Towards Sustainable Development Goals and Environment Stewardship through Geography Education

KIRAN K. SINGH*

Abstract

Distinctiveness of geography as a discipline is revealed through its focus on the study of the earth surface as a world of human. At the time of organisation of knowledge into two broad realms; humanities, social science and sciences, geography could not separate itself due to its inherent nature of performing a role to bridge the human and earthly relationship. The study of geography is by nature ecological in approach and perspective, and creates a bond between the two by studying both, ways of interaction and intervention. Space, time and scale are the critical elements of the discipline which play an important role in the analysis and pursuit of sustainability. This paper deals with the conceptual framework of sustainable development and how geography education plays a role in creating awareness and developing critical thinking about the different components of sustainability at various scales and in different time frames. The paper also brings attention to the core contents or themes of sustainable development which can be seen in the geography curricula in various universities. Sincere attention to content and themes in the curriculum will help to maintain its orientation in the dynamic world scenario. It also discusses the role of geography in transforming learning into environment stewardship.

INTRODUCTION

There is not a single day in our lives that does not tell us about environmental problems. We hear about the changing weather pattern, dying of fishes on shore, salinity ingression, river pollution, extinction of species, pollution-related diseases

* *Assistant Professor,* Department of Geography and Geology, School of Environment and Earth Sciences, Central University of Punjab 151 001, India.

and so on. Furthermore, the realisation of such problems has mobilised public opinion and had an impact on the government policies and decision making. The words sustainable development are so common that any educated person can define them literarily and sense the meaning of it as promoting a practice which continues to achieve a form of existence which can be maintained indefinitely. According to Whitehorse (2006), the phrase 'sustainable' has become a very fashionable adjective in the light of the concerns over environmental problems, and appears in a wide range of contexts like sustainable environment, sustainable economy and sustainable society.

There are two kinds of intellectual discourses on the degrading condition of the earth and environment. One views it from the grand geological process of evolution and proposes that the natural process is so strong that human contribution is negligible. The other views it from the human perspective and considers anthropogenic activities as the prime cause of environmental degradation. The proposition based on scientific research makes both the discourses worth being paid serious attention to. But, such a discourse is the outcome of the realisation and visibility of widespread environmental problems. The point here is that if there is so much awareness about it, then why is the problem becoming serious? Are we becoming apathetic to these concerns because the development of mankind depends on the natural capital, and degradation of the environment is inevitable in the due process of development?

The problem does not lie only in the development vs. environmental conservation debate but also in the attitude of the human beings. Education, in this context, plays a significant role. Today, the academic discipline is fragmented into several parts (mainly science, social science and humanities) and one discipline which has always focussed on the interdependence of humans with their physical, social-cultural, and human-built environments is geography. The study of geography is, by nature, ecological in approach and perspective, and creates a bond between the human and environment by studying both, ways of interaction and intervention. This discipline has the capacity to generate inventories which are required to take the decisions that may enhance the quality of human life as well as the quality of environment. Such inventory can be generated in different space and time frame. Space, time and scale are the critical elements of the discipline which play an important role in the analysis and pursuit of sustainability.

But, one may raise the question that the realisation of the role of education in solving environmental problems is not a new revelation, so where does the problem lie? Is it with the way we communicate

environmental information to the students and the general public, or because since education does not carry this responsibility in isolation, so it shall not be held accountable for remaining ineffective? There are various strategies to implement sustainable development, like the efficiency strategy, consistency strategy, permanency strategy, sufficiency strategy and education and social commitments (Haubrich, 2007). Thus, one may examine the efforts that education has spearheaded to develop a mechanism to reinforce the standard of environment education and to make it possible to achieve them. In this text, sustainable development has been viewed from environmental and societal perspective because geography takes it as green agenda.

Geography and Sustainable Development

Active social commitments are essential for sustainable development. The social element is necessary to maintain human and ecological integrity. This social element is the product of the society and culture and if ways and means in pursuit of sustainable development are embedded in the cultural and social ideology, then it is a matter of living a life with practices of sustainable development; otherwise it remains a matter of law and policy decision. The society and culture which do not promote ecological and human integrity by practice cannot contribute to ameliorate any of the environmental problems, though they claim to. The discipline of geography in India has the advantage of dealing with a variety of cultures and societies which were, more or less, connected with the conservation of nature. It is a matter of reorienting the curricula to those practices which are missing today.

Sustainable development has three components—the environment, society and the economy. Granados (2010) has metaphorically compared the component of sustainable development with a three lens telescope (Figure 1). Of these three aspects, the environment is the basic life support giving mechanism behind human activity, society is the organisational base of institutional structures and agents, and the economy comprises all goods and services. The environment lens put emphasis on the maintenance of natural resources and keeping the planet healthy, the

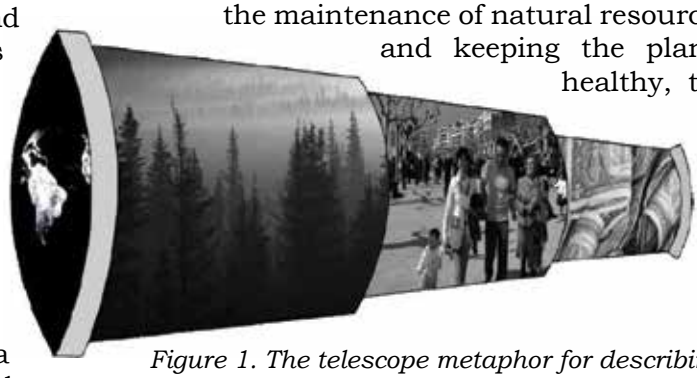

Figure 1. The telescope metaphor for describing and interpreting sustainability
(Source: Granados 2010)

social lens denotes the social justice, and the economic lens proposes the development of an efficient system.

Granados explained that in order to get a clear view of the sustainable world, one needs to look through all the three lenses at the same time as they are interrelated and interdependent. Thus, sustainable development is only viable if these three cruxes exist in equilibrium, just as a telescope only functions well when each lens works in conjunction with the other. In this way, this metaphoric model allows us to see the space from a different scale—global to local, and from dynamic time dimension—short, mid or long term. According to Kolnik (2009), geography has the educational potential in civic education and sustainable development because it offers quality in connecting natural and social knowledge and common values in order to understand global as well as local problems, and encourage students to respond to these responsibly.

Geography Education and Sustainability

In order to develop a sustainable pattern of living, the role of education is significant, as it develops the knowledge, skills and values. Development of knowledge through research enables people to engage themselves with the world in more reasonable ways. Education for sustainability inculcates responsible attitudes towards environmental conservation. By understanding the interdependence of three components of sustainable development, suitable action plan can be suggested through action-oriented research[1]. Education for Sustainable Development first gained widespread attention during the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. Chapter 36 of Agenda 21 (WCED 1998) described ESD and identified the need to reorient the current national educational system to it. The aim was to empower learners to change their behaviour and adopt sustainable action through participatory learning (UNDP).

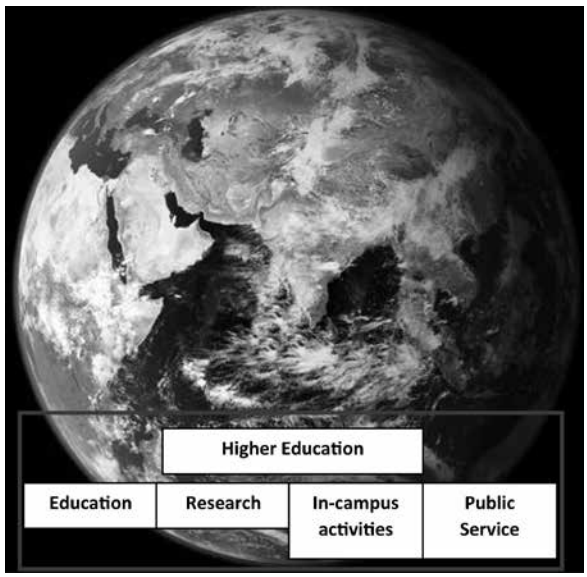

Figure 2. Holistic and systemic approach to sustainable development in higher education

[1]*Source: Australian Curriculum. Sustainability. Retrieved October 2013: from: http://www.australian curriculum.edu.au/CrossCurriculumPriorities/Sustainability*

The International Conference on Education as Driver for Sustainable Development in Ahmedabad from 11 to 13 January 2016[2] discussed that policy instruments and technological solutions are not going to be sufficient, but education is critical in achieving sustainable development. It also acknowledged that the education system has tended to impose a narrow concept of rationality at the expense of emotional understanding, learning acquired through experience and traditional knowledge system.

According to a report by the University of Antwerp & Ghent University, the higher education is generally seen as a major (potential) catalyst towards sustainable development through its traditional missions of education, research and public service. It is not only the education (curriculum/teaching) and campus operation that have impact of sustainable development but research and public service as cross-cutting issues, can also have an impact. The report also highlights the need for holistic and systematic research to sustainable development as shown in Figure 2.

In the case of geography, the International Geographical Union Commission on Geographical Education (IGUCGE) argues that geography curriculum cannot attain uniformity at the global level because it contains objectives and contents that relate to the regional and national needs differing from region to region and from country to country. Therefore, a global geography curriculum would ignore or deny the regional and national needs and differences (Haubrich, Reinfried and Schleicher 2007).

Normally, sustainable development and sustainability are used interchangeably because the ultimate goal of both is to reconcile human activity with the environmental process to the mutual benefit of both. But, sustainability should be regarded as the goal and sustainable development as the means to achieve that goal (Porrit 2007). The social and environmental as well as educational reasons why the geography addresses sustainability is reflected in many literature. Many geography educators like Bardsley (2004) think that teaching and learning for sustainability is the prime concern of geographical education or the raison d'etre of geography teaching. McKeown and Hopkins (2007) consider geography as an integrating discipline that bridges natural, social and economic sciences, and its distinctive dimensions of place, space and scale and its capacity of synthesis are crucial for the analysis and pursuit of sustainable development. Morgan (2000) offered three concrete suggestions regarding the ways geography can contribute to teaching for a sustainable society—in understanding the changing nature of

[2] *Conference was organised by the Centre for Environment Education (CEE) in partnership with UNESCO and UNEP to share experiences in strengthening the role of education in achieving 17 Sustainable Development Goals (SDG) adopted by UN.*

work in different parts of the world at different scales; in understanding the social divisions; and in investigating the complex social factors that create variations in social environments.

McKeown (2002) proposes to reorient curricula towards sustainable development through five aspects—knowledge, topics, skills, perspectives and values. The curricula should be designed in such a way that could develop the ability to communicate effectively, the ability to think critically, the capacity to move from awareness to knowledge to action, the ability to think in time and to forecast, and the capacity to develop an aesthetic response to the environment. 'Perspective' means the perspective of different stakeholders in order to understand different environmental issues. 'Values' are the sense of commitments, the respect and care for the community of life and the ecological integrity, the respect of human rights and the social and economic justice, and of the culture of peace.

According to Kerski (2011), geography is not just a 'nice to have' subject among the already crowded educational curriculum. It underpins the critical thinking skill, citizen skill and technology skill. It is essential for grappling with the essential issues of our time. Through geography, students understand that the earth is changing and then they scientifically and analytically explore the reason why it is changing. In this process, they dig deep and understand the causes and consequences of the change. In geography, they also try to find out the human role in such changes. In this way, geography does not only provide scope for critical thinking and problem based learning but also empowers students to become decision makers. Some of the central concepts in geography are—

- location
- place
- people-environment relationship
- spatial interaction
- region
- temporal change

Geographers ask the following questions—

- What is it?
- Where is it?
- Why is it there?
- How did it happen?
- What impact does it have?
- How should it be managed for the mutual benefit of humanity and the natural environment?

Pursuing the answer to these questions necessitates the investigation of the nature of problem in a location, spatial pattern and temporal change, digging deep into the causes of the problem, its impact on the nature as well as the community and suggest ways for management and future course of action. If an area is facing the problem of water logging, then students or researchers of geography can map the waterlogged areas in different time periods, find out the causes behind the problem, detect the spatial change and direction of change, its impact on

the local community and economic activities. Subsequently, suggestions can also be given to solve the problem. Field work offers a lot of opportunities to understand the real cause of a problem. In many literatures, poverty is linked with the degradation of land, forest and water resources because poor people lack the resources to manage those resources properly. But through field work, interaction with the local community may give different insights. Local poor people might be protectors of resources than exploiters.

Core Elements of Geographical Knowledge and Sustainable Development

Geography and sustainable development are tied together in terms of core knowledge elements, skills and values. The International Charter on Geographical Education focuses on the geographical competencies which are crucial to implement sustainable development goals. Since the discipline offers the prospect to attain knowledge and an understanding of natural systems, and socio-economic systems of the Earth and their interaction with each other, so the goal of knowledge creation for sustainable development is achieved. Figure 3 shows such interaction between these two systems. Such interaction also gives a sense of location, space and time.

Such interaction reveals the entire social and cultural practices and values which affect the natural system. The use and application of geographical skills like cartography, geospatial technologies, field work, analysis of information, action or policy-oriented research are all related to critical thinking and problem solving skills and are a very common skill of sustainable development too (Selected from International Charter on Geographical Education 1992, p. 17).

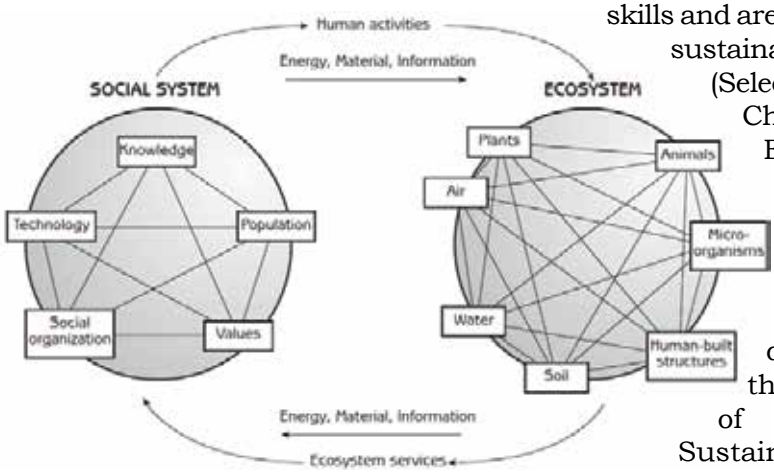

Figure 3. Interaction of the human social system with the ecosystem
Source— Marten, 2008

Many universities across the world have started departments of geography and sustainable development like the Department of Geography and Sustainable Development under the School of Geography and Geosciences, University of St. Andrews, UK; the Department of

Geographical and Sustainability Sciences, University of Iowa; Department of Geography and Environmental Sustainability, University of Oklahoma; School of Geography and Sustainable Communities, University of Wollongong, Australia; Geography, Urban, Environmental and Sustainability Studies, University of Minnesota, Duluth and Department of Geography and Geology, Central University of Punjab. The aim of such departments is to enable students at the forefront of education and research in various fields of Geography and Geology. The syllabi in geography is designed in such a way as to make the students learn and critically think not only about the local and regional human-environmental issues but also sense the nation through the lenses of the physically unifying forces. Table 1 shows the relevance of the core concepts of sustainable development in geography curriculum.

The main question is how this discipline translates knowledge into action and fosters environment stewardship? Reinfried et al. (2007) suggest, through their elucidating example of water shortage and its possible causes, that modern geography education should not only take the analysis of a problem into account. If education shall qualify students for their participation for example, in local agenda activities then, by moving a step ahead, the contemplation of alternative solutions and responses are required to be discussed. The 63 themes from three major components of sustainable development encompass almost everything. The themes are slightly modified from what were suggested by the United Nations, and is based on the major and minor themes from the syllabi of geography in higher education. In the context of sustainable development, geography in India should include the Indian traditional and cultural environment conservation practices. Fleischner (2011), in his edited book *The Way of Natural History*, nicely states, 'That Gautama, the historical Buddha, had his original moment of awakening while seated under a tree is probably not coincidental.' Let us all find our tree and awaken, for the future of our earth is at stake.

The curriculum reflects our sensitivity towards the global and local agenda, but it hardly incorporates or discusses the traditional methods of finding a solution. The Convention on Biological Diversity signed at the 1992 Rio Earth Summit, is dedicated to promoting sustainable development. It interprets biological diversity as more than plants, animals, and ecosystem. It is also about human beings and our food security. It views the ecosystem from a human perspective. But the rich Indian heritage safeguarded in texts and scriptures have always valued the role of ecosystem and considered human being as a part of it. It recognises the importance of each and every living being and

does not recognise their importance because it is important for human beings. This difference in ideology should be appreciated by everyone. The UN Declaration on the Rights of Indigenous People, endorsed by UNHRC in 2006, recognises that respect for indigenous knowledge, culture and traditional practices contributes to environmental management and sustainable development. Traditional knowledge got attention in Biological Diversity Act (2002) of India, and is being utilised in medicine and health but has still not received attention in many disciplines.

Rai (2007) has substantiated several examples of from eco-cultural communities who utilise traditional ecological knowledge in sustainable natural resource management. In such practices, certain religious beliefs and traditional practices help in the conservation of nature and its biodiversity for example, Demazong (the Buddhist eco-cultural landscape in Sikkim Himalaya) and the Apatani eco-cultural landscape in Arunachal Pradesh. Apatanis, one of the major ethnic groups of eastern Himalayas, are known for their systematic land use practices and rich traditional ecological knowledge of natural resource management and conservation[3]. Such knowledge is required to be shared with the students in class so that they can know and value the practices. Geography has the freedom to choose the themes which are in the local, regional and national interest.

Table 1
Relevant Themes for ESD and the Teaching of Geography

ESD Component	S.No.	Themes
Environment	1.	Air Quality/pollution
	2.	Climate change
	3.	Monsoon and ENSO phenomena
	4.	Biodiversity protection
	5.	Threat status of species
	6.	Desertification/land degradation
	7.	Land use change
	8.	Deforestation and forest fire
	9.	Continental and marine water quality
	10.	Waste generation
	11.	Generation of hazardous waste
	12.	Water resources used
	13.	Waste management

[3]*Apatani Cultural Landscape, UNESCO*

	14.	Soil conservation
	15.	Ecological quality of river
	16.	Noise pollution
	17.	Natural/anthropogenic hazards/disaster
	18.	Effect of environmental change on process of landforms
	19.	Weathering and erosion
	20.	Gaia theory
	21.	Environment ethics
Society	22.	Human Environment interaction
	23.	Population growth
	24.	Life expectancy at birth
	25.	Poverty and inequality
	26.	Gender equality
	27.	Cultural diversity and identity
	28.	Access to primary health care facilities
	29.	National investment in health services
	30.	Living conditions and housing
	31.	Security and crime
	32.	Leisure and services
	33.	Mobility and migration
	34.	Social welfare and quality of life
	35.	Literacy
	36.	Investment in education and ICT
	37.	Employment
	38.	Safety at work
	39.	Participation in decision-making
	40.	Corruption
	41.	Role of women in environmental and disaster management
	42.	Behavioural approach and subjectivity
Economy	43.	GDP
	44.	Cooperation, technology transfer and global sustainability
	45.	Research and development
	46.	Sustainable public finance
	47.	Corporate responsibility
	48.	Energy use and consumption

	49.	Renewable energy production
	50.	Transportation and connectivity
	51.	Fisheries
	52.	Sustainable consumption
	53.	Development of rural areas
	54.	Management of biotechnology
	55.	Eco tourism
	56.	Regional disparity
Skill Development	57.	Critical thinking
	58.	Quantitative techniques
	59.	Cartographic techniques
	60.	Spatial/temporal analysis
	61.	Geospatial techniques
	62.	Environment stewardship
	63.	Action oriented project work

Source: Relevant themes of ESD are adopted from Sanchez (2011).

Fostering Environment Stewardship

We use natural resources for the sustenance of our life and it is impossible to survive in the absence of it. What is required is the appreciation of its role in our daily lives and the commitment to modify our behaviour and attitude in order to reduce our footprints on the environment. Our emotional and psychological attachment to our earth and the environment is essential to foster environment stewardship. It is only possible when we make such an attachment from the beginning of one's life by making it a part of the educational curriculum. Human beings still like the intact beauty of nature. The concept of environment stewardship was advocated by Aldo Leopold for land ethics and it is generally considered that ecologists can be among the leaders to define the societal path to planetary stewardship and this is possible if the scientists integrate social aspects in their research (Power and Chapin 2009). This is applicable for geography also.

Outdoor field study is one of the integral components of geography. Outdoor field activities expose the students to the world reality and the wonder of nature and society. They could learn to appreciate the earth's intrinsic beauty, recognise the significance of their own footprint, and, potentially, alter their behaviours to create positive change (Ray 2013). General observation by the individual is not sufficient, but purposeful and well organised field activities can help students to understand the problem.

Robert Aitken, a contributing author of *The Way of Natural History*, claims that close attention to nature is a prerequisite to intimacy with nature. Most of the geographical projects are environment oriented. When students go to the field, they understand the reality in a better way (Fleischner 2011). Several examples can be cited in this context. Watershed management involves the study of hydro-physical characteristics of watershed, changing landuse or cover pattern, human interaction with the environment and its management. During such a study, a student gets the chance to know the relevance of watershed not only for the local community, but also for other catchment areas. It offers an opportunity to learn how rivers, mountains or hills, and human beings are woven in a bond. Such a study may help in influencing the land and water management practices and policies in the watershed. The author of the book *The Way to Natural History* writes that if an individual experiences the nature through slow-paced, sensory-based recreational activities (like nature photography, birdwatching, sketching, and foot travel), they develop a higher degree of introspection and spirituality than those who partake in fast-paced activities, and they will so develop their behaviour that it will not compromise with the sanctity of nature. According to Ray (2013), 'we protect what we love, and if playing outside cultivates a passion for environmental health, then getting people outdoors is essential in responding to global climate change'.

Conclusion

Geography inherently deals with the core concept of sustainability and can provide a strong methodological foundation in addressing various issues. The discipline allows to relate the phenomena in different time frames which are essential to develop an understanding of the nature of any phenomena and its association with others. Students can connect themselves to the nature and can study the dynamics. The spatial dimension of the discipline facilitates an understanding of the phenomena at various scales and assists in finding area specific solutions. Another advantage of this discipline is its nature to incorporate the society as a key factor in shaping the earth's processes which gives realistic insights. Besides the intrinsic nature of geography, its curriculum can aim to empower learners to change their behaviour and adopt sustainable action through participatory learning as the discipline is not confined within the boundary wall of a classroom. Purposeful and well organised field activities can help students to understand the problem. The geography curricula should also include the traditional practices, in order to comprehend environmental perception and conservation methods. The learning acquired through experience and traditional knowledge system can be a catalyst to achieve sustainability.

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