Symbiosis and Sustainability through the Lens of Buddhism

Shuichi Yamamoto and
Victor S. Kuwahara

1. Introduction

CONFERENCES focusing on development and environmental problems, which include the United Nations Conference on the Human Environment (also known as the Stockholm Conference) in 1972, the Nairobi Conference in 1982, The United Nations Conference on Environment and Development (also known as the Rio Summit) in 1992 and The World Summit on Sustainable Development (Earth Summit) in 2002, have been held every ten years. In addition, an international conference addressing global problems has been held every year since 2002. Unfortunately, not much progress has been made as a whole. In recent years, optimism towards resolving global environmental issues has waned, and recent research suggests continued negative prospects for resolving the vast majority of problems we face. This pessimism is partly due to the continuous conclusions that the present global human civilization is headed towards unavoidable collapse. Under these desperate circumstances, a clear and determinative policy is necessary to manage human desires, encourage symbiosis and develop sustainability. Concrete policies should be divided into larger frameworks which include improvements in technology, social systems, life styles, civilization and the implementation of humanistic views. How can Buddhist philosophy contribute to improving the policy and framework? In this study, I describe the possible contribution of Buddhist philosophy towards symbiotic and sustainable solutions of environmental problems.

2. Scenarios of Collapse for Modern Civilization

Matsui (2010) who specializes in planetary physics defines human civilization as a unique system called the "human-sphere" which is different from the biosphere within the Earth's traditional systems, *i.e.*

atmosphere, hydrosphere, lithosphere, etc. (Matsui, 2010)[1]. Human beings used to be categorized within the biosphere amongst other living organisms during the hunting-and-gathering age. The hunting-and-gathering age is categorized as the time in history where people lived within the same food-chain as other living organisms without altering the interdependent systems of Earth. However, the start of the agriculture and stock-farming revolution caused slow deforestation and degradation of various other biota within the biosphere. In other words, the agricultural revolution not only degraded the most important primary production subsystem on Earth, but also transformed forests into a single farming-based subsystem. As a result, the evolved flow of energy and matter on Earth changed dramatically. Furthermore, human civilization added a larger transformation to the Earth's systems after the Industrial Revolution in the form of fossil fuels and atomic power which are not found in nature.

The combination of these new and unnatural processes caused a mass transfer rate of organic and inorganic matter by human beings that exceed the natural cycles by 100,000 times. In this way, human civilization built a new "human-sphere" within the Earth's formal systems. However, the "human-sphere" cannot sprawl infinitely because Earth has limited materials and energy. At the current rate of consumption, human civilization is destined to collapse. Matsui (2010) concluded that although the human-sphere is fundamentally a part of and should stay within the biosphere, the human-sphere has exacerbated and overwhelmed the biosphere through heavy transfer rates of matter and energy that will eventually devastate the planet.

Ishi (2010)[2] who is an environmental journalist asserts "the earth deteriorates from the desires of human's." He assesses the 20th century as a time when the self-fulfillment of human desires (previously a privilege of the affluent few) has reached the common level of average citizen's for the first time in human history. He predicts that a certain cataclysm will appear on Earth when the population reaches 8 billion around 2025. Ishi suggests five critical changes: shortage of food, shortage of water resources, destruction of ecosystems, exhaustion of food resources, and evolution of new types of viruses and diseases.

Ishi also considers the collapse-scenario of the present civilization as follows: increases in population causing increased deforestation and farmland, the remaining primeval forests on Earth decreasing to one third of the original area, and 40 percent of surface of the planet becoming artificial surfaces including farmland, cities, roads and reclaimed ground. Further, the United Nations predicts that 70 percent

of the terrestrial surface of the planet will become artificial by 2050. As a result, the natural environment maintained by human civilization will be lost. Further, due to economic expansion, increases in resource consumption, and progression of environmental pollution or destruction of nature will follow, leading to a collapse of the present day civilization from food shortage or natural disasters.

Ishi suggests the following causes for the collapse of present day civilization. At some point or another, the system of "production for consumption" reversed to a system of "consumption for production" due to the switch from individual needs to "mass production," "mass consumption" and "mass waste." In other words, the infinite expansion of human desires has caused inconceivable expansion of civilizations mass consumption.

3. Learning "Symbiosis" and "Sustainability" from Nature

Living organisms appeared, evolved and diversified during the ~4,600 million year history of Earth. The complex and relatively stable ecosystem was formulated by the gradual diversification of life. In other words, the ecosystem slowly acquired "symbiosis" and "sustainability" through diversification. Thus, it is probably wise to review the history of the evolution of the ecosystem to find model answers towards "symbiosis" and "sustainability" since humans are also a part of the greater biosphere who benefit from the ecosystem.

The term "symbiosis" is originally a concept from ecology. According to Fujita (1997)[3], "symbiosis" is defined as "living organisms, including human beings, living harmoniously together on Earth with other organisms without extinction and with various relations." Symbiosis is a mutualistic relationship fundamentally required for securing human civilizations "sustainability." Parasitism is also an important concept in the context of symbiosis.

According to biologists in recent years, it is becoming clear that evolution of living organisms began from symbiosis of living organisms. According to the "endosymbiotic theory" by Margulis (1967)[4], anaerobic bacteria were dominant during the time of limited free oxygen on Earth. When free oxygen began to accumulate into the atmosphere from the evolution of cyanobacteria, survival of anaerobic bacteria became difficult. At this point, aerobic bacteria were then utilized by anaerobic bacteria, and "symbiosis" evolved. The aerobic bacteria utilized in the cells of eukaryotic cells are the mitochondria's. It is interesting to note that the causality of this symbiotic relationship was deterioration in the

environment in the form of accumulated free oxygen in the atmosphere. In other words, as the environment transformed and became hostile for one type of living organism, the survival strategy of intracellular symbiosis evolved.

Another evolutionary strategy was the establishment of extracellular "symbiosis" between living organisms. Symbioses between living organisms are also explained by the exchanging of substances between living organisms, surviving through more efficient transfers of matter, *i.e.* predator and prey. Other extracellular "symbiotic" relations between living organisms are well-known such as the relationship between sea anemone and anemone fish, or honey bees and flowers. However, such examples are few in nature. Rather, all living organisms are active in a "symbiotic system" in various overlapping forms when viewed from processes related to recycling of matter in the ecosystem. In summary, the ecosystem is unsustainable without symbiotic relationships and symbiosis.

How did the "symbiotic" process start in the ecosystem between living organisms? According to Yamamura (1995)[5], symbiosis between living organisms began from "parasitism" where one side utilizes another side. For example, a typical parasite-host relationship is easy to understand where the parasite burdens a host. The host will soon weaken or die from the burden of the parasite. However, this process also means the eventual death of the parasite simultaneously. Thus, the parasite must be careful in exploiting the host too much. Ultimately, the parasite must evolve to coexist and co-prosper with the host. The conclusion to this example is that "symbiosis" must evolve from fatal "parasitism" in order for survival.

Another useful method to study "sustainability" between life is by examining the history of living things. It is well known that dinosaurs, which evolved into the largest living organisms in history, suddenly became extinct on Earth ~65 million years ago. The leading opinion now as to the cause of the mass extinction is the collision of a colossal meteorite into Earth (Alvarez et al., 1980)[6]. The impact of the meteorite generated global-scale dust clouds decreasing sunlight sharply, and not only caused global cooling but also reduced photosynthesis of plants on lands and in the oceans. The food-web completely collapsed and as a result, the dinosaurs vanished. When the massive meteorite collided into Earth, it is easy to visualize how vast quantities of dust and soot were generated, followed by massive fires launched into the stratosphere, and eventually reducing sunlight for prolonged periods of time. As an end result, the earth cooled rapidly, photosynthetic activities were prevented,

where plants withered first. Therefore, it is hypothesized that the factors that led to the extinction of dinosaurs was caused by cooling and food shortage.

One question that remains is how some organisms were able to avoid extinction? What factors determined the final fate? One of the factors separating the fate of living organisms is considered to be difference in body size. It is presumed that mammals were able to survive after dinosaurs became extinct because they were small. Even though almost all plants had withered, mammals were capable of survival with limited food. Therefore, the reason that dinosaurs became extinct is due to the physical factor of evolving into large organisms (requiring more resources), which paradoxically also allowed them to be very successful on the planet. However, it was also this large physical form that led to the eventual extinction due to sudden changes in the environment that they conquered.

We can also learn from insects which are the single most prosperous organisms on Earth today. Insects are the first animals to have marched out to land ~400 million years ago. It is noteworthy that insects are the most prosperous organisms on the planet since they account for more than half of all the living organisms on Earth. Moreover, it is known that insects have overcome at least four large mass-extinctions of living organisms during the history of Earth. Major features of insects not only include high adaptability for niches in various environments, but also the evolutional direction to be small. The natural selection to evolve small must have enabled the insect to acquire various niches within the ecosystem, and also lead to high biodiversity. In other words, "being small" allows for high adaptability to environmental changes. This is very important to consider when trying to understand "sustainability" from an ecosystem-based approach.

4. Symbiosis and Sustainability through the Lens of Buddhism

As explained above, the potential causes of civilizations collapse can be attributed to the eventual limitations in resources of Earth, where the "human-sphere" grows, the influence of the human beings on the surface of the earth are large, and shortage of food and water resources with increasing of population. We can now consider ways to avoid the downfall of human civilization by reducing the consumption rate of substances and energy, and controlling the "desires" of people as factors which determine the consumption rate of resources. As a matter of

course, if the expansion of human desires can be controlled, we will be able to reduce the consumption rate. Thus, we must focus and control human desires.

In addition, the following concepts are considered as lessons that can be learned from the natural history of living organisms. By selecting "symbiosis" from "parasitism," living organisms were able to overcome the causal downfalls from environmental change, and were capable of forming a "sustainable" network of interconnected organisms. Moreover, "small-size" was shown to be an important factor for acquisition of "sustainability," since it enhances the adaptability to changing environments. So to speak, the direction towards "symbiosis" from "parasitism" means "specialization" between living organisms in the biosphere. In other words, living organisms must live harmoniously together rather than dominantly acquire resources for themselves. Therefore, symbiosis which exchanges resources or shares capabilities is considered to be an inevitable solution to our current problems.

Next, I would like to examine these concepts and include Buddhist philosophical viewpoints.

4.1. Control of Human Desires

The problems of human desires have been discussed up to the present. According to the environmental archaeologist Yasuda (2001, 2010)[7], the difficulty of controlling human desires is found in the fact that human desires also contributed to the growth and advancement of society. The paradox is found in the fact that desires allowed human civilization to overcome various conventional problems, expand and grow prosperously, but at the same time, human desires have also lead to environmental problems and degradation of the planet. This suggests that factors which develop civilizations are also ones that can potentially collapse civilizations. This phenomenon is similar to the example of the large growing dinosaurs, discussed before. This concept can be viewed another way; the "paradox of civilization" (Matsui, 1989)[8] and the "the factor of prosperity" act as a factors for crisis (Hanya, 1989)[9]. On the other hand, at present, desires are not denied, rather, desires are encouraged which compounds and makes the problem difficult to approach. In present day society, human desires for materialistic things and appetites for consumption are symbols of high value and affluent living. Incidentally, at certain times in history past, openly sharing and flaunting personal desires were not considered noble signs of the affluent, whereas today's society considers people who do so as great and successful people. When a majority of human beings openly

expresses and materialize their desires, unless there are infinite resources, environments, and space, it becomes more and more difficult to fulfill the desires. Gandhi famously said, "Although Earth has enough (resources) to satisfy the necessity for all people, it is insufficient for filling all the people's greed[10]."

However, unless the grossly enlarged desires of human civilization are controlled, environmental problems cannot be solved. How can desires be controlled? Yasuda (2001)[11] points to two things. From his viewpoint of studying ancient religions, and relations between civilizations and the environment, in order to control desires, an altruistic mind to sympathize with others is important, and that this altruistic mind includes not only man, but also nature. He gives an example of past philosophies of cultures who believed in deities and gods of forests. In these cultures, forest gods supervised human activities in the forest—there was always a sense of supervision by a higher entity. In other words, within the subconscious of people who utilized the forest, the higher entity was always watching the actions and desires of humans. In today's modern world, we have completely lost this sense of respect and fear for such deities. He further suggests that the sense of reverence to an invisible existence plays a large role for controlling desires. Matsui (2010)[12] also asserts that a new "environmental religion (or philosophy)" is necessary in today's cultures where a new higher entity of respect and fear allows eternal, sustainable progress of human civilization.

What role can Buddhist philosophy play in order to control human desires? Buddhism is the religion of "self-consciousness" and could also be called the philosophy of "self-responsibility." Moreover, a unique feature of Buddhism in the definition as a religion is that deities and gods do not exist, per say. Buddhism is the philosophy of self-reliance, -responsibility and -respect *vis-a-vis* the god within each individual. Therefore, there is no "eye of the surveillance" from an outside entity, Yasuda says. However, there is the concept of Karma in Buddhism[13].

In the 'Consciousness-Only' doctrine of Buddhism, all physical and mental activities encompassing life experiences that take place in an individual are accumulated as Karma seeds (*shuji*) in the Alaya consciousness within the depths of the subconscious. The information (or energy) as seeds accumulated there appears in the real world as the fruit and results of the Karma. The acts of good induce good results, while the acts of evil induce evil results. With regards to the meaning of "surveillance," there is an eye and responsibility from within each person in Buddhism. In other words, in Buddhism all things become self-responsibility and self-discipline.

What is the ideal way of life in Buddhism? In Buddhist philosophy, today's rampant human desires can be defined as the human life-condition of "hunger" or *Gaki* in Japanese. In other words, the human condition of greed and addiction to greed in people is a form of "hunger" in a figurative sense. The life-condition of "hunger" is not ideal in Buddhism. Further, in Buddhist philosophy, there is an ideal way of living where people control their desires and greed by "living with limited desires and being satisfied with small portions." In other words, it is not necessary to completely deny desires towards human growth, rather, it is important to limit and control those desires to small portions. Further, the concept explains that "satisfaction" from desires can only be understood through satisfaction from small portions. Without understanding the concept of "satisfaction," people cannot control their desires. Human civilization today has lost the sense of satisfaction from gorging on desires. This concept is very important. It is critically important to control unlimited desires.

Buddhism teaches people to strive for the ideal life-condition of a Buddha, or Buddhahood, which is a life-condition of "compassion." Buddhist compassion pertains to all living organisms, *i.e.* fellow humans, animals, plants, microbes, etc. The life-condition of "compassion" allows people to feel responsibility for others. Although it is difficult to control our own personal desires and greed, it is easier to control these desires when we have compassion for others. We can also expand this concept to environmental and societal problems. In other words, through the acts of compassion and philanthropy, we are able to enrich our own lives while at the same time protect the planet. This societal "consciousness" allow all people to enrich their own personal lives as well as contribute towards a symbiotic relationship with the planet. In short, the principle mission in life for Buddhists is the responsibility for oneself and others.

Schumacher[14], who proposes "Buddhist Economics," suggests that society should base economics on non-violence and simplicity, while at the same time attain maximum well-being with minimum consumption. Although modern economics focusses the index of happiness on the consumption of materialism, Buddhist Economics suggests minimizing consumption towards benefiting the self and others. His suggestion also proposes "controlling desires" as the fundamental principle of Buddhism.

4.2 From "Parasitism" to "Symbiosis"

The present civilization centered on science and technology is one

which unwillingly wastes natural resources, such as fossil fuels, food resources, and forest resources. Resources from nature are generally obtained from developing countries which have abundant natural resources at low prices. In a way, the over-consumption of global natural resources can be viewed as an act of violence towards nature. In other words, this act of violence can also be viewed as "parasitism" towards nature and the developing countries. As described before, "parasitism" in ecology is not necessarily one-sided where one organism profits while the other is damaged. If this were the case, the parasite would also eventually see demise. Rather, the parasite must carefully balance the act of profit so that both organisms can maintain stability.

Currently, advanced nations obtain various profits from nature and developing countries, with little return of gratitude. Many advanced economies purchase natural resources at low cost, and sell goods at high prices. This simple act is a form of "parasitism." However, "parasitism" is a structure of mutual maintenance to avoid mutual downfall. As in the ecosystem, human civilization must re-order priorities based on "sustainability" and learn the mutual benefits of "parasitism" in the context of "symbiosis."

Buddhism has a concept called "Dependent Origination," or *engi* in Japanese, which explains "symbiosis" where all living organisms are fundamentally connected based on the life-principle of Buddhahood (life-condition of Compassion) within all organisms (Yamamoto, 2001)[15]. "Dependent Origination" is a view that suggests all matters and phenomena coexist in relation to each other. In the concept of "Dependent Origination," all organisms are connected by a large, stable mesh or net (Yamamoto, 2005)[16]. The mesh is comprised of small sub-sections and connected by many knots, where each knot represents each living organism, and each connecting thread represents relationships between organisms. Moreover, there is no superiority or inferiority in the knots. As in ecology, dense relationships between living organisms without superiority or inferiority enable overall "symbiosis" of an ecosystem, and ensure "sustainability." Further, since the life-condition of Buddhahood exists in all living organisms equally, including humans, Buddhism suggests that all the living entities are connected by the same principle under the disguise of different phenotypes. Therefore, Buddhism views the biosphere as egalitarianism which regards all living organisms, including humans, microbes, plants and animals as fundamentally equal. In other words, Buddhism always exists and views life from "symbiosis," and the concept of "Dependent Origination" which emphasizes relationships from an egalitarianistic vantage which treats

all living things equally.

4.3. Towards Suitable Sizes from Large Sizes

As described before, the subsystem called the "human-sphere" amongst all systems has grown tremendously including the products of science and technology, the social system, and the life style of each individual. In modern society today, each human being is surviving through the consumption of resources equivalent to the physical size of elephants or dinosaurs when calculated from food or energy per capita. (Motokawa, 1992)[17]. In other words, the individual human "footprint" of resource consumption can be considered to be as large as elephants and dinosaurs although our physical size is relatively small in comparison to other animals. Thus, just as the dinosaurs were physically too large to adapt to dramatic changes in the environment during their evolutionary period, humans are also susceptible to changes in the environment derived from either natural or artificial causes. In other words, human civilization has reached a grandiose point where global changes in the environment might reveal our fundamental weakness to survive. This suggests that it is critical to find our direction towards being "smaller" as a way of life, just like the mammals and insects at the time of the extinction of dinosaurs.

Schumacher[18] described that strangely, technology advances by its own laws and principles different to laws and principles of nature. Nature's laws and principles based on ecology and biology naturally achieve evolutionary stability. Human technology is generally not conducive to natural laws and principles, *i.e.* plastics, polymers, factories, machinery, etc., and are sometimes too artificial for the delicacy of nature to absorb. That is, although man is natural, the technology which humans develop is generally heterogeneous with nature, and not suitable. The natural needs of human civilization and each person are relatively small, not large and harmonious to nature. Therefore, human civilization must return to "small," as Schumacher suggests, "Man is small, and, therefore, small is beautiful[19]."

Schumacher's logic is based on the idea of "middle way" in Buddhism. The middle-way is not too large, and not too small, thus, technology should also be a suitable size which is controllable for human beings. The idea of the "middle-way" offers suitable technology for human civilization, and is an important consideration for the entire system of the "human-sphere." The tragic nuclear accident in Japan last year (2011) is an unfortunate example. Although there were no direct fatalities, the instantaneous accident relating to atomic power became a

serious disaster beyond recall. It was a situation where humans could not control the accident although it was technology originating from human industry. Gandhi once described that if people say, we require machines, of course, we will use machines; although machines helping every human being is good, we do not need machines which make humans mere keepers of the mechanical technology with concentrated power in the hands of a few people[20]. In other words, machines that enhance and heighten human skills and capabilities can be considered good, while machines that bind humans as mere mechanical slaves are unnecessary. This is an important insight into how modern civilization should utilize technology and science.

5. Conclusion

If environmental problems are inevitable for contemporary civilization, then we must change the conduct and lifestyle of civilization. At the current rate, it is almost certain that human civilization will greet a severe and disastrous collapse. New principles for civilization are needed. In order to avoid the collapse, human beings must learn to control their desires and incorporate concepts of "symbiosis" and "sustainability." However, this critical task will not be easy and will require a dramatic effort on the part of each individual human being. The following are three conclusions that can be summarized from this study.

1) World religions have an important role in empowering people to control desires as a major causal factor for environmental problems and potential collapse of human civilization. In Buddhism, there is a life-concept suggesting, "living with small (limited) desires, and satisfaction from small gain." Buddhism is also the philosophy of self-responsibility for the environment and responsibility for others through the life-condition of compassion and the practice of this principle empowers people to control their desires.

2) The relationship between advanced nations and developing countries, as well as human beings and nature can be viewed from the ecological perspective of "parasitism." Finding a way to attain "symbiosis" from "parasitism" is very important for securing "sustainability" of our global ecosystem and human civilization. Buddhist philosophy always strives for finding a path from "parasitism" to "symbiosis," and accept all living organisms from an egalitarian perspective based on the concept of "Dependent Origination" which emphasizes relationships.

3) The fundamental cause of extinction and collapse for any organ-

ism and system is becoming too large, as with the dinosaurs. Buddhist philosophy always aims for suitable portions for human beings on the principle of the "middle-way" where all things are neither large nor small.

Notes

[1] Matsui T. (2010) Human-sphere in the earth system approaching a limit, in "*Civilization Crisis, editing down about Environment* (in Japanese)," edited by Inamori K., Tokyo-Keizai-Sinbunsha, Tokyo

[2] Ishi H. (2010) Misery of Africa warning the future of earth civilization, in "*Civilization Crisis, editing down about Environment* (in Japanese)," above.

[3] Fujita K. (1997) "*Meanings of Symbiosis* (in Japanese)," Koudansha, Tokyo

[4] Lynn Sagan (Lynn Margulis) (1967). On the origin of mitosing cells. *J. Theoretical Biology* 14(3), 255–274.

[5] Yamamura N. (1995) "*Symbiosis from Parasitism* (in Japanese)," Heibonsha, Tokyo

[6] L.W. Alvarez, W. Alvarez, F. Asaro, H.V. Michel (1980) Extraterrestrial Cause for the Cretaceous-Tertiary Extinction, *Science*, Vol. 208, 1095–1108.

[7] Ishi H., Yasuda Y. and Yuasa T. (2001) "*The World History of Environment and Civilization* (in Japanese)" Yousensha, Tokyo; Yasuda Y. (2010) A new civilization principle was born in the time of crisis, in "*Civilization Crisis, editing down about Environment* (in Japanese)" above.

[8] Matsui T. (1989) "*Loneliness in the history of 4,600 million of the earth: Beyond the hypothesis of Gaia* (in Japanese)," Tokumashoten, Tokyo

[9] Hanya T. and Akiyama N. (1989) "*Human, Society, Earth* (in Japanese)," Kagakudouji, Tokyo

[10] Radhakrishnan, N. 2002. "*Gandhi, King, Ikeda—Hibouryoku to Taiwa no Keifu* (Gandhi, King, Ikeda—The History of Nonviolence and Dialogue)," translated by Kurihara, T., Daisan-Bunmei-sha: Tokyo

[11] Ishi H., Yasuda Y. and Yuasa T. (2001) above.

[12] Matsui T. (2010) above.

[13] Yamamoto S. (1998) Contribution of Buddhism to environmental thoughts, The Journal of Oriental Studies, 8, 144–173.

[14] E.F. Schumacher (1973) "*Small is beautiful, A study of economics as if people mattered,*" Muller, Blond & White Ltd.

[15] Yamamoto S. (2002) Environmental ethics in Mahayana Buddhism: The Significance of Keeping Precepts and Wisdom. *The Journal of Oriental Studies*, 12, 137–155.

[16] Yamamoto S. and Kuwahara V.S. (2006) Symbiosis with the Global Environment: Buddhist Perspective of Environmental Education, *The Journal of Oriental Studies*, 16, 133–142.

[17] Motokawa T. (1992) "*Time of elephant, time of mouse* (in Japanese)," Chuo-kouronsha, Tokyo

[18] E.F. Schumacher (1973) above.

[19] E.F. Schumacher (1973) above.

[20] E.F. Schumacher (1973) above.