

## Sustainability science in India

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The new emerging discipline 'Sustainability science' is being introduced as an inter- and trans-disciplinary academic programme in the higher education system across the world to bring commitment to education on sustainable development. It seeks to understand the fundamental characters of interaction between nature and society<sup>1</sup>. As we are aware, the environmental degradation and poverty on one side and ecological imperialism on the other are the main threats to sustainability. Hence, there is a need to integrate and reshape the natural, technical, social, economic and ethical sciences to accommodate the current and future needs of humankind<sup>2</sup>. The impact of environmental degradation has no boundary and therefore, there is a need for common effort to control the degradation at global level. Against this backdrop, the concept of sustainable development was introduced in 1987 by the World Commission on Environment and Development (WCED) in its report 'Our common future'.

The geographical differences bring about different cultures and traditions across the globe, thereby giving rise to diversity in the community. A nation has culture and tradition different from the others governed by the existing natural conditions or the local environmental characteristics. The issues of sustainability are location-specific, but the aim is to have sustainability of the planet Earth. Therefore, major objectives of this new emerging discipline, are to nurture a generation of leaders who are capable of appreciating the significance of changes in global, social and human system, and who tread the path of sustainability in implementing policies on the basis of this understanding<sup>3</sup>. It is being introduced in various universities across the world.

### What is sustainability science?

The origin of the concept of sustainability science is sustainable development. Implementing sustainable development requires involvement of all the stakeholders from farmers to decision-makers at different levels. Here, the role of edu-

cation is unavoidable, wherein, different methods of education can be used to sensitize and maximize participation. Now, in countries with high population like India and China, the major hurdles to sustainable development are issues of population growth accompanied by high-consumption lifestyle. And again high population growth with developing or low economic progress has multiple issues of environmental degradation, food security and unplanned expansion of growth. Countries like India have major challenges in the expansion of economic growth at the cost of environmental degradation that finally affects the social system. The complex issues of developmental paradigm during the last few decades like special economic zone, GM crops, unsustainable mining versus the social equity and equality, gender bias, rights and justice to the natives are some of the key facts that signify the need for a participatory approach in planning and development, where a holistic understanding is required. It can only be achieved by encouraging knowledge-sharing and cooperation among various academic sectors and decision-makers. Sustainability science is an emerging discipline in this direction where we can sensitize groups of stakeholders and train other groups to achieve common goals. The number of academic programmes in Sustainability science is growing across the globe. Few pioneers are Arizona State University and Harvard University, USA; Lund University, Sweden; Maastricht University, The Netherlands; Leuphana University, Luneberg, Germany; The Technical University of Catalonia, Barcelona, Spain; Stellenbosch University, South Africa and University of Tokyo, Japan<sup>4</sup> and Indira Gandhi National Open University, New Delhi.

### Whom to educate?

Education in sustainable development has to be based not on theoretical concepts but on problem-solving approaches rooted in real-life situations. People's involvement and participation are critical for securing inclusiveness necessary to promote sustainable development at all

levels<sup>5</sup>. Therefore, the content of the discipline would be developed both in anticipatory as well as participatory mode<sup>6</sup>. It has to play a major role in the integration of different styles of knowledge creation in order to bridge the gulf between science, practice and politics – which is central to successfully moving the new paradigm forward<sup>7</sup>.

If we look into the process of implementation of planning and development, we can see the stakeholders at different stages as the general public (who are the direct beneficiaries), scientists or academicians (who study the issues for an alternative) and policy makers or planners (who have the authority to implement). Bringing all the stakeholders together to a common understanding of these multiple challenges at a time is a greater challenge, especially in India, where percentage of educated class is still very low. Here, we should use education as an effective tool. But how to achieve the desired outcome through this tool is also a question that needs to be reviewed.

Teaching sustainability science to different stakeholders has to be through the available existing mode of education depending upon the level of stakeholders. Conventional education at the traditional universities or institutions and distance education in open universities are the two major modes available in India. But recently, a number of blended modes of education are being introduced in different institutions. On-line education has become one of the newly introduced supplementary modes for both conventional and distance education systems. Also many conventional institutions have introduced both modes of education. We acknowledge that the distance education programme is cost-effective and is for working professionals and academicians who want to acquire additional knowledge and qualification for progression of their careers. The advantage of distance education is easy accessibility for the unprivileged section of the society, especially in the remote areas covering large and varied population at an affordable cost. Distance education is gaining popularity with the increasing use of Information and Communication Technology

(ICT) in delivering the programmes. Looking into the need for sustainability science education across different stakeholders, India should strengthen this new emerging discipline in all the available modes of education for these stakeholders. Some of the perceived major stakeholders are as follows.

**Stakeholders 1:** The general public, including those highly educated citizens working in a highly specialized profession. They need to be sensitized on the different issues of sustainable development as a holistic approach, so that they may become aware of the issues from multiple perspectives.

**Stakeholders 2:** The policy makers and planners, including politicians may be considered in this group. They may need to be sensitized and educated about the holistic understanding of any of the issues and effective implementation of planning and the process to achieve a common goal.

**Stakeholders 3:** Academicians and scientists who bridge the gap between stakeholders 1 and 2. They need interaction among themselves and with other stakeholders. They need to share the knowledge in achieving common goals for sustainable development education.

### What to educate?

What to educate, how to educate and whom to educate in India at present is not an issue. We clearly understand that environmental education is widely practised up to undergraduate level. The need is to produce a group of leaders who are committed to sustainable development. The basic concepts of sustainable development, its approaches and models across different sectors need to be the focus. So, looking at the progress in sustainable development education across the globe as a new emerging discipline, sustainability science, India also should take the lead. We may look forward to having more sustainability leaders in the years to come and even serve as a hot spot from where the other countries can seek advice.

When we conduct a quick review on the structure of the course in different universities across the globe, it is found that the major focus is on local specific issues to address the challenges to sustainable development.

India, as a developing country with high population growth rate needs more food and livelihood options to survive as a healthy nation. We have the highest number of youth in the world. We are in a country with high biological diversity and diverse landforms with different agro-ecological zones. Our rivers play an important role in the global hydrological cycle. Our mountains play a key role in the climate of this subcontinent. Moreover, India is home to communities with diversity in culture and traditions. This unique characteristic of diversity is threatened by global environmental phenomenon, climate change and economic reformation under globalization of economy. Climate change threatens the flow of rivers, availability of water, production of food and finally, the livelihood option. In the name of economic liberalization, small local enterprises are on the verge of extinction and traditional cultures are already under threat. Looking into the complexity of these issues, the need of the hour is research and education that cares in a holistic manner. Social issues have to link in an integrated way with environment-friendly economic progress. It has to teach the foundation of 'do ecology' and not just 'don't ecology'<sup>6</sup>. In the Indian context, any developmental pathway should keep three indicators as benchmark: pro-nature, pro-poor and pro-women to make the development inclusive and sustainable<sup>6</sup>. Thus, it may be introduced under two components, viz. the contemporary issues and our traditional ethos.

### Contemporary issues of the country

The green revolution of 1960s brought a big relief to India, but the consequences of the green revolution have left us with environmental degradation. It led to a strange paradox of 'mountain of grains on one hand, and millions of poor on the other'<sup>8</sup>. Major issues like decrease in groundwater level, scarcity of water and decrease in agricultural yield brought the social issues like nutrition, food security, etc. The issue which may be either social or environmental is a threat to livelihood in case of a country like India, where agriculture is the main source of economy. Again, whether the recent economic progress in India or GDP is able to secure our environment in general and

sustainability in particular, where more than 70% of the population are still in rural areas and majority of them are without livelihood security. Irrespective of rural and urban divide, the number of people without livelihood security is increasing. The increasing numbers of migrant workers in the city, especially in the informal sectors, are not having a secure livelihood. They do not have enough food to eat; basic amenities like health and hygiene still need to be improved. What can we expect for the children of these workers? Where and what is their future? In brief, we can look at all the issues as insecure livelihood across all the sections of the society; rich or poor, urban or rural; and old or young.

India has a host of physical as well as socio-cultural diversities. Examples of socio-cultural diversities are in terms of community structure, society, cultural norms and traditions. Geological and geographical diversity, landform and structural diversity, ecosystem diversity and of course biological diversity are examples of physical diversities. These major characteristics of the domain diversity reflect that bringing sustainability is not an easy task. Understanding all these and their effective linkages well, is very much necessary in implementing different sustainable development programmes and policies. In spite of implementation of a number of sustainable development projects, we do not see much progress except corruption and money laundering. If we look into the present socio-political issues of the country, we realize that we should bring back our age-old ethos which is reflected in our ancient scriptures from top to bottom, i.e. all sections from policy-makers and planners to general public.

### Traditional ethos

Kates *et al.*<sup>1</sup> described 'sustainability science as a discipline that seeks to understand the fundamental character of interactions between nature and society'. Pillai<sup>5</sup> is of the view that in India, sustainability science must focus to train a cadre of youth who will be keenly aware about the value and need of the deep-seated socio-cultural roots that have defined India's unique philosophical outlook on environment and development. Then, which path do we need to take? Education may be one of the key factors

in achieving such goals. Environmental education at school level brought a number of changes like awareness about environment, environmental problems and our responsibility in protecting it. Is it going to be enough for bringing sustainability or is there a need for action for sustainable development? There is still a big gap. Moreover, when the issue of sustainability arises, the dynamic nature itself brings attention to understand the same issues at different levels at a time. So, we need inter- or intra-disciplinary understanding, and also a group of leaders irrespective of age and gender, who are committed to environmental sustainability. Guha<sup>9</sup> has rightly pointed out that ‘an environmental literate Prime Minister would certainly help in the promotion of environmental sustainability’. Are the present politicians not environmentally literate? As mentioned in the beginning, the issue of sustainability is not a new phenomenon in India. Swaminathan on various platforms reminds us again and again that ‘sustainability has been an integral part of our ethos and is reflected in our ancient scriptures’. So, it is the hunger for power by the power-seekers leading to corruption on their path that is threatening the livelihood of all sections, including them. Singh<sup>10</sup> stresses that, ‘we need to transform our own individual and collective behaviours. Environmental values are already built in our ethos but we are not behaving in accordance with those environmental values and in fact we seem to be behaving in the exact opposite direction.’ If education is a way to achieve, we need sustainability education at tertiary level.

### The approach

The approach we may adopt is to train highly specialized experts from young generation, update the knowledge and understanding of the policy-makers and planners through regular training, inte-

grate sustainability as a major component in the existing higher education curriculum and in all the administrative training academies. It should not be implemented as a literacy programme, but as a participatory education programme. In the new education revolution through ICT, the option of open and distance learning should be given top priority, since this may be the only option through which we can deliberate the progress in knowledge and experiences in a formal way. Thus, in this UN Decade of Sustainable Development Education (2005–2014), Indira Gandhi National Open University under the guidance of Swaminathan, has developed sustainability science as a new discipline and introduced a number of programmes to enhance awareness in a wide spectrum of scientists, environmentalists, administrators, social scientists, policy makers and enlightened corporate sector on the urgent and imperative need to put sustainability at the centre of all their endeavours. Major sectoral and thematic-based issues are taken to develop the courses looking into the unique characters of our country. The problems and issues with our unique rivers, mountains and ecosystems with the linkages to biodiversity, social issues are well focused in the courses. Courses are built on the foundation of ethics, economics, equity, energy, employment and education with major focus on pro-nature, pro-poor and pro-women-based sustainable development.

### Conclusion

The main conclusion we would like to draw is that environmental literacy has to be integrated with sustainability education at the higher or tertiary level and the same knowledge needs to be enhanced, especially amongst the senior policy-makers and planners. Here, we should not forget that wherever and whenever Swaminathan talks about food security,

he always stresses that India’s food security will be taken care of, when we wipe out the famines of livelihood. Thus, the new discipline should focus on the issues of livelihood improvement in a holistic way.

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ACKNOWLEDGEMENTS. We thank the anonymous reviewer and Prof. P. C. Kesavan for their valuable comments and suggestions that helped improve the manuscript and Prof. M. S. Swaminathan for advice and guidance.

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