BEST: International Journal of Management, Information Technology and Engineering (BEST: IJMITE)
ISSN 2348-0513
Vol. 3, Issue 6, Jun 2015, 1-12

"TECHNOLOGY, SCIENTIFIC ATTITUDE AND HUMAN BEHAVIOUR: A REVIEW"

AVTAR SINGH RAHI

Research Scholar, Associate Professor, Department of Chemistry, Government College of Education, Bhiwani, India

The problems that exist in the world today can't be solved by the level of thinking that created them.

- Albert Einstein

ABSTRACT

Today we are moving through a deteriorating world where problems manifest themselves at an ever increasing rate, while becoming more complicated. We produce more food, more comforts, more luxury and more and more. We are doing as if it is our last day to get something. We don't like to share ourselves with others. As human population continue to grow, material consumption intensifies and production technology including synthesis and manufacturing in laboratories further expands; by consequence the quantity and quality of environmental resources keep steadily decreasing. To dilute ill effects of its work, the world is trying to "go green". But any development which is the product of green scheme can't be termed as sustained. We need to search methods to conceptualize the problems and develop strategies for their solution. A man can't ruin the earth alone but it requires a group and nature alone has the capacity to revert back to its original and pure position but every time it asks for a cost or sacrifice. Environmental sustainability requires changes in age-old patterns of thinking about the abundant availability of natural resources which is no longer the case, and a focus on human survival through controlled environmental exploitation within ecological limits. A sketch discussing most pressing environmental problems and their general driving forces is necessary to get rid of today's alarming situations. So there is a need to study nature, humans and effects from environmental to behavioral and from general to specific terms.

KEYWORDS: Technology, Scientific, Attitude, Behaviour, Environment, Pollution, Human, Thinking

INTRODUCTION

We live in a world of limited resources, including time, energy, money, and attention. In this context, human beings are forced to choose, consciously or unconsciously, between competing values. The values of peace, freedom, development, and environment remain prominent aspirations and efforts are increasingly being made to link them together. We all know that applications of science play an important role in the societies in which we live. It is the machines, products and systems of applied knowledge that scientists and technologists develop through technology; helps man to gain increasing control over his environment and improves the structure of society or application of that knowledge by different members of society from government to common man who use special methods of thought and action. Science and technology, together with Scientific Brain are our hope for the future, but do we know their strengths, weaknesses and shortcomings? Today we are moving through a deteriorating world where problems manifest themselves at an ever increasing rate, while becoming more complicated. If it is the science and technology which plays the foul, we should consider it. But it has given us so much advantage that we have become able to exceed the natural confines of our environment, whereas the millions of creatures around us are not able to do so, how can we blame it.

As human population continue to grow, material consumption intensifies and production technology including synthesis and manufacturing in laboratories further expands; by consequence the quantity and quality of environmental resources keep steadily decreasing. To dilute ill effects of its work, the world is trying to “go green”. Manufacturers are pushing “energy efficient and eco friendly” versions of common, household and other items. Even educational institutions are educating students about the importance of preserving the environment around them (Shastri, 2014). But any development which is the product of green scheme can’t be termed as sustained. The challenge is when we will begin to define, describe and ultimately deal with the dangers that confront us? We need to search methods to conceptualize the problems and develop strategies for their solution. A man can’t ruin the earth alone but it requires a group and nature alone has the capacity to revert back to its original and pure position but every time it asks for a cost or sacrifice. Where may we find the weapons to fight the bad mechanisms faced?

Overuse of surface water and an increasing reliance on nonrenewable groundwater resources have been reported over various regions of the world, casting significant doubt on the sustainable water supply and food production (Wada and Bierkens 2014). There is a rule that what you can own, is only what you can carry but we are no longer like to bind by the constraints. We might have forgotten that what one can eat today, is all one can feed on. We are no longer limited by how much we feed, depending on how far we can walk. We are doing as if it is our last day to get something. We produce more food, more comforts, more luxury and more and more. We have conquered diseases as if we no longer die by being unfit. We don’t like to share ourselves with others. We try to maintain a burgeoning army of autocrats and people who do not try to contribute our basic needs, but like to accumulate. Is this Science and technology which is producing pollution, sewage problem, contamination in air, water and land, non-uniformity, poorness, over eating, bad habits, over accumulation, jealousy, crime, wars, suicide, genetic disadvantages, undesirable and risky behavior, etc. or something else may also be made responsible for this.

LITERATURE SEARCH

Takacs-Santa (2004) considers six evolutionary milestones of Fire, Language, Agriculture, Civilization, European Conquests, and the Technological-Scientific Revolution since the beginning of human presence on earth and these may be supplemented by Mass Motorization (1900) and Computer Revolution (1965). World population is expected to grow to about 9 billion around 2050, particularly more in less industrialized countries (Engelman, Halweil, & Nierenberg, 2002). Increasing population need more material security and comfort. Expanded consumption gradually transforms basic needs fulfillment into meeting ever-new temptations; may be termed as “luxury fever” (Frank, 1999). Sanne (2002) argues that most consumers are “locked-in” by social structures and processes that strongly induce environment-burdening patterns of consumption. Nieuwenhuis, Vergragt, and Wells (2006) discuss the many possibilities for reducing transport’s widespread environmental impacts, but they also argue that, in many respects, society is technologically locked into the private motor vehicle system. The “addiction” to short-term economic growth usually overrides the desire for long-term environmental quality and security (Booth, 2004). Environmental sustainability requires changes in age-old patterns of thinking about the abundant availability of natural resources which is no longer the case, and a focus on human survival through controlled environmental exploitation within ecological limits (Agrawal, 2002; Glasbergen and Groenenberg, 2001). In many cultures, material possessions and consumption signify people’s identity, success, and power in society (Dittmar, 1992). Personal power, achievement, and self-determination are prominent values of modern society (Schwartz, 1994). However, if the earth’s ecosystems are to be kept livable for present as well as future generations, culturally embedded long-term thinking and greater collectivism (Triandis, 1995) are both needed.

Kemp (2004) and Chu and Yu (2002) suggest that population growth brings environment deterioration through development. There has been increasing concern on environmental degradation caused by industrialization and understanding of need to take corrective measures to protect the environment (Venkatesh and Kumari, 2012). Environmental degradation, human wellbeing, and environmental behavior including sustainable development have been studied by several authors mainly non-Indians like Bechtel & Churchman, 2002; Geller, Winett, & Everett, 1982; Redclift & Woodgate, 1997; Stokols & Altman, 1987; Wohlwill, 1970; Bonnes & Bonaiuto, 2002; Gardner & Stern, 2002; Kaufmann-Hayoz, 2006; Schmuck & Schulz, 2002; Vlek, 2000; Winter & Koger, 2004. But lesser research is available (Vlek and Steg, 2007) referring human role in forcing environment to behave abnormally. A sketch discussing most pressing environmental problems and their general driving forces is necessary to get rid of today's alarming situations. So there is a need to study nature, humans and effects from environmental to behavioral and from general to specific terms.

AFFAIRS OF HUMAN SOCIETY

Despite the importance of human values, attitudes, and behaviors in recognizing sustainable development, relatively little is known about the long-term global trends in values, attitudes, and behaviors that will both help or hinder a sustainability transition. Weak general-purpose biases, such as 'copy the majority', can sometimes weaken the defense against specific maladaptive ideas, perhaps explaining the demographic transition and other oddities of modernity (Newson and Richerson 2009). At the most general level, GlobeScan (2000) found that 83 percent of the global public was concerned about environmental problems. Attractively packaged cultural variants designed by advertisers may increase their sales by attracting customers, not the recipients' fitness and place unnecessary burden on the environment. Schipper (1997) reported that the number of vehicle-kilometers per capita has been steadily rising from 1970 onward in Western countries which results to higher carbon emissions and the trends in the travel sector show no signs of saturation. As per GlobeScan surveys (2002), in almost all countries, majorities derive great pleasure from material consumption.

As human population continue to grow, material consumption intensifies and production technology including synthesis and manufacturing in laboratories further expands; by consequence the quantity and quality of environmental resources keep steadily decreasing like nature fragmentation, loss of biodiversity, shortages in freshwater availability, over-fishing of the seas, global warming, extreme weather events, urban air pollution, and environmental noise. Poverty is also devaluing people (Narayan et al. 2000). Du Toit (2002) concludes that in rural Africa wildlife resources will inevitably be exterminated from unprotected areas because of hunting for food. Residents of poor nations are often the most vulnerable to local public health problems such as contaminated water supplies, poor sanitation, and indoor air pollution. With economic development, the emphasis changes to local air and water pollution and the proper management of toxic substances. Even developed or rapidly industrializing countries have not been successful in reducing emissions of pollutants (Chameides et al. 1994; Streets et al. 2001; Klimont et al. 2002). Whether defined by income, socioeconomic status, living conditions or educational level, poverty is the single largest determinant of environmental degradation and poor economic growth (Dasgupta et al 2005).

There is a clear distinction between richer and poorer societies, with 67 percent of respondents from high-income countries reporting that they had chosen "green" products, compared to only 30 percent in low-income countries, and with 75 percent of respondents from high income countries saying that they had reused or recycled something, compared to only 27 percent in low income countries (Inglehart, 2000). GlobeScan (2002) reported that among the twenty developed and developing countries they surveyed, 36 percent of respondents stated that they had avoided a product or brand for environmental reasons, while 27 percent had refused packaging, and 25 percent had gathered environmental information. As abhorrent as is the current inequity in the distribution of resources between north and south, rich and poor, here and

there, it pales in comparison with the impending inequity between us, living today, and those who will be born tomorrow and who, under current trends, will inherit a rapidly deteriorating planetary life support system (Harte 2007).

WORLDWIDE ENVIRONMENTAL DETERIORATION

As a process, globalization has a mixed impact on a sustainability transition (Kates 2003). Values and attitudes, despite their importance, often do not translate directly into actual behavior, and many research studies have identified critical gaps and barriers between expressed values or attitudes and actual behaviors, both at the individual and collective levels (Blake 1999; Kollmuss and Agyeman 2002; Stern 2000). Almost all choices involve some explicit or implicit system of weighting or prioritizing different values, ranging from the individual choice of which vehicle to buy (power or comfort or safety or fuel efficiency) to collective choices about whether or how to reduce greenhouse gas emissions (economic growth or environmental protection or equity). Further, these collective decisions are often made even more difficult because some decision-makers are willing to compromise and tradeoff particular values, while others consider certain values absolute and view any effort to compromise them as "taboo" (Tetlock 2003). Thus, most debates over social policies, decisions, and actions are fundamentally disagreements over the relevance and priority of particular values.

Ehrlich & Holdren (1971) devised a classical formula that Total Environmental Resource use (involving wasteful emissions) is a multiplicative function of **P**opulation, **C**onsumption and **T**echnology supported by evolution of **I**nstitutions and society's **C**ulture (Stern, 1992). The basic formula reads: Impact=P×A×T, where P stands for Population, A for average Affluence (consumption per person), and T for the average resource intensity of the Technology used per unit of production. Most analysts, however, recognize that these variables are not fundamental driving forces in and of themselves and are not independent from one another (Lambin 2000). A similar approach has been applied to human development (D=P×A×E) with an expanded concept of affluence and institutional entitlements and equity substituting for technology (Parris and Kates 2003). Alam et al., (2007) has measured the environmental degradation as rate of growth of CO_2 emissions. Researchers modeled and tested the effects of population, affluence, and other factors on total national-level ecological footprints (York et al. 2003).

Their results indicate that population and affluence by themselves account for 95 percent of the variance of total national footprints. Although difficult to empirically identify, many social scientists argue that material goods consumed in the core have disastrous effects on the environment in other regions of the world (Hornborg 2001; Tucker 2002). The carbon dioxide portion accounts for approximately 50 percent of the United States' and approximately 80 percent of Kuwait's total per capita footprint (Wackernagel et al. 2000) and this supports the findings of Burns et al. (1997), which identify per capita carbon dioxide emissions to be largely a function of a country's position in the world economy. It is interesting to note that the majority of the refined fuels are exported to other regions of the world for consumption (Podobnik 2002) and these besides exporting countries increase also the CO_2 level in exported countries where these sometimes become the part of material pleasure and luxury fever and so convert people to eco enemy.

WHAT IS THE PROBLEM AND HOW SERIOUS IS IT?

Apart from being mostly concerned about the "big issues" of global air pollution, climate change, and diminishing biodiversity (Uzzell, 2000), many people are increasingly sensitive to the quality of their own living environment and the availability of natural areas. According to Neumayer (2003) the industrial sector is usually regarded as more pollution intensive than the services sector. The industrial output might help to explain the level of pollution, because in developing countries, wastewater tends to be dumped into rivers without treatment. The origins of many global environmental problems related to air and water pollution are located in cities (Reddy, 2004). Cole and Neumayer (2004) argued that

means of transports, like cars, buses, etc., are more intensively used in urban areas as compared to rural parts of the economy. Much of the sewage in urban areas goes untreated and is dumped into rivers and lakes. As a result, surface water and ground water have been increasingly polluted due to industrial and domestic wastewater and also agricultural runoff (Banister 1998). The main causes of water pollution from agriculture are pesticides, chemical fertilizers, intensive farming in certain areas, and livestock manure (Environmental Agency 2005; Rogers 2000; WHO/UNEP 1997), which goes into underground water or run off into rivers or surface water (NIAES 2002).

The improvement in environmental quality can be achieved by advancing the technological mode of production (de Bruyn, 1997; Xiaoli & Chatterjee, 1997) or by exporting the "dirty industry" to low income countries (Rock, 1996; Suri & Chapman, 1998). Economic development and poverty reduction efforts are increasingly constrained by environmental concerns, including degradation of forests and fisheries, lack of fresh water resources, and poor human health as a result of air and water pollution (Banister 1998). Alam (2010) asserted the need to globalize resources, reduce poverty, own green technologies, control growing population and urbanization rate if sustainable development is to be attained in Pakistan. Humanity is degrading environmental goods and services such as clean water, air, soil, and biodiversity, and simultaneously reducing the capacity of natural processes to replenish these contributors to the quality of life (Harte 2007). One question here is how well ordinary citizens evaluate urban living environments in comparison to experts.

A related question is how important nature is and how nature experiences may affect people's general well-being. There are many reasons for people to give short-term individual interests more weight than long-term common goods. Sensitivity of people regarding particular environmental stressors, measure the type of policy to be recommended for prevention, abatement, and mitigation. Human behavior depends on multiple motivations which may determine people's information processing and attitude formation. For averting the threat of environmental resource depletion, a variety of approaches toward changing user behaviors have been proposed, such as providing technical alternatives, regulatory rules, financial incentives, information, social examples, and/or organizational change (De Young, 1993; Geller, 2002; Geller et al., 1982; Gardner & Stern, 2002; Vlek, 2000). The environmental effects of technical installations, vehicles and equipment significantly depend on actual user behavior, and how the latter in turn may be shaped, enhanced, or constrained by specific features of the technical environment. The net effects of technical solutions to environmental problems are largely unclear without considering the different perceptions, understandings and uses different people associate to them.

To measure the extent of complexity of many environmental problems, sufficient communication and cooperation among researchers from various disciplinary backgrounds is inevitable. Scientists can better analyze and understand the dynamics of the science practice process as scientists, but even better as communicators and participants in that process. For society at large, problem analysis, policy decision making, and behavioral intervention programs are particularly important with regard to climate change as resulting from forced global warming (Lorenzoni, Pidgeon, & O'Connor, 2005). Numerous studies have suggested that environmental damage can have particularly significance for the poor, because the poor are least capable of managing the environmental effects (Albla-Betrand 1993; Myers and Kent, 1995). Environmental decision making is not so easy but a very crucial task (Gilovich, Griffin, & Kahneman, 2002) and effectiveness evaluation of environmental policies may involve more or less costly behavioral changes as well as changes in environmental conditions (Poortinga, Steg, & Vlek, 2004) but this can significantly affect human quality of life (Steg and Gifford, 2005). Winter and Cava (2006) clearly warn that conflicts over natural resources and environmental conditions are threatening peace and stability and may do so increasingly in the near future.

ENVIRONMENTAL SECURITY AND SUSTAINABILITY

Sustainable development, at the most abstract level, emphasizes the values of economic development, environmental protection, and social progress/equity. For the past several centuries, humanity has been increasingly polluting air and water, altering Earth's climate, eroding the soil, fragmenting and eliminating the habitat of plants and animals, and depleting the natural bank account of nonrenewable resources (Harte 2007). A comprehensive national-level measurement is now available that quantifies how much land and water are required to produce the commodities consumed and assimilate the wastes generated by them: the *ecological footprint* (Wackernagel et al. 2000). Furthermore, it provides a common unit of measurement that allows for comparisons of various types of impacts (Wackernagel et al. 2000; York et al 2003).

The promise of green building programs has increased funding for climate solutions in the hopes that its market will generate "green jobs" (Keerthi 2013). Cities are essential actors in stimulating green infrastructure and urban finance is one of the promising ways in which this can be achieved. Cities are key investors in infrastructure with green potential, such as buildings, transport, water and waste (Merk and Saussier 2012). More specific values for sustainable development range from dozens to over a hundred as declared in the many efforts of representative groups to create global, national, regional, and local indicators of sustainable development (Parris and Kates, 2003). Surveys by Dunlap and Saad (2001) have found that the environment consistently ranks lower in priority than all other national issues (e.g., the economy, health care, terrorism, etc.), while among environmental issues, climate change ranks 12th out of 13. The World Risk Index is a tool to assess the disaster risk that a society or country is exposed to by external and internal factors. The aim of the Index is to sensitize the public as well as political decision-makers towards the important topic of disaster risks. Correlation has been established between the frequency of flooding and deforestation by Bradshaw et al. (2007). Degradation due to deforestation can lead to a roughly fourfold increase in the extent of flooding in comparison to riparian landscapes with intact, undisturbed vegetation cover (Atta-ur-Rahman and Khan 2011).

Even with good environmental policies and clean technologies, continued increases in output may tend to increase the total volumes of various kinds of pollutants in many cases. Understanding the relations between information, physical structures and individual objects is crucial to implementing more sustainable process. A physical outcome in the context of environmental sustainability may be a decrease or an increase in emissions, waste or consumptions. The physical outcome represents the environmental impact. Research that quantifies and aggregates environmental impact for further interpretation requires a deep understanding of materials, energy forms, chemical substances as well as metrics (Lofgren and Tillman 2011, Page and Wohlgemuth 2010, Thiede et al. 2013). Watson et al. (2012) argue that Information Systems can play a significant role as they can "wrap around" the affected physical systems in order to control human interaction. In order to optimize physical systems from an ecological perspective, a "symbiotic physical and informational modeling and simulation" is needed. Windisch et al. (2013) suggest that information systems have a strong influence in this context as they manipulate decisions making of individuals. In this way they affect the behavioural patterns of persons. Understanding and shaping the informational and physical systems surrounding us is an essential for a more sustainable future.

Cole (2004) argued that trade may reduce pollution due to greater competitive pressure or greater access to greener production technologies. The various effects of trade on environmental quality can be divided into three components: how trade affects the overall scale of the economy; how trade affects the techniques of production, and how trade affects the composition of industries (Copeland and Taylor, 2003).

Any development which is the product of green scheme can't be termed as green or sustained. To ensure environmental security and sustainability, the overall policy goal certainly must be to reverse the trend of gradual environmental deterioration, locally as well as globally. Some key aspirations are: (1) safeguarding the availability of basic resources, (2) protecting human health from environmentally risky conditions, (3) ensuring sufficient quality of human living environments, (4) protecting natural areas with their wildlife, and (5) promoting greater harmony between humanity and (other) nature.

CONCLUSIONS

It is obvious that the power of knowledge has multiplied very rapidly in the past few years and our understanding has also been brightens, but so have our environmental problems and issues too. The question now is, whether our knowledge and understanding tool will be able to outrun our problems and will be able to keep doing so forever. It may well be that a new class of problems will manifest, outside the scope of knowledge, and that a new way of thinking will be needed. Torras and Boyce (1998) include measures of education as control variables in their respective setup. Hence, higher education may be a prerequisite for a higher demand of a clean environment. There is a need to Think Earthly and Act Earthly if we want our Earth remain ours. Without humans, the nature would not have any problem but where is nature in that case when there is no human? What is the fun when humans are not in conquering mood? Simply what matters- How do humans work?

REFERENCES

1. Agrawal A. **2002,** Common resources and institutional sustainability, In E. Ostrom, Th. Dietz, N. Dolsak, P.C. Stern, S. Stonich, & E.U. Weber (Eds.), *The drama of the commons,* pp.41–85, Washington DC: National Academies Press.
2. Alam S. **2010**, Globalization, Poverty and Environmental Degradation: Sustainable Development in Pakistan, *Journal of Sustainable Development*, **3**(3), 103-114.
3. Alam S., Fatima A., and Butt M.S. **2007**, Sustainable Development in Pakistan in the Context of Energy Consumption Demand and Environmental Degradation, *Journal of Asian Economics*, **18**, 825-837.
4. Albla-Betrand J. M. **1993,** The political economy of large natural disasters. Oxford: Clarendon Press.
5. Atta-ur-Rahman & Khan A. **2011,** Analysis of flood causes and associated socio-economic damages in the Hindukush region, IN: *Natural Hazards*, **59**, 1239-1260
6. Banister J. **1998,** Population, Public Health and the Environment in China, *The China Quarterly*, **156 (**Special Issue: China's Environment), 986-1015.
7. Bechtel R.B. & Churchman A. (Eds.) **2002,** *Handbook of environmental psychology*, New York: Wiley.
8. Birkmann J., Buckle P., Jaeger J., Pelling M., Setiadi N., Garschagen M., Fernando N., and Kropp J. **2010,** Extreme events and disasters: A window of opportunity for change? Analysis of changes, formal and informal responses after mega disasters *Natural Hazards*, **55**(3), 637-669.
9. Blake J. **1999,** Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local Environment*, **4**(3), 257–278.

10. Bonnes M. & Bonaiuto M. **2002,** Environmental psychology: From spatial-physical environment to sustainable development, In R.B. Bechtel & A. Churchman (Eds.), *Handbook of environmental psychology*, pp.28–54, New York: Wiley.

11. Booth D.E. **2004,** *Hooked on growth: Economic addictions and the environment*, Lanham, MD: Rowman & Littlefield.

12. Bradshaw C. J.A., Sodhi N.S., Peh K S.H. & Brook B.W. **2007,** Global Evidence that deforestation amplifies flood risk and severity in the developing world, In: *Global Change Biology*, **13**, 1-17.

13. Burns T. J., Byron D., and Kick E.L. **1997,** Position in the World-System and National Emissions of Greenhouse Gases, *Journal of World-Systems Research,* **3,** 432-466.

14. Chameides W.L., Kasibhatla P.S., Yienger J., and Levy H. II.**1994,** Growth of continental-scale metro-agro-plexes, regional ozone pollution, and world food production, *Science*, **264**(5155), 74.

15. Charles Vlek and Linda Steg, **2007,** Human Behavior and Environmental Sustainability: Problems, Driving Forces, and Research Topics, *Journal of Social Issues,* **63(**1), 1-19.

16. Chu C.Y.C. and Yu R.R. **2002,** Population Dynamics and the Decline in Biodiversity: A Survey of the Literature, in Population and Environment: Methods of Analysis, Luts, W., Prskawetz, A., and Sanderson, W. C., (eds.), *Population and Development Review*, Population Council: New York.

17. Cole M.A. & Neumayer E. **2004,** Examining the impact of demographic factors on air pollution. *Population and Development Review*, **26**(1), 5–21.

18. Cole M.A. **2004,** Trade, the pollution haven hypothesis and the environmental Kuznets curve: Examining the linkages, *Ecological Economics*, **48**, 71–81.

19. Copeland B.R. and Taylor M.S. **2003,** North-South Trade and the Environment, *Quarterly Journal of Economics* August, 755-87.

20. Dasgupta S., Deichmann U., Meisner C., & Wheeler D. **2005,** Where is the poverty–Environment nexus? Evidence from Cambodia, Lao PDR, and Vietnam, *World Development*, **33**(4), 617-638.

21. de Bruyn S.M. **1997,** Explaining the environmental Kuznets curve: structural change and international agreements in reducing sulphur emissions, *Environment and Development Economics,* **2,** 485-503.

22. De Young R. **1993,** Changing behavior and making it stick. The conceptualization and management of conservation behavior, *Environment and Behavior,* **25**, 485–505.

23. Dittmar H. **1992,** *The social psychology of material possessions, To have is to be,* London: Harvester Wheat sheaf.

24. Du Toit J.T. **2002,** Sustainable wildlife utilization in Africa: A contest between scientific understanding and human nature. In P. Schmuck & W. Schultz (Eds.), *Psychology of sustainable development*, pp.197-208), Norwell, MA: Kluwer.

25. Ehrlich P.R. & Holdren J.P. **1971,** Impact of population growth, *Science,* **171**, 1212–1217.

26. Engelman R., Halweil B., & Nierenberg D. **2002,** Rethinking population, improving lives. In L. Brown et al. (Eds.), *State of the world 2002*, pp.127–148, New York/London: W.W. Norton.

27. Environment Agency **2005,** Impacts of proposed housing growth in south and east England: water resources and water quality, Part of Environmental impacts of housing growth in the south and east of England (SCHO0806BLFD-E-C), Available from publications catalogue at www.environment-agency.gov.
28. Frank R.H. **1999,** *Luxury fever,* New York: Simon & Schuster.
29. Gardner G.T. & Stern P.C. **2002,** *Environmental problems and human behavior* (2nd Ed.), Boston: Pearson Custom Publishing.
30. Geller E.S. **2002,** The challenge of increasing proenvironmental behavior. In R.B. Bechtel & A. Churchman (Eds.), *Handbook of environmental psychology*, pp.525-540, Chichester, UK and New York: Wiley.
31. Geller E.S., Winett R.A., & Everett P.B. **1982,** *Preserving the environment: New strategies for behavior change,* Elmsford, NY: Pergamon.
32. Gilovich Th., Griffin D., & Kahneman D. **2002,** *Heuristics and biases; the psychology of intuitive judgment,* Cambridge, UK/New York: Cambridge University Press.
33. Glasbergen P., & Groenenberg R. **2001,** Environmental partnerships in sustainable energy, *European Environment, the Journal of European Environmental Policy,* **11**, 1–13.
34. Harte J. **2007**, Human population as a dynamic factor in environmental degradation, *Population and Environment,* **28,** 223-236.
35. Hornborg A. **2001,** *The Power of the Machine: Global Inequalities of Economy, Technology, and Environment.* Walnut Creek, CA: Alta Mira Press.
36. Inglehart R. **1999,** Globalization and Postmodern Values, *Washington Quarterly,* **23**(1), 215-228.
37. Kates R.W. and Parris T.M. **2003,** Long-term trends and a sustainability transition, *Proceedings of the National Academy of Sciences of the United States of America,* **100**(14), 6.
38. Kaufmann-Hayoz R. **2006,** Human action in context: A model framework for interdisciplinary studies in view of sustainable development, *Umweltpsychologie,* **10** (English section), 154-177.
39. Keerthi B.S. **2013**, A study on emerging green finance in India by B.S. Keerthi, *International journal of management and social sciences research*, **2(**2).
40. Kemp D.D. **2004,** Exploring Environmental issues: An Integrated Approach, Routledge: London and New York.
41. Klimont Z., Streets D.G., Gupta S., Cofala J., Lixin F., and Ichikawa Y. **2002,** Anthropogenic emissions of non-methane volatile organic compounds in China, *Atmospheric Environment*, **36**(8), 14.
42. Kollmuss A. and Agyeman J. **2002,** Mind the Gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research,* **8**(3), 239-260.
43. Lambin E.F., Turner B.L., Geist H.J., Agbola S.B., Angelsen A., Bruce J.W., et al. **2001,** The causes of land-use and land-cover change: Moving beyond the myths, *Global Environmental Change: Human and Policy Dimensions,* **11**(4), 10.
44. Lofgren B., Tillman A.M. **2011,** Relating manufacturing system configuration to life-cycle environmental performance: discrete-event simulation supplemented with LCA, *Journal Clean. Prod.*, **19**(17-18), 2015–2024.

45. Lorenzoni I., Pidgeon N., & O'Connor R.E. **2005,** Dangerous climate change: The role for risk research, *Risk Analysis,* **25**, 1387-1398.

46. Merk O. and Saussier S. **2012**, Financing Green Urban Infrastructure, *OECD Regional Development Working Papers*, October 2012.

47. Myers N. and Kent J. **1995,** Environmental exodus—An emergent crisis in the global arena. Washington, DC: Climate Institute.

48. Narayan D., Patel R., Schafft K., Rademacher A., & Koch-Schulte S. **2000,** *Can anyone hear us? Voices of the poor,* New York: Oxford University Press.

49. Neumayer E. **2003,** Are left-wing party strength and corporatism good for the environment? Evidence from panel analysis of air pollution in OECD countries, *Ecological Economics,* **45**, 203–220.

50. Newson L. & Richerson P.J. **2009,** Why do people become modern: A Darwinian mechanism, *Population and Development Review, **35***, 117-158.

51. NIAES **2002**, Annual Report of National Institute for Agro-Environmental Sciences Japan, (April 2001 – March 2002).

52. Nieuwenhuis P., Vergragt Ph., & Wells P. (Eds.) **2006,** *The business of sustainable mobility. From vision to reality,* Sheffield, UK: Greenleaf.

53. Page B. and Wohlgemuth V. **2010,** Advances in Environmental Informatics: Integration of Discrete Event Simulation Methodology with ecological Material Flow Analysis for Modelling ecoefficient Systems. Proceedings of Environment Science, **2**, 696–705.

54. Parris T.M. **2003,** Toward a sustainability transition: The international consensus, *Environment,* **45**(1), 12.

55. Parris T.M. and Kates R.W. **2003,** Characterizing a sustainability transition: Goals, targets, trends, and driving forces, *Proceedings of the National Academy of Sciences of the United States of America,* **100**(14), 6.

56. Parris T.M. and Kates R.W. **2003**a, Characterizing and measuring sustainable development, *Annual Reviews of Environment and Resources,* **28,** 559-586.

57. Podobnik B. **2002,** Global Energy Inequalities: Exploring the Long-Term Implications, *Journal of World-Systems Research,* **8,** 252-275.

58. Poortinga W., Steg L., & Vlek C. **2004,** Values, environmental concern, and environmental behavior, a study into household energy use, *Environment and Behavior,* **36**, 70-93.

59. Redclift M. & Woodgate G. (Eds.) **1997,** *The international handbook of environmental sociology,* Cheltenham, UK: Edward Elgar.

60. Reddy A.K.N. **2004,** Energy and Social Issue, In T. B. Johansson & J. Goldemberg (Eds.), Energy and the challenge of sustainability, New York: UNDP, UNDESA and WEC.

61. Rock M.T. **1996,** Pollution intensity of GDP and trade policy: can the World Bank be wrong, *World Development,* **24**, 471-479.

62. Rogers V. **2000,** Agriculture, Water Pollution and the Regional Dimension in French Public Policy, *Journal of European Area Studies*, **8**(1), 35-56.

63. Sanne C. **2002,** Willing consumers-or locked-in? Policies for a sustainable consumption, *Ecological Economics*, **42**, 273-287.

64. Schipper L.J. **1997,** Carbon emissions from travel in the OECD countries. In P.C. Stern et al., *Environmentally significant consumption; Research directions*, pp.50-62, Washington DC: National Academies Press.

65. Schmuck P. & Schultz W. (Eds.) **2002,** *Psychology of sustainable development*, Norwell, MA: Kluwer.

66. Schwartz S.H. **1994,** Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, **50**, 19-45.

67. Shastri M. **2014**, Green finance and its viability in India, *Pravish Rajnam Journal of Studies*, **2**(2).

68. Steg L., & Gifford R. **2005,** Sustainable transport and quality of life, *Journal of Transport Geography*, **13**, 59-69.

69. Stern P.C. **1992,** Psychological dimensions of global environmental change, *Annual Review of Psychology*, **43**, 269-302.

70. Stern P.C. **2000,** Toward a coherent theory of environmentally significant behavior, *Journal of Social Issues*, **56**(3), 407.

71. Stokols D. & Altman I. (Eds.) **1987,** *Handbook of environmental psychology*, New York: Wiley.

72. Streets D.G., Tsai N.Y., Akimoto H., and Oka K. **2001,** Trends in emissions of acidifying species in Asia, 1985-1997, *Water, Air & Soil Pollution*, **130**(1-4), 6.

73. Suri V. and Chapman D. **1998,** Economic growth, trade, and energy: implications for the Environmental Kuznets Curve, *Ecological Economics*, **25,** 195-208.

74. Takacs-Santa A. **2004,** The major transitions in the history of human transformation of the biosphere, *Human Ecology Review*, ***11***, 51–66.

75. Tetlock P.E. **2003,** Thinking the unthinkable: Sacred values and taboo cognitions, *Trends in Cognitive Sciences*, **7**(7), 320.

76. Thiede S., Seow Y., Andersson J., Johansson B. **2013,** Environmental aspects in manufacturing system modelling and simulation—State of the art and research perspectives, *CIRP Journal of Manufacturing Science and Technology*, **6**(1), 78-87.

77. Torras M. and Boyce J.K. **1998,** Income, inequality, and pollution: A reassessment of the environmental Kuznets curve. *Ecological Economics*, **25**, 147–160.

78. Triandis H. **1995,** *Individualism and collectivism*, Boulder, CO: Westview Press.

79. Tucker R. **2002,** Environmentally Damaging Consumption: The Impact of American Markets on Tropical Ecosystems in the Twentieth Century, Pp.177-196 in *Confronting Consumption*, edited by Thomas Princen, Michael Maniates, and Ken Conca. Cambridge, MA: MIT Press.

80. Uzzell D. **2000,** The psycho-spatial dimension of global environmental problems, *Journal of Environmental Psychology*, **20**, 307-318.

81. Venkatesh J.and Kumari R.L. **2012**, Enhancing SMEs Access to Green Finance, *International journal of marketing, financial services and management research*, **1**(7).

82. Vlek C. **2000,** Essential psychology for environmental policy making, *International Journal of Psychology*, **35**, 153-167.

83. Wackernagel M. and Silverstein J. **2000,** Big Things First: Focusing on the Scale Imperative with the Ecological Footprint, *Ecological Economics*, **32,** 391-394.

84. Wackernagel M., Linares A.C., Deumling D., Sanchez M.A.V., Falfan I.S.L., and Loh J. **2000,** *Ecological Footprints and Ecological Capacities of 152 Nations: The 1996 Update*, San Francisco, CA: Rede.ning Progress.

85. Wada Y. and Bierkens M.F.P. **2014**, Sustainability of global water use: past reconstruction and future projections, *Environmental Research Letters*, **9**, 1-17.

86. Watson R.T., Corbett J., Boudreau M.C., Webster J. **2012,** An information strategy for environmental sustainability, *Commun. ACM*, **55**(7), 28.

87. WHO/UNEP **1997,** Water Pollution Control - A Guide to the Use of Water Quality Management Principles. http://www.who.int/docstore/water_sanitation_health/wpcontrol/begin.htm

88. Windisch J., Roser D., Mola-Yudego B., Sikanen L., Asikainen A. **2013,** Business process mapping and discrete-event simulation of two forest biomass supply chains, *Biomass and Bioenergy*, **56**, 370-381.

89. Winter D.D. & Cava M.M. **2006,** The psycho-ecology of armed conflict, *Journal of Social Issues*, **62**, 19-40.

90. Winter D.D. & Koger S.M. **2004,** *The psychology of environmental problems* (2nd Ed.), Mawhah,NJ: Erlbaum.

91. Wohlwill J. **1970,** The emerging discipline of environmental psychology, *American Psychologist*, **25**, 303-312.

92. Xiaoli H. and Chatterjee L. **1997,** Impacts of growth and structural change on CO_2 emissions of developing countries, *World Development*, **25**(3), 395-407.

93. York R., Rosa E.A., and Dietz T. **2003,** Footprints on the Earth: The Environmental Consequences of Modernity, *American Sociological Review*, **68**, 279-300.