families. Some of them learn in the training programmes arranged by the development commissioners office. Even in these programmes, trainers are basically traditional craftsmen. The trainers do not have exposure to Industrial Design.

Products which the craftsmen make are traditional objects like baskets learnt from their families or through training programmes.

Occasionally new product ideas are brought in either by craftsmen's intuition or due to the demands made by a customer. Generally a craftsman sells the products himself. Consequently he has a direct access to user and user demands. Sometimes he makes a new design, to order, by an architect or an interior designer.

Designers formally trained in modern western design methods have been greatly inhibited to enter into craft area. Bamboo craft has been no exception. Lack of ready western model to follow may be one of the reasons. However, National institute of design at Ahmedabad has made a pioneering effort in recent times in documenting the bamboo craft of north eastern areas. This still leaves many gaps to be filled in the course of developing a suitable process for bamboo craft design.

Today the major drawbacks of a craftsman as a designer are :

Unfamiliarity with the requirements of the urban user.

Lack of training in systematic study of user requirements.

No knowledge of marketing channels other than the melas and exhibitions.

Shelf life, modularity and packaging considerations are not understood by the craftsmen today.

Lack of perception in aspects like durable finishes, product ergonomics and product liability etc.

Insufficient knowledge of tools, jigs and fixtures which help to increase productivity.

Little knowledge of other materials like plastics, leather, composites etc.



It is imperative that modern design inputs are incorporated to offset the above drawbacks. A trained industrial designer also has many handicaps to design bamboo products like:

Lack of first hand knowledge of techniques used by the craftsmen.

Lack of readily available data on types and properties of bamboo.

Lack of model making and simulation techniques for bamboo.

Lack of access to high craft skills for making prototypes.

Lack of design data on composite materials with bamboo as base.

There is an urgent need to evolve a craft design process for bamboo products. Working groups between designers and craftsmen can be formed in the learning phase.

3.1.2 Design strategies

Bamboo products is limited due to current mind set of the market segment it could cater. It is possible to identify wide spectrum of products by systematic investigation. In a study done at IDC, various craft products were compared to locate the product opportunities in bamboo. Exploration of bamboo as a material further helped in imagining the product possibility in bamboo. Seven product groups evolved out of the various products identified for analysis.

- . Gifts and souvenirs.
- . Stationery items.
- . Household and kitchen items.
- . Lamps.
- . Furniture.
- . Carrying items and containers.
- . Packaging containers.

Several design strategies are proposed which can be applied to different categories. These design strategies can give competitive edge to the bamboo products in the market.

Redesign

Redesign is normally practised in industrial products mainly due to heavy investments in tooling. In bamboo craft 'redesign' concept is valid for a different reason. Some craft products have an established image. Baskets, trays, chics and lamps are associated with bamboo and cane. There is a large market for these items. Even plastic baskets are made to look like bamboo baskets. In these cases it is a better strategy to retain the same product configuration and offer design innovations to improve the quality.

Incorporating modern features

Features like compactness, feasibility, stackability, modularity help in making a product market friendly as well as user friendly. Currently bamboo products like lamps and trays are not compact, consequently they become difficult to carry or for bulk transport. Modularity is generally absent in trays. Design innovations can be made to just incorporate this feature, keeping the traditional product configuration.



Use of new Surface finishes

New surface finishes like melamine spray or spray painted colours can be introduced in bamboo products. The products need to be redesigned to facilitate use of such techniques. Traditional techniques like smoking to get browns need to be used more effectively. For eg. smoked brown tray could have a black matt painted at the rim to give new colour combination.

Techniques like screen printing and pad printing can be used to enhance surface value of the products which acquire a new semantic significance. With such technical inputs, decorative patterns with letterforms of Indian languages can provide a new dimension to transform the products.

Better detailing

Details like joints, rims and hinges need design attention. Mass production of these elements with the help of jigs and fixtures can be thought of. Even moulding some of these elements can make the products durable with better setup and finish. Such elements can give a new scope for aesthetic expressions. Better detailing can reduce number of operations in making the products thus bringing down the costs.

Multiple designs or designs in numbers

Offering a large number of designs or variety is an Indian tradition. Indian sarees are well known for their innumerable variations in the borders, colours and patterns. The strategy of design in numbers will suit well to craft products, especially for 'gift items'. Designing needs to be thought like a computer programme in this case. Each design element can be construed as a variable. The change of variables will give new designs. A paper knife in bamboo was taken up to experiment with this strategy. As many as 50 design variations were developed.

Similar approach is practised in Japan traditionally. Each group of craftsmen belonging to a village or a family produce one variation in design. Similar to saree styles like "Dharmavaram sarees" or "Kanjivaram sarees", the bamboo products can also be identified with that group. Thus each group produces unique product variation.

Technology based new designs

New technology is being applied to bamboo processing. Resin bound bamboo boards, bamboo laminations, bamboo bending, square and triangular sections using bamboo splits are few examples. It is strategically advantageous to think of new product designs with such technology rather than trying to compete with the existing products. For example, resin bound boards made out of bamboo mats are being manufactured by two organisations. The boards are of high quality in strength and looks. But the



user compares them with plywood sheets and formica. Consequently a new product like bamboo board has to be needlessly compared in every detail like workability, cost, weight etc. with plywood boards. Here a design strategy to think of new product lines in resin bound bamboo would be more beneficial. New products using this process would be easier to market. High value chair shells can be moulded with the same process, as bamboo mats are flexible. Many specific furniture items like train seats can be conceived in moulded shapes.

Briefcase shells can be another item which can be made from the same process. Laminated bamboo is one more attraction. Completely new items like "watch straps" can be thought of in laminated bamboo. High quality spoons and forks are already made in Japan by lamination.

Add on design

Add on design can be another concept to arrive at new designs in bamboo. Bamboo parts can be added to the existing products to give them an exclusive 'culture friendly' look. Casings for thermos flasks, thermowares, ice buckets can be made in bamboo. This would be sold as a special value added item for travel or as a gift.

Bamboo basket cover for items like 'Good-night' gadgets, can become culture friendly, in the homes. Similarly some parts of products to be

made in bamboo can be identified. In these cases the bamboo parts will be sold as a unit of the total product. Several possibilities open up with this strategy. Bamboo spoons can be sold along with Teflon coated non-stick frying pans. Handles for various spoons can be made in bamboo. Marketing becomes easier with this approach.

3.2 Market Inputs

Improving the current markets by catering to the newer market segments and thinking of new organisational set ups for marketing are vital for bamboo craft to survive in the future. Entrepreneurship by designer can ensure growth of craft values even when the bamboo products are made in large numbers.

3.2.1 Market profile

It has been difficult to get data on bamboo products marketed within the country and abroad. Based on the data that 5% of the bamboo produce goes to craft industry, we could estimate that 1.6 lakh tonnes of bamboo is utilised for craft. If we assume a rate of Rs 1000/- per tonne and product cost of bamboo as 5 times that of material cost, we arrive at a figure of Rs 8 crores as current market share of bamboo craft. Export figures are not available fully.



The amounts are not significant considering the high potential of manpower and raw material. One cosmetic manufacturer of Indian origin doing business in USA was ready to place an order for 2 million baskets to be marketed as gift packs during christmas sale.

So far bamboo products are being sold through exhibitions or government craft emporia. This has a limited scope. It is important for bamboo products to enter into general markets. Steady, regular markets would demand lasting qualities in the product. Considerable change is required in the mind set of bamboo craft producer to enter into regular markets. The sale in exhibitions being one time, the craftsmen are less concerned about what happens to the product over a time. Qualities like proper treatment of bamboo, durable joints, compact packaging and modularity have to become features of craft products.

According to the NGO's involved in bambo craft, several export orders are given up for want of supply of bamboo products in stipulated time with requisite design and quality. The gaps between supply and demand have been large. Government agencies meant to strengthen these links have been sluggish. A major effort is required in networking various suppliers of bamboo craft products all over the country. A nodal agency in marketing, preferably in private or joint sector, is required.

Such an agency with a capital fund at its disposal, can act as a store house or reservoir to buy and sell. Buying potentially marketable products will ensure work for the craftsmen throughout the year. Huge export demands can also be met easily. Design and technology

inputs can be channelised through such marketing setup effectively. Such a setup would be self sufficient as well.

3.2.2 Entrepreneurship

In bamboo craft area, craftsmen themselves have been entrepreneurs. They have been producing and marketing. Though this has been advantageous to the craftsmen, the craft industry has not grown as in China and Taiwan. To face the demands of changing markets and competition from materials like plastics, new entrepreneurship is necessary. Professionals like engineers and designers, becoming entrepreneurs could be one solution.

One example in such an endeavour is 'Adicraft' at Nagpur, run by two professionals. One of them is an industrial designer trained at IDC. Adicrafts employs 30 workers, many of them, skilled craftsmen. The company markets exclusive bamboo lamps at premium prices. The products are of export quality. Care in detailing and finishing, ensured by the management has resulted in the success of Adicrafts.

More such entrepreneurs are required to tap the unlimited potentials of bamboo products. Craft industry demands high innovation in product



diversification based on new market strategies. Continuous design inputs of high order are required. Since any small setup finds itself uneconomical to hire an industrial designer, new strategies need to be thought of.

There is a good scope for a designer or design group to link with craft production unit. Designer willing to become an entrepreneur, can identify a marketable bamboo product, develop it and liason with a craft group to produce it. With his/her urban training, it should be possible to find the marketing links. Designer can also ensure technology and training inputs to the craftsmen to achieve higher quality and productivity. It could be possible to tap export markets with such a professional entrepreneurship.

3.3 Technology inputs

Considering the big market potential inputs of technology into bamboo craft needs urgent attention. Taiwan, China and Malaysia have industrialised bamboo work. Use of mass production machinery and high level of worker organisation have made these countries highly competitive and they are already exporting bamboo products to Japan, USA and Western countries. It would not be surprising if they enter Indian markets due to free trade policies currently being adopted in our country. To meet this challenge our bamboo craft industry has to

modernise in many ways.

We could see the potentials of technology inputs into bamboo industry at two levels of production:

Craft level

Mass production level

3.3.1 Craft level

At craft level we need technology development to improve the quality and productivity. These could cover a broad range like
Bamboo treatments
Forming techniques like heat bending
Laminations
Technology to produce edges, rims etc.
Finishing techniques
Measuring and size control gadgetry
Jigs, fixtures and tools to achieve the desired shapes.

Bamboo treatments are known at laboratory level. No equipment or plant for such treatment is available to the craft industry. A small plant for steaming and chemical treatment could improve the quality of bamboo significantly.

Heat bending technique is already used by craftsmen, But to bend bamboo to a predetermined shape needs high skills. Development of gadgetry for this can lead to many new products.



Appropriate technology can be developed to make small laminated bamboo products like spoons, forks, watch straps, handles etc.

Specific gadgetry and methods need to be developed for making certain parts like edges of woven mats. If edges can be done speedily in a finished manner with the help of small machine or fixture, the quality of products like trays, package boxes, lamps which use woven mats will go up. Even other materials like metal, plastic or leather can be used for such details. Finishing techniques like spraying are still new to craftsmen. A compact unit to spray melamine or other resins can be developed.

In Japan a craftsman measures thickness and width of the bamboo strip with a vernier callipers. Use of measuring and sizing instruments can result in increased quality of a crafted product. Quite often the craft items lack the exact geometry and finished detail. It is worth using jigs and fixtures to attain well defined shapes of crafted products.

3.3.2 Mass production level

If we have to compete globally, mass production is inevitable. Mass production can happen either by organising large number of craft level producers with small equipments and gadgetry or by using mass producing machinery. It is possible to mechanise bamboo work. Bamboo machines for splitting, sizing and polishing are available. Even weaving machines are used in countries like Taiwan.

As a strategy it will be prudent to centralise mass production of bamboo strips, as strip making is a laborious process. Large number of bamboo workers and craftsmen can then be employed for weaving mats, baskets etc. Weaving by craftspeople will be advantageous as it is a skilled operation. New designs in weaves can be introduced more easily. Thus several subsidiary work in bamboo products can be generated by having a centralised mass production unit.

As suggested earlier, technology based new designs, like moulded articles using bamboo laminates is another potential area. China is reported to be making 10,000 tonnes of bamboo boards. If a proper market is secured for products using bamboo boards, similar potentials exist in India as well.

To conclude, a great deal of efforts are required to bring out the potentials of bamboo craft industry. Though government spends money on various programmes for bamboo craft, these efforts remain ill conceived and poorly co-ordinated. A fresh initiative to rejuvenate bamboo craft, maybe in the form of 'mission' is much needed today.

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