Special Feature 2:

The future of the world

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Dr. Itaru Yasui is vice-rector for the environment and sustainable development at United Nations University. On his website entitled "Environmental studies guide for citizens" [in Japanese], he explains the latest environmental issues. We asked Dr. Yasui to discuss the future of the world and Japan.

Decoupling and the developmental stages of countries

Let's begin with an explanation of Fig. 1, which I often use in considering the future of the world.

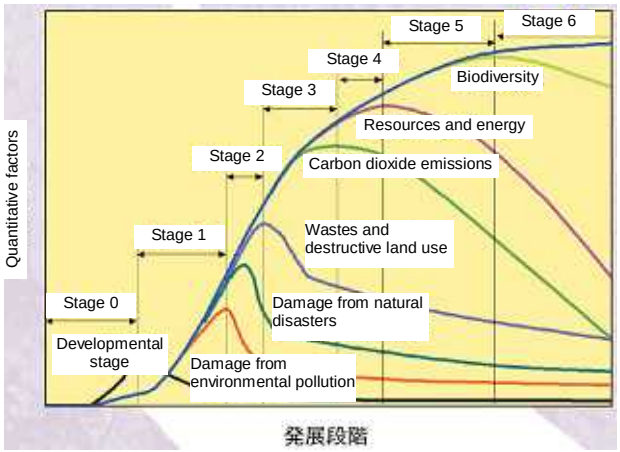

Fig. 1. Developmental stages and decoupling

As a country develops, various environmental problems increase in magnitude along with the developmental process, and these problems are surpassed one by one. Here, the surpassing of environmental problems means that the country's economic vitality is separated from each problem in turn. This is known as "decoupling." With the decoupling process, each problem reaches a peak and then begins to decline, and the country then moves on to the next stage.

First, after some degree of development, a country's forests are destroyed. Let's call this "Stage 0." As the country gains economic strength, it turns from forests to fossil fuels for its energy needs. In other words, the country's economy is decoupled from the destructive exploitation of nature, and forest destruction then declines. This is Stage 1.

Next, economic development leads to water pollution, air pollution, and other forms of pollution. A country enters Stage 2 when it begins to overcome these pollution problems. This decoupling is a reflection of how much the country values the health and lives of its citizens. In Japan, this took place in the 1970s. Next, the problem of garbage and waste becomes more severe. The level of severity depends on the size and population of the country, but after this problem has peaked, the country enters Stage 3.

The next problem is that of carbon dioxide emissions. When carbon dioxide emissions begin to decline, the country enters Stage 4. Thus, various problems emerge in the course of development, and a country moves on to the next stage by decoupling its economic vitality from each problem.

Further stages have already appeared as well. Stage 5 is the depletion of resources and energy. Since this problem is closely linked to that of carbon dioxide emissions, it begins worsening as soon as a

country enters Stage 4. Next, Stage 6 is the problem of loss of ecological and biological diversity. These are the stages we can perceive at the present time.

Local risk and global risk

From the standpoint of risk, these six stages can be classified as local risks (Stages 1-3) or global risks (Stages 4-6). However, local risks may become global risks if taken collectively. Many countries of the world are in Stage 0. Their people need to go to rivers to draw water, and to hills to gather firewood, so even children are an important source of labor, and this leads to exponential population growth. These nations are beginning to use fossil fuels, halting forest destruction; however, this contributes to a rapid rise in global carbon dioxide emissions.

The United Nations Millennium Development Goals (MDGs) are based on the view that everyone in Stage 0 countries should progress to Stage 1, at least. Advanced nations have pledged to devote 0.7% of their GDP to ODA in order to achieve this, but many countries, including Japan, have failed to abide by this promise. Global risk can be decreased by taking steps to halt forest destruction while introducing renewable energies. The technologies of advanced countries are needed for these endeavors, such as small-scale hydroelectric power generation which is used in Sri Lanka. In the past, ODA has been excessively biased toward large-scale projects such as building dams, but imitating advanced countries will not be a successful strategy in the future. Support should be aimed at the pursuit of comfort through other means, based on traditional technologies.

Countries' current situations and methods for advancing to the next stage

As illustrated in Fig. 1, Japan is currently at the stage of seriously attempting to reduce carbon dioxide emissions, putting us around Stage 3.9 at present.

Europe is launching a cap-and-trade program, indicating that it has entered Stage 4. In the past, emitting carbon dioxide did not cost money; but under this program, a fee of about US $50 is charged for every ton of emissions. People nowadays are reluctant to get started on this kind of program even though they recognize that this is a better way. There is a strong mentality of pursuing economic development, and such people tend to see environmental matters in monetary terms. After Stage 2 in countries that have achieved some degree of economic development, in order to move on to the next stage, carbon dioxide emissions need to be changed from something that is free of charge to something that costs money. The same applies to garbage and industrial waste. Originally, garbage was generated free of charge; but now, for example, enormous costs are associated with the demolition of buildings.

Along the same line of thought, although resources already cost money, I believe that countries can enter Stage 5 by developing mechanisms that would provide incentives for improving resource productivity, or require investment to expand the supply of renewable resources in accordance with the amounts of depleted resources that are consumed. To enter Stage 6, society will need to bear the cost of creating and protecting refuge areas for threatened species.

Investing for the future

Stages 4 and beyond are strongly associated with investment for the future. However, investing for the future is not very feasible with today's

economic system. For example, let's say that losses of ¥200 million (such as damage to human health due to environmental problems) are certain to result after 30 years if nothing is done, but that those losses could be prevented by investing ¥100 million today. In a society such as China which has an annual growth rate of 10%, considering that the same ¥100 million could turn into ¥1.7 billion after 30 years, such investment would not take place. This is called "discounting the future." I do not believe it is possible to begin addressing environmental issues until growth rates fall to about 1%. As soon as there is general acceptance that 1% will be the correct economic growth rate, the future becomes heavy. People are then able to begin thinking a little about investing in the future. Japan today is approaching that point.

The Stern Review Report on the Economics of Climate Change was published last year in the U.K., drawing a great deal of attention. This report is quite cleverly worded as a kind of threat: "If we don't act, overall future losses due to climate change could rise to 20% of global GDP per year. However, we could greatly reduce future losses by taking action now at a cost of around 1% of global GDP each year, although economic growth will decline slightly as a result." This warning, aimed at the U.S. and other countries where economic growth is most highly valued, is truly ingenious. It seems to be based on the understanding that an annual decline of about 1% in economic growth would contribute to sustainability.

Ultra long-term vision and backcasting

I am the chairman of an ultra long-term vision study group at the Ministry of the Environment. In considering how to surpass Stage 4 and enter Stage 5 by about 2050, we are discussing the image of future goals, whether it is achievable, and whether it can be accomplished by technological means alone or whether it is necessary for everyone to develop a renewed awareness of the *mottainai* mentality and change their lifestyles accordingly.

Courage will be needed for Japan to move on to Stages 4 and 5. There needs to be some impetus for taking the plunge, and we will not be able to develop the necessary courage for taking that plunge until we can visualize what lies on the other side. Backcasting is a means of indicating what our goals on the other side are like and what the paths to those goals are like, while showing that it is not actually such a daunting prospect.

The mentality of *mottainai*

Based on the discussion thus far, I think that the concept of *mottainai* ultimately involves placing a value on things that have not hitherto been valued by society. The question of what is meant by *mottainai* depends on the mentality of a society at that point in time. When Wangari Maathai speaks of *mottainai*, she is referring to waste of the world's resources. However, when we consider the mentality that scenic beauty can also be wasted, the concept of *mottainai* becomes broader and more diverse.

From the era of rapid economic growth through the era of the economic bubble, the mentality in Japan was that consumption is a virtue, and that the world's resources are limitless so it's fine to use plenty of resources, and that in fact, this is the best way to achieve economic development. Today, human activities have expanded too far, and the world's limits are starting to be seen in a variety of ways. There is an emerging struggle between the world's limits and human values.

We need to understand the very basic fact that our present mentality in the era of fossil fuels, which began in the eighteenth century, is quite distinct in the long history of humanity. We need to have a

more philosophical and precise debate about what activities are possible because of fossil fuels, and what activities will become impossible when fossil fuels are gone. This kind of philosophical debate may not be a strong point of the Japanese people. Since we have begun using fossil fuels, we tend to believe firmly that our civilization of massive energy consumption is the most advanced kind of civilization; but after we have used up the fossil fuels, people will not necessarily share this same belief in the future. Because this fossil fuel civilization has become so firmly rooted, there is a widespread delusion that to depart from this kind of civilization would be like entering a world without oxygen.

In the United States, people believe that the unlimited consumption of energy is a fundamental right. However, the principles of globalization and a free market economy which have developed on the basis of that way of thinking are not governing principles of the entire world. We are currently too dependent on depletable resources, and in addition, we are using renewable resources at a faster pace than they can be renewed. Renewable resources depend on the land. I believe that the greatest mission of civil engineering is land modification, but it may be time for us now to stop and think for awhile about whether the land is being used in ways that are *mottainai*, whether space is being used in ways that are *mottainai*, and whether these uses will become *mottainai* after the end of the fossil fuel era.

However, there are problems with stopping to think. For those who believe in the American-style philosophy that the economy has supreme importance, the problem is that this would disrupt the economy. Disrupting the economy would also disrupt people's mentality. It is likely that people will not be able to change their mentality fast enough to keep up. This would lead to difficult choices, in which one can either assert one's own views while keeping up with that speed, or protect the existing mentality by creating a closed country situation similar to that of Bhutan in a certain sense.

Still, we do have strengths. Japan has older businesses than the U.S. The oldest ongoing business enterprises in Japan are thirteen or fourteen centuries old. Japan has achieved economic growth by maintaining its values over extremely long periods of time. That was destroyed during the economic bubble period, and the American values of short-term snap decisions and instantaneous equivalent exchanges have taken hold. However, I believe that ultimately, we will return to the value of upholding the principles of families and businesses. We will restore the kinds of conditions in which we can maintain those principles and discuss the long-term values of a business with calm and composure, protecting our own mentality and maintaining national vitality. When the values of our society change, education will also change as the next generation grows up. Ultimately, success will depend on people's ways of thinking.

I believe that in the field of civil engineering, there should be debate from all standpoints with regard to whether or not our current and future ways of using land and space are *mottainai*.

Profile of Itaru Yasui

Graduated from the University of Tokyo's School of Engineering in 1968, majoring in synthetic chemistry. Received his doctoral degree from University of Tokyo in 1973. He initially served as assistant and lecturer and was then appointed as assistant professor in the University of Tokyo's Institute of Industrial Science in 1979, and full professor in 1990. After serving simultaneously as director of the University of Tokyo's Center for Collaborative Research, in 2003 he joined United Nations University, where he is vice-rector for the environment and sustainable development.

Environmental studies guide for citizens [in Japanese]: http://www.yasuienv.net/

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