ENTREVISTA COM:

SHARMISTHA BANERJEE

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1) Talk a little about yourself, professional acting, training…

Sharmistha Banerjee: I work as an Assistant Professor at Department of Design, Indian Institute of Technology (IIT) Guwahati, Guwahati, India. Here I teach courses related to Product design, Design Engineering, Interaction Design and Sustainability. My PhD research is in the area of Design for Sustainability applied to scale-appropriate agricultural equipment design and am pursuing the same at IIT Guwahati. I have done my Masters from Technical University of Delft (TU Delft), Netherlands in Integrated Product Design and my Bachelors is from IIT Guwahati in Industrial Design. At present I am focused in the area of sustainable product service system development, bio-inspired product design and agricultural machinery design and have been working on various national and international projects, both for the industry and academia.

2) When and why did you start to get interested in sustainability? Have you been interested in sustainability since the beginning of your career or has this interest been built throughout your career?

Sharmistha Banerjee: It was during my Masters Program at TU Delft that I was introduced to the concepts of Life Cycle Assessment (LCA) and Design for Sustainability. During our second semester, we were introduced to LCA and used it for the assessment of our project work for the semester. This experience gave me a totally different outlook towards product design and development. This was the first time I thought about the cradle-to-grave journey of my proposed design solution and realised the immense potential impact that me as a designer can have in creating sustainable future consumptions. Thus the next semester project was consciously selected and it was about sustainable packaging design for organic food consumers. During this project, I realised that if I am to create significant impact on sustainable product design, it's not about just bringing in production side environmental sustainability. But it's about bringing in sustainable consumption. This was very difficult to tackle since it involved bringing in behaviour change. The consumer always wants ease and comfort and if sustainable consumption is going to make her life less easy, the chances of my design failure goes high. Thus our project team explored avenues of sustainable consumption by involving the consumers into the whole design and development process. Thereafter my thesis project was with the Design for Sustainability (DfS) group at TU Delft. This project helped me again explore sustainability more from the LCA perspective.

Thereafter, I returned back to India and started working at IIT Bombay, India as a researcher. Our research team went around different parts of the country exploring what can be potential ways of constructing an affordable and sustainable housing solution for the Base of Pyramid population of the country. We mostly focussed on rural habitat. This was a great learning experience. It was jaw-dropping to see that the concept of waste didn't exist in rural India. Waste from one process became the input into the next process. This was true irrespective of whether we go to a dry, hot, cold, humid or any place. This was during this experience I started noticing the nuances of sustainability studies in a developing contexts and rural contexts.

Next I went on to join IIT Guwahati as an academician and began exploring sustainability further in the Northeastern part of India. This part of the country

again brought in new challenges and hence my outlook towards Sustainability evolved. It was during my project in Bangladesh on making an agricultural machinery, I discovered two potential areas of work for myself. The first was Sustainable Product-Service System Design and second was the huge domain of small-scale agricultural machinery for developing countries. Thereon I have picked up several such projects and also set the Sustainability and Social Innovation Lab (*www.sustainability-and-social-innovation.com*) at our department with my colleague Pankaj Upadhyay. We also joined the LENSin network and our evolution on the track of Sustainability continues.

Currently our lab's objective is:

- To provide infrastructure and guidance to student projects related to DfS.
- Conduct training sessions for interested local institutions and bodies in the application of DfS.
- Research into DfS, Sustainable Frugal Design & developing case studies in DfS through execution of projects.
- Development of course material related to DfS.
- Developing tools & methodologies for the implementation of DfS in the emerging, marginalized & industrialized contexts.

3) Considering the current moment in which we live, do you think it is possible to integrate in practice the so-called pillars of sustainability (economic, social and environmental) today, or are we still far from the theory?

Sharmistha Banerjee: If I look at sustainability in the current moment in the Indian context, I can divide it roughly into two altogether different sides in terms of the challenges of integration.

The first side is all those rural areas of India where traditional ways of living still dominate. In these parts of the country, sustainability is woven into the fabric of daily living in many ways. The introduction of new ways of living, say consumption of packaged cookies or shampoo sachets, is introducing unsustainabilities since there is no way for these communities to handle the upcoming plastic waste. Or say the shift from traditional housing materials and design to concrete housing is leading to socio-economic and environmental challenges. In these parts of the country, it will be prudent to identify the (un) sustainabilities of traditional living and plan out development in a way that sustainability is at core of the developmental agenda.

The second side is mostly the urban and semi-urban parts of the country which have already moved in a big way towards embracing unsustainable patterns of consumption and production. Integrating sustainability here will require the combined efforts of policymakers, city planners, designers, businesses and the citizen.

4) What is Design for Sustainability (DfS) and where we can apply the Design for Sustainability?

Sharmistha Banerjee: Design for Sustainability, in my view, is an approach and outlook to designing with an eye on creating an apt balance between the social, economic and environmental forces in the ever changing socio-technical circumstances of our world. It's about designing products, services, practices, policies, systems and most importantly behaviour change cues towards sustainable consumption patterns. Its application is ubiquitous as DfS is a thinking process and can be applied to all forms of human activities.

5) Could you give us some example of practical development for DfS?

Sharmistha Banerjee: Providing Urban Amenities to Rural Areas (PURA) is a framework which was envisioned by the then President of India, Dr. APJ Abdul Kalam in order to provide livelihood opportunities and urban amenities to the rural population in order to improve their quality of life and bridge the urban-rural divide. The PURA framework has been devised as an empowerment-based model to achieve sustainability by providing the villages with the necessary Physical, Electronic, Knowledge and Economic Connectivity (Kalam and Singh 2011). These entail the setup of proper infrastructure such as roads, railways lines, educational and medical institutions, and communication networks such as wireless networks and broadband connectivity in order to provide the villages with improved access, technical knowledge for improving productivity of village farm and non-farm activities, and creating opportunities for economic growth and development through setup of factories, industries and other institutions. The PURA framework as proposed by Kalam et. al. (Kalam and Singh 2011) is inspired from the several regional community development projects for the social and economic development of villagers that have been setup in India during the early post-Independence period by several social reform workers.

Two of the PURAs and its activities are presented below (Kalam 11 November 2005, Batra, Singh et al. 2011, Kalam and Singh 2011, Dwivedi and Jha 2012, Awasthy and Agarwal 2013):

- Warana PURA - The Warana initiative began during the 1950s out of the necessity to support the small and marginal sugar cane farmers from fluctuating prices and insufficient demand. Under the leadership of Tatyasaheb Kore, the sugar cooperative movement began when he founded the Warana Sugar Cooperative and set up a factory. (Kalam and Singh 2011) The funds for this factory was raised on an equity basis from the farmers of the region along with investments from other sources. The farmers of the region are stakeholders in the cooperative factory and now it has around 20,000 famers, across 69 villages as its cooperative members. The factory has gone on to diversify its activities with forward and backward integration of the production chain by:
- Extending subsidies to farmers on pesticides, herbicides, micronutrients etc.;
- Three-tier nursery programme to provide quality seeds to the farmers;
- Introduction of a seedling scheme run and managed by women;
- Agricultural research centre which provides soil testing and informs the farmers about agricultural techniques for optimal production;
- Several irrigation schemes;
- Export of sugarcane after processing through various products such as packaged flavoured sugar cane juice etc.

After the cooperative movement it has been noticed that the production and efficiency of cultivation of sugarcane has been significantly higher in Warana than in other parts of the country. Also the sugar factory has been giving high returns to its investors. The cooperative movement has also made an attempt to create a sustainable model for the villages by creating income opportunities in other core competencies such as dairy and poultry farming. Warana has established a dairy brand with several collection centres in different villages which collect milk from thousands of producers and process it. Warana cooperative supermarket is an entrepreneurial attempt to provide the consumers with better access to consumer goods which is run and managed by women. The Warana Bazaars have rural stores in several villages with 16,000 villagers as members who receive discounts on products.

In order to remove illiteracy, educational institutions have been set up which includes schools and colleges of engineering, medical, arts and sciences etc. Efforts have also been taken to provide health care facilities to the villagers by setting up hospitals such as the Mahatma Gandhi Hospital. The Warana Cooperative Bank has 18,000 members and extends credit facilities to its members in order to promote entrepreneurship activities with the goal of creating income opportunities for the landless and marginal farmers. Through such novel fundamental initiatives, Warana has achieved significant socio-economic development for its society.

- Chitrakoot PURA - Chitrakoot is a district in central India which lies in the state of Uttar Pradesh and on the border to Madhya Pradesh. The Chitrakoot PURA was borne out of a social movement in the late 1960s for the welfare of the majority farming population in the Chitrakoot district by Nanaji Deshmukh. Deshmukh was a social activist from the state of Maharashtra who was inspired by Lokmanya Tilak and the nationalist ideology. He set up the Deendayal Research Institute in Chitrakoot in 1968 with the goal of promoting research in social science and establishing rural development and training centres for research and promotion of new technologies in sustainable agriculture, water conservation, alternative industrialization, self-employment generation etc.

The primary focus of the Deendayal Research Institute is to provide innovative methods for the economic development of the farmers. Almost all of the projects undertaken by DRI are with the goal of bridging the social and economic disparity. One such method is to provide practical, hands-on training to the farmers and also operate demonstration farms which provides live demos of optimal intensive cultivation patterns on farms of sizes similar to the common land holding size of farmers of the area (21/2 and 11/2 acres). This optimal cultivation pattern, through crop diversification, is based on calculated nutritional requirements of an average household to meet internal demands of the farmer's family along with incorporation of commercial crops for increasing the incomes. It also specifies the area allotment for cultivation, the layout and planning of the field, crop calendar, selection of crop varieties and crop production technologies.

DRI also strives to overcome problems of illiteracy, unemployment, healthcare, internal village disputes, and aims to create a self-reliant village. Most of their efforts

centre around empowering people to create income generating opportunities for themselves. Vertically Integrated Self Help Groups have been formed so that employment opportunities can be created at all levels of the production chain. One such example is the formation of seed clubs and seed villages to address the inability of small and marginal farmers to procure quality seeds. In order to resolve this problem, seeds are produced by farmers under the guidance and supervision of DRI and are also guaranteed returns on their produce at a pre-specified rate.

Several activities such as Bal Jagat and Udyameeta Videyapeeth have been initiated for the social development of the population which include vocational training centres for the youth to find sources of employment. It also trains the villagers in the core competencies and in the utilisation of the local resources of the region. Udyameeta Videyapeeth also extends zero interest micro-finance loans to the youth following a strict methodology which ensures repayment. This is ensured with the help of Samaj Shilpi Dampati. Gramodaya Darshan is an initiative to promote innovations in which all innovations and interventions for self-reliance are exhibited. Along with this several educational institutions have been setup in order to create a literate community. These include several primary, middle and high schools aimed at removing illiteracy and an educational research centre for providing new and innovative learning aids for schools and adult literacy.

The most innovative initiative introduced in Chitrakoot is the Samaj Shilpi Dampati, a couple which is intended to perform the role of local leaders in the village and whom the villagers can look upto for guidance in social matters and can also help promote education among children , health, women's awareness, family planning etc. This is an interesting method to tackle the problem of social awareness in rural areas and also may help in ensuring conflict resolution. DRI and Chitrakoot have, through such initiatives, attempted to create a sustainable and self-reliant model for villages to successfully operate.

Thus, PURA helps to overcome the challenges of sustainable development of rural areas of the country by:

- Wealth generation for a large number people by realising the core competencies of the area
- Diversification in the use of resources
- Entrepreneurship and self-reliance opportunities
- Development of technical knowledge and skill through access to education and healthcare
- Vertical and horizontal integration of economic activities to create a self-reliant economic model for a group of villages.

6) What challenges can be listed for implementation of sustainability in India? And in the world? What are the ways to make sustainability implementation possible?

Sharmistha Banerjee: A coordinated effort from both the government and businesses are a must for implementation of sustainability in India. Since sustainability is a thought process which then translates into action, I strongly feel that integration of this thought process in the school curriculum will be one of the most important steps in implementing sustainability in our society's thought fabric. Behaviour change measures through mass media and social media will further incubate and nourish the sustainability thought. Also availability of sustainable solutions in the market with appropriate advertising of the same will help consumers to make conscious sustainable consumption choices. Next defining appropriate indicators for sustainability across various sectors and domains will give the citizens and businesses a guidelines to follow. Monitoring and ownership will be another challenge with our country being divided into the federal and state level administrative structure, with each being further sub-divided in several administrative departments. Also similar monitoring and ownership models need to be developed for local level governance structure. Lastly another important challenge is, progress monitoring through various efficient and cost-effective data gathering.

7) Do you participate in LENSin? What is LENSin?

Sharmistha Banerjee: We joined the LENSin network in 2016 and began our journey into exploring Distributed Design and Distributed Manufacturing applied to Sustainable Product-Service System Design. LeNSin (The International Learning Network of networks on Sustainability (*http://www.lens-international.org*) is an EU-supported (ERASMUS+) project involving 36 universities from Europe, Asia, Africa, South America and Central America, aiming at the promotion of a new generation of designers (and design educators) capable of effectively contributing to the transition towards a sustainable society for all.

In this project, we are focussing on identifying Indian case-studies which follow the conceptual structure of Distributed Design and Distributed Manufacturing applied to Sustainable Product-Service System Design. In the process, we are also trying to understand the manifestation of these concepts in the Indian context in terms

of similarities and dissimilarities with respect to the global. We conducted a pilot course in Bangalore, India with our Indian partner, Srishti Institute of Art, Design and Technology. The seminar brought in leading designers of the country working in this domain. The seminar proceedings can be accessed at *http://www.lensin-india-seminar.com/seminar-proceedings.html*. We also conducted a pilot course for our students to explore creation and testing of didactic material to train our young minds in Sustainability and create future leaders in the domain. We will soon upload our didactic material at *http://www.lens-international.org*.

8) What else would you like to say about sustainability?

Sharmistha Banerjee: Let's make sustainability a way of living our life.