9

Market forces and environment: Introduction

Chung-in Moon

Human efforts to sustain higher living standards for ever-increasing numbers of people have been accompanied by two grave ecological consequences. One is ecological scarcity and the diminishing carrying capacity of the planet earth, and the other is pervasive environmental degradation stemming from the misuse and abuse of the ecosystem. While environmental degradation has seriously undermined the quality of life, ecological scarcity, especially involving such vital resources as food, water, and energy, has threatened the very foundation of organic survival of national populations and global populace. The latter is particularly critical not only because food, water, and energy are the basic requirements of life, but also because they serve as both inputs and outputs of economic development and improved quality of life (Paoletto 1997).[1]

The United Nations forecasts that the world population will increase to 12.5 billion by the year 2050 from the current level of 6 billion (Paoletto 1997). Despite advances in agricultural technology, feeding 12.5 billion people will not be easy because of natural limitations to food production, as well as a distorted pattern of distribution and consumption on the global scale. Unpredictable climatic changes, growing scarcity of water, and erratic demographic transition by region could complicate food security in the twenty-first century. Fresh water is also likely to pose a major environmental challenge for the next century. Water is not scarce, but it is unevenly distributed across the planet, making the dilemma more localized. A growing percentage of the world's population, especially in the

third world, is deprived of access to clean drinking water and sanitation needs, which are the most fundamental to human survival. Moreover, in recent years disputes over the allocation of fresh water resources are escalating to violent intra-state and inter-state conflicts. The trend is likely to amplify in the coming century.

The global energy situation does not seem to be promising either. Although the recent oversupply of energy has defused the acuteness of the energy dilemma, a spectre of energy shortages could haunt human society in the medium and in the long run. Apart from the biophysical limitations embodied in the second law of thermodynamics,[2] energy consumption is on the rise, while the current energy glut has structurally impeded the development of alternative energy sources. Depressingly low energy prices, public concerns about safety, and technological barriers are hindering not only the promotion of soft energy paths (e.g., solar, wind), but also the development of nuclear power and fusion energy. At the same time, a vicious cycle of development, an increased demand for energy consumption, and extensive emissions of air pollutants are turning the energy issue into one of the major environmental problematiques in the twenty-first century.

Food, fresh water, and energy constitute the core of contemporary and future environmental concerns, all of which are intertwined through an intricate web of ecological interdependence. How can one cope with these environmental challenges? There are essentially two contending paradigms.[3] One is the technological-fix perspective, which is predicated on human ingenuity and adaptability (Kahn, Brown, and Martel 1976; Simon and Kahn 1984). Its proponents believe that the carrying capacity of the planet earth is not fixed but variable, and that human beings are capable of expanding the global ecological carrying capacity through knowledge and technology. Herman Kahn and Julian Simons, two leading futurists, point out that ''because of increases in knowledge, the Earth's carrying capacity has been increasing through the decades and centuries and millennia to such a extent that the term carrying capacity has by now no useful meaning'' (Simon and Kahn 1984, 45).

Human adaptation is manifested primarily through the logic of market forces, which plays a pivotal role in facilitating progress in knowledge and technology. In economic terms, scarcity simply denotes a situation in which certain goods are undersupplied while overdemanded. The disequilibrium can be easily corrected by market forces that respond through technological invention and innovation. Green Revolution, Blue Revolution, genetic engineering, and fusion technology are the hallmarks of technological responses to ecological scarcity through market mechanisms. Market forces are resilient enough to come up with alternative solutions to ecological scarcity and environmental degradation. What

matters is incentive structure. If proper institutions are arranged in such a way as to assure profit incentives, markets can effectively overcome current and future ecological dilemmas by expanding the current carrying capacity through new frontiers of knowledge and technology.

The other approach is the sustainability perspective (Meadows and Meadows 1992; Harman 1979; Ophuls 1977; Pirages 1989; Postel 1994; Brown et al. 1996; Dobson 1995). Its proponents postulate that although technology and market forces can help manipulate ecological limits to accord with human preferences, the outright repeal of the limits is virtually impossible. Instead of removing or weakening limits through market forces and technology, they argue that the forces of growth should be weakened in harmony with the biophysical realities of a finite planet. Central to this approach is the concept of sustainability, which emphasizes the interlocking dynamics of resources utilization and destruction, regenerative capacity, and the collapse or preservation of ecosystems.[4] It involves three major dimensions. First is the ability to live within the boundaries of ecological limitations in the contemporary setting. The second involves inter-generational sustainability. Current needs should be met without depriving future generations of the resources necessary for their survival. Third is the concept of sustainability, which touches on the issue of intra-generational equity. A great portion of scarcity and human suffering arises more from the unequal distribution of resources than from scarcity *per se*. Thus, an equitable sharing of scarce resources emerges as a moral imperative.

According to this view, free markets are a powerful social invention for efficient allocation of scarce resources, but they cannot serve as a useful tool in ensuring sustainability. Decentralized, profit-maximizing agents of free markets seldom appreciate the meaning and value of sustainability. Neither future implications of current production and consumption nor intra-generational equity associated with the distribution of basic human needs is fully incorporated into the workings of market forces. Thus it becomes essential to restructure the operational logic of market forces in line with global sustainability; otherwise, it is impossible to escape from the sombre omens of the doomsday model.[5]

The chapters in this section converge with the sustainability perspective. They all share the view that scarcity problems involving food, fresh water, and energy are real and present and that market forces and technology alone cannot resolve the ecological dilemmas. Alternative ways of coping with the dilemmas should be actively sought.

Wilkening, Von Hippel, and Hayes argue that rapid industrialization and population growth have accompanied a substantial rise in energy demands, posing a major challenge for developing and developed nations in the twenty-first century. They present a rather pessimistic outlook by

postulating that market forces cannot ensure long-term sustainability in energy use. The current operating logic of energy markets defies the issue of sustainability and is not ready to cope with future energy dilemmas. In order to secure energy sustainability, long-term objectives for energy supply and demand should be defined. International norms and values related to energy use should be altered, while energy-related institutions and infrastructure should be overhauled. Finally, there should be effective monitoring of progress towards sustainable energy.

In this process, experts and expert knowledge become a crucial factor in steering energy markets toward sustainability, since they can harness the power of the market by socializing ideas and practices of sustainability. Generating new knowledge on energy supply and demand, disseminating widely sustainable energy knowledge through the formation of epistemic communities, and applying such knowledge to market-related public and private sectors should constitute an integral part of new strategies for global energy sustainability. The authors conclude that the United Nations is uniquely positioned to act as a catalyst in creating, coordinating, and institutionalizing epistemic communities in service to the vision of sustainable energy.

In analysing the global fresh water dilemma, Peter Gleick notes that there is a sufficient amount of water to meet the needs and wants of every human being. But at regional, national, and local levels, imbalances between overall availability and growth in need and demand have emerged as a serious problem. Billions of people around the globe still suffer from a lack of basic sanitation services and clean drinking water, bearing serious implications for human health. Water is also posing a major threat to food security, due to diminishing water supplies as well as higher costs of water resulting from competition with industrial and other users. While excessive manipulation of the hydrological cycle has deepened the ecological crisis, the allocation of limited water supplies has increasingly been linked to inter- and intra-state conflicts.

Can market forces be conducive to resolving the global fresh water dilemmas? Gleick sees two conflicting faces of market forces in this regard. Market forces can serve as a valuable tool for conserving fresh water resources. Inadequate attention to the role of markets and subsequent failures in properly pricing water have led to excessive groundwater overdraft and wastes of fresh water. Thus, recognizing water as an economic good that is subject to the law of supply and demand can cure a great portion of fresh water dilemmas in many parts of the world. However, the application of market approaches in situations where non-economic values are high or where certain types of water needs or uses cannot be quantified is bound to fail, and may even create new problems. Local, national, and international intervention become essential in order

to ensure the satisfaction of water as a basic human need. Gleick suggests several policy options: normative commitment to identify and meet basic human and ecosystem water needs; adoption of food policies within the boundary of water limitations; treatment of water as an economic resource; and participatory water management systems on the local, national, and even the international levels.

Drawing on the experiences of the Philippines and selected Asian countries, the chapter by Briones and Ramos explores the dimensions of food insecurity in developing countries. Despite a recent rise in food supply through progress in agricultural production technology, they argue that most developing countries still suffer acute and pervasive food insecurity, which has resulted from a lack of access to food rather than the actual production and supply of food. Limited and skewed access to food by a great majority of inhabitants in the third world is a product of both external and internal factors. While international pressures on liberalization of domestic agricultural markets through the settlement of the Uruguay Round of GATT have imposed unbearable constraints on the sustainable food production and distribution system, domestic, social, biophysical, and institutional factors have also contributed to aggravating food insecurity in developing countries. Briones and Ramos point out that rural poverty and illiteracy, environmental stress, and institutional and political distortions have not only undermined the foundation of domestic food production, but have also impeded people's access to adequate food. In their view, market forces are the primary causes of food insecurity rather than a solution to it.

New strategies should be devised for sustainable food production, distribution, and consumption. These include the systematic spread of technical advances to local farmers through education, public investment in the agricultural infrastructure, injection of profit motives in the minds of farmers, and the protection of small farmers by correcting unfair agricultural trade practices embodied in the GATT-Uruguay Round provisions, such as extensive farm subsidies in OECD countries. Briones and Ramos also draw attention to the importance of new partnerships and close cooperation between government and NGOs that would promote an empowering process for rural populations.

Common to the three chapters in this section is the belief that market forces alone cannot cope with the environmental dilemmas in the twenty-first century. Unruly market forces have severely undermined food security by distorting food production, distribution, and consumption in the developing world. Old inertia associated with the industrial paradigm has prevented energy markets from adopting the idea of sustainability, clouding the energy future in the twenty-first century. In the case of fresh water, market forces have a mixed outlook. Although market forces are

deficient in satisfying basic water needs of the majority of inhabitants in developing countries, they can serve as an effective deterrent to overuse and misuse of scarce water resources.

In view of this, market forces and the environment are closely intertwined. In contrast to the technological-fix perspective, however, market forces are fundamentally flawed in coping with the environmental dilemma.

First, as long as the current pattern of population growth and conspicuous consumption continues, market forces and technology cannot ensure future sustainability. Technological progress might be able to abort major crises resulting from scarcity in the current generation, but cannot guarantee inter-generational sustainability since market forces rarely discount current consumption for the sake of future generations. Even if it is assumed that technology can fix the current and future scarcity dilemma, intended or unintended social and economic costs associated with it could wipe out its benefits. As the case of nuclear power development illustrates, the fallacy of the Faustian bargain could easily prevail (Ophuls 1977, 156–158).

Second, market forces often fail to take into account normative dimensions of resource scarcity. Food, water, and energy are the minimum requirements of basic human needs. Regardless of costs, human beings are entitled to them. As Beitz (1979, 136–142) aptly puts it, ''those who are less advantaged for reasons beyond their control cannot be asked to suffer the pains of inequality when their sacrifices cannot be shown to advance their position with an initial position of equals.'' Market forces cannot effectively address this normative concern of distributive justice embedded in the allocation of food, water, and energy. It is all the more so because the production and consumption of these resources are heavily concentrated in the industrial North, and their equitable distribution is severely constrained by global capitalism.

Finally, food, water, and energy have the strong characteristics of public goods. Market mechanisms cannot resolve the undersupply or overexploitation of collective goods through free-riding behaviour. The tragedy of commons is likely to abound (Hardin 1968). In order to enhance the sustainability of food, water, and energy, there must be visible hands of national and global governance to correct market failures. Otherwise, market forces are likely to aggravate the scarcity problem in the future.

There are two viable ways of correcting market failures and enhancing ecological sustainability. One is to engineer the changes of the dominant social paradigm which defines social reality and shapes social expectation (Pirages 1989, 14). The environmental dilemma cannot be resolved by resorting to the old industrial paradigm which is heavily influenced by

human ingenuity and cornucopian *Weltanschauung*, while defying sustainability. New norms, values, ideas, knowledge, and institutions should be developed and socialized so as to enhance global sustainability.

The other is the critical importance of global governance (Young 1994; 1997). Local and national governments alone cannot handle the dilemmas of market failures and distributive injustice. As with individual market agents, national governments are also obsessed with the maximization of short-term national interests rather than long-term global human interests. It is in this context that the role of the United Nations becomes all the more important. On the occasion of the Rio Earth Summit in 1992, which brought more than 150 nations and 1,400 NGOs to Rio, a new momentum was provided for the new sustainable pathway to our common future. However, enthusiasm generated through the Rio Summit has been withering away, while implementation of the Rio agenda has been stagnant. The United Nations should reverse the trend by taking a more active leadership role. Shaping a new global governance structure under the rubric of the United Nations will be the best way to resolve the current dilemmas and prevent the future calamities.

Notes

1. The terms ''environment'' and ''ecology'' are used interchangeably here. Environmental concerns such as air and water pollution, wastes, biodiversity, and climate change are being treated as a subset of the ecological system.
2. The second law of thermodynamics or entropy law refers to a natural process in which free energy degrades into bound energy. The law underscores the physical limitation to recycle non-renewable energy sources. See Georgescu-Roegen (1976, 4–7).
3. For a succinct discussion of the contending paradigms, see Dobson (1995), Pirages (1989), and Hughes (1985).
4. The best conceptual work on sustainability can be found in Daly (1992). Pirages (1977) and Goldin and Winters (1994) also offer useful overviews of sustainable society and sustainable development.
5. On the doomsday model, see Meadows and Meadows (1972; 1992).

REFERENCES

Beitz, C. R. 1979. *Political Theory and International Relations*. Princeton: Princeton University Press.

Brown, L. R., C. Flarin, H. Kane, L. Starke, and N. Lenssen. 1996. *Vital Signs: The Trends that are Shaping Our Future*. New York: W. W. Norton.

Daly, H., ed. 1992. *Steady-State Economics,* 2nd edn. London: Earthscan.

Dobson, A. 1995. *Green Political Thought*, 2nd edn. London and New York: Routledge.

Georgescu-Roegen, N. 1976. *The Entrophy Law and the Economic Process*. Cambridge, MA: Harvard University Press.
Goldin, I. and L. A. Winters, eds. 1994. *The Economics of Sustainable Development*. Cambridge: Cambridge University Press.
Hardin, G. 1968. ''The Tragedy of the Commons.'' *Science* 162(3859): 1243–1248.
Harman, W. 1979. *An Incomplete Guide to the Future.* New York: Norton.
Hughes, B. B. 1985. *World Futures: A Critical Analysis of Alternatives*. Baltimore: Johns Hopkins University Press.
Kahn, H., W. Brown, and L. Martel. 1976. *The Next 200 Years.* New York: Williams Morrow.
Meadows, D. H. and D. Meadows, eds. 1972. *The Limits to Growth*: *A Report for the Club of Rome's Project on the Predicament of Mankind.* New York: Signet.
Meadows, D. H. and D. Meadows, eds. 1992. *Beyond the Limits: Global Collapse or a Sustainable Future.* London: Earthscan.
Ophuls, W. 1977. *Ecology and the Politics of Scarcity*. San Francisco: Freeman.
Paoletto, G. 1997. ''Position Paper for the United Nations System in the 21st Century.'' Mimeo. Tokyo: UNU Press.
Pirages, D. 1977. *The Sustainable Society*. New York: Praeger.
Pirages, D. 1989. *Global Technopolitics*. Pacific Grove: Brooks-Cole.
Postel, S. L. 1994. ''Carrying Capacity: Earth's Bottom Line.'' In *State of the World,* eds L. Brown et al. New York: W. W. Norton.
Simon, J. and H. Kahn, eds. 1984. *The Resourceful Earth*. Oxford: Basil Blackwell.
Young, O. R. 1994. *International Governance. Protecting the Environment in a Stateless Society*. Ithaca: Cornell University Press.
Young, O. R. 1997. *Global Governance*. Ithaca: Cornell University Press.

FURTHER READING

Daly, H. ed. 1973. *Toward a Steady-State Economy*. San Francisco: Freeman.
Hughes, B. B. 1993. *International Futures*. Boulder: Westview.