Syed Nadeem Fatmi, Abdul Matin & Asfiya Karimi

SOCIAL ECOLOGY AND SUSTAINABLE DEVELOPMENT: ADVOCACY FOR PARADIGM SHIFT

It is important to begin the discussion by admitting that there exist many layers of confusion in the emerging discourse that attempts to elucidate the relationship between social ecology and sustainable development in India today. This confusion relates, on one hand, to a lack of clarity in the meanings given to both these concepts in the extensive literature that is produced on this subject. Contrariwise, the concept of sustainable development has a long and meandering etymology in social sciences. When used in the context of social ecology it has been associated with ambiguous and contradictory meanings. It could imply a more or less neutral process of social change, including ecological change or change in the natural habitat; a process which is not a cause, a cure nor a consequence of anything. It could imply an analysis of the ecological consequences of a single development project. On the other hand, it could mean policies, programmes and interventions that enhance or cure the problems of nature. Or its opposite, it could also mean policies and programmes that destroy nature. In some literature it has meant both destruction and reconstruction of nature, such that it has been suggested, development as industrialisation in consort with modern technology has redefined the relationship between human species and nature. To a large extent the confusion regarding its relationship relates to the fact that there is no antecedent to draw from in framing this theme within the social science discourse. Many approaches have been used to assess social-ecological systems sustainability. Social ecological systems usually include discrete, heterogeneous elements involved in local interactions; they can be effectively represented as networks. In these networks, human and bio-geophysical elements of interest are connected to each other through a selection of links to form a structure whose properties can then be analyzed. An increasing number of social scientists from many fields are now focusing their efforts toward assessing social ecological systems' sustainability in this manner, using the broad network theory.

SYED NADEEM FATMI, Department of Sociology, Gautam Buddha University, Greater Noida, India; ABDUL MATIN and ASFIYA KARIMI, Department of Sociology, AMU, Aligarh

Social Ecology

Social ecology is a critical social theory founded by Green author and activist Murray Bookchin. Conceptualized as a critique of current social, political, and anti-ecological trends, it espouses a reconstructive, ecological, communitarian, and ethical approach to society. Social ecology advocates a reconstructive and transformative outlook on social and environmental issues and promotes a directly democratic, confederal politics. As a body of ideas, social ecology envisions a moral economy that moves beyond scarcity and hierarchy, toward a world that re-harmonizes human communities with the natural world, while celebrating diversity, creativity and freedom.

Social ecology suggests that the roots of current ecological and social problems can be traced to hierarchical modes of social organization. Social ecologists claim that the systemic issue of hierarchy cannot be resisted by individual actions alone such as ethical consumerism but must be addressed by more nuanced ethical thinking and collective activity grounded in radically democratic ideals. The complexity of relationships between people and nature is emphasized, along with the importance of establishing more mutualistic social structures that take account of this (Bookchin, 2005; 85-87). Social ecology's social component comes from its position that nearly all of the world's ecological problems stem from social problems; with these social problems in turn arising from structures and relationships of dominating hierarchy. They argue that apart from those produced by natural catastrophes, the most serious ecological dislocations of the 20th and 21st centuries have as their cause economic, ethnic, cultural, and gender conflicts, among many others. Present ecological problems, social ecologists maintain, cannot be clearly understood, much less resolved, without resolutely dealing with problems within society (Bookchin, 2005; 16).

Bookchin argues against the uncritical use of ecological principles by environmentalists, who, he believes, tend to seek peaceful associations with nature but do not challenge its ongoing commodification and plunder. Environmentalism, according to Bookchin, facilitates domination of nature by developing techniques for diminishing the hazards caused by domination. Ecology, as a philosophy, emphasizes instead diversity and complexity, both biological and, by extension, socio-cultural. Bookchin sees the alienation of human beings from their environment as the result of class, race, and gender struggles, which, over time, have led individuals to subjugate one another and the environment in the pursuit of power and domination. Those in power have ignored lessons from ecology, seeking holism through unity in sameness rather than unity in diversity. Bookchin's concept of an ecological society, though more a liberal interpretation of history than a fact based one, emphasizes just such pluralism within nonhierarchical communities: "Freedom would no longer be placed in opposition to nature, individuality to society, choice to necessity, or personality to the needs of social coherence".

Social ecology focuses its critique on domination and hierarchy *per se:* the struggle for the liberation of women, of workers, of blacks, of native peoples, of nature (the ecology movement), are ultimately all part of the struggle against domination and hierarchy. Social ecology is the study of both human and natural ecosystems, and in particular the social relations that affect relationship of society as a whole with nature. Social ecology advances a holistic worldview, appropriate technology, reconstruction of damaged ecosystems, and creative human enterprise. It combines considerations of equity and social justice with energy efficiency and appropriate technology. Social ecology goes beyond environmentalism, insisting that the issue at hand for humanity is not simply protecting nature but rather creating an ecological society in harmony with nature. The primary social unit of a proposed ecological society is the eco-community, a human-scale, sustainable settlement based on ecological balance, community self-reliance, and participatory democracy. Social ecology envisions a confederation of community assemblies, working together to foster meaningful communication, co-operation, and public service in the everyday practices of civic life, and a "municipalist" concept of citizenship cutting across class and economic barriers to address dangers such as global ecological breakdown or the threat of nuclear war. Co-operation and co-ordination within and between communities is considered able to transcend the destructive trends of centralized politics and state power. The city can function, social ecology asserts, as "an ecological and ethical arena for vibrant political culture and a highly committed citizenry" (Bookchin, 1987).

Sustainable Development

Human activities have damaged the natural integrity of major ecosystems on every continent, threatening the security of the societies that depend on these ecosystems. Moreover, the most worrisome environmental trends are global in scope, and thus threaten all of humanity. In 1987 the World Commission on Environment and Development (WCED) report 'Our Common Future' brought the concept of "sustainable development" squarely into the purview of governments and publics around the world. The global audience has pinned its hopes to sustainable development as a solution to urgent environmental and societal problems. The mainstream view of the environment today is sharply different from what it was a few decades ago, when environmental problems were almost universally regarded as minor, technical, soluble and politically uncontentious. They were considered the byproducts of economic growth and social progress which further applications of growth and progress would duly solve, as increasing wealth created the resources and improved technology the means to solve them. In contemporary time, throughout the industrialized world, governments and political parties now acknowledge that environmental problems are indeed very serious, requiring solutions which are not merely technical and which may not be available at all without significant social and economic change. The vehicle

for this shift has been the concept of sustainable development, which has succeeded in overcoming the conflict between environmental protection and economic growth which characterized the environmental debate of 1970s and early 1980s. It accepts that protecting the environment requires fundamental change in the direction of economic progress and government policy. But it argues that this is compatible with continued economic growth in a (regulated) global capitalist system. In this sense, sustainable development represents a "historic compromise" between the ideology of capitalism and its environmental critique and which has enabled a single environmental discourse to develop, used by all manner of governments, business organizations, and environmental organizations (Jacobs, 1997).

In the context of other significant global reports on the environment over the last few decades, a major contribution of the World Commission was its explicit recognition that poverty is a major source of environmental degradation. For example, the collection and use of firewood by families in developing countries is sometimes considered a major reason for deforestation. While this connection may seem reasonable enough at first glance, the main causes of deforestation are actually large-scale lumbering, agricultural expansion, overuse of existing agricultural land, burning of forests to encourage fodder growth, over-grazing and rapid urban growth (Pietila, 1990). Although the Commission provided no analysis of the causes of poverty, its concern about poverty lead it to the argument that economic growth must be stimulated. However, the major flaw of the Commission's analysis (and the likely reason 'Our Common Future' has been embraced by governments and corporations as much as by environmentalists) is that it downplays the extent to which both poverty and environmental degradation result from wealth.

Sustainable development *per se* has only recently emerged as a distinct subject of inquiry; therefore it remains to be seen which theoretical framework offers the most guidance for sustainable development concerns. Here, three interesting points may be discussed. Firstly, the most conventional, narrow interpretations of sustainable development primarily emphasize fulfilling material human needs, maintaining environmental assets for future generations (e.g. conservation), and future equity. The most relevant theoretical perspective related with social reform and policy analysis have much to offer in regard to fulfilling material human needs, but are virtually mute on all the other sustainable development components discussed above: advancing social equity, maintaining environmental assets for future generations, avoiding irreversible damage to any single significant asset, expanding organizational effectiveness and building capacity toward sustainability. Given that social reform and policy analysis are the two dominant traditions constituting the heart of the "rational paradigm", it can be seen why theoretical concern has been slow to identify sustainable development concerns and give them appropriate prominence. Secondly, only

the social learning and social mobilization traditions, not very dominant traditions offer guidance in regard to current equity, expanding organizational effectiveness and building capacity. Thirdly, despite the less acknowledged contributions of the social learning and social mobilization traditions, there are still significant gaps in theoretical framework as it pertains to sustainable development, especially in the areas of future equity, building capacity toward sustainability, maintaining environmental assets for future generations, and avoiding irreversible damage to any single significant environmental asset. Planners concerned with these aspects of sustainable development will have to look to greener pastures for relevant theoretical guidance (Rees, 1992a, b).

The Green Movement: The Greens believe in the following pillars of ecology, social responsibility, grassroots democracy, and nonviolence (Capra and Spretnak, 1984). These pillars translate into principles of community self-reliance, improving the quality of life, harmony with nature, decentralization and diversity. From these principles, the Greens question many cherished assumptions about the rights of land ownership, the permanence of institutions, the meaning of progress and the traditional patterns of authority within society. The Greens recognize that their movement will have to take different forms in different countries (Capra and Spretnak, 1984). Sustainable development refers to the fulfillment of human needs through simultaneous socio-economic and technological process and conservation of the earth's natural ecosystems. To achieve this, careful attention must be paid to preservation of the information as a kind of natural resources.

Information Society

The fast development of information and telecommunication technologies, as well as the increasing significance of knowledge has led to many revolutionary changes in the lifestyle and human communication in the last decade of the 20th century. A new socio-economic formation is developing currently. It is called information society to emphasize the role of information in the present day society. Information is considered one of the most important factors of socio-economic development (Capurro R., 1990). Since the beginning of the 1990s, the term "information society" has been used to describe the many and varied challenges and opportunities which have been created by the rapid development of modern information and communication technologies. Knitting together of digitally stored data, texts, sounds and images has led to widespread use of modern telecommunication systems, personal computers and electronic information services as well as a quantitative growth in the traditional media. The internet, a world-wide data network, has established itself as a global communication platform creating opportunities for information exchange on the global scale which can be used for the development of cooperation aimed at effective prevention of negative changes in natural environment, e.g. green house effect, ozone layer depletion, acidification. What

does the term "information society" mean then? "The information society is the society in which the whole structure and legislation is set to satisfy, to the largest possible degree, the general access to information and to information dissemination, using all modern technological means, with the observation of those necessary regulations which must limit the right to information" (Kulikowski 1998).

In Europe, the strategically important moment in the creation of the information society was the preparation of the Bangemann Group Report in 1993 (Recommendations to the European Council, 1994). The Report is significant because:

- it introduced the concept of information society to Europe;

- it introduced the information society issues to the area of direct interests of leadership bodies in the European Union and its member states;

- it specified various challenges facing Europe at the turn of centuries experiencing a fast development of information technologies;

- it gave proposals as to the methods of operation and directions of development of the European Union to meet such challenges and use the emerging information society for the acceleration of economic growth and improvement of the quality of life;

- the information revolution is primarily a communication revolution, i.e. the revolution in the area of information exchange methods existing in the society, as well as in telecommunication. The convergence of telecommunication, data transmission and the computer technology provides the infrastructure for electronic communication which completely transformed information in the present-day world. Digital telecommunication allows for handling audio-visual and multimedia transmissions. A new challenge is the digital interactive television and multi-dimensional graphics. The telecommunication network determines the process of distributed data processing and digital communication. In the information society, electronic communication becomes as indispensable as electricity. The telemetric revolution, or the convergence of telecommunication, computer and audio-visual technologies is one of the most important stages of creating the technological basis of the information society;

- the establishment of information society structures is associated with the increasing confidence in electronic information processing system;

- the general access to the information systems should be associated with the use of computer networks;

- the costs of recording and making available electronic data should be constantly decreasing, also in proportion to the costs of information development.

The information society also becomes a society of paradox. Culture, art and entertainment are more and more dependent on the electronic means of information transmission. Owing to the interactive and multimedia aspects, the boundaries between education, work and entertainment are less and less visible. The concept of interaction becomes a cultural norm. The use of multimedia technologies leads to the removal of differences between various literary genres. With time, however, the problems with retrieving information are growing. Infomedia technologies determining the information infrastructure of the present day society are based on wide area and local networks which allow for transporting information and offer solutions dedicated for specific user groups, as well as basic types of network services (Babik, 1999).

They present great opportunities; spatial and temporal constraints on communication are being reduced; information can be stored and transferred quickly and with a high usage value; the price of automated services is falling.

Shaping of the Information Society

Changing the communities into information society is not only a technological process, but primarily a social one. Implementation of modern hardware and software, as well as modern technologies should generate new forms of intellectual activities relating to the abundance of information and the necessity to operate new types of information sources.

The problems of shaping the information society are the following:

- Problems of access to information. Access to information is more and more a key to business and social success. The statement that those who hold information hold power and money is more and more true.

- The problems of social development and cultural changes. There is interdependence between the development of communication and information technologies, the information products and services on the one hand and the existing socio-economic conditions on the other.

- New methods of electronic information provision and new forms of information. Electronic publications exist in addition to print or as a replacement thereof.

- New tasks and requirements of the information users related to the changes in needs and expectations of information receivers. Presently, information users may not operate without computer skills or access to the Internet.

One of the basic problems of the development of the information society is the limited ability of communities to adopt and use new information technologies, including coping with the evergrowing quantity and deteriorating quality of available information (Babik, 2002). These processes pose a threat of excessive split or division of communities into those which have access to information and those without it (information poor communities), both in global and local aspects.

Sustainable Development of Information Society and Ecology of Information

"Sustainable development refers to the fulfillment of human needs through simultaneous socioeconomic and technological progress and conservation of the earth's natural resource systems" (Sage, 1999). To achieve this, careful attention must be paid to preservation of the information as a kind of natural resources in the environment of human being.

The term "information ecology" is analogous to the terms already in use: ecology, human ecology, protection of environment, ecological factors which concern the specific types of man's environment. Both components of the term of "information ecology" are well known. Ecology is a branch of biology which deals with the examination of mutual relationships between populations and not only between individual organisms or between organisms and their surroundings. The word "ecology" makes us think of protection of natural environment and removal of its contamination. It is also present in such terms as "social ecology" or "culture ecology" and associated with it are ecological movements, clubs or activities. In this way the notion of ecology may be referred to the times of Ernst Haeckl, as a division of biology dealing with the examination of relationships between plants, animals and the whole of environment they live in. Also the term "information" is familiar to us. It is obvious that the meaning of "information ecology" depends on the understanding of the information itself. Information ecology is a science which studies the laws governing the influence of information summary on the formation and functioning of bio-systems, including that of individuals, human communities and humanity in general and on the health and psychological, physical and social well-being of the human being, and which undertakes to develop methodologies to improve the information environment" (Eryomin, 1998). Certainly, it concerns the external factors affecting the so-called "information purity," protecting information against "pollution" that may consist in fact falsification or untrue information, or in providing incomplete information. In the case of information ecology, the emphasis is put directly on information, and indirectly on man. We should protect information like our natural environment because it affects man, either positively, or negatively.

Manuel Castells' Environmental Movement

Castells in his study of environmental movements has enquired the movement within the framework of network society. The environmental movement aroused in the last quarter to the end of the millennium due to the network of information through the media. Whose influence was so enormous that with it nod or string of information in the network society, the flow of information within the space of timeless time with which various aspect got concern of environment. While enquiring the environmental movements Castells opposes the concept of Nation-State. By arguing, how it can be possible to study the problem which is related from local national, global level need only the concern of Nation-State. We all are sharing the same ecological conditions. We all are living in the same global ecosystem but at the time of concerning problems related to environment. We confine ourselves to the boundaries of nation state only (Castells, 1997: 126).

It is the critical matter for the influence of the new ecological culture is its ability to weave threads of singular cultures into a human hypertext, made out of historical diversity and biological commonality. It is a green culture which Castells defines in a Petra Kelly's terms: "We must learn to think and act from our hearts, to recognize the interconnectedness all living creatures and to respect the valve of each thread in the vast web of life. This is a spiritual perspective and it is the foundation of all green politics. Green politics requires us to be both tender and subversive (Castells, 1997: 127).

The environmental movements examined by Castells is typologized by Alain Tourain with three features, viz. (a) Identity (b) Adversary and (c) Goal (Castells, 1997: 113). Castells has observed five environmental movements, viz.(1) Conservation of nature (2) Defense of own space (3) Counter-Culture (4) Save the planet (5) Green Politics.

The movement and a number of other organizations that followed suit were completely decentralized, formed by autonomous tribes that would meet periodically, according to the rites and dates of Native American Indians and decide their own actions. Deep ecology was the ideological foundation of the movement, and it figures prominently in The Earth First! But equally, if not more, influential was Abbey's novel 'The Monkey Wrench Gang', about a counter-cultural group of eco-guerrilas, who became role models for many radical ecologists. Indeed,"monkey wrenching" became a synonym for eco-sabotage (Castells,1997: 116). These counter cultures are of the ideas of deep ecology. In 1990 the animal liberation movement focusing on outright opposition to experimentation with animals, seems to be the most militant wing of ecological fundamentalism.

Eco-feminist with the feeling of deep ecology are of motto that it is the patriarchal society which is responsible for industrial revolution and showing dominance not on females but on the ecological system by deteriorating or

polluting the environment through industrial revolution. Thus Eco-feminist is of the view that patriarchalism and industrialism can be overthrown only with the absolute respect for nature. Some eco-feminists are of the view that we all should move to pre-historic, natural societies, free of male domination. Thus, with deep ecology, eco-feminism, radical ecologist link up environmental action and cultural revolution to achieve the aim of ecotopia (Castells, 1997: 117).

Another environmental movement which Castells studies is the 'Save the Planets' with Green Peace organization. Green Peace is the world's largest environmental organization and probably the one that has most popularized global environmental issues, by its media oriented, non-violent direct actions founded in Vancouver in 1971. The identity of Green Peace is the internationalist eco-warrior, its goal is to achieve sustainability and its adversaries is unfettered global development. Green Peace are of the concern that the development or the model of development for which we are racing what outcome it is giving to our environment. They are of concern that development is necessity of life but it should be in the eco-friendly way.

The last movement which Castells has observed is the green politics that he has seen that the whole world is now uniting in the same concern of save the environment with different identity from different places so the politician gets the topic to save the planet which is the goal of not only the social organization, elite class, feminist perspective but also the concern of common man. The parties started keeping the name of the party having the influence of environment. The major force underlying its formation was the citizen initiatives of the late 1970s mainly organized around the peace and anti-nuclear mobilizations. It uniquely brought together veterans of the 1960s movements with feminist and educated middle class concerned with peace and nuclear power, the environment, the state of the world individual freedom grassroots democracy. A very different Germany emerged from the green politics experiment, both culturally and politically. But the impossibility of integrating party and movement without inducing either totalitarianism or reformism at the expense of the movement received another historical confirmation as the iron law of social change. Thus, by observing the different movements of environment occurred in different aspect with the flow of information. Here, Castells has observed there is string or network due to which at different places at the same time, the same kind of movement has occurred. The whole world has come under the same umbrella of environmental movement. Castells in light of the study of network society has observed the above mentioned environmental movements. It is the spatial transformation that he has tried to capture under the concept of the space of flows that interacts with the traditional space of places, so that the new spatial structure associated with information, is not placeless, but is made of networks connecting places by information and communication flows. Under the informational paradigm,

the capacity of any communicating subject to act on the communication network enables people and organizations with the possibility to reconfigurate the network, according to their needs, desires, and projects. Yet the configurative capacity for each one depends on the pattern of power present in the configuration of the network.

Within this framework of network society Castells has studied five environmental movements and observed that how the movements are going at different places in but with the same notion of preserving environment, in its natural form. With different identity of nature lovers, local community, the green self internationalist eco-warriors, concerned citizens. The adversary of the movement are uncontrolled development, polluters, industrialism, technocracy, patriarchalism, unfettered global development, political establishment. Their goal is to achieve wilderness, quality of life, health, ecotopia, sustainability and counter-power. By observing the movements, Castells has observed that much of the success of the environmental movement comes from the fact that more than any other social force, these movements have been able to be best adapt to the conditions of communication and mobilization in the new technological paradigm. By creating events that call media attention environmentalist are able to reach a much broader audience than their direct constituency. Thus the aim of present section of enquiring the environmental movement within the framework of network society is this much that the world which is divided into the nation-state sharing the same ecological condition. It must be under the frame of our globe. When disaster or natural calamity takes place, we took our vision only at nation state dividing our planet with the boundaries of our nation-state and your nation-state.

Social-Ecological Networks

Networks consist of nodes and links that can be used to represent a given system in terms of its localized components, i.e., nodes or vertices, and the relations between those components, i.e., links or edges. At the time of representing a social-ecological system as a network, a decision must be reached that which attributes of the social-ecological system are of interest for the study, i.e., which attributes we want to translate into a network structure. This choice determines how the structural map of the system is constructed and therefore, also influences the analysis, which is based on the structural map. Examples of different attributes include trust, power, management information, flows of water, movement of cattle, contamination, and seed dispersal. The nodes could therefore symbolize both social and ecological components. Note that we use the term "social nodes" for human-related nodes and the term "ecological nodes" for nodes that are not related to humans. Typical social components are individuals and/or organizations, as normally used in the social sciences. Typical ecological components are species, as in food webs, and/or individual patches of habitat in a landscape. Links can

be directed or undirected, and they can depict relations of any chosen kind between the linked pair of nodes. The nature of the relations could be either entirely social, entirely ecological, or a mixture of both social and ecological components, e.g., a relation consisting of a farmer's resource extraction from his/her farm. Human activities can create a social-ecological network by linking ecological nodes, i.e., independent ecological systems become connected by the activities of humans. For example, livestock can be moved around in a landscape and previously unconnected areas of land then become connected. Another example is fishermen who fish in different lakes and transfer invasive species when transporting their boats between the lakes. Of course, those lakes could already be connected ecologically, but the human/social component has direct implications for ecosystem management for resilience. On the other hand, social connections can be created via ecological connections, e.g., rivers connect people from upstream and downstream, thereby creating a social-ecological network.

We acknowledge the difficulty in defining what should be included in the network representation of the social-ecological system under study. There is no such thing as the "right" way to represent the social-ecological network of a given system, just useful and not so useful ones. What qualifications must a particular component of a system possess to be included in the network? If we include it, should it be represented as a node by itself or lumped together with other similar components into a single node? Also, what determines if a relationship between components should be represented as a link? Components can have different relationships in different contexts, and the strength of the links may vary over time. Furthermore, because links can be of different sorts in the same network, e.g., human-human links and human-species links, we understand that we will face problems of link comparability in the structural analysis. These are important considerations that have to be addressed.

Conclusion

The paper provides an overview of issues associated with sustainability of network and information society. Of particular interest in this connection is ecology of information. The continuous increase is often outdated, incomplete and unreliable information causes that it is necessary to implement a reasonable information evaluation and selection process. These issues are especially important at this time since we are in major expansion in information network and knowledge management capabilities. Ecology of information gives us a new perspective of view on information resources and its users as a type of environmental resources for human beings.

The role of network society in analyzing the sustainability of social ecological systems faces many challenges, including modeling the social ecological systems and social sub-networks is a particularly sensitive task.

The use of network society as a framework to study is still in the early stages of development. Despite certain limitations, which require more theoretical work, research seems to be progressing rapidly in this direction and eventually provide practical insights into sustainable social-ecological systems.

ICT has a great potential to share with the wider audience especially the people adversely affecting. It may enable the concerned people in reorienting for a new social movement in persuit of sustainable social ecology. Some of these movements have been highlighted by Manuell Castell in his study of social movements and its replication for Kosi command area. Due to the notorious command of the Kosi river, touching boundaries of various countries including Nepal, India and Bangladesh may be directed for a new social movements for sustainable ecological development. This exercise is replicable for many disaster management in India, which needs serious attention by academicians as well as social activists for a proper policy formulation. In order to ensure better quality of life for ordinary citizens as well as new nations of first quarter of the twenty first century.

REFERENCES

Babik W.

Transformations in Information Society – New Challenges. Proceedings of 8th International Seminar "Scientific and Technical Information in Central and Eastern Europe", Warsaw 1999, pp. 34–38.

Babik W.

Information Ecology – the Challenge 21st Century. Praktyka i Teoria Informacji Naukowej i Technicznej, vol. 10, No. 1, 2002, pp. 20–25.

Babik W.

Information Ecology as a Remedy for Threat from Modern Information Technologiepp. Proceedings of 10th International Seminar "Scientific and Technical Information in Central and Eastern Europe", Zakopane 10–12 May 2001, Information Society Technologies, Warsaw 2002, pp. 65–69.

Bookchin, M.

1987   *The Rise of Urbanization and the Decline of Citizenship*, Sierra Club, San Francisco, CA.

Bookchin, M.

2005   *The Ecology of Freedom: The Emergence and Dissolution Hierarchy*, Oakland: AK Press, pp. 85-87.

Capra, F., Spretnak, C.

1984   Green Politics: The Global Promise, E.P. Dutton, New York.

Castells, M.

1997   *The Power of Identity, The Information Age: Economy, Society and Culture*, Vol. II. Malden, MA; Oxford, UK: Blackwell.

Capurro R.

> *Towards an Information Ecology*. [In:] Wormell I. (ed.), Information Quality. Definitions and Dimensionpp. Proceedings of a NORDINFO International Seminar "Information and Quality" (Royal School of Librarianship, Copenhagen 23–25 August 1989), Taylor Graham, London 1990, pp. 122–139.

Eryomin A.L.

> *Information Ecology – a Viewpoint*. International Journal of Environmental Studies, Sections A & B, No. 3/4, 1998, pp. 241–253.

Guha, R.

    1998   *Social Ecology,* Delhi: Oxford University Press.

Jacobs, M.

    1997   The new politics of the environment. In: Jacobs, M. (Ed.). Greening the Millennium? Blackwell Publishers, Oxford.

Kulikowski J.L. : *Contribution to the Foutrh Information Forum in Zakopane (Poland)*

    1977   Conference Proceedings of 4rd Forum on Scientific and Technical Information, Zakopane 2–7 September 1997, Warszawa 1998.

Kulikowski J.L.

    1978   *Information and the World We Live*. Pañstwowe Wydawnictwo Naukowe, Warszawa.

Matin, A. and S. N. Fatmi

    2007   'Ecology, State Intervention and Impact: A Case Study of Bathipur', *IASSI Quarterly: A Journal of the Indian Association of Social Sciences Institutions (IASSI)*, Vol. 25, No.4, April-June, pp. 74-84.

Matin, Abdul and Sadaf Nasir

    2013   ICT and New Social Movement In India: Tentative Observations. New Delhi: Icon Publications Pvt. Ltd.

Pietila, H.

    1990   Environment and sustainable development. IFDA dossier 77, 61–70, May/June 1990.

Rees, W.E.

    1992a   Understanding Sustainable Development: Natural Capital and the New World Order. School of Community and Regional Planning, Vancouver, UBC.

Rees, W.E.

    1992b   Ecological Footprints and Appropriated Carrying Capacity: What Urban Economics Leaves Out. Presented to Globe'92, Vancouver, British Columbia, 18 March 1992.

Sage A.P.

    1999   *Sustainable Development: Issues in Information, Knowledge, and Systems Management. Information*. Knowledge, Systems Management, No. 1, pp. 185–223.