

# Traps in Sustainable Development Governance: Reflection on the Fukushima Crisis for Rio+20

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## I. Introduction

The Great East Japan Earthquake of March 11, 2011 and the subsequent disasters of the Fukushima No. 1 nuclear power plant of the Tokyo Electric Power Company (TEPCO) highlighted the need for a serious debate on denuclearization and a green economy in Japan and in the world more broadly. The accident was local, but the problem is global.

It is reported that, during the disaster, control rods were inserted to stop nuclear fission, but no electric power was available to remove decay heat from the reactors and the pools for spent fuels. This led to blasts in the four reactors, resulting in catastrophic radiation leakage. Although TEPCO insisted that the main cause of the blackout was the “unexpected” tsunami waves, critics argued that the earthquake damaged key facilities, such as pipes and external power towers, and that therefore the antequake safety guidelines were inadequate.

The risks of earthquakes and nuclear disasters have been discussed by seismologists and others since the 1970s.<sup>(1)</sup> With these warnings, why could the accident at Fukushima not be prevented? This paper attempts to answer this question by identifying four main traps: security, economic, social, and environmental. These traps are deeply embedded in the paradigm of sustainable development and the existing institutional responses to the tragedy of the commons. In order to develop a genuine green economy, both philosophical and institutional frameworks must be reconsidered at the United Nations Conference

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on Sustainable Development to be held in Rio de Janeiro in 2012 (Rio+20).

## **II. Traps in Sustainable Development Pillars**

This section will provide a framework of four traps to analyze the Fukushima crisis by critically examining the themes of Rio+20: “a green economy in the context of sustainable development and poverty reduction” and an “institutional framework for sustainable development.” The Rio+20 conference logo represents the three pillars of sustainable development: social, economic, and environmental. The three pillars have been formed and reconfirmed since the 1972 United Nations Conference on the Human Environment held in Stockholm.

Stockholm stressed a combination of “human” and “environmental” aspects and addressed underdevelopment in developing countries. Yet, because few leaders from socialist and developing countries attended the conference, the developed countries’ main concerns about the environmental pillar were highlighted. As a result, the institution produced by the Stockholm Conference was the United Nations Environment Programme (UNEP).

In 1982, the special session of the UNEP Governing Council was held in Nairobi, and the World Charter for Nature was adopted at the UN General Assembly. Ironically, the first UN organization headquartered in the developing world focused on the environment, despite the fact that the main concern of the global south was development.

At the 1992 Rio Earth Summit, the economic and development pillars were more visibly integrated into environmental governance, as exemplified by the establishment of the Global Environment Facility. The Rio Summit also created the UN Commission on Sustainable Development to ensure linkage between the environmental and development communities.

At the 2002 World Summit on Sustainable Development in Johannesburg, the three pillars were reconfirmed, and partnerships by multiple stakeholders were widely recognized as a framework for sustainable development governance that was considered likely to be effective.

How various stakeholders can effectively integrate the three pillars remains the core question, but Rio+20 should go beyond these three components. A missing pillar of sustainable development is peace and security. The Stockholm Declaration, adopted during the Cold War period, contained the principle of the elimination of “nuclear weapons and all other means of mass destruction.”<sup>(2)</sup> Agenda 21, adopted at Rio, promoted the safe and environmentally sound management of radioactive waste. However, the peace and security aspects were deemphasized in the Rio and Johannesburg declarations, both of which were adopted after the Cold War. The linkage between peace and development has been increasingly recognized in the post-9.11 world, and a decent green economy will not be achieved without integrating this pillar into sustainable development governance.

In the institutional context of global environmental governance, Garrett Hardin’s classical explanation of environmental destruction as the tragedy of the commons should be reconsidered.<sup>(3)</sup> To solve the dilemma of overgrazing the commons, which are regarded as the property of no one (*res nullius*), there exist at least four prototype solutions.

The first approach is market-oriented environmentalism. Its prescription is the transformation of the commons into private property, as exemplified by the enclosure movement. By so doing, the environment is to be conserved at a sustainable level by egoistic individuals in order to suit their own interests. It will work only if incentives to use resources sustainably are internalized into human behavior, and if the necessary information is fully available. However, the belief in sustainable economic growth and individualism can be sources of what Ulrich Beck calls a “world risk society,” where a future risk is uncontrollable in the modernity paradigm.<sup>(4)</sup> It is far from the original meaning of *oikonomia*, or “dwelling (household) governance.” This departure is the economic trap.

The second approach is regulatory environmentalism. It is the transformation of the commons into state property (like a Soviet-era state farm *sovkhos*), or strengthening state regulation of public goods (like a Soviet-era

collective farm *kolkhoz*). The effectiveness of this approach depends on the legitimacy and capability of the authority. This is based on a hierarchical model for military discipline. As the etymology of security stems from “without care” or “careless,” the security dilemma (literally a “careless” mistake) can arise from this model both internationally and internally. Herein lies the security trap.

The third approach is plurilateral environmentalism. This is the transformation of the commons into “club” goods. The natural resources are used exclusively by one group, whose members share them as nonrivalrous goods. When negotiation costs to provide public goods are high, like-minded people may form plurilateral institutions for the sustainable use of resources. However, aristocratic governance becomes tainted by crises, drastically restructuring the economy into an oligarchic society through what Naomi Klein calls the “shock doctrine” of “disaster capitalism.”<sup>(5)</sup> Although society is expected to be a friendly group of people in an ordered community, it can be degraded into an exclusive club of unaccountable elites lacking a sound system of checks and balances. This is the social trap.

The fourth approach is civic governance by multiple stakeholders, who transform common property into the real commons (*res communis*). Based on values and knowledge shared by both state and nonstate actors, the environment can be used and maintained sustainably through stakeholders’ dialogue and communication. Rebecca Solnit argued that the mutual help of civic associations liberated from both the state and market society “emerges” in an “emergency” situation.<sup>(6)</sup> This is because disasters affect elites as well as the masses. According to Beck, “poverty is hierarchic, while smog is democratic.”<sup>(7)</sup> However, the anthropocentric concept of environmental conservation still regards the environment as being detached from human beings. As the etymology of disaster refers to “bad planet” or “detached planet,” the planet cannot be detached from humans; nor can nature be separated into parts, because the atmosphere, geosphere, hydrosphere, and biosphere are all connected. The conception of the detached environment can be the very source of disaster, which I call the environmental trap.

The above framework for catching and holding our attention will be applied in examining some key discourses on the causes of the nuclear crisis associated with the 3.11 disaster in Japan.

### **III. The Security Trap: “Atoms for Peace” and “Energy Security”**

The epitaph of the Hiroshima atomic bomb cenotaph says, “Rest in peace; for we shall not repeat the error.” Despite this commitment, Japan made the mistake of not rejecting nuclear power. The early history of the introduction of nuclear energy to Japan was closely related to the nonproliferation strategy of the Eisenhower Administration during the Cold War. The US responded to the horizontal proliferation of nuclear weapons by using the rhetoric of “Atoms for Peace” and by establishing the regime of the International Atomic Energy Agency (IAEA).<sup>(8)</sup> The US Information Service collaborated with Matsutaro Shoriki – the president of Yomiuri newspaper and Nippon Television at that time, who became the first chair of the Atomic Energy Commission (AEC) and the first director-general of the Science and Technology Agency (STA) in charge of nuclear power administration – for the transfer of nuclear technology, while suppressing antinuclear and anti-US sentiment after the Lucky Dragon No. 5 fishing boat was contaminated by the US nuclear test on Bikini Atoll in 1954.

Young Yasuhiro Nakasone successfully submitted to the Diet in 1954 the budget to build the first nuclear reactor, after his trip to the US on Henry Kissinger’s invitation. Although the Japanese nuclear power project started in the context of “Atoms for Peace,” as Nakasone mentioned at the Diet commerce committee in 1955, this did not mean that Japan legally and technically discarded the potential of possessing nuclear weapons. It can be inferred from Nakasone’s action (as well as Germany’s Franz Josef Strauss’ actions) that he sought the possibility of Japan’s nuclear armament until at least 1970.<sup>(9)</sup>

Even after the Diet formally adopted in 1971 the resolution of the three nonnuclear principles, a government official mentioned in 1982 that the Japanese Constitution does not prohibit minimum self-defense forces, whether nuclear weapons or conventional weapons.<sup>(10)</sup> The plutonium accumulating from

“peaceful” reactors guaranteed Japan the technical means to develop nuclear weapons. Thus, the security dilemma was internalized through the proliferation of nuclear power: weapons and energy were linked. A threat was set within their territories.

The development of nuclear power plants was further promoted in Japan as well as in other nations, such as France, using the concept of “energy security” following the oil crisis of the 1970s. While the Environmental Agency was created in 1971, one year before the Stockholm Conference, the Agency for Natural Resources and Energy was also established under the Ministry of International Trade and Industry (MITI) in 1973 to seek a stable energy supply through the nuclear fuel cycle plan.

After the 1974 radiation leaks from the nuclear-powered ship, *Mutsu*, the Nuclear Safety Commission (NSC) was established as a spin-off of the AEC, and was further “strengthened” after the JCO criticality accident of 1999. Despite the institutional reforms, the NSC did not function well at the TEPCO Fukushima accident: although the NSC recognized in the early stages of the crisis that the accident might be a Level 7 event, it was not until April 12 that the Nuclear and Industrial Safety Agency (NISA) of the Ministry of Economy, Trade, and Industry (METI) officially made a Level 7 announcement.

It is said that the institutional failure originated from the administrative reform of 2001, when the STA was dissolved and its functions integrated into the newly created METI and the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Since then, commercial nuclear power plants have been “regulated” (actually, promoted) mainly by METI’s NISA. In accordance with the Basic Law on Energy Policy of 2002, the Basic Energy Plan was adopted with the three Es (Energy security, Environment, and Economy) as the core components of Japan’s energy policy. Although safety is mentioned in the context of energy security, it is not recognized as a core component. Instead of the social pillar, the security pillar was consolidated jointly with the environmental and economic pillars as Japan’s energy policy focus. Social movements for nuclear safety have challenged state-led nuclearization through

the court system, but all plaintiff attempts have been eventually defeated.

Japan's "energy security" strategy emerged not with the nationalization of nuclear energy, but rather with a national policy of promoting regionally monopolized private commercial development of nuclear power plants. TEPCO and other electric companies have been heavily guided by what Chalmers Jonson called the developmental state.<sup>(11)</sup> However, many people felt that the government's announcement of the emergency response in 2011 was inappropriate, and it was often compared to the false announcement of downplayed losses made by the Imperial General Headquarters during World War II.

At the international level, as of March 2011, both the IAEA and International Energy Agency (IEA) were directed by Japanese. IAEA director-general Yukiya Amano argued that even after the Fukushima accident, nuclear power would remain an option for many countries as "a stable and clean source of energy."<sup>(12)</sup> Former IEA director-general Nobuo Tanaka stated, "if nuclear power is available only at lower ends of projections, costs of low-carbon technology will be higher."<sup>(13)</sup> These statements indicate that the position of the Japanese government, as well as those of many other nuclear-capable countries, remains unchanged even after the Fukushima disaster. This is in contrast to position of the International Renewable Energy Agency (IRENA), established by the initiative of Germany after the Johannesburg Summit to advance renewable energies on a global scale. IRENA director-general Adnan Amin said, "the impetus towards looking at renewables today has definitely strengthened" after Fukushima.<sup>(14)</sup> All these international organizations, however, share the view that the choice of energy source is a sovereign decision. IRENA can be regarded as an institutional attempt to challenge the inadequacy of the IAEA's nuclear power dominance and the IEA's club of oil-consuming developed countries. At the same time, promoting renewable energy development can be understood as an attempt to regain state control over energy development risks, which are no longer adequately controllable by the IAEA and IEA.

#### **IV. The Economic Trap: “Too Cheap to Meter” and “Regional Development”**

Another trap lies in market efficiency for sustained economic growth. Pro-nuclear power advocates have long argued that nuclear power is economical or “too cheap to meter.”<sup>(15)</sup> The Japanese government has estimated the unit cost of electricity by source, and argued that nuclear power is cheapest. For instance, the most recent cost estimates based on the model plants presented by the Federation of Electric Companies of Japan in 2004 at the METI Advisory Committee for Natural Resources and Energy suggested that the cost of nuclear power generation was lower than that of thermal and hydraulic power: for instance, 5.3 yen per kWh for nuclear, 5.7 yen for coal-fired, 6.2 yen for liquid natural gas-fired, 10.7 yen for oil-fired (utilization ratio, 80%; discount rate, 3%; plant operational lifetime, 40 years), and 11.9 yen for general hydraulic (utilization ratio, 45%; discount ratio 3%; plant operational lifetime, 40 years) power.<sup>(16)</sup>

However, these estimates were unrelated to actual plant operating performance and excluded important back-end costs and government subsidies related to nuclear power plant development.<sup>(17)</sup> According to the study by Kenichi Oshima based on performance data available from the financial statements of electric companies, it cannot be concluded that the unit cost of nuclear power is cheapest: 10.68 (8.64) yen per kWh for nuclear power, 9.90 (9.80) for thermal combined, 3.98 (3.88) yen for general hydraulic, 53.14 (51.87) for pumping-up hydraulic, and 12.23 (10.13) yen for nuclear power plus pumping-up hydraulic (numbers in parentheses exclude subsidies) on average during 1970–2007.<sup>(18)</sup> One of the main reasons for nuclear power’s reputation as having the “cheapest” price is that the cost of nuclear power is transferred to hydraulic power by adding the cost of the pumping-up hydraulic power using the excessive amounts of electricity generated by nuclear power plants during night hours.<sup>(19)</sup> When these costs are taken into account, nuclear power generation can be the most expensive.

Cost-plus pricing is another institutional reason for the expansion of nuclear



power in Japan. Through this mechanism, a predetermined percentage of the per unit cost of electricity generation is added to electricity prices to provide a profit margin for a utility company. In order for an electric power company to increase its profit margin, it must simply increase its investment in more expensive facilities (even if they are less feasible), such as nuclear power plants, reprocessing plants, and spent fuel storage facilities. Thus, electricity prices in Japan remain one of the highest among OECD countries.

High electricity prices undermine industrial competitiveness, but electric power companies offer large-scale industrial customers a series of “emergency time adjustment contracts,” with which they can enjoy discounted electricity prices in nonemergency times subject to the condition that electricity supply is to be reduced during excess-demand emergency times. It is unclear the extent to which this supply-demand adjustment was actually implemented during “planned rotating blackouts” after the 3.11 emergency period, but METI resorted to limiting power usage for large-scale users for the summer months of 2011 based on the Electricity Business Law.

Another reason for the high cost of nuclear power generation is the large government subsidies to the marginalized areas where nuclear power plants operate. In 1974, immediately after the oil price shock, Prime Minister Kakuei Tanaka and MITI Minister Yasuhiro Nakasone successfully established the so-called three power source siting laws, which require electric power firms to pay tax (which is actually passed on to electricity consumers via increased prices) to the government’s special account for the promotion of power resource development and for subsidies to the local governments that host nuclear plants and to their neighbors. Depopulated coastline communities with agriculture and fishery industries have been targeted as sites for nuclear power plants, partly as a disaster prevention measure to protect large cities, and partly as a poverty alleviation measure for marginalized villages. According to the perspective of Prime Minister Tanaka, elected from the rural area of Niigata Prefecture, this was an institutionalized solution to regional economic disparity. Prime Minister Tanaka said, “Why don’t we build up here something which Tokyo cannot

build in Tokyo? Let us send them electricity, and let them send us money.”<sup>(20)</sup> The world’s largest nuclear power plant operated by TEPCO was established in Prime Minister Tanaka’s constituency, Kashiwazaki-Kariwa. Using these subsidies, a number of paved roads and public facilities were built by general contractors. When the maintenance costs of these infrastructure facilities could no longer be paid, the local host government attracted the development of another nuclear power plant in order to receive additional subsidies. Thus, many nuclear power plants have been built in these marginalized areas.

In this situation, the anti-nuclear power movement can become counterproductive, leading to unintended consequences: because the more active anti-nuclear power movements are, the more need of expensive public acceptance programs are recognized by the government. It has been reported that the antinuclear movement was actually encouraged by pronuclear local advocates with the intention of increasing the financial profits of pronuclear locals.<sup>(21)</sup> The vicious circle also contributed to an increased number of nuclear power reactors concentrated in these areas, increasing the hazards faced by locals and jeopardizing local autonomy.

In order to denuclearize and promote renewable energies, institutionalization for both market efficiency and local autonomy should be taken into account. Some solutions recommended by market-environmentalists are “negawatt power” and demand-side management for increased efficiency in energy conservation and for reduced energy consumption. A first step can be the introduction of time-based pricing, which sets higher prices for peak times, as implemented in France.<sup>(22)</sup> The government subsidies used for nuclear power generation can be transferred to provide incentives for energy-saving products and activities and for research and development into renewable energy.

Another important institutional agenda is the division of electric power generation from distribution. Electrical grids for delivering electricity in Japan are currently owned by eleven private power generation companies that have near monopolies in the respective service areas. In this case, the electrical grid should be transformed from monopolized private property to a smart grid that is

a collective good or common.

Following the Price-Anderson Act in the US, Japan's current Law on Compensation for Nuclear Damage imposes liability on the nuclear power plant operator for damages caused by nuclear accidents. Compensation of up to 120 billion yen per nuclear power plant is available under insurance. Full coverage by the private insurance industry is regarded as impossible for the operation of high-risk nuclear power generation. Although it is not clearly stated in the wording of the law, it is understood that the nuclear power plant operator has no cap on its liability. If, however, the damage is caused by "an abnormally large natural disaster or social unrest," the nuclear power plant operator may be exempted from paying compensation.<sup>(23)</sup> TEPCO has frequently emphasized that the Fukushima accident was caused by an "unprecedented" tsunami, so that they can be exempted from liability; they would argue that the government should bear the cost of compensation, both domestic and possibly overseas.<sup>(24)</sup> The Japanese government argues that the Fukushima accident is not a case of exemption from liability because it did not involve a "historically unimaginable" earthquake and tsunami.

The TEPCO rescue plan approved by the Diet is designed to protect TEPCO from bankruptcy at the expense of taxpayers and electricity users under the regional monopoly. If the state takes responsibility for TEPCO's liability, some argue that the power distribution grid should be collateral for compensation, and that both the grid and the regional power generation monopolies themselves should be made public goods. A proposal for a feed-in tariff for renewable energies was actually adopted in Japan at the cabinet meeting held several hours before the earthquake of March 11, 2011. The unit cost of power generation by renewable energy, which was initially high, has been decreasing. It is reported that the per kWh cost of solar photovoltaic systems decreased below that of power from new nuclear power plants in 2010 in North Carolina, and that the cost of solar energy will decrease further below the cost of nuclear energy.<sup>(25)</sup> A network of geographically dispersed and cooperative smart grids will

contribute to local autonomy and supply decent jobs for regional development. Local production and local consumption of renewable energies can replace the putatively “cheap” but not actually economical energy of nuclear power, which carries many hidden costs and risks.

## **V. The Social Trap: The “Safety Myth” and “Nuclear Power Village”**

The image of “peaceful, efficient, and clean” nuclear energy has been strengthened by a groundless belief that Japan’s nuclear power plants are absolutely safe. “In Japan, we have something called the ‘safety myth,’” METI Minister Banri Kaieda said at the IAEA meeting. “It’s a fact that there was an unreasonable overconfidence in Japan’s nuclear power generation technology.”<sup>(26)</sup> Such a belief has been socially constructed by what critics call the “nuclear power village” people. The absence of emergency technology and equipment is explained by this myth. The cost of preventive equipment is one reason, but a more serious reason is the social and psychological mindset among the “nuclear power village” people. Introducing such equipment would imply an admission that nuclear power is unsafe, undermining the premise that Japan’s nuclear power is absolutely safe.

The structure of the like-minded “village” of corporate, political, and academic stakeholders in nuclear power is influenced by a cycle of reciprocal favors between members: politicians and bureaucrats provide the industry with lax regulations and with a higher nuclear power target share in the energy plan, even after discovering operational faults and new information regarding earthquake and tsunami risks; in turn, the nuclear power industry appoints former senior bureaucrats (even a judge) and politicians to executive positions of the companies whom they formerly regulated. Business leaders of the Federation of Electric Power Companies support the Liberal Democratic Party, while the Federation of Electric Power Related Industry Workers Union of Japan supports the Democratic Party of Japan. The labor union shifted to a pronuclear position when they transferred the risks of radiation exposure among laborers to unorganized subcontracted workers. Untrained, temporary laborers are used

for hazardous work that exposes them to radiation in regular as well as crisis situations.<sup>(27)</sup> The nuclear industry makes donations to academia for research and education related to nuclear energy, and academia sends graduates to the nuclear industry in turn. The state provides positions and subsidies for the academics, who in turn support government policies promoting nuclear power. The media also uses pronuclear academics to promote the safety myth. Politicians, bureaucrats, businesspeople, and academics, who raised questions about the safety of nuclear energy, have been discriminated against and marginalized from the “nuclear power village.”

The institutional development of the “nuclear power village” explains why preventive measures were inadequate and also why the disaster responses were delayed and confused; the fallacy of the safety myth and the role of the “village” were revealed mainly by alternative media on the Internet and by civil society organizations.

After the accident, official statements and actions organizing the evacuation of local residents and safety measures for workers, food, and drinking water were largely confused. One of the typical confusions relates to the evacuation standards and radiation exposure standards for schools in Fukushima Prefecture. The Emergency Response Support System did not work, reportedly because of a blackout, and the data from the System for Prediction of Environmental Emergency Dose Information were not matched by the necessary immediate evacuation measures, reportedly to prevent a panic. Critics argue that it is the elites, not the public, who were in a panic. It took more than one month after the explosions for the government to set the “planned evacuation zone” as the area within a 30 km radius of the power plant. In the first month, those living in the hot spot areas had been exposed to radiation. It is estimated that soil contamination in some areas in Fukushima matches the level that prompted compulsory migration orders in the 1986 Chernobyl disaster. The NSC guidelines for evacuation recommend remaining indoors or evacuating based on cumulative exposure forecasts: to remain indoors with 10–50 mSv for external exposure (exposure through the skin) or 100–500 mSv for internal exposure

(ingestion of radiation); and to evacuate with over 50 mSv for external exposure or over 500 mSv for internal exposure.<sup>(28)</sup>

More contentiously, MEXT released an interim policy that outdoor activities in and outside schools in Fukushima Prefecture should be restricted as much as possible in schools where air dose rates of 3.8  $\mu\text{Sv/h}$  or more were measured in schoolyards or playgrounds.<sup>(29)</sup> According to MEXT, this policy was based on the recommendation by the International Commission on Radiological Protection (ICRP) setting the “post-emergency situation” reference level for acceptable exposure in the band of 1-20  $\mu\text{Sv}$  per year. The 3.8  $\mu\text{Sv/h}$  dose rate is more than six times higher than the level accepted in radiation-controlled workplaces (0.6  $\mu\text{Sv/h}$ ) – where those under the age of 18 are prohibited to work, under the Labor Standard Law – and 20 times higher than the maximum safe adult exposure level set by the government.<sup>(30)</sup> Further, the policy did not take into account children’s higher sensitivity to radiation or the possibility of internal radiation exposure. Thus, concerned parents and social actors demanded that the government retract the MEXT policy. Despite such social protests, MEXT maintained this policy, although it stressed that it was a temporary measure, and that it would attempt to reduce the radiation dose rate to 1  $\mu\text{Sv/h}$  where possible.

There is little disagreement that the deterministic (short-term) radiation effect on acute disorders has a threshold. The policy controversy is concentrated on the relationship between radiation dose and nondeterministic delayed effects, stemming from the scientific debate about the effects of radiation in the dose range for which epidemiological evidence is unavailable, below 100 mSv.<sup>(31)</sup> There exist at least three schools of thought. The first hypothesis assumes that there exists a “linear no-threshold” relationship between radiation dose and health effects in the unobserved dose range as well. US authorities take this position, using a linear no-threshold model that links to the observed effects. The ICPR model for external exposure (also applied for internal exposure) also hypothesizes a linear relationship, with a risk coefficient lower than that of the observed data from Hiroshima-Nagasaki victims. The second school of thought is that there is a threshold for negligible health effects due to the ability of

human cells to recover from radiation damage. Some nuclear promoters further argue that low-level radiation exposure can have beneficial effects on human health (radiation hormesis).<sup>(32)</sup> The third school of thought follows the rights-based model developed by the European Committee on Radiation Risk (ECRR), who criticized the ICPR's cost-benefit models of external exposure to radiation, which were inappropriately applied to internal exposure.<sup>(33)</sup> As the model was based on recent findings on epigenetic effects, such as bystander signaling and genomic instability, the ECRR recommended that the total maximum permissible dose limit should be kept below 0.1 mSv per year for members of the public, and 2 mSv for nuclear workers.

Many governments still adopt the model of the ICPR, which is closely connected to the IAEA. At the level of intergovernmental organizations, the 1959 agreement between the IAEA and the World Health Organization (WHO) "has effectively gagged the WHO from telling the truth about the health risks of radiation."<sup>(34)</sup> Some suggest that the ECRR is not an official authority, and was formed during a conference arranged by the Green Group of the European Parliament. The ECRR remains independent of the ICPR and the UN Committee on the Effects of Atomic Radiation. While the independence of the epistemic community is important, this independence may or may not influence advocacy for public policy and public campaigning.

The trap of the independence of the scientific community was also recognized by the early denuclearization movement in Japan, in the debate on "clock vs. hammer" among the founders of the Citizens' Nuclear Information Center in Japan. While Jinzaburo Takagi argued the need for a social movement collaborating with alternative science, Mitsuo Taketani argued that "scientists have their own functions, and social activists have their own roles. A clock cannot become a hammer, and when the clock is used as a hammer it will be broken."<sup>(35)</sup> In sum, it is important to form a collaborative network of independent, open, responsible civil society agents promoting a green economy, rather than a collusive network of dependent, closed, irresponsible "villagers" promoting nuclear power.

## **VI. The Environmental Trap: “Nuclear Fuel Recycling” and “Clean Energy”**

The environmental pillar was misused to justify nuclear power generation in Japan. Nuclear energy has been overhyped as “environmentally friendly” because “uranium is recyclable” and “nuclear fission does not emit any carbon dioxide.”

The advocates for spent fuel recycling have stressed that resource-poor Japan should conserve uranium resources. The originally intended nuclear fuel cycle involves the use of fast breeder reactors with mixed oxide (MOX) fuel; however, the fast breeder reactors were faced with a series of accidents and the data falsification scandal. Another cycle of the pluthermal project has also been faced with a series of problems at the reprocessing plant at Rokkasho, which continues to emit radioactive materials at a “safe” level into the air and the ocean, while also being involved in the production of “temporary” high-level radioactive waste and the underground disposal of low-level radioactive waste. Unit 3 of the Fukushima No. 1 plant was one of the boiling water reactors that used MOX plutonium fuel. The radiation and radioactive materials emitted during the meltdown of the reactors and from the pools of spent rods at Fukushima No. 1 were a result of this failed recycling plan. These nuclear cycle programs do not constitute genuine “recycling” because no final disposal site for high-level radioactive waste is available. Critics refer to this situation as a “mansion with no toilet.”

Equally importantly, the phrase “nuclear energy is clean” has been widely used, especially after 1997, when Japan hosted the conference for the Kyoto Protocol on Climate Change. The budget relating to the Kyoto Protocol target achievement plan is spent primarily on nuclear power and carbon credit purchases through the Kyoto mechanism.<sup>(36)</sup> Even after the Fukushima accident, the Japanese government still promotes the export of nuclear reactors to developing countries, arguing that carbon credits related to nuclear energy should be introduced for climate change mitigation and sustainable development in developing countries. Vietnam recently selected Japan as the second preferred



country (following Russia) to jointly supply Southeast Asia's first nuclear power plants. However, the front- and back-end processes of nuclear energy generation as well as plant building and decommissioning all emit greenhouse gases, and other social and environmental risks should be taken into account.

The failing nuclear fuel cycle program and the “nuclear energy is clean” myth are insulated from the environmental legislature in Japan. Contamination by radioactive materials is effectively excluded from Japanese environmental laws, including the Air Pollution Control Law, the Soil Contamination Countermeasures Law, the Agricultural Land Soil Pollution Prevention Law, the Water Quality Pollution Control Law, the Law for the Prevention of Marine Pollution and Marine Disasters, the Marine Fishery Resources Development Promotion Law, and the Wastes Disposal and Public Cleansing Law. The laws and rules on nuclear power plants and nuclear fuel and waste are all under the jurisdiction of nonenvironmental ministries, such as METI and MEXT. The exclusion of radioactive materials from environmental laws is based on the premise that the environment is common property, beyond the jurisdiction of environmental ministries. This fallacy originates from the anthropocentric view that human-made plutonium can be recycled, and a parochial perspective that views climate change as detached from other global environmental issues. The ontology of the environment as being the environs, that is, an outside zone that surrounds human beings, who are positioned at the center of concern, is very different from the worldview of indigenous peoples, as shown in the following poem:

*To the earth I ask;  
Was the weight unbearable?  
Did it hurt you?  
More deeply  
We should have been aware  
And in awe of you.  
Your weight*

*Your pain  
We should have known the way to gauge.  
People after people  
Disappeared into waves  
Together with your weight and pain  
And  
To the earth they returned.  
That pain  
We, numerous survivors,  
Now awaken to  
And we press our hands together  
In its reverence.* <sup>(37)</sup>

The above poem, “The Earth,” was written following the 3.11 earthquake by Shizue Ukaji, an indigenous Ainu artist and activist. She was told by her Japanese friend who read this poem, “Ainu people feel concerned about the land first, rather than the dead people, even in this disaster.”<sup>(38)</sup> A cleavage between the two worldviews exists regarding the inseparability of the land and human lineage. When I met Ms. Ukaji at the 2008 Indigenous Peoples Summit in Hokkaido, an American indigenous participant shared the following proverb: “We do not inherit the Earth from our ancestors. We borrow it from our children.” From an indigenous perspective, “the land is the property of nobody,” meaning that nature is divine and is a place where humans live and die. In this sense, nature cannot be owned by anybody. In other words, our bodies are nature itself, and the land, air, and water are ours only to care for.

If nature is regarded as common property, the risk of environmental damage is also imposed on everybody. When nature is contaminated, clouds, wind, air, land, water, milk, vegetables, meat, fish, clothes, and house walls all become threats to us. Here arises a responsibility on all stakeholders to protect nature and to prevent environmental catastrophes. The environment cannot be owned, but rather must be shared and cared for by everybody. To reconstruct

the concept of the commons, the epistemology based on the worldview of indigenous people should be shared. It is erroneous to believe that traditional indigenous life involves poverty. Rather, the meaning of the subsistence and resilience of the “original affluent society” must be learned.<sup>(39)</sup> Reducing energy demand and degrowth do not mean a return to the Stone Age; it is what some postdevelopmentalists call conviviality.<sup>(40)</sup>

In considering alternative and renewable energies, a convivial relationship between nature and human beings can be considered. First, passive energy directly harnessed to achieve certain human needs, such as heating, cooling, and lighting, requires little energy and thus reduces overall energy consumption. Policy and institutional innovations for such efforts must be promoted. Second, in promoting renewables, it is necessary to consult with indigenous and local peoples to ensure that the energy solutions are acceptable to them. Large-scale dams would not be acceptable to indigenous communities, whereas small-scale hydropower and wind power may be acceptable. The potential of geothermal power plants is also high in earthquake zones, although consultation with the regulator of national parks and the hot spring industry is needed.<sup>(41)</sup> Wave energy is said to be one of the most efficient methods per unit of area, and further research and development should be conducted in the East Asian region. The key point here is that large-scale atomic energy generation in a centralized system is always accompanied by a continuous increase in energy consumption, whereas small-scale renewable energies, which are locally autonomous, geographically dispersed, and functionally cooperative, can reduce energy consumption, provide subsistence, and be decent, resilient, and sustainable.<sup>(42)</sup>

## **VII. Conclusion**

The nuclear crisis at Fukushima is a failure of Japan’s quest for autonomy and sustainable development. Despite the fact that nuclear energy is militarily insecure, economically inefficient, socially unhealthy, and environmentally unsustainable, the Japanese people were easily trapped by socially constructed

myths. To make Fukushima a significant turning point leading to a genuine green economy with alternative renewable energy, it is important for us to reflect on both the philosophical and institutional meanings of “sustainable development” and the “property” approaches to the tragedy of the commons.

Denuclearization may or may not be accompanied by demilitarization, degrowth, democracy, and deconstruction of the orthodox concept of the environment. The earthquake shook everything on the land, including the foundation of our worldview; the tsunami swept away so many lives and structures, as well as the veil of the traps; and the explosions at the Fukushima nuclear power plants produced radioactive clouds that blocked any rays of light from “basking in the warmth of the atomic sunshine,”<sup>(43)</sup> while shining on an opportunity for a green, resilient, and decent economy and governance.

## Notes

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**Traps in Sustainable Development Governance:  
Reflection on the Fukushima Crisis for Rio+20**

<Summary>

Katsuhiko Mori

With ample warnings of possible nuclear disasters triggered by earthquakes and tsunamis, why could the accident in the Fukushima nuclear power plant not be prevented? During the 40 years since the Stockholm Conference on the Human Environment, four main traps have been identified: security, economic, social, and environmental. These traps are deeply embedded in the paradigm of sustainable development as well as the institutional responses to the tragedy of the commons. For a genuine green economy in the context of sustainable development and poverty alleviation, both philosophical and institutional frameworks for denuclearization must be reconsidered.

