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Conserving nature

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Biodiversity Network Japan

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Editorial committee: Naoya Furuta, Kunio Iwatsuki, Harufumi Nishida, and Mieko Kawamichi

Translation: Liza Drius, Tom Eskildsen, Yoshiro Kakei, and Haruko Kishi

Cover design: Tatsuo Hidaka

Layout: Takumi Kondo

Cover photo: Nature Citizen Institute

Other photos: Hikaru Sasaki, BIO-City, KYOTOKAN(Kenzou Yokoyama), Shogoin Temple, Kiyomizu Temple, and other contributors

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Foreword

I am very pleased to present this publication at the CBD COP9 in Bonn. Biodiversity is a result of the earth's long-time evolution as well as the basis of our daily life. Unfortunately, we are losing this valuable asset very rapidly, while we are still ignorant about it. It is evident that our conventional approach to conserve biodiversity solely through endangered species protection and the creation of protected areas is not sufficient. We have to explore new approaches which lead us to work on farmland, forest land, villages and even cities, as well as collaborate with scientists, government bodies, private sectors and civil society through creative integration of traditional knowledge and the latest science and technologies.

In this small publication, we tried to showcase broad experiences, views and initiatives on biodiversity in Japan. Unlike other publications on biodiversity, we didn't focus on conventional topics such as endangered species and protected area. Neither have we intended to show the best way to conserve biodiversity. Rather, as a first step to explore a new way of thinking, we tried to review our cultural and social background and own historical experiences on how our ancestors tried to create ways to live harmoniously with nature. This traditional concept may be characterized by a sense of awe towards nature and focused on respecting and enjoying nature benefits rather than just protecting them.

We also tried to highlight some of the recent efforts being made by various actors, such as central and local governments, the private sector, religious bodies, museums and NPOs with different interest. We believe that all of these efforts are related to biodiversity either directly or indirectly. By sharing these experiences, we would like to catalyze dialogue among various sectors both in Japan and in the rest of the world towards the COP10 in Nagoya in order to find a way to reshape our society and thus co-exist with nature more harmoniously.

Finally, I would like to gratefully acknowledge financial support from Keidanren Nature Conservation Fund (KNCF) to make this publication available. I am also grateful to those who contributed with articles and photos to this publication and would like to thank Countdown 2010 and Nippon Keidanren Committee for their valuable collaboration.



Harufumi Nishida

Secretary General
Biodiversity Network Japan

Sustainable Use of Biodiversity, with Reference to the Japanese Spirit of Worshipping Nature

Kunio Iwatsuki

Director, Museum of Nature and Human Activities, Hyogo
Professor emeritus, the University of Tokyo

The development of the Japanese Archipelago was followed by the concept of harmonious co-existence between nature and mankind. However, this traditional concept has now nearly been forgotten even by the Japanese themselves. To establish a sustainable use of resources, such concept should be understood more widely and its underlying idea should be remembered globally. In this article, successful zoning of Japanese Archipelago forming *hitoazato* (=residential area), *satoyama* (=buffer zone) and *okuyama* (=core area) is introduced and traditional Japanese spirit to worship nature is noted in reference to the *chinju-no-mori*. It may be suggested that the introduction of Western civilization was successful in Japan with respect to energy-material-based development, but this was imperfect and resulted in the destruction of biodiversity as the traditional spirit to worship nature was abandoned.

Introduction

Mankind is an animal species now active not only in cities and villages but everywhere on the Earth. Even in mountain forests far from the cities, as well as on oceans, human activities are distinct and no mysterious place for human civilization, where no one ever stepped in, is remained on the Earth, except for the deep sea. In this situation, the life of mankind is inseparable from the biodiversity surrounding it and the so-called lord of creation cannot live even an instant without the support of biodiversity. Harmonious co-existence between nature and mankind should, therefore, be a leading concept for sustaining the Earth. Yet, this concept seems not to be easily accepted by modern people under the strong influence of Western civilization and the strong desire of energy-materials-based wealth.

Throughout its history until the Meiji Restoration era, development of the Japanese Archipelago has been performed in harmonious co-existence between nature and mankind and the result was a structure divided in three distinct zones, i.e. *hitozato* or residential area, *satoyama* or buffer zone and *okuyama* or core area. This zoning was created by the general public, not by order of decision makers nor suggested



Satoyama landscape - Harmonious coexistence between nature and mankind

by scientists. This historical development is mainly based on sincere worship of Japanese people to nature.

At the time of the Meiji Restoration, some 130 years ago, Japanese recognized the higher level of Western civilization and strongly expected to reach and overcome it and thus constructed a perfect education system to achieve their target. After 100 years, Japan has perhaps reached the same level of civilization of Western countries, especially as to

economy on material basis. Yet, the Japanese Archipelago has been over developed thus resulting in a variety of severe environmental problems. In the education system, aiming at the development of an energy-materials-based direction, Japanese people have forgotten their traditional spirit to worship nature. It is necessary to remember this beautiful concept to perform harmonious co-existence between nature and mankind for sustaining the Archipelago for forthcoming days.

Organisms are distributed on the Earth in various ways and biodiversity should be always considered as a whole, i.e. all species living on the Earth. Thus, the sustainable development of biodiversity can only be achieved when harmonious co-existence will successfully be performed throughout our only Earth. This typically Japanese concept should be a leading idea for the sustainable development of the Earth in general.

Harmonious co-existence between nature and mankind - its theory and practice

The phrase 'harmonious co-existence between nature and mankind' was proposed as a symbol of the Expo '90 for Flowers and Greenery successfully held in Osaka in 1990. At first, it is said that this type of expression was thought to apply on various sectors. In our generation it is thought that nature and mankind cannot be co-exist harmoniously, as 'natural' is the opposite term of 'artificial'. The original Japanese term for 'harmonious co-existence', as applied here, has the same expression of the biological term 'symbiosis' and in some documents 'symbiosis' is erroneously applied to explain this particular concept. However, this is a misapplication as symbiosis is a term applied mainly to the relationship between two particular species and it can be ironically noted that mankind is actually depends on nature, when we consider the term symbiosis in its broadest application, including mutualism, commensalism and parasitism. The original Japanese term - meaning something like living together - means harmonious co-existence with much stronger impact and our traditional lifestyle in Japan followed such concept throughout history until the Meiji Restoration period. Actually, the phrase stated above was at first variously related, but is generally recognized throughout Japan in its true understanding. Since the 1990s, this particular phrase has been widely applied in various occasions in relation to environmental issue.

This symbolic phrase is easily understood in Japan if the traditional worship of nature is recognized, but it is terribly difficult to explain to those who consider nature only as a provider of resources for human life. Nowadays, most of the people live according to the concept of a materials-energy-based civilization and they usually consider materials only on the basis of their monetary value. The harmonious co-existence between nature and mankind should be accepted only when the worship of nature is recognized and the idea of evaluating every natural material as resource for human life may stand be the opposite of worshipping nature. Recognizing this different concept based solely on material-energy, it may be better to remember that the potential of the traditional Japanese concept to live in harmonious co-existence with nature aims at a sustainable development of biodiversity on our only Earth.

Sustainable development of the Japanese Archipelago

By definition, the term 'artificial' is opposite to 'natural'. In the history of Japan, the first artificial large-scale development was given to the Archipelago by our ancestors who established the New Stone Age some 25 centuries ago. It is logical to say here, therefore, that destruction of nature on our Archipelago was at first made by our ancestors. Yet, no one says that they were the first nature destructors.

In Japan pasturing was only allowed in restricted areas and the establishment of the New Stone Age mainly focused on agriculture. However, the developed area for agriculture was only about 20% of the whole Archipelago - only small plain areas and valley zones along the rivers. Even at this moment, the developed area is not so large, although no part is badly damaged by general people. The complicated topography of the Archipelago prevented the development of whole the Archipelago. In this respect, the devel-

opment of Japanese Archipelago is different from that of Europe and North America where it was performed completely from one end to the other. European and American agricultural fields are very large, in comparison with Japanese landscape always ending with small hills or mountains and usually with narrow agricultural areas. In Japan, the Archipelago is surrounded by steep mountains and/or gorges with very narrow plains in its complicated topography and has a particular climate with four distinct seasons including very cold winter and hot and humid summer, having generally higher temperature and high precipitation.

The entire Archipelago was deep green and soils were generally fertile with a wide range of plants living in the same area. Natural resources are richly occupied there and people historically enjoyed such a rich natural production, in addition to their agricultural products. On the other end, the Japanese Archipelago is frequently attacked by severe disasters, including earthquakes very often with tsunami, heavy rains, floods and typhoons. As the area was so rich in resources but attacked by disasters, the Japanese people gratefully thanked but also terribly feared nature. The particular concept or the value attributed to nature seems to have developed in Japan under the strong influence of this relationship between nature and mankind.

Even after agricultural sites were fully developed, the area was not big enough to occupy materials for all the people living there and the *hitozato* was not sufficient in space to offer the necessary resources to the people living in the Japanese Archipelago. Our ancestors, then, thought that they could use the backyards of the developed areas from where the firing woods were cut down and charcoal was produced. They cut and collected wood for energy purposes in a regular cycle - usually every 10 to 15 years they could cut the trees for fire. The broad-leaved trees were cut down, but the



Our ancestors built village shrine, expecting the 8 million deities to guard their daily lives

stocks were usually left aside from where side shoots came up and grew up to the woods within 10 to 15 years. Sometimes, tall stocks of over 1 meter high are preserved to prevent damage caused by deer, bears and other animals. Fallen leaves of pines are collected and used as another kind of valuable resource for fire. In addition to energy resources, people obtained various types of materials from backyard areas. Small animals and birds were hunted and eaten by the people as valuable proteins. The Japanese people were rarely fond of eating meat of mammals. On the contrary, wild vegetables and fungi have been the favorite food of Japanese people for many years in addition to a variety of algae, marine and freshwater. These are usually considered supplementary food, but the Japanese enjoy wild products as a gift from nature. Medicinal plants are also collected in the wild and folk medicine has been another valuable resource for human life for

many years.

With this activity of the backyard of *hitozato*, or developed area now called *satoyama*, beautiful secondary forests developed throughout the Japanese Archipelago. Warm and humid climate helped the forests grow up fast, more green developed beautifully in these areas. Forests developed in between *hitozato* and mountainous area as a continuous zone throughout the Archipelago and worked as a buffer zone between primitive nature and artificial *hitozato* area. The natural status of this zone was recognized even in the Heian Period, some 1000 years ago, as was noted in Japanese style short poet, *waka*, as seen in some *wakas* in our classic 'Man'yoshu'. In the Muromachi Period, about 500 years ago, this zone was established throughout the Archipelago and already in the Edo Dynasty the name *satoyama* appeared in literature. This name is

popular in the past half century, when *satoyama* was suffering from its critical damage by so-called energy revolution in 1960s. The definition of *satoyama* is variable and it is rather difficult to recognize its area, but slightly less than 20 % of the whole Archipelago may be referred to form such a zone.

Active lives of Japanese people have developed mostly in *hitozato* area and supplementary work was made in *satoyama*. Thus, the remaining parts of the Archipelago were left natural and the natural area, or about a half of the Archipelago, is named *okuyama*, or deep mountain area. The *okuyama* area is kept natural and less artificial influence has been given there. Wild life has, therefore, been naturally maintained in this area and it is to be noted here that no big mammal species was extinct in Japan until at the end of the Edo dynasty.



In Japanese concept, 8 million deities are believed to live in nature

Another interesting point is that in Japan battles were fought mostly in smaller scale or often only by the representative leaders and forests have never been destroyed in wider areas. No large-scale fire has ever hit the Archipelago. Forests are maintained naturally in most parts of the *okuyama* area, although truly primitive forests cannot be seen now in most part of the Archipelago.

The Japanese Archipelago is thus developed in typical zoning of *okuyama*, *satoyama* and *hitozato*. This zoning coincides very well with that of Core area, Buffer zone and Transitional or Residential area as nominated by UNESCO at first by MAB programme in 1960s and then by the World Natural Heritage in 1980s. It is noted that the development of the Japanese Archipelago during the past 25 centuries is referable to the most advanced concept of nature conservation designed by UNESCO and now pop-

ular worldwide. This development was made through the daily lives of the Japanese people, not under the direction of decision makers, nor recommended by the scientists. Moreover, this development is seen throughout Japan, except for Hokkaido.

Another comment should be added here on the uniqueness of Japanese *satoyama*. The landscape of *satoyama* is often seen in various places in other Asian countries, especially in various parts of China. Fuel woods are collected from the backyard of the village in cycle of several years and supplementary resources are also collected from there. Secondary forests are maintained in this area in a way similar to *satoyama* in Japan. However, outside of Japan this landscape is usually located in single areas and not continuous to form a zone buffering between natural forests and residential areas. In this respect, the *satoyama* of the

Japanese Archipelago forms a distinct landscape in Japan and is connected with the general Japanese concept as noted in the next section.

Worship of nature as exemplified by chinju-no-mori

The development under ideal zoning of the Japanese Archipelago - recognizable by the natural environment sustained there with rich resources in beautiful forests, especially in *okuyama* area- benefitted from warm and humid climate and complicated topography. It may be true and we may perfectly realize that the nature of Japan brought to the people a unique concept of worship. In addition to rich resources, we remember that terrible disasters frequently attacked the Archipelago and, even in these days when technology developed very much, there are big damages to the lives of people every year. Our ancestors seemed to be afraid of it but at the same time they had respect for the



The Japanese Archipelago is developed in typical zoning of *okuyama*, *satoyama* and *hitozato*

nature and expressed sincere thanks to it.

Our ancestors who created the New Stone Age started the development of their land cutting down the beautiful forests surrounding them. They seemed to have realized that they damaged the nature and thus apologized to the nature. Then, they built their village shrine, or tutelary deity, in every village, even in smaller hamlets. They expected the shrine, which consisted of 8 million deities, to guard their daily lives. Sometimes the heroes and heroines of the village were deified and enshrined, but the main targets of their prayers were the 8 million deities, which were equivalent to the elements of nature. They believed that their village shrine was unique, yet this unique shrine spread throughout Japan, except for Hokkaido.

These 8 million deities are, in Japanese culture, present in nature and it was

necessary for our ancestors to accommodate them in the shrines under natural forests. Thus, they invited the natural forest to cover the shrine and every shrine was mainly covered by forest which was named *chinju-no-mori*, or the forest to guard the shrine and/or the people. Throughout the Japanese Archipelago, shrines were invited to every village and covered by the forests on behalf of *okuyama* where the deities were believed to live in natural condition. Such a concept was similar to the primitive animism in underdeveloped peoples and it was so 20 centuries ago. Throughout the history of Japan, village shrines were maintained and the evolution of shrines was observed along with the historical development of Japanese culture.

It is a pity to note the fact that Japanese Shintoism was under a strong influence of militarism after the Meiji Restoration, in parallel with the pro-

motion of the advanced Western civilization. Moreover, many *chinju-no-moris* were destroyed by the direction of the government who considered that traditional belief was an obstacle to learn the advanced Western civilization. *chinju-no-mori* was established, as in the case of *satoyama*, by the people themselves in their own lives, not following decision makers nor scientists and it was developed throughout the Japanese Archipelago with the exception of Hokkaido. The political power worked on the *chinju-no-moris* only to destroy it and actually more than half of them were cleared up after the Meiji Restoration.

Chinju-no-mori is, thus, the symbol of the Japanese concept featuring sincere worship of nature. Harmonious co-existence between nature and mankind was sustained in Japan on the basis of this general concept to sincerely worship nature.



A little more than 20 % of the whole Archipelago may be referred to as *satoyama*

As religious facilities, it is well known that the temples in China are usually located on the mountains, like Emei-shan and Wu-dei-shan. However, these temples were actually built on the mountains and forests were originally there. In the case of Japanese *chinju-no-mori*, on the contrary, the forests were invited to the developed villages, or *hitozato*, on behalf of *okuyama*, or nature.

Folk belief of general people is widely maintained in Asia and is closely connected with the worship of nature. As a result, various sacred places were sustained in natural, not to damage the place of their deities. This is more or less similar to the case of Japanese Shinto. The uniqueness of Japanese Shintoism is found in : 1) the worship is sustained throughout its historical development even in particularly industrialized country with more understanding of science and technology, and 2) *chinju-no-mori* was invited

to the developed village and grew up artificially by man power, in contrast with the case of folk belief which maintained nature in their originally sacred places. The conservation of biodiversity in sacred area is strongly suggested by UNESCO-MAB, currently holding five successful symposia on this particular topic.

Now, *chinju-no-mori* is remembered by vegetation scientists as the particular site where potential vegetation of the area concerned is maintained in an ideal way and its conservation is strongly suggested. It is true that it is part of the valuable heritage maintained by people, but I would point out that *chinju-no-mori* should be a particular site in Japan as a symbol of the worship of nature. On the basis of this concept, the development of Japanese Archipelago was made under the concept of harmonious co-existence between nature and mankind.

Japanese concept under the word mottainai

Since the Nobel peace laureate Ms Wangari Maathai spread the Japanese word *mottainai* outside Japan, this particular word has been internationally understood. But, it seems necessary to add some comments on the meaning and usage of this Japanese word. Recently, this word is usually understood as wasteful even in Japan and used with the meaning of saving the materials even if they are not useful at the moment and refraining from thoughtless abandonment of them. We should evaluate all the materials on the Earth, even though they are not useful today and should avoid their abandonment. This idea is important to sustain the Earth forever.

The modern usage of the word *mottainai* is to recommend not having wastefulness of the materials and this is important to have a stronger effect



The Japanese have historically enjoyed natural resources, in addition to their agricultural products

of this word, especially for younger generations who often abandon the materials which are useless for them at the time. It is a pity to note that nowadays we often use materials and easily throw them away because they are not necessary at the time but can be still useful. Sustainability of the Earth is strongly endangered by unnecessary consumption of valuable materials and this campaign to save materials under *mottainai* is quite an effective action expected at the moment.

Originally, however, the Japanese word *mottainai* has a particular meaning. Japanese *mottai* means substance and in traditional Japanese culture every substance was a gift from nature. All the substances around us are elements of nature and we thankfully receive them from nature. This is quite a religious gratefulness and Japanese people have always been thankful to the donor or in their concept the deities for their generous

gifts. Therefore, in the traditional style, the word *mottainai* is often accompanied with a phrase from a text of sutra, a religious book in a sect of Buddhism. When I was a small boy, I was repeatedly taught by my mother that every material around us was a gift from our deities, or nature, and we should respect even one grain of spilled rice as valuable material to sustain our own life.

Our extreme materialism often leads us to evaluate every material in its monetary value. In this way, it is rather difficult that all people understand the meaning of sustainability of our only Earth. We should be respectful to the donor of the materials to support our lives and thank nature as in traditional Japanese culture. On the basis of this idea, boys and girls can understand the worship of nature and will eagerly contribute to sustain the Earth.

For a sustainable Earth

The Japanese Archipelago sustained an excellent history of development until the end of the Meiji Restoration in the second half of 19th century. This has been followed by modernization under the influence of Western culture during the past 130 years. Now our culture is more or less international and in such a situation we should use the concept of sustainability of the Japanese Archipelago, as a part of our only Earth.

The human environment was heavily destroyed during the 20th Century, as a result of a variety of technologies based on advanced sciences. Some complain that modern technology was the devil that destroyed nature, but actually the crime was not technology itself but its management. Developers usually felt that science could do anything and offer the perfect tool even when technology was misapplied and influenced their environment negatively. This was only an



Wild vegetables and fungi were favorites of the Japanese for many years in addition to a variety of algae, marine and freshwater

illusion and now we are faced with a much more impoverished Earth's surface, expecting our human environment to recover from such abuse.

It is evident that we - every person on the Earth - cannot expect complete happiness if we only believe in material wealth. We can expect to be happier in requiring completeness in materials-energy wealth, but we will face a limit when all mankind expects this same materialistic happiness. Even under a concept of acquiring material wealth, we may increase our happiness, but no one can reach the happiest stage of life if one wishes to fulfill his or her happiness only in a materials-energy direction. It is recommendable, therefore, to understand the traditional Japanese concept of a sincere worship of nature and this spirit is better remembered to give sustainability to our only Earth.

It is rather difficult to explain to the general public why it is necessary to sustain biodiversity. They do not understand how desperately biodiversity has been affected by human activity. In the case of climate change, especially global warming, the general public recognizes our difficult situation and many people sincerely consider how we can contribute to keep climate change a natural process. We succeed in explaining this to the general public mostly by applying statistics and numerical information. In addition, it is possible, in the case of climate change, to estimate the future on the grounds of mathematical indicators. However, we have to point out that most of the general public does not realize why we have to halt global warming. And we have to warn that it is biodiversity that will be seriously damaged by rapid global warming and human beings cannot survive if biodiversity on Earth is destroyed.



Traditional Japanese concept - deep respect and sincere thanks to nature

The need for a huge amount of data and statistics, probably unparalleled to other related concepts such as climate change, adds to the complexity of discussing or understanding biodiversity. The notion of 'diversity' goes beyond the conventional scientific approach that seeks universal or common principles - this is, I believe, where the challenges and importance of biodiversity science lies.

The Need to Conserve the Vanishing Satoyama Heritage

Alphonse Kambu

Director, IICRC Special Programme, United Nations University Institute of Advanced Studies



Paddy fields, terraces, secondary forests and human settlement in satoyama, Noto Peninsular, Ishikawa

Introduction

Satoyama is a term in the Japanese language which is becoming a trendy concept in Japan in recent years. Despite it being a trendy word, many people may not know what it is or the issues associated with it in greater depth. In fact, *satoyama* is loaded and it is perhaps deeper than what people may perceive it to be as merely a trendy word or area. It is a very significant area. *Satoyama* once provided an abundance of food we eat, the water

we drink and use to brew our beverages, the timber we use to build our homes or for energy sources, cleansed the air we breathe to stay alive, and provided the aesthetic and spiritual values for inner peace. These are the benefits provided by the ecosystems found in *satoyama* for human well-being. *Satoyama* continues to provide a number of these services to people in Japan today, but to a lesser extent compared with the past as it is losing some of its functions.

Since the 1950s *satoyama* began to undergo change due to a number of factors which can be attributed to social, economic, ecological and technological changes that began to take place around that time. These factors are both internal as well as external. The external factors tend to be mostly tied to the process of globalization, such as global trade, and sometimes can be beyond the control of those that live and work in *satoyama*. The internal ones are sometimes a matter of policy,

consumer preferences and social change. With the degradation and loss of *satoyama* some of the beneficial attributes of *satoyama* enjoyed by people in the past have been lost or in the case where they continue to exist they are being underutilized. This very change is taking a toll on the value and functions of *satoyama*.

With the changes and the loss of *satoyama* and its functions, one is left to decide on whether action should be taken to conserve *satoyama* or to allow the changes to continue in a business-as-usual situation. In any case trade-offs come into play. However, accurate and credible scientific information is necessary for decision makers. If a decision is taken to pursue action for conservation, a number of issues must be established first and some may include the conceptual or definition issue, the need for a profound understanding of the issues surrounding *satoyama* and how it functions is crucial. Clarifying such issues can contribute to a comprehensive conservation effort. This paper introduces the concept of *satoyama* and its benefits and discusses some of the problems facing *satoyama* as well as some of the prospects that exist for the regeneration of the declining value of *satoyama*.

1. What is *satoyama*?

Individuals and organizations have made attempts to define *satoyama*, but no common definition has been coined to date. The definitions that exist are sometimes narrow and biased as those that define it are influenced by their own beliefs, interests, perception and expertise. The ecologists refer to it as ecosystems. For the foresters and forest experts, *satoyama* is merely a forested area with human settlements. For the farmers and those that work in the areas of agriculture see it as paddy fields and terraces or agricultural lands. As can be seen it may mean different things to many people.

Furthermore, many people may be aware of the word, but they may not quite understand what it is or what it entails. Certain people may live and work in it and yet they may not know that they are dwelling in *satoyama* because they may regard it as merely their home. Others may derive food, water, and building materials or other items necessary for their daily livelihoods without knowing that these basic material needs are derived from *satoyama*. Or even those outside of *satoyama* may benefit from it in one way or another without knowing it.

Despite the lack of clear understanding of the concept of *satoyama*, there are certain things about *satoyama* that we know already. *Satoyama* is not just one of the things that different people or groups describe above, but is all or most of the things above put together. Unlike other people, I will not attempt to define *satoyama*, but I will try to describe its features, which is a first step to coining a common definition. As soon as we know the features of *satoyama*, then we can establish a common definition. When looking at *satoyama* I consider that there are four major features, which I would like to use to describe here. These factors include interaction and reciprocity, location and parameters, functions, use and value and the time factor.

a) Interaction and reciprocity

Satoyama is an area that has been created through interaction between humans and their environment, especially the ecosystems existing in *satoyama*. Interaction with ecosystems has always been an inherent process in human history. The interaction by humans with their ecosystems whether through clearing of forests for gardens and settlements, farming, hunting or gathering have all shaped the environment in numerous ways. *Satoyama* is no exception as interaction between humans and ecosystems has been a central process responsible for the evolution and existence of *satoyama*.

In fact, the interaction has a reciprocal effect on both humans and ecosystems. On one hand, humans interacted with ecosystems in *satoyama* to obtain food, water, wood or other essential spiritual and material wealth to support their livelihoods while at the same time leading to the development of the local diet culture and the knowledge system to manage the ecosystems. Moreover, humans have learned the traits of managing *satoyama* in a systematic way through interaction with their environment and ecosystems.

On the other hand, the various ecosystems, and in particular the biodiversity in *satoyama* grew accustomed to human interaction and the artificial ecosystems shaped by humans to the extent that biodiversity became reliant on interaction for their continued existence. For instance, the engagement in agriculture and in particular the creation of paddy fields and irrigation ponds attract species including dragonflies, tadpoles and frogs that use them as their breeding grounds and habitat. Without agriculture, paddy fields and irrigation ponds, frogs, dragonflies, tadpoles and other species would not otherwise be attracted to dwell in such ecosystems. The *satoyama* existing today is a consequence of the interaction and reciprocity between humans and the environment. In other words, interaction means sustainable management of *satoyama* and therefore it is a very essential feature of *satoyama*.

b) Location and parameters

The second characteristic of *satoyama* is its location or parameters. *Satoyama* is most commonly located between the outer peripheries of urban districts and stretches to the area just before the natural or primary forests (or *okuyama*). What distinguishes *satoyama* from any other regular area is that *satoyama* encompasses between 4-5 major ecosystems including agro-ecosystems, secondary forests, artificial wetlands (such as paddy fields and irrigation



Handicrafts made from *satoyama* on display in local shop in Noto, Ishikawa



Bamboo shoots and mushrooms from *satoyama* displayed in Sogo Dept Store

ponds), grassland, and hilly or mountain ecosystems. In addition to these ecosystems, human settlements are an added component to the total make up of *satoyama* where a number of vital activities including agriculture and farming, forestry, and development of cultural heritage takes place.

c) Functions, Use and Values

Satoyama possesses a number of significant functions, use and values for both humans and the environment. The functions, use and values of *satoyama* emanate from direct and indirect use of tangible and intangible materials or items that exist within its parameters. Obviously, functions, use and values are all interconnected factors. The functions or roles of *satoyama* include habitat for plant and animal species, sceneries, habitat for humans, and pool for biodiversity and ecosystems. The plant and animal species and ecosystems have both use and non-use or intrinsic values, which are of tremendous values to humans and the environment. Ecosystems alone are a central component from which use and values are the most significant as they play an important link between the biotic and abiotic elements of ecosystems that maintain a balance in the environment. The biotic component of ecosystems such as biodiversity are sig-

nificant in the sense that they can be sources of food, timber and non-timber forest products, fuel and energy, spiritual, cultural and aesthetic benefits. Moreover, the recent MA recognizes four major categories of goods and services, which humans derive from ecosystems for human well-being. These ecosystem services include provisioning services, regulating services, cultural services and supporting services. These are all services that can be derived also from *satoyama* as Table 1 below identifies.

d) Time Factor

The fourth feature of *satoyama* is the time factor. Although, the use of the word *satoyama* dates back to the 18th century, the creation and existence of the area is likely to predate the use of the word. This assumption can be attributed to the interaction factor between humans and their environments. In history wherever humans went, they had always interacted with their environments through agriculture, forestry and other activities. For instance, agriculture especially the cultivation of rice in Japan dates back to the Yayoi Era which is an era from 500 B.C to 300 A.D.

The interaction between humans and their environment over time has gener-

ated new environments and ecosystems of which *satoyama* is one such environment. Imaginably, a tremendous amount of time has been invested in the creation of *satoyama*. Interaction over time has enabled people to learn about their environments and have accumulated knowledge systems about their environment. Based upon the knowledge people acquired, they in turn applied it back to their environments and knew how to deal with their environments in a more sustainable manner. For instance, humans have learned the traits of mitigating and adapting to changes within their environment. In addition, they have also developed habits that form part of the cultural heritage that exist today. For instance, the festivals (*matsuri*) associated with rice planting and harvesting (*shukakusai*) found in various parts of Japan, the diet culture people have developed and the knowledge systems accumulated over the years comprise a part of the bigger cultural heritage. In fact, *satoyama* can be regarded as a heritage.

2. Benefits from *Satoyama*

For many hundreds of years *satoyama* has been a place that provided many benefits to the people of Japan. For instance, the rice, timber, charcoal and water that people obtain to nour-

Provisioning Services	Regulating Services	Supporting Services	Cultural Services
<ul style="list-style-type: none"> - Rice - Sake (Rice Wine) - Wild edible plants - Charcoal - Bamboo shoots (<i>takenoko</i>) - Mushrooms (e.g. <i>Matsutake</i>, <i>Shitake</i>) - Genetic resources - Medicinal plants - Berries - Bush meat - Timber - Water, etc. 	<ul style="list-style-type: none"> - Climate control (in Japan) - Local air quality control - Flood control - Erosion control - Landslide control - Water quality control - Water filtration - Control of wild animals Population - Pest control - Habitat for migrating birds - Pollination control - Buffering against acid rain and dust, etc. 	<ul style="list-style-type: none"> - Nutrient cycling - Groundwater supporting - Carbon storage, etc. 	<ul style="list-style-type: none"> - Eco-tourism - Traditional knowledge - Symbols and heritage of Japanese culture - Spiritual monuments and objects (e.g. temples, mountains) - Folklore - Festivals (<i>Matsuri</i>), etc.

Table 1. Some Ecosystem Services from *Satoyama*

ish their livelihoods are a few examples of the benefits derived from ecosystem services of *satoyama*. *Satoyama* also played a significant role as a buffer zone for dangerous animals like bears, wild boars and sometimes monkeys. It also prevented erosion from occurring as the drains in the paddy fields slowed down the flow of water. The forests in *satoyama* also play a crucial role in cleansing or purifying the air we breathe. Furthermore, the cleansing process adds to regulating local climate in Japan. Such services that people obtain emerge from the many ecosystems found within *satoyama*.

Of special note is that the benefits of *satoyama* are not only enjoyed by those residing within the *satoyama* setting. Some of the ecosystem services originating from *satoyama* are enjoyed also by those living outside of *satoyama*. For instance, rice produced in rural areas of Japan, with the exception of the imported portion, is consumed by both rural and urban dwellers. A similar case can be said for the timber that is harvested in the secondary forests of *satoyama* and used by people to build their homes or for other purposes. The ecosystem services that originate from *satoyama* and are benefited by those beyond the *satoyama* setting are what can be considered

as the *ex-situ* benefits of *satoyama*. This significant role of *satoyama* is something which links the rural *satoyama* and urban dwellers, but it goes unnoticed at often times. Although *satoyama* continues to provide some of the services today, the extent to which it does now has declined compared to the past due to the declining values of *satoyama*. The following table illustrates some of the benefits *satoyama* can provide to humans both within and beyond the *satoyama* setting.

3. Issues of *satoyama*

Despite the vital services *satoyama* has been providing to people in Japan, it is beginning to face degradation and loss due to numerous factors that it has now become a significant crisis in Japan. This means that it is losing its carrying capacity or value and functions. The Ministry of Environment of Japan estimates that 40 per cent of the total land mass in Japan is comprised of *satoyama*, and this area is now under threat. *Satoyama* is experiencing overgrowth due to neglect, loss of its economic value, and it is losing its role as buffer zone to prevent natural disasters, such as floods and the appearance and attacks by bears among other functions. The cause of change in *satoyama* can be attributed to a multitude of factors including

abandonment, ageing population and out-migration of the younger generation, global trade, and advancement of science and technology. The change is part of the changing ecosystems of the world that have been identified by the Millennium Ecosystem Assessment (MA) in 2005.

The abandonment and overgrowth is attributed to depopulation and lack of able workforce. Depopulation is occurring in the rural *satoyama* areas as the younger generation is migrating to urban areas for alternative ways of life in urban areas. This adds to the problem of low workforce in *satoyama* because the remaining population in the *satoyama* hamlets is primarily the baby boomers who are now in their late 60s or 70s. As the baby boomers grow older they no longer possess the physical strength to cultivate the paddy fields or agricultural lands or engage in the forestry sector. As out-migration of the younger generation and depopulation continue to occur the gap between the older and younger generation in terms of knowledge transmission grows wider and wider. This may lead to the loss of traditional cultures and especially traditional knowledge of the community.

In addition, the impact of the abandon-



Saka-ami net for catching wintering birds in Kamoike Ramsar Site surrounded by paddy fields in Kaga, Ishikawa is a dying tradition

ment and overgrowth process can have an impact on biodiversity. As mentioned earlier, there are species including tadpoles, frogs and dragonflies that are used to human intervention and with abandonment and overgrowth they may cease to exist while new species may invade. There are two schools of thought existing on the issue of overgrowth where the first group believes that the nature in *satoyama* should be allowed to take its own course thus allowing secondary nature to evolve into primary nature where humans should not intervene. This is perhaps along the lines of deep ecology or biocentrism where nature has the capacity to evolve and should be left to take its own course. The second group on the other hand perceives that

satoyama is initially a managed area and should therefore have human intervention to maintain the centuries old area. These views are paradoxical and any decision to choose either one of them requires accurate scientific information. However, it should be noted that the recognition of the *satoyama* crisis in the third version of the National Biodiversity Strategy of Japan illustrates the need to intervene for conservation of the centuries old tradition.

A second consequence of abandonment can lead to the decline in productivity and self sufficiency in Japan. A report by the Ministry of Agriculture, Forestry and Fisheries (MAFF) in 2004 already illustrates this trend. For example,

self-sufficiency rate of vegetables in Japan declined from 100% in 1965 to 82% in 2003, and that of mushrooms does from 115% to 77% in the same period (Japan MAFF, 2004). This change can be partly attributed to global trade and competition.

Japan is capable of importing cheaper food and other goods from abroad through global trade, but if it chooses to pursue this path extensively it will take a toll on domestic products or goods especially those from *satoyama* and cause further demise of the entire *satoyama* system. While trade can be seen as a contributing factor to the demise of *satoyama*, Japan may choose not to import foreign products. However, under trade rules the mea-

asures taken to not import foreign products may constitute an act of discrimination. But, there are also exceptions within the GATT, especially under Article 20, which provides exceptions for certain measures to prevent significant ecological damage due to trade. This is perhaps something for Japan to embark on in the future to minimize external causes, especially trade related ecological, cultural and social change and prevent *satoyama* from collapsing. However, given the high cost of labor and production for goods in Japan it will still be a challenge for the goods produced in *satoyama*.

A related consequence is that when consumers tend to choose cheaper imported goods, the expensive domestic goods are forced to compete with the imported goods. It is natural for consumers to choose cheaper imported goods over the expensive ones which can have an impact on the value of local goods causing the value of the goods to drop followed by the closure of business. With high competition coupled with the declining value of goods from *satoyama* and closure of business, it places the entire value of *satoyama* at risk. It can discourage people to engage in the production of goods from *satoyama*. This is something which is happening currently in the *satoyama* area. One such example is the decreasing production of charcoal from bamboo and secondary forests. This is due to the advancement of science and technology especially the import, production and consumption of fossil fuels that began during the 1950s which is the era of energy revolution. It must be noted that local economies depend on goods produced in areas like *satoyama*. Therefore, once *satoyama* ceases to exist along with the goods and services it provides it can take a toll on the local economy.

Thirdly, *satoyama* has been losing its function as buffer zone for dangerous mammals and pests. *Satoyama* which once acted as a buffer zone for animals

and residential areas is losing its function due to abandonment and overgrowth causing bears to wander into the overgrown areas and residential areas, and consequently attacking people. For instance, until June 2007 in Nagano Prefecture, the Prefectural Government reported 188 cases of attacks by bears.

These few problems associated with *satoyama* illustrate the change and seriousness of the declining *satoyama*. The implications of change in *satoyama* can certainly lead to the collapse of the social, cultural, economic and ecological structures that have been created over many centuries. It is now crucial for innovative ways to be designed to help conserve the *satoyama* heritage.

4. Prospects of *satoyama*

The fact that *satoyama* is declining and so are its services is indisputable. However, *satoyama* should not be viewed as a useless area. There are certain opportunities for *satoyama* which could be explored or developed to revitalize its value. To be able to ensure that creative ways are needed as times have changed and one cannot use old methods or neither return to the hay days of *satoyama* where its resources were used extensively. Some of the resources that were used in the past have lost their value in the modern context, but they lie dormant and have a potential for development. To be able to regenerate the value, links with the current trends may be useful. Forests, cultural services including ecotourism, and aesthetic values are some resources found in *satoyama* that could be developed.

Forests and technology

One major sector for development is the forest sector. Since the 1960s Japan started planting trees for prevention of natural disasters such as floods and landslides, which increased its forest cover. Approximately 70 per cent of the land in Japan is covered

with forests. This high forest cover is also due to the fact that Japan's forest demand has stabilized recently at 90 million cubic meters. Given the large amount of forest cover there is great potential to develop these resources. While timber itself might be less competitive compared with the cheaper foreign timber market, forest products could be developed with technology to add value to it for markets. While technology could be a cause for the demise of *satoyama* as was seen in the case of the development and use of fossil fuels that killed off traditional sources of energy from *satoyama*, it can also be utilized, at least, in the modern context to regenerate *satoyama*. There are already examples of using technology to add value to wood resources from *satoyama*. One such example is the woodblock technology used for homes, buildings and construction work. Over 900 locations throughout Japan use the woodblock technology today. Woodblock method or technology is created from thinnings and woodchips from timber harvested from *satoyama*. The material is compacted and used for walls of homes, buildings and construction for cheaper prices. Some of the features of the woodblocks used for walls of homes are that they are highly resistant to earthquakes compared to concrete and steel. They also absorb humidity during the summer season, and act as insect repellants. Patents have been taken on the technology by a number of companies including the Deguchi Construction of Ishikawa Prefecture.

Forests and woody biomass

Again given the large forest cover in Japan the timber and forest resources, such as forest thinning, branches, leaves, log ends, sawdust, and damaged trees from *satoyama* can be a major source of biomass production for energy or power generation. While there is an abundance of forests the percentage of electricity generation coming from woody biomass is only 1 per cent compared to other sources of



Secondary forests and terraces in rural Japan, Wajima, Ishikawa. Satoyama, Eco-tourism and Agro Products



Eco-labeling for rice produced in satoyama, Miyagi



Tourist spot in satoyama terrace. Senmaida, Wajima, Ishikawa

power generation. It is estimated that 37,000,000 cubic meters of primary woody biomass is generated annually in Japan (Forestry Agency edition, 2004). This means that there is yet room for the extensive use of woody biomass.

Forests, carbon sinks and markets

Carbon emissions trading is one of the primary instruments developed worldwide to help reduce greenhouse gas emissions and mitigate global climate change. While carbon emissions trading is only at experimental stages in Japan, there is a potential to incorporate forestry management and carbon sequestration projects into a national emissions trading scheme. While Japan's voluntary emissions scheme has not yet developed a system to include forestry based off-set projects which could bring financing to such activities. The IPCC, Mitigation Working Group describes forest-related mitigation activities as low cost projects that

can be designed to create synergies with adaptation and sustainable development and can have "substantial co-benefits in terms of employment, income generation, biodiversity and watershed conservation, renewable energy supply and poverty alleviation" (IPCC, 2007). Under the Kyoto Protocol Joint Implementation mechanism, which outlines carbon offset projects between industrialized Kyoto eligible projects include activities that lead to: avoided deforestation, and improved management of croplands, grasslands, forests and peat lands. This could help regenerate the declining economic value of *satoyama* forests.

Ecotourism, which primarily combines recreational and educational excursion, is a growing niche market in Japan as it offers many urban-based people retreat from the stress, noise and pollution associated with living in the city. In many parts of Japan, there

are rural-based, small-scale family-owned initiatives on sustainable or organic agriculture and livestock management which serve as businesses, training centers, tourist attraction and technology demonstration sites. These draw visitors and patrons from within and abroad. This trend has presented opportunities for local residents, small-scale businesses and nonprofit organizations to participate in business activities related to tourism, environmental education, and sustainable or organic agriculture. Other related opportunities include food production - mushrooms, local rice varieties (e.g. *kamo-mai*) and local rice wines e.g. (*maizokin*) or conservation activities through ecotourism, green tourism, *furusato* (nostalgic values of past era type of landscape), and cultural (spiritual) retreats.

Conclusion

The changes in ecosystems and their



Cultural and spritual value of *satoyama*, Chiba

services in *satoyama* are real. The message from the MA is timely for Japan's *satoyama* as well. The degradation and decline of ecosystem services are in themselves messages for us to be worried about because some of the ecosystem services including food, fiber, clean air, freshwater, genetic resources, and cultural assets are some of the basic items that support our lives and livelihoods. We cannot afford to wait for another 10 - 15 years to address the degrading ecosystem services of *satoyama*. The ecosystem changes are real issues that need immediate action because if we neglect them and delay action, the ecosystem services can be lost, and it could be difficult to restore them later. Furthermore, any delayed action can be inviting the collapse of the social, cultural, economic and ecological aspects of the centuries old *satoyama* heritage.

However, *satoyama* still has resources which are dormant, and if tapped into now through innovative ways including links to technological and market opportunities it can help revitalize the value of *satoyama*. This can serve as incentive for interaction and can further lead to the sustainable management of *satoyama*.

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Ecology of Divine Punishment and Favor: An Introduction to Environmental Ethnology

Hiroyuki Torigoe

Professor at Faculty of Human Sciences, Waseda University

Until fairly recently, we have inherited wisdom gained through the experience of generations. These wisdoms are often region specific, tailored to be best suited to its natural features and histories and most acceptable to the minds of the local communities. Environmental ethnology is a new discipline that seeks to explore and accumulate indigenous wisdoms, with particular focus on their environmental aspects. The question here is: in what terms are current environmental and development issues irradiated by such wisdoms which remain alive beyond the boundaries of time?



Ema - Illustrated wooden plaques given as votive offerings to shrines and temples, observed all over Japan. Visitors to a shrine or temple often write their prayers or words of thanks on the ema and dedicate them to the shrine or temple they have visited

Ethnology as a means to address the pressing problems of time

For quite some time, humans have believed that progress is determined by how "independent" we are from the

natural environment, a notion which has gradually been challenged. We are now reshaping our interpretation of the interrelation between the natural environment and humans - who are dependent on the former.

Our ancestors accumulated personal experience during the course of their lives, out of which some truly splendid ideas were born. Some of these ideas have become the wisdoms of local communities. While these wisdoms



The Japanese have loved the beauty of managed nature in gardens at home and landscapes since ancient times



Enjoying a slow and relaxing trip going down the river with the raft

may seem strange or obsolete to the eyes of contemporary humans, ethnologists - in their attempt to discover the underlying concepts - believe that these are irreplaceable sources of knowledge. Environmental ethnology is

a discipline that focuses on the environmental aspects of such underlying concepts.

Japanese ethnology is a descendant of *Kokugaku* (lit. National Study or

Japanology) led by Norinaga Motoori and Atsutane Hirata. What characterizes *Kokugaku* is that it does not draw distinctions between factual analysis, thoughts and social movements. In economic science, for example, what is



Cherry blossoms covering Yoshinoyama. Tradition says that breaking one of the branches will break your arm

done before a discussion is to clearly specify the difference between values and prices or define the meaning of a capital. In *Kokugaku*, on the other hand, an essential term may have more than one definition. For example, when you ask what “home” means in ethnological terms you get several answers. This is because in the discipline of *Kokugaku*, the notion of “home” recalls the questioner of his/her own life experiences and any answer that precludes them is meaningless in the pursuit of what “home” really means.

During the Meiji era, the discipline of *Kokugaku* was excluded from school education by the government. Yet, the renowned scholars Kunio Yanagita and Shinobu Orikuchi favored the thoughts, and consequently gave rise to a new

discipline to be adapted to the modern society called *Shin Kokugaku* (neonativism), which was later termed “Japanese Ethnology.”

Most research carried out by Japanese universities is based on western science which was strongly influenced by the Western European political thoughts of 17th century. Objectivism and elementalism speak of such influences, as proved by the breaking down of water into H and O elements in natural science or the separation of human activities into individual social acts in sociology.

We, humans, systematize knowledge in our lives and in so doing create some sort of a pattern. Science is no exception - it has its own pattern in systematization, which is to consider what is

deemed ideal by the current society as a desirable goal. On the other hand, since *Kokugaku* was not founded on the history of western science, its basic methodology is different from those of economic science, political science or sociology.

Kunio Yanagita, the father of Japanese ethnology, stated that “the reason why we study ghosts and the world of the dead is that these things pose compelling problems. Japanese ethnology is concerned with the research of what is compelling for individual living humans. It is a discipline of posing deep questions on how we should exist at all.”

It is often considered that the *Kokugaku* school researched on *The Kojiki: Records of Ancient Matters* and *The Man'yōshū: Collection of Ten Thousand*



One of the local small girls dressed up to dedicate a cherry branch to a temple on the birthday of Buddha for Yoshinoyama *Hanae-Shiki* - Lit. a ceremony to meet the flowers at Yoshinoyama. A tradition that shows how local communities have cherished the cherry blossom trees here

Leaves because studying old Japanese things is what it was set out to do. This, however, is an incorrect understanding of the discipline. From the Genroku era onwards, when the *Kokugaku* school was founded, ordinary people started to have more spare time to ponder over the purpose of human beings existence. To them, the time of Man'yōshū seemed laid-back and free, representing the most desirable form of society. This deep interest in the question of how they should exist laid the foundation for the rise of *Kokugaku*.

Now, if ethnology is about studying compelling themes, then why should it address ghosts and the world of the dead? Kunio Yanagita put it this way: "The most compelling problem for old the elderly is what they will become when they die, but there is no disci-

pline available to provide any plausible answer for such question. That is why these matters should be studied." Thus, it is certainly not concerned with the simple question of whether ghosts actually exist or not.

With regard to the world of the dead for example, ethnology explains that in Japan, when people die they are supposed to become one of the ancestors who will protect their home or village as a divine being. This explanation makes you happy as it reduces your sorrow at the thought of dying and being forgotten afterwards.

Some people dismiss such a way of thinking as unscientific. Indeed, it is not in line with western science at all. Nonetheless, if a question is concerned with the meaning of gaining knowledge for

humans, it should not be devalued just because it is "unscientific." Japanese ethnology is essentially disinterested in the question of whether or not it is true in scientific terms. After all, if any new explanation makes people - who lead their lives at this very moment - feel at ease, this can only be an advantage.

The basic systematization approach adopted by ethnology is to examine the wisdoms gained through experiences by many generations of ancestors. The key is to seek to figure out what lies beneath these wisdoms. To this end, the focus of the research tends to be placed on the past.

Invisible rules for happy lives

As part of the research into wisdoms gained by generations of ancestors,

ethnologists visit various places to look at a variety of traditional occupations such as farming, forestry, ship building and smithing. The utilization of the history of traditional occupations is effective in dealing with environmental issues in ethnology.

Conventionally, ethnological studies are driven by the pressing need to record traditional occupations that seem to be vanishing due to the aging of skilled workers. As a matter of fact, however, there are always some young people replacing them and taking over the business. The young people do what they believe is important, not swayed by the continuing driving force of industrialization. Environmental ethnology seeks to find the reasons why these people stick to the traditional ways of farming or fishing, despite the apparent inefficiency of these activities.

It is found, for example, that a fisherman answers his young follower's question as to where he could find fish saying "Ask fish about fish" - an answer based on the deep understanding of nature, representing the idea of compromising agreements between nature and humans in the form of sustainable fishing. As a matter of fact, doing something in an inefficient way is fun. As much as it may look inefficient, taking what you need without damaging ecology is a rational relationship you can have with nature.

Compromising agreements also exist among the members of a local community. There are unspoken rules on what to take, where and which part of the cultural aspects of the community. Understanding these cultural aspects is key to getting on with other members and enjoying being in the community.

The property value of a Shinto shrine may now sometimes become a topic of a conversation, "*chinju-no-mori* (i.e. sacred groves around Shinto shrines)" essentially belong, not solely to the



Yoshinoyama *Hanae-Shiki* - Many people including those serving gods at the temple and those from local communities attend the ceremony

Shinto priest, but to everybody. As capitalism progresses, the idea of "belonging to everybody" has become so weak that the notion that the owner has the right to do anything about his/her properties seems to have prevailed.

Still, I believe more people will begin to realize the fact that while a piece of land belong to a particular person, it is at the same time part of the whole, which belongs to us all. As all rice paddies and vegetable fields in Japan used to be viewed that way, we believe that private land is part of "our land" while still acknowledging private ownership. When such idea has taken root, the capitalist society would have matured to a point where the term "capitalism"

seems somewhat irrelevant.

Japanese have always cherished a managed natural environment

Interested in people who have developed wisdoms by living with the nature, ethnological researchers have a positive view towards human beings' working on nature. Ecology, on the other hand, focuses on the lives of organisms and regards human beings' livelihood from that perspective. For example, walking through a forest is a perfectly natural thing for a human being to do, but such an activity may be regarded as a disturbing factor in an ecological survey, as it could "jeopardize" what is going on in the forest. Human activities are often excluded



Regarding mountains as sacred places is often observed in Japanese religious practice. Believing in the presence of spiritual power in mountains seems to be connected to the control of worshippers' behavior in their daily lives

for that reason in ecology. The discipline of ecology tends to be based on principles by which the managed natural environment - such as rice paddies and vegetable fields - would be kept "unchanged".

Ethnology, on the other hand, has a positive view towards changes made by human beings. For example, people in Kyoto have been enjoying the managed natural environment, instead of the wild mountains per se, for a long time. The beauty of the managed natural environment - cherry blossoms, colored leaves, pine trees planted along the beaches - is what they cherish as nature. Regarding the state of being "virgin" as more precious is a relatively new view of nature, which has been

developed through scientific knowledge and environmental education.

For example, it is now prohibited to enter part of the Shirakami Mountain Range - a world natural heritage site - on the basis of the notion that there the virgin Japanese beech forests should be protected. Local hunters, who have long worked in the forest for their livelihood, are now allowed to walk on the mountains provided they wear guardians' armbands to watch out for intruders. This certainly feels wrong - they had worked deep in the forests since ancient times and should be allowed to continue to do so. At least some thought should be given to what a virgin Japanese beech forest really means.

A mechanism to develop respect for nature

Humans have also made numerous mistakes by carrying out destructive developments since ancient times. For example, when constructing the ancient capital cities of *Heiankyo* and *Heijokyo*, they cut timbers excessively, so much so that new raised-bed rivers were created. On the other hand, there have been numerous successful cases of the managed natural environment which all share common characteristics - respect for nature, and a certain mechanism to keep respectful manners.

Throughout Japanese history until very recently, everyone was given some role to play in the society. Any person who



Worshipping water springs as sanctuaries results in more care to keep the places clean. A happy interaction between a tradition and daily life

may be regarded “useless” in the current society, including the elderly who were unable to move properly or those with disabilities, used to have a part in the society they belonged to. The Japanese used to have a concept that people would carry certain roles even after death - the dead were expected not to simply rest in peace but to ensure the peace of mind of their descendants and the prolific growth of crops for the community.

In Japan and other Asian countries, the term “gods” is not the God with the capital “G” but it is represented by ancestors who protect us after death. Those who did what they should not have are not worshipped by their descendants and thus become ghosts. If you ask the Japanese people if they believe in God, many would answer

“No.” However, they all more or less share this kind of spiritual concept - all those rituals they enjoy, such as throwing money into an offertory box of a shrine at the New Year or putting a good-luck charm in the car, represent nothing other than faith, no matter if they deny it. Therefore, when trying to communicate with the Japanese about the respect for nature, it would be effective to use this sort of spiritual concept in a sensible way.

Accepting the notion of gaining advantage from the environment

The Japanese term “*kyosei*” has become very popular in recent years. It literally means “living together.” In ecological terms, it is used to mean “symbiosis”, where both or either of two species are drawing advantages

from living together. However, when the term is used in administrative policies or by social scientists or natural conservationists, it seems to mean “living harmoniously,” which I believe is more representative of what the Japanese in general have in mind when they say “*kyosei*.”

From an ethnological point of view, “living harmoniously” brings about certain advantages, including the joy of planting and enjoying the aesthetics of flowers and trees. For example, there are canals that lead to Lake Biwa, which were once used to transport firewood and tiles. They tended to build up sediments, which would then be dredged away - together with algae - by farmers, to recycle them as fertilizer. Once the sediments used in rice paddies became clayey, they would



A sacred place kept in the managed landscape. A means to maintain respect for nature

then be dug up regularly to be used as tile materials. The tiles produced were then transported via the canals.

In those old days, people did not dredge sediments and algae to clean the water of the lake - they took advantage of them by reusing them as fertilizer. I believe the idea of "taking advantage" this way should be credited more in current environmental conservation efforts.

What is behind animism and faith?

In Yoshinoyama, which is renowned for its splendid cherry blossoms, there is an old saying that if you break a branch of a cherry blossom tree, you will break your arm or finger, get ill or incur some sort of divine punishment. I regard this as a way of utilizing faith to

prevent people from damaging trees.

To cite another example, Fukui City has many public washing-up places. When I visited them, I found these places suggest to worship the god of water. In one of these places, I saw several local ladies doing their washing-up and chatting. One of them left the place in a hurry, as someone called her because the phone was ringing. Another lady tidied up what she left, saying something like, "Oh my, the god of water is watching us" in a pleasant way. I suppose she may have not cared if the god of water had not been there. Because she did it for the god, I gather she did not feel her neighbor was a nuisance.

If you call such a behavior as representative of "animism" or "faith" from a

western point of view, it would be quite irrelevant - these people would find it difficult to accept such terms for what they are doing. It may be a little similar to animism, but not quite animism per se. Likewise, it may be some sort of faith, but not quite faith per se. So, how can we call this mentality? This is not a simple question, but a very important one too, as it concerns something we have lost in return for a rapid economic growth, which now needs to be recovered.

Ethnological concept in planning and design

With regard to planning and design, I think there are two points to note from an ethnological perspective. The first one is concerned with veneration for nature. Unlike our ancestors, the Japanese today are trying to escape their responsibilities for natural disasters by simply utilizing latest technologies to delay potential occurrences. For example, when a river is deemed risky, we could just take away the houses around it instead of constructing new embankments to stand for just 100 to 200 years. The ancestors of local communities in the region must have known they should not live there. Some locations may do better with concrete, but some may not. We really should incorporate our respect and veneration for nature in planning.

Planning must also be taken into consideration for another aspect. Priority should not be given to the physical creation of a beautiful natural environment. The lives and lifestyles of the people who live in the area are key to the creation of a beautiful natural environment, and not vice versa. Today's development activities seem to ignore the fact that a beautiful natural environment should be a natural consequence of the way people lead their lives. I believe this is why ethnological perspectives are needed in the concept of development today.

Dreaming 400 Years into the Future

Kiyomizu Temple in Kyoto

“Buys a Mountain” for Future Re-Building

Kounin Mori

Legal Affairs Manager, Kiyomizu Temple

Interviewer: Masaki Mashita, Nippon Keidaren Committee on Nature Conservation

Buildings, traditions and scenery all coming together

“The Temple buys a Mountain.” Thus read the headlines in the newspapers a number of years ago. Kiyomizu Temple, a well-known Buddhist temple in Kyoto, had purchased surrounding mountain land and begun planting trees - an unprecedented activity for a temple. Kiyomizu temple, with a history of more than 1200 years, is one of the most popular of the many shrines and temples in Kyoto. It is so renowned that it appears in many literary works and is on the itinerary of all school excursions.

The secret to the temple’s unchanging popularity is without a doubt its beautiful surroundings. The main temple and the stage where the “*Bugaku*” dance is performed for the deities hang over a steep mountain cliff atop 12 meter-high stilts. The view from there is breath-taking. Some visitors are so enthralled by the view that they forget to pay their respects to the *Kannon* (Bodhisattva of Mercy) in the main temple. Japanese often use the adage “to jump off the stage at Kiyomizu,” meaning “to take the plunge” or make a bold decision. The subtle changes of the four seasons so unique to Japan add splendor to the scenic beauty. However, the scenery of Kiyomizu temple is unique to Kiyomizu; the same scenery viewed from a different place would not move the soul in the same way. In other words, the buildings, traditions, scenery and other aspects of the Kiyomizu temple come together to move the heart in a special way. The



Kiyomizu Temple - One of the most famous temples in Japan

Kiyomizu temple purchased surrounding mountain lands out of a sense of mission to protect this moving experience for future generations.

Growing the necessary wood

Let us consider how the Kiyomizu temple came to purchase the mountain lands.

The head abbot’s first and foremost mission is to “protect the temple.” If the temple is to be safeguarded in perpetuity, it needs to be repaired on a regular basis. But many challenges arise when repairing an old temple.

The first challenge is that proper repair of shrines and temples requires use of timber from “*hinoki*” (Japanese cypress) and “*keyaki*” (zelkova) trees that are at least three to four hundred years old. The trees need to be closely cared for to be suitable for temple repair. Such wood is quite scarce. For instance, the “*hiwadabuki*” method for roof thatching requires “*hiwada*” (Japanese cypress bark) from “*hinoki*” trees that are at least 80-100 years old. The wood is painstakingly prepared by first peeling off all the rough outer bark, then letting the tree recover and finally harvesting the re-grown bark ten years later. If all the suitable



The stage of the temple surrounded by the colored leaves of autumn

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wood is used up at once, repairs will not be possible for another four hundred years. Not long ago, when the Itsukushima shrine in Hiroshima suffered damage from strong winds on two separate occasions, a huge amount of "*hinoki*" bark was required for repairs. The necessary wood may become unavailable if such crises recur.

The second challenge is the shortage of people with expertise to repair or rebuild temples. The craftspeople know as "*motokawashi*" who specialize in collecting "*hinoki*" bark are dwindling in number, to the extent that



some temples are trying to train people in this skill. Master artisans who specialize in building and repairing temples and shrines, known as “*miya-daiku*,” are also extremely few in number, and their traditional skills are being lost due to a lack of successors.

The third challenge is that temples wish to use wood grown on their own lands. During the Meiji period (latter 19th century), the so-called “*haibutsu kishaku* (expel Buddhism)” movement to segregate Shinto shrines from Buddhist temples was carried out with the biased view that the Japanese ancestral religion of Shinto must be purged of the foreign influence of Buddhism. Prior to that, Buddhist temples had fiefs known as “*jiryō*” which supplied wood for repairs, but the temple fiefs were nationalized as state forests as a result of the crackdown on Buddhism. After that, temples were forced to purchase the wood they needed for repairs.

The novel plan of “buying a mountain” was conceived as a way to solve such problems. The plan was to buy mountain land, plant the necessary trees on it, then grown the wood needed for the temple’s future. A decision was made to purchase mountain land that had been abandoned due to the decline of forestry in recent years. Some people who read about the plan in the newspaper donated zelkova saplings which they had raised. These were planted on the newly acquired lands - an activity without precedent. TV stations went on to report that “Kiyomizu temple is planting zelkova trees with a dream for 400 years in the future.”

The head abbot of Kiyomizu temple says: “Planting trees is a way to fulfill our dream. We don’t expect all of the trees to survive 400 years. It is enough if even one of them survives. It is enough if we can even replace one of the stilts of the temple platform with timber from our mountain. That will



Protecting surrounding forests protects the temple - Kiyomizu temple carefully manages forests at a cost of nearly 5 million yen a year

mean one less tree to cut elsewhere, and less damage to nature. Buying the wood might be simpler, but we would prefer to harvest at least some of the timber from our beloved mountain. No one knows if even the mountain will exist 400 years from now. But why not invest in this dream?” One can feel the abbot’s sense of mission and hope that motivated him to purchase the mountain land and plant trees for Kiyomizu temple.

At present, the Kiyomizu temple owns two areas of mountain land (forests), which are being carefully managed, each at a cost of nearly 5 million yen a year, partly subsidized by Kyoto city. This is one thing the caretakers of Kiyomizu temple can do to protect it for the next one or two hundred years. Planting and tending the trees is hard work that must be continued for many years, so it has been entrusted to the local people, providing a boost for the local economy and community. Though nature cannot be restored overnight, the important thing is

to work one step at a time while looking a couple of centuries ahead. That is a lesson we can learn from the Kiyomizu temple.

Caring for the trees

Through such activities, the temple staff deepened their understanding on conserving biodiversity and the cycles of interdependence between plants and animals, and began to feel the need to plant a greater variety of plants. They also began a process of trial and error to grow the kind of trees needed for temple building. For instance, they carefully selected which branches should be pruned and tried planting other trees around the zelkovas so that they would grow upwards rather than outwards. People hearing of their concerns started to give advice on how to best care for the trees. This advice was communicated to the people tending the trees, and methods suitable to the area were actively adopted. Not only Kiyomizu temple, but the entire community took it upon itself to care for the mountain.



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The basic role of a temple is to calm the minds of those who visit

Recently the town of Kyoto has also started to pay attention to scenic beauty. Even the local government, which used to take the attitude “let the scenery take care of itself,” started to take action as it saw the hills lose their vitality. As Kyoto is surrounded by mountains on three sides, there is a movement to revive the “*satoyama*” or mountain biotopes of the old days. With a wish to bring back the seasonal beauty of Kyoto with its spring cherry blossoms and autumn wheat fields, the local community and temples are teaming up with the Forestry Agency, City Hall, and Kyoto Prefecture and nowadays even the Construction Ministry.

“Now all stakeholders must work together to foster nature. We have to rebuild what we have destroyed. At one time, even the famous Arashiyama district, so renowned as a place to enjoy Kyoto’s seasonal beauty, lost all of its pine trees. Even the cherry trees were on the verge of extinction. That is when the conservation society made a massive

effort to transplant heavy trees on the hillsides, somehow restoring the landscape to the present state.”

For the future of our children

The head abbot says that such activities of caring for the environment are needed more than ever nowadays due to the weakening bonds of human relationship. The mountains, invigorated by these activities, breathe fresh life into people’s hearts. Modern-day people, driven by profit, have lost their sense of gratitude and reverence towards nature. They do not think to plant a tree after cutting one, to keep waste off the sidewalk or separate their garbage. What is common to such behavior is a lack of the sense of the sanctity of nature, or in Buddhist terms, “that even rivers, grasses and trees will become Buddhas (fully awakened).” Practically speaking, one reason is that people had few opportunities to commune with nature as children. The head abbot of Kiyomizu temple insists on the importance of envi-

ronmental education and learning through contact with nature.

The head abbot comments that children used to have all their fun playing in nature. As soon as they returned from school, they would go out to play in nature, hunting for insects, building tree houses, or picking wild berries. So they appreciated nature, knew the names of plants and animals, and learned the sense of being alive. But children nowadays live in the virtual world of TV games, where they come to think that violence is O.K. since “reset” is only a click away. They lose touch with the sense of being nurtured by nature and sharing life with other living creatures.

It is actually the children’s parents, the adults, who are fomenting such attitudes. They also grew up without experiencing nature, so they do not know how to teach children about nature and prefer to keep their children away from nature. As long as the parents deprive their children of nature, scolding them for “going near the dangerous pond” or “picking up those dirty insects,” the children will have no way to get in touch with nature.

The greenery of the temple grounds helps in a modest way to improve this situation. Teachers, parents and children need to learn together from nature in the space the temple provides. “I want everyone to feel how nice it is to be in nature. A temple is a place of worship, but that is not its only function. Its more basic role is to calm the minds of those who visit. To be able to forget the woes of daily life, even for just a moment, and take in a breath of fresh air while enjoying the view—such peace of mind is the temple’s gift to people. This same serenity is needed when nurturing a forest. I hope people will learn to calm the mind while tending the trees. If so, the wish to protect nature will naturally take root. People who think this way will instinctively work to protect the environment.”

山川草木悉皆成仏

- The Mountains, Rivers, Grasses and Trees Will All Become Buddhas -

The Japanese View of Nature and Religion

Kasei Nagasawa

Secretary General, Kyoto Buddhist Organization

Interviewer: Masaki Mashita, Nippon Keidaren Committee on Nature Conservation



A shinto shrine inside a premise of a temple - representing the unique coexistence between Buddhism and Shintoism in Japan

Religion takes root in a place

The Japanese view of nature cannot be discussed without considering the Japanese religious outlook. The Japanese have developed a unique perspective on religion over the long years of their history. The influence of Buddhism has been particularly strong, and has been a major factor in the development of the Japanese view of

nature. Buddhism was brought to Japan via China and Korea, but was transformed into something uniquely Japanese after its arrival. Its transformation came about through interaction with ancient Shintoism, the indigenous religion of Japan devoted to the "eight hundred myriad gods." A typical example of this influence is the concept of (Japanese) Buddhism that "the moun-

tains, rivers, grasses and trees all have Buddha Nature"; in other words, that Buddha Nature (the enlightened consciousness of the Buddha) is immanent in all of nature. This view is deeply influenced by ancient Shintoism. Shintoism has also been influenced by Buddhism in many ways, such as in the "garan"*-style layout of the religious compound (*Translator's note:from



Japan's mountain religion is based on the spirituality of ancient mountain worship and teaches that one can achieve enlightenment, overcoming suffering and purifying body and mind, by practicing austerities in the rugged mountains

"Samgharama" or monastery in Sanskrit).

As this indicates, religion does not develop in isolation. It takes root in the culture of the area, accommodating the local climate and customs. The view of nature is an important factor for religion to take root in the local traditions. In Japan, it came to be

believed that the Buddha nature is immanent in the mountains and forests, trees and flowers, moon, stars and sun, which help to purify and develop the mind.

There is a Zen saying that "water flows to its origin, the sea; the moon sets but never leaves the sky." Zen teaches that there are many rivers following

different courses, but they all end up at their origin, the ocean. The moon may set, but it is still most certainly there, though it is not visible to the eye. This teaching is transposed to our deceased loved ones, who are thought to be not dead but certainly present, only not visible to the eye. In this way, nature in its many aspects has breathed new life into the teachings of Buddhism in a way unique to this land.

Interaction of Buddhism and Shintoism

Buddhism and Shintoism have been in contact for more than a thousand years. It is no exaggeration to say their interaction gave birth to the Japanese identity. The unique Japanese view of nature that developed over a millennium considers the human mind itself to be one with nature. Thus, humans are not the caretakers of nature, rather they are at one with nature and inseparable from it.

This view of nature is most apparent in Japan's mountain religion, as represented by the Honzan Shugen School. The Honzan Shugen School, headquartered at Shogoin temple in Kyoto, is a uniquely Japanese religion syncretizing Buddhism and Shintoism. It is based on the spirituality of ancient mountain worship and teaches that one can achieve enlightenment, overcoming suffering and purifying body and mind by practicing austerities in the rugged mountains. Prior to the "*haibutsu kishaku*" crackdown, this sect had twenty thousand temples throughout Japan, but now this has dwindled to only some two hundred temples. The number of practitioners roaming the mountains while praying to the Gods and Buddhas was also drastically reduced. (Note: "*Haibutsu kishaku* (expel Buddha)" refers to a crackdown on Buddhism during the Meiji Period (late 19th century) in which many Buddhist temples, statues and scriptures were destroyed and the monks and nuns were deprived of their privi-



The Japanese view of nature is partly based on the spirituality of ancient mountain worship

leges, since Shintoism alone was seen to be the ancestral religion of Japan.) As this shows, the “*haibutsu kishaku*” crackdown shook the very foundations of Japanese spirituality. However, people did not go so far as to throw away the Buddhist altars in their homes as urged by the Meiji government. Therefore, the government could not completely wipe out Buddhism from the hearts of the Japanese people. No institutional change could wipe away spirituality from people’s minds; the uniquely Japanese outlook on religion had somehow survived.

At present, the relations between the two religions, which had become alienated under such historical circumstances since the Meiji era, have started to mend, leading to new cooperation between Buddhism and Shintoism. For instance, the Kitano Tenmangu

shrine that enshrines the nobleman Michizane Sugawara as a god of learning has started to donate Michizane’s “*hamaya*” (ritual arrows said to dispel evil influences) to the Kinkakuji (Golden Pavilion) temple. The monks of Toji temple, world famous for its five-storied pagoda, have been making regular visits to pray at Fushimi *Inari* shrine, headquarters to the countless *Inari* shrines throughout Japan. The *Hachimangu* shrine conducts the *Hojo-e* ceremony*, and the Yasaka shrine, famous for its Gion festival, is also visited regularly by the monks of Mt. Hiei, the sacred mountain that is like a mother to the many schools of Buddhism in Japan. (**Translator’s note: originally a Buddhist ceremony in which captured fish are freed in a pond as a sign of compassion and gratitude for giving their lives to humans.*) The deep communion between

Shintoism and Buddhism is thus being revived nowadays. Here we can see the strong spiritual support of not only the general populace but also the clergy devoted to the Gods and the Buddha’s teachings.

Shintoism, based on the ancient Japanese values of reverence for nature and the wish for prosperity of future generations, is also very much alive today. Often one will find a Buddhist temple right next to the Shinto shrine, or a shrine side by side with a temple. These are signs of the continuing syncretism of Shintoism and Buddhism in the present age.

Environmental issues need to be addressed with a Buddhist sense of time

The view that “the mountains, rivers, grasses and trees will all become



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Solving various problems requires action grounded in a Buddhist sense of time, a long term vision of the future at least one or two hundred years from now

Buddhas” considers that humanity was given life by all of nature. This is the basis for the Japanese outlook on nature. When environmental issues are viewed from this perspective, it is no longer possible to speak of “symbiosis between humanity and nature” as separate entities. The two are one. The concept of “being gentle to the earth” is human-centered and is full of human intent. Rather, the relevant view is that “the earth is gentle to us.” “Being gentle to the earth” implies a rather arrogant outlook, much different from the distinctly Japanese view that “nature breathes life into us.” This outlook cannot be understood without reference to religion and culture. For instance, wooden buildings are part of Japanese culture. Buildings constructed with wood from thousand year old trees are said to last for a thousand years, but nowadays acid rain

and environmental degradation are preventing large trees from living this long. Japan is being deluged by problems such as acid rain, global warming, infiltration of exotic species and loss of biodiversity, which are impacting not only human health but also our cultural assets. Solving these problems requires action grounded in a Buddhist sense of time, a long term vision of the future at least one or two hundred years from now.

From now on, it will be necessary to take an approach that supports the life of humanity and nature as one, protecting the way of life and social cohesion of residents and making the most of the unique features of the locale such as the people, landscape and seasons. One of the uniquely Japanese expressions of this approach is the “*chinju no mori*” or sacred grove of the

Shinto shrine. These groves most clearly reflect the Japanese sense of awe towards nature and the presence of the sacred in nature, which safeguard nature and greenery. Depopulated villages whose shrines and temples are seldom visited tend to lose vitality as communities, leading to loss of natural bounty as well. In other words, treasuring the community spirit by protecting the sacred groves and everyone celebrating the local festivals ultimately fosters a vibrant society in which all living things can prosper.

Having a sense of awe towards nature

Japan, surrounded on all sides by ocean, has fostered a distinctly Japanese culture of great subtlety and refinement through many centuries, incorporating diverse cultural influences from the continent. This culture is based on the “forest religion” of Buddhism, which is sensitive to the sanctity of nature and its changing seasons. Buddhism is also characterized by self-knowledge and edification. Self-edification leads to a common view of reality, fostering a uniquely Buddhist view of nature, which I am convinced can transcend national boundaries to instill deep understanding.

I think nature has its own grand biorhythm. The sense of awe towards nature that the Japanese, Inuits and other peoples share has helped us to live in harmony with this biorhythm. Humans cannot live without eating other plants and animals. For this very reason, we have a natural sense of awe and gratitude toward nature. This sense is universal. Is it not the common ground we share with all other nations?

I am certain a solution to the biodiversity crisis can be found if we let go of our human bias and tap into the wisdom of “all living beings” which thinks five hundred or a thousand years into the future.

Reintroduction of Oriental White Storks in the Wild as the Central Focus of Policy Making Toyooka City, Hyogo Prefecture

Hidemichi Ootagaki

Director of the Oriental White Stork and Human Coexistence Department, Toyooka City



An Oriental White Stork chick at the feet of its parents (Photo credit: Hyogo Prefectural Homeland for the Oriental White Stork)

Toyooka City Data

- Confirmed to have been the habitat for the last wild Oriental White Stork in Japan.
- Location: North-east part of Hyogo Prefecture, adjacent to Kyoto Prefecture.
- Population: 90 thousands approx.
- Municipal area: 700km², 80% of which are forests

- Industries: Agriculture, fishery, forestry and tourism (over 5 million tourists per year); indigenous industries include bag making, Toyooka *Kiryu* woodwork, *Izushi* porcelain, *Kinosaki* strawwork and *Tajima* silk crape.

- Oriental White Stork initiative: The city started releasing Oriental White Storks in the wild in 2005.

What is the Oriental White Stork?

- Order : Ciconiiformes ;
Family: Ciconiidae
- A huge limicoline bird, 1m long, weighs 4 to 5 kg and has a wingspan of 2m approx.
- Predatory - Eats fish like crucians and loaches, as well as frogs, grasshoppers and other small animals.



A fledging young Oriental White Stork

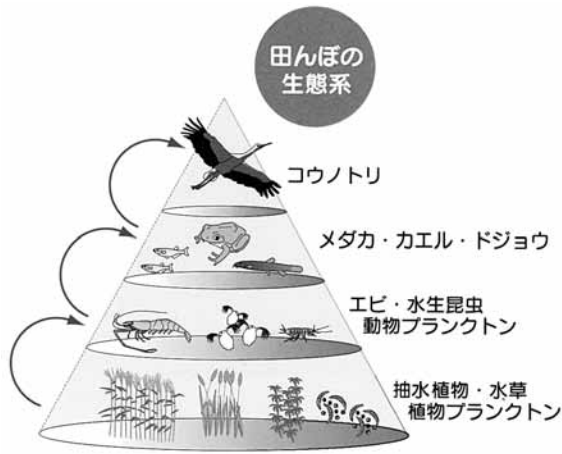


Trial release in 2005



Crowds of spectators gathered to witness the 2005 trial release

- Eats approx. 500g per day under captive breeding (equivalent to 80 loaches), and thus is unable to live without rich biodiversity.
- Basically migratory. Mainly breeds in wetlands in the catchments of the Amur River in eastern Siberia and travels to the south-east region of China (around the Yangtze River and Lake Poyang), Taiwan, Korea and Japan to stay over the winter. Basically migrates between the breeding place and a wintering place, but may become a resident bird when adapted to the environment of a particular place along the way.
- Estimated population: 2,500 to 4,000.
- Classified as CR (Critically endangered) on the "IUCN Red List" IUCN Red List of Threatened Species.
- Classified as Category IA (Critically Endangered) under the Law for the Conservation of Endangered Species of Wild Fauna and Flora.
- Designated as a specially protected species by the Japanese government under the Cultural Properties Protection Law.
- The White Stork is a closely-related species, which mainly breeds in the mid-south to north region of Europe and migrates to the North Africa to stay over the winter.



Paddy field ecosystem pyramid



A city government's sign asking drivers not to disturb Oriental White Storks



Farmers and an Oriental White Stork



Extermination of non-native species



A study group examining ways to accommodate Oriental White Storks

Extinction and revival of Oriental White Storks

Oriental White Storks used to hover the land of Japan. In the Edo Period, Heinrich Schliemann, who was renowned for the excavation of the legendary city of Troy, witnessed some of these birds nestling in a temple and a Shinto shrine in June 1865. In Toyooka City, which is confirmed to have been the last of their habitats in

Japan, the population steadily decreased until the last wild individual was found dead in 1971.

How did they come to extinction? First, there was the lifting of ban on guns under the Meiji government, which resulted in overexploitation. Second, the cutting down of pine trees during the Second World War for the purpose of providing wood and oil for the bat-

tlefront radically reduced their nestling places. Third, the post-war environmental destruction caused serious damage to their habitats, i.e. wetlands. Use of pesticides and chemical fertilizers also reduced their food, such as crucians and loaches, and caused the accumulation of toxic substances inside their bodies.

Alarmed by the rapid decrease, a pro-



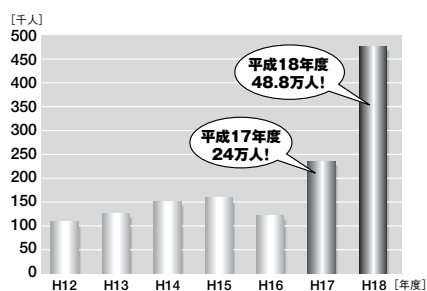
Oriental White Stork sake brand



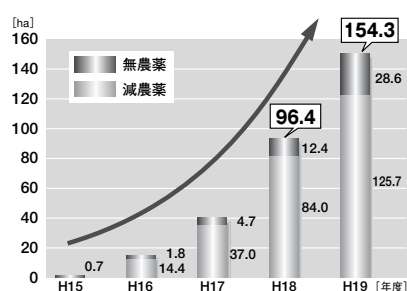
A fishway connecting a paddy and a water channel



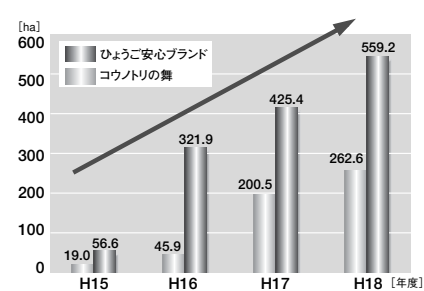
Studying living organisms in a paddy



Changes in the number of visitors to Eco Museum Center for the Oriental White Stork (2000 to 2006)



Changes in the number of visitors to Eco Museum Center for the Oriental White Stork (2000 to 2006)



Changes in the area under cultivation for the Safe Rice brand

tection campaign was launched in 1955, which eventually came to using artificial feeding as a last resort in Toyooka in 1965. It turned out to be an absolute ordeal, as not a single chick was hatched for 24 years. In 1985, Khabarovsk of Russia, with which the Hyogo Prefecture was trying to have a sister city relationship, provided juveniles as a gift. This led to the hatching of the first ever chick in 1989, and

today, there are over 100 birds under captive feeding.

Ultimate goal of reintroduction efforts

Returning Oriental White Storks to the wild is a grand project, unprecedented in the world. Toyooka City has invested enormous time, energy and resources in this project for the following reasons:

We are committed to fulfilling a promise we made with the bird. When we decided to do artificial breeding as a last resort, caught a pair and lock them in a cage, we promised them to return their offspring to the wild. We must keep our word. Returning the captive birds to the wild has been one of the important missions of Toyooka for generations.



Tour guide training course

We are committed to contributing to the international efforts on the conservation of endangered species. The rapid economic growth, which caused the extinction of the birds in Japan, is also happening in the breeding places like Russia, as well as in China, Korea and Taiwan. Now that many species are being threatened by environmental destructions, conserving an endangered species, like Oriental White Storks, is regarded as a duty of a member of the international community. Hyogo Prefectural Homeland for the Oriental White Stork has promoted international information exchange, in which Toyooka is participating to further promote international collaboration.

We are committed to recreating a rich environment. In order to allow Oriental White Storks to live, it is essential to turn the current *satoyama*, paddy fields, rivers and water channels into the rich natural environment sustained by diverse living organisms. Regeneration of such natural environment requires changing our lifestyles. We must remind ourselves of the fact that it was our way of living and values that forced the birds to extinct. We will also have to recreate a cultural environment to coexist in harmony with the birds. If we manage to create the natural and cultural environments that are rich enough to make the birds comfortable, it will definitely be beneficial for us humans too.



Local communication center "Konotori Hongo (Oriental White Stork Shop)" run by Toyooka City

Synergetic effects between environmental efforts and economy

In order to make the initiative sustainable, we believe economic benefits should be sought at the same time. Toyooka City developed the "Environmental Economic Strategy" in March 2005, aiming to promote synergetic effects between environmental efforts and economy. The Strategy has three objectives: to make all environmental initiatives sustainable; to make the citizens proud of being part of the city; and to become economically independent through the effective utilization of environmental assets. To fulfill these objectives, five key policy concepts have been developed: promotion of consumption of locally produced products in the city; promotion of the Toyooka-style sustainable agriculture; promotion of Oriental White Stork tourism; promotion of the invitation of private enterprises with the environmental economic focus; and promotion of the use of natural energy. We have had some successful cases already, they are described below.

Rice production by the stork-oriented farming

We developed the "Oriental White Stork Oriented Farming" to combine the efforts to promote good rice production and create the good natural and cultural environments for the birds. The method consists of various techniques to nurture their live food organisms, such as the early flooding of paddy fields, maintenance of an ample water depth, delayed mid-term water drainage, water flooding and installation of fishways in paddies. Thanks to the vigorous media coverage which reported on the birds feeding on the paddies and promoted the safe image of the rice grown there, inquiries from consumers and retailers are rapidly increasing. The prices of the rice produced this way are much higher than those of the conventionally grown rice, which has been the good incentive for the farmers. Furthermore, rice for brewing *sake* is grown in this method under contracts with major *sake* brewers, and a variety of Oriental White Stork brand *sakes* are available in the market now.



A wild Oriental White Stork that used to fly to Toyooka called "Hachigoro" feeding himself



Reconstructed wetland provisionally called "Hachigoro's Toshima"

Promotion of oriental White Stork tourism

The Hyogo Prefecture set up the Homeland for the Oriental White Stork in November 1999 as a breeding and research center, while Toyooka City opened the Eco Museum Center for the Oriental White Stork in the Homeland in June 2000 as a center for city residents to participate in the initiative. Since the first reintroduction of the birds to the wild in September 2005, the number of visitors to these facilities has rapidly increased from 150 thousand to more than 450 thousand per year. Those visitors often purchase souvenirs, dine or reserve accommodations in the city. Some major travel agencies have released tourism products featuring the birds, which are becoming very popular.

Presence of a solar battery manufacturer giant

One of the biggest thin film solar battery manufacturers of the world has moved to the city to strengthen its competency and meet the rapidly increasing demand mainly from European countries. The company first

moved its production base to the city in 1999, and now has transferred its headquarters functions of research and development as well. They are planning to expand their business further from here, which not only will boost the local economy but also help reduce fossil fuel consumption, ultimately helping prevent global warming. Upon moving, they stated clearly that they chose Toyooka because of its Oriental White Stork initiative. They found the city a suitable location for pursuing their dream of a sustainable future.

Biodiversity initiatives for sustainable city planning

One of the issues in returning Oriental White Storks to the wild is the regeneration of feeding places. There are not enough live food organisms naturally available for the 20 birds currently living in the wild, particularly during winter. Toyooka used to be a major habitat for the birds because it had diverse wetlands scattered around the city. Now that all these rich habitats were lost, what we need to do is to reconstruct individual wetlands, however small they are, and link them to create a wetland network. To create,

regenerate and conserve rich ecosystems, the city continues to undertake efforts for wetland revival, including registration under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, in coordination with flood control and agricultural interests.

The initiatives are expanding into the private sector too - more and more private enterprises are participating in the initiatives as part of their CSR activities. The city is also promoting the theorization of the initiative, as we believe that in order to make our efforts sustainable, all the experiences and lessons learned should be organized as a set of academic knowledge. To this end, we are establishing a multi-disciplinary and multi-level collaboration system to involve local communities, students in and outside the city, researchers and specialists in and outside Japan. Our Oriental White Stork initiative is thus a part of city planning processes, where our lifestyles, material needs and knowledge are interconnected with each other through reevaluation of history, traditions and resources centering on the natural environment of the city. Toyooka is committed to promote itself as a small City of Pride through these initiatives.

Regional Planning with a Focus on Biodiversity: Challenges of a Local Natural History Museum Museum of Nature and Human Activities, Hyogo

Isao Nakase*, Takashi Kyakuno**

* Vice president; Museum of Nature and Human Activities, Hyogo. Professor; University of Hyogo (Landscape planning, Regional planning)

** Senior researcher; Museum of Nature and Human Activities, Hyogo (Urban planning, Environmental planning)

“ササユリ”について

ササユリは、日本固有の植物で、葉が笹の葉に似ていることからこの名前がついています。
山地の草原や、人里に近い丘陵地の明るい林や、その林のまわりなどに生えていて、高さが50cmから1mくらいです。
6月初から7月末にかけて、茎の先にほんのりピンク色がかった白っぽい花を咲かせます（花は、ピンク色からほとんど白色のものまであります）。1つの茎に1から3個の花を横向きにつけます。



また、ササユリの葉には、短い柄があります。ササユリは種子から花を咲かせるまでふつう7年くらいかかります。



■白っぽい花が咲くほかのユリとの見分け方

タカサゴユリ

花は7月末から10月で遅めです。ササユリよりも花の筒状の部分が長くなります。葉は細く、葉には柄がありません（右図参照）。花被片の外側に赤紫色のぼかしが入っています。



台湾原産のユリですが、大正時代に観賞用として輸入されました。タカサゴユリとテッポウユリとの雑種で新テッポウユリというもあり、共に、各地で野生化しています。繁殖力が旺盛で、1年で種子から花を咲かせることができます。線路沿いの土手や高速道路沿いの斜面などで野生しているのはこれらユリのユリです。

ひとはく 自然・環境情報システムについて

人と自然の博物館では、「ひとはくに来ればすべてがわかる」をめざして自然・環境情報の収集・整理と公開をすすめています。集まった情報は、自然環境の保全や再生のための参考資料として活用されています。ホームページでは、収蔵資料を検索することができるほか、生き物情報を地図で見られる「地図で調べるひょうごの自然（インターネットGIS）」のページなどがあります。ぜひアクセスしてみてください。（<http://hitohaku.jp>）

■ササユリが生育しているところ

本州中部以西から四国、九州に分布しています。兵庫県では、もっとあちこちに生育しているはずですが、あまり記録はありません。みなさんと一しょに、もっとくわしい「ササユリ地図」をつくりたいと思います。



兵庫県での分布
(2004年3月までの情報による)

リサーチ結果の発表

リサーチの結果は「ひとはくフェスティバル」で公表するほか、博物館のホームページでも公開します。また、情報をくださった方（みつからなかったという情報でもかまいません）には、調査結果をまとめた冊子をお送りします。

*個人が特定される情報は公開致しませんのでご安心ください

お問合せ/FAX (079)559-2033
担当/自然・環境評価研究部 高橋 晃・布施 静香

ササユリ情報

いつ?	年	月	日
どこで?	県	市・町	
（くわしい地名）			
だれが?	氏名	（歳）	
	学校名	立	学校（年）
	住所	〒	
	電話	FAX	
	Eメール		
ホームページにお名前をのせてよろしいですか？ はい・いいえ			
どのくらい？	咲いていた（株）・咲いていなかった・みつからなかった		
かんたんな地図やほかの情報			

ササユリをみつけたら

右のハガキを参考に、いつ、どこで、だれが、どのくらいみつけたか、を詳しく書いて、ハガキ、FAX、Eメールで、博物館までお知らせください。

ハガキ

FAX (079)559-2033

Eメール databank@hitohaku.jp

随時受け付けています。

おねがい
きれいな花を咲かせるので、時々、庭に植えようとして帰る人がいます。しかし栽培は非常に難しく、ふつう再び花を咲かせることはできません。たくさん咲いていても、罌粟（「ゆりね」のことでず）を持って帰ったりしないでください。

Fig. 1: Example of research project information brochure

1. Biodiversity in regional and community planning

As the Kyoto Protocol entered into force, Japan has to reduce CO₂ emissions by six percent by 2012. In the meantime, actions on biodiversity, such as the introduction of the Invasive Alien Species Act to conserve native ecosystems, have also been accelerated. Although increasing concerns on

environmental issues are not a special phenomenon in Japan, Japanese economic and social systems have gradually changed to address environmental challenges since Rio Environmental Summit in 1992.

Over recent years the emphasis on the “environment” in urban, regional and community planning has increased.

Accumulation of knowledge and data on biodiversity is indispensable for regional and community planning today. Regional natural history museums can contribute much in this regard. The function of natural history museums is not only to hand specimen and data to future generations, but also to support environmentally-sound regional and community planning by

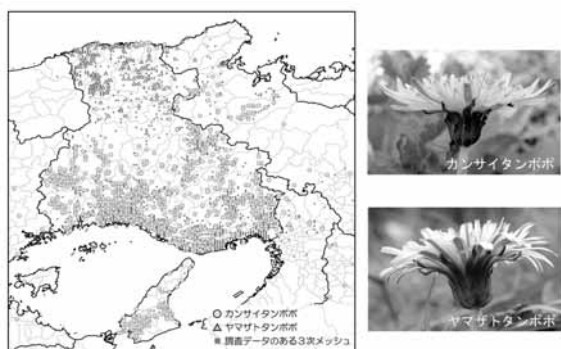


Fig.2: Example of results of a dandelion survey (native species)

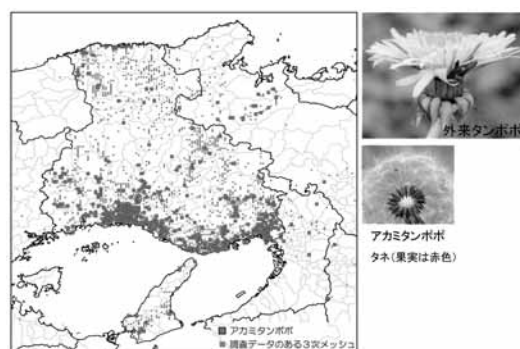


Fig.3: Example of results of a dandelion survey (exotic species)



Fig.4: Results of a wild boar appearance survey

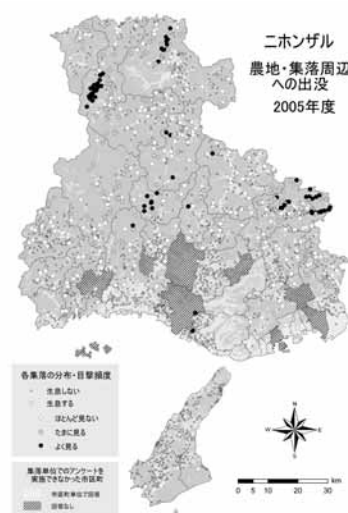


Fig.5: Results of a Japanese macaque appearance survey

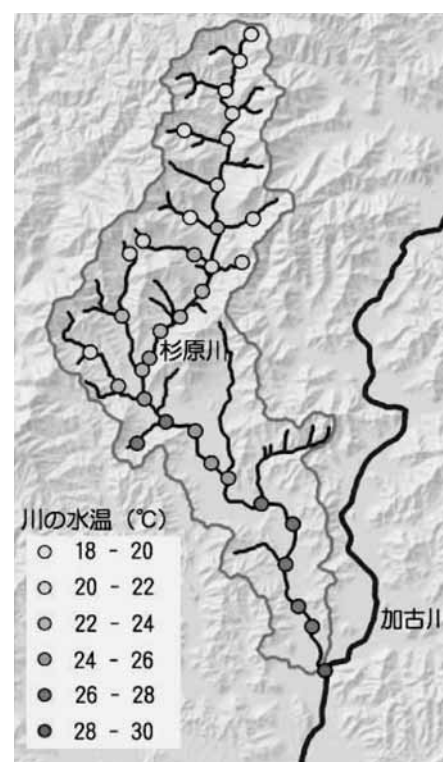


Fig.6: Results of a simultaneous water temperature distribution survey



Photo 1: Local residents joining in the dandelion survey



Photo 3: Huge encapsulated specimen

educating citizens and providing professional knowledge to the public.

In this article, we discuss how natural history museums can contribute to community and regional planning focusing on biodiversity and the role natural history museums have to play on the basis of our experience in the Museum of Nature and Human

Activities, Hyogo (hereafter HITOHAKU). As a public natural history museum, HITOHAKU has been actively engaged in communicating and cooperating with citizens and supporting regional and community planning. This makes HITOHAKU one of the leading museums in this field in Japan. At HITOHAKU, researchers in the field of planning (urban planning, architecture

and landscape planning) have been cooperating with those in the field of natural science to promote projects and programs since its establishment in 1992. Such partnership among researchers considerably contributes to community and regional planning by taking into consideration nature and the environment.



Photo 2: Aquatic plant survey



Photo 4: Borneo Jungle Experience School



Photo 5: Learning the construction of a flower from an expert

2. Collection of basic materials on biodiversity with participation of citizens

(1) Collecting materials with citizen's participation

HITOHAKU is collecting various materials related to nature and the environment. Specimens of living organisms are mainly stored in the repository while photos and figures are stored either as tangible copies or as image data. The number of items is more than one million, which makes it one of the largest stocks in natural history museums in Japan. Collecting is the basic activity of a natural history museum and the core for its research activities. Many natural history museums, including HITOHAKU, collect materials by efforts of their own staff or by donation from amateur collectors and researchers. Moreover, owing

to the growing interest in environment issues and the necessity of environmental education at citizen level, there is also a growing need to promote environmental education among citizens while collecting basic materials in collaboration with them so as to enrich the academic material of the natural history museum.

HITOHAKU has been conducting basic biological surveys with the participation of citizens since 2002. In this participatory research project, we distribute brochures explaining the survey method to the citizens who want to join the project to collect data, including witness information on various species, which are then plotted on maps to create distribution charts. Information is provided to us mainly by postcards and the Internet. The results are published through the Internet by using GIS and can be searched for and browsed. It is also possible to compare them with the distribution data of other wildlife in order to understand the natural environment of the region. The targets of past research projects included dragonfly (*Sympetrum pedemontanum elatum*), flowering date of

cherry blossoms, bamboo lily (*Lilium japonicum*), forest green treefrog (*Rhacophorus arboreus*), etc. Currently we are working on the distribution of colonies of cormorants (cf. Figure 1). In the case of *Sympetrum pedemontanum elatum*, elementary schools in the region actively participated in the project by contributing to the education of children.

HITOHAKU is conducting other several basic surveys related to biological distribution with the participation of citizens besides the examples above. Some of those examples such as the survey on dandelion and wild animals will be explained later on.

(2) Dandelion distribution survey

The research project "Dandelion Survey 2005" was a wide-scale distribution survey of dandelions which saw the participation of citizens from the Kinki area in the Western part of Japan from 2004 to 2005. The Kinki area is composed by large cities (Osaka, Kobe, etc.) with their wide urban areas, as well as wide mountains and coastal areas. Climate conditions vary considerably in the Kinki

Enumeration district No.	1	2	3	4	5	6
# of species at the time of survey	45	27	33	31	40	50
# of species found in follow-up survey	52	37	38	38	44	55
# of species lost	10	12	10	11	5	11
# of species increased	3	2	5	4	1	6
Species increased	<i>Callicarpa japonica</i> <i>Carex lanceolata</i> <i>Castanea crenata</i> <i>Dioscorea tokoro</i> <i>Lonicera gracilipes</i> var. <i>gracilipes</i> <i>Lindera glauca</i> <i>Paederia scandens</i> <i>Pourthiaea vilosa</i> var. <i>laevis</i> <i>Prunus grayana</i> <i>Wisteria japonica</i>	<i>Amelanchier asiatica</i> <i>Cocculus orbiculatus</i> <i>Dioscorea gracillima</i> <i>Lindera umbellata</i> <i>Mallotus japonicus</i> <i>Paederia scandens</i> <i>Parthenocissus tricuspidata</i> <i>Prunus verecunda</i> <i>Rhus trichocarpa</i> <i>Viburnum erosum</i> <i>Vitis saccharifera</i>	<i>Aster scaber</i> <i>Castanea crenata</i> <i>Dioscorea gracillima</i> <i>Lindera umbellata</i> <i>Pleioblastus argenteostriatus</i> f. <i>glaber</i> <i>Rhus javanica</i> var. <i>chinensis</i> <i>Rhus trichocarpa</i> <i>sinensis</i> var. <i>japonica</i> <i>Smilax china</i> <i>Vitis saccharifera</i> <i>Celtis</i>	<i>Aster scaber</i> <i>Paederia scandens</i> <i>Prunus grayana</i> <i>Prunus verecunda</i> <i>Rhododendron kaempferi</i> var. <i>kaempferi</i> <i>Rhus trichocarpa</i> <i>Smilax nipponica</i> <i>Styrax japonica</i> <i>Viola violacea</i> <i>Viburnum erosum</i> <i>Vitis saccharifera</i>	<i>Fraxinus sieboldiana</i> <i>Mallotus japonicus</i> <i>Prunus grayana</i> <i>Prunus verecunda</i> <i>Sapium sebiferum</i>	<i>Celtis sinensis</i> var. <i>japonica</i> <i>Elaeagnus umbellata</i> <i>Ilex serrata</i> <i>Lespedeza cyrtobotrya</i> <i>Mallotus japonicus</i> <i>Parthenocissus</i> <i>Pourthiaea vilosa</i> var. <i>laevis</i> <i>Prunus verecunda</i> <i>tricuspidata</i> <i>Tripterospermum</i> <i>Viola violacea</i> <i>Zanthoxylum piperitum</i>

Table 1: List of plant species newly appeared after the implementation of *satoyama* management



Photo 6: *Satoyama* management

area, ranging from modest temperature with limited rainfall and relatively low temperature with large amounts of snowfall in winter, to high precipitation. *Taraxacum japonicum* Koidz (native species), *Taraxacum officinale* Weber (exotic species) and *Taraxacum laevigatum* DC (exotic species) are the major species of dandelion in this area. It is generally recognized that *Taraxacum laevigatum* DC is more common than *Taraxacum japonicum* Koidz in urban areas, although their detailed distribution is still unknown. The distribution of *Taraxacum pectinatum* Kitamura and *Taraxacum albidum* Dahlst. is also unknown. The identification of these distributions was an important task for the Invasive Alien Species Act and the national biodiversity strategy. The special feature of this project was the collaboration with a large number of citizens; especially schools played an important role as centers for field surveys. The steps of survey were as follows:

- Asking citizens, including students, to collect dandelion from nearby parks and roads;
- Asking them to record the date and place of sampling in a data sheet and

submit the data sheet together with the collected samples;

- Identifying species using advanced methods including DNA analysis in difficult cases for identification, although basic identification methods are provided to the participants; and
- Summarizing the results in the GIS system.

Photo 1 shows the collection of samples and Figure 2 and Figure 3 show the results on GIS system. This distribution survey has achieved academically valuable results, which are utilized in the presentations and seminars at HITOHAKU.

As mentioned before, schools played an important role in this survey. High school students were the main actors and they conducted surveys while performing DNA analysis for identifying collected samples and studying basic knowledge on the classification and identification of plants. This resulted not only in a great success in collecting comprehensive data of dandelions but also in deepening understandings of the natural environment in general in the surveyed region. Once this network of study sites for biodiversity is established in the region, we can use this

network to study other species as well as to use this infrastructure to realize biodiversity-centered regional planning.

(3) Wild animal distribution survey

Collecting and processing precise information on the distribution of wild animals is essential when discussing regional biodiversity. In Japan, especially in rural mountain areas, wild boars, deer, foxes and monkeys cause various damages to agriculture and the conservation of wild animals tends to have a trade-off relation with agricultural production. To find a solution, collaboration with professionals and citizens is important while collecting precise data.

HITOHAKU has launched the Wild Life Management Project to address this issue. To understand current distribution and behavior of wild animals, researchers conducted field surveys and other basic studies, such as distribution estimation by computer simulation. They also collected witness cases by questionnaire survey among citizens. Collected data were entered in the GIS and analyzed by comparing

them with agricultural damages data. On the basis of this result, local governments, citizens and researchers are looking for ways to let wild animals coexist with humans. (Figures 4 and 5)

3. Activities of natural history museums for promoting biodiversity

(1) Education and outreach activities on biodiversity

To conserve biodiversity in the region, it is important to enhance knowledge and interest in nature of citizens in the region. HITOHAKU has been conducting a regional activity called "HITOHAKU Caravan Program" consisting of exhibitions, seminars and participatory research projects since five years ago. The most significant characteristic of this program is that it is implemented by an executive committee involving representatives from the community, the government and schools. They actually take part in preparing exhibitions and seminars and citizens often provide exhibition items for the Project, such as butterflies and fossils collected in the region. When exhibitions are organized in local centers for nature education, volunteers in those centers often help us and thus acquire enough knowledge and experience to provide information to visitors by themselves.

Another characteristic of this program is the participatory field survey by citizens. Whenever this program is implemented in a certain area, citizens, volunteers and government officials in the area perform field surveys based on the instructions by researchers at HITOHAKU and other local professionals. For example, when we carried out a vegetation survey of an irrigation pond, volunteers at the partner institution of the program implemented an aquatic plants survey with the assistance of professionals from HITOHAKU and from an NPO specialized in local aquatic plants (cf. Photo 2). The collected plant samples and other data such as water quality and water temperature were summarized in a state of current vegetation map, which was then displayed at the exhibition. In another case,

a survey on river aquatic insects was carried out in collaboration with schools in the region to create huge encapsulated specimen. A measurement of water temperature of those rivers was also carried out at the same time (cf. Photo 3, Figure 6). In each case, we work on this program in collaboration with citizens by sharing know-how to investigate the local environment and provide outcomes and results of these surveys to the region.

(2) Environmental education for children in the tropical rainforest in Borneo

When we think of our local environment, it is also important to think about the global environment at the same time. While climate change and destruction of forests are happening as a consequence of a globalized economy, it is quite meaningful, especially for children, to experience and feel diversity of wildlife in the field and to learn that there are different natural environments around the world, which are quite different from Japan.

To this end, HITOHAKU is running an environmental education program for children, called "Borneo Jungle Experience School", every summer starting from 1998 in cooperation with the Institute for Tropical Biology and Conservation of the University Malaysia Sabah. Tropical rainforest is an ideal field to study biodiversity with its high diversity of species. In this program, children from elementary, junior high and high schools spend about one week in the jungle of Borneo in Malaysia trekking in tropical forests and watching animals and plants. Communicating with local children is also included in the program. This program is also characterized by the fact that children learn and understand about the wildlife under the guidance of researchers from HITOHAKU and the University of Malaysia. Another characteristic is that children learn from group and experience research activities such as observing nature and classification of samples by themselves through the guidance of experts (cf.

Photos 4 and 5). Each child is impressed by different things. Some children are impressed by animals like orangutan or the view of trees and leaves from the canopy, while others worry about the state of forest destruction.

The career developments of the participants in this program is also an interesting aspect. In many cases, participants choose biology, global environment and life science and some of them further study to become researchers, which shows the importance of environmental education for children in the field. When learning about environment issues, especially wildlife, it is important to observe and put them in direct contact with nature. We wish that this experience remains in their mind so that they will approach global environment issues in different ways when they grow up. The natural environment of rainforests is much different from that in Japan. Yet, they are connected to each other through global economy. There is a wide variety of species and their diversity forms our globe. We believe that understanding this fact is also useful for biodiversity-centered regional planning.

(3) Natural environment management in cooperation with the region

There used to be a typical form of forest called "*satoyama*" nearby towns and villages throughout Japan. *Satoyama* is a secondary forest managed mainly to produce fuel wood on a regular basis. This also contributed to diversify shrubs and undergrowth and to maintain a good space in terms of landscape and biodiversity. *Satoyama* has been maintained for several centuries and was an important part of our forest image in Japan. But owing to various reasons - such as a change in lifestyle and the use of fossil fuels instead of fuel wood, the decrease of rural population and development activities in forests close to cities - many *satoyama* were lost in the last several decades.

HITOHAKU is proposing a unique method for *satoyama* management called "Mita Method" and is applying it to *satoyama* in Mita City. Although actual management methods differ from place to place, most of them aim to conserve and enrich the environment, landscape and biodiversity rather than to promote fuel wood production. "Mita Method" is also characterized by an approach enabling citizens without special knowledge and skills to manage *satoyama* effectively in a short period by cooperating with researchers (cf. Photo 6).

The outcome of applying Mita Method on *satoyama* is remarkable. One to two years after starting this kind of management based on Mita Method, the number of species in each surveyed region increased. There were thirty-eight species in average before management activity and now there are forty-four species, including typical *satoyama* species (*Prunus verecunda* Koehne, *Padus grayana*, *Vitis saccharifera* Makino, etc.) (cf. Table 1).

When applying participatory *satoyama* management like the Mita Method, cooperation with governmental organizations is also essential. Governmental organizations call for citizens' action and provide fields whereas HITOHAKU offers professional knowledge and know-how. This kind of collaboration cannot be achieved in a short period of time but requires a good record of cooperation among HITOHAKU, citizens and governmental organizations.

4. The role of natural history museum in the biodiversity-centered regional planning

A concept of eco-museum is emerging in natural history museum. Conventional natural history museums focused on storing and displaying uncommon and valuable collections and their activities were completed inside their buildings. The eco-museum approach is different as it respects the integration of the environment, buildings, life and culture in the region as a whole and regards the integration itself as an exhibition of

museum containing useful information and values to be handed to the next generation. Accordingly, eco-museum approach can even provide a methodological framework for conserving the regional environment and culture as they exist. From the point of view of biodiversity, it is more important to conserve and exhibit them in the field rather than to collect and exhibit dead specimen in the museum building.

For example, the Natural Museum of Storks planned in the northern part of Hyogo Prefecture adopts this approach. Forests as habitat and the network of stagnant water region as feeding ground are necessary for storks to live. So paddy fields and adjacent forests are necessary. Low-chemical agriculture must be deployed in the paddy field so that loaches that feed storks can live there. All these conditions become the basis for securing the region's natural environment. This approach also contributes to the region's economical development, since rice produced in paddy fields where storks can live is marked with added value. Storks can also attract many tourists to the area and those tourists would then be attracted by the beauty of the natural environment where storks live, resulting in so-called ecotourism or green tourism development in the region. Similar movements can be observed for the fossils of dinosaurs found last year in Tanba City. Researchers at HITOHAKU excavate fossils jointly with residents in the region and try to use this resource for community development.

Recently, natural history museums, including HITOHAKU, began to apply the eco-museum approach, which enables them to contribute to urban and regional development with a focus on biodiversity. Museums are more appreciated by the fact that there are always experts dealing with the storage of materials related to the natural environment in the form of books and database freely available for citizens rather than just storing materials and

displaying them. Museums today are also appreciated for their openness to citizens and as centers for local people to communicate to each other on related matters. Citizens can participate in the biodiversity-centered planning and development of the region by utilizing the accumulated resources in museums related to the natural environment. Natural history museums become the core of such activities and serve as an important infrastructure.

In order for natural history museums to act as intellectual infrastructures in the region, there are two conditions to be met. First of all, as mentioned at the beginning, experts in natural science, such as biology and environmental sciences, should cooperate with experts in regional planning, architecture, civil engineering, etc. by sharing their knowledge and set of values to achieve a common goal. Although there are often differences in views and approaches among experts in biology and planners, we must learn and appreciate each other for the sake of biodiversity-centered regional and community planning. The second condition is to have both a regional point of view as well as a global point of view. While globalization in terms of information, people and goods accelerates, global environmental issues become more serious. Both a global perspective with local focus and local actions while thinking globally are needed.

We believe that the function of natural history museums with their new role as an infrastructure connecting the world to the region and the natural environment to our life, enabling collaboration of various professionals and assisting transformation of the whole region into eco-museum will become more and more important in the future.

Acknowledgement

The projects and programs presented here are result of the collaboration of the researchers at HITOHAKU and local residents. We sincerely thank those who provided us with relevant materials.

Rejuvenation of Valley-Bed Rice Fields and Restoration of Lake Water Quality through Sake Brewery Business

Keinosuke Hirose
Shiragiku Shuzo, Co., Ltd.

Clean water is essential for the food industry, particularly for *sake* (rice wine) brewery business. The Asaza Fund, an NPO focusing on Lake Kasumigaura, launched the "Rice Field Restoration Project" as part of their program to restore the water quality of Lake Kasumigaura and realize a sustainable social system. When NEC Corporation, one of the leading Japanese manufacturers, decided to support and participate in the project, a local *sake* brewer joined in to help them. The success of the concerted efforts made by the NPO, the giant manufacturer and the local merchant attracted public attention. A young Executive Director of the local *sake* brewer talked about the joy of witnessing his familiar environment becoming full of life day by day.

In 2003, a joint project was launched by a manufacturing giant NEC and an NPO focusing on Lake Kasumigaura called the "Asaza Fund". NEC decided to support the Fund's "Program for Water Quality Restoration through Rejuvenation of *yatsuda* (Valley-Bed Rice Fields)", and launch a participatory awareness-raising program for its employees and their families.

In creating a partnership with the Fund, NEC believed it was vital to keep themselves as equal partners. It was not the conventional one-way involvement, whereby a big company merely makes donations or outsources its awareness raising programs to an NPO.

The Fund and the company both wanted to make the most of each others' skills and expertise in realizing the new initiative.

Decision to participate

I heard that it all started when some personnel from Environmental Management Division attended a lecture by Mr. Iijima from the Asaza Fund and introduced them to him afterwards. Mr. Iijima proposed a collaboration, which seemed an extremely timely offer for NEC, who was seeking a chance to improve company-wide environmental awareness.

In a word, the project was aimed at



restoring nature through growing rice without chemical fertilizers and pesticides at *yatsuda* (valley-bed rice fields) near Lake Kasumigaura. They felt that they needed something more to help create a sustainable society, and decided to get a local enterprise involved to ensure their rice would be introduced to the market. They came up with the idea of having *sake* (rice wine) produced from their rice, and visited us at the office of Shiragiku Shuzo. I think they may have cited us because our *sake* cellars are right in front of Lake Kasumigaura.

They told us about their nature restoration program to restore paddy fields that had been left uncultivated and grow rice there, and that they wanted us to brew *sake* from their rice. They said they were aiming to clarify the water of Lake Kasumigaura through their program, eventually creating an environment that will serve as habitats for Japanese crested ibis and white storks in 100 years time.

By the time I was born in the 70's, the lake had already been totally polluted. The massive growth of water bloom in the eutrophicated lake would some-



times emit a bad smell. As a young kid, I used to wonder how it would be like if the lake had been cleaner. I felt it would be wonderful if the future vision for the lake described by the Asaza Fund came true.

On the other hand, Shiragiku was not making any particular corporate efforts to improve the environment at that time. In fact, I had never heard of the Asaza Fund before, and even did not have a very positive impression of NPO's. That may tell how ignorant I was of environmental issues.

If our business is supposed to help, then why not?

When the Fund talked about the project, I could not imagine how growing rice would help restore the once beautiful Lake Kasumigaura. When I asked them how it would work, they explained that because the lake did not have any large river, it was served by countless springs nearby. It was how the lake was maintained, they said.

Until just a few decades ago, rice used to be grown without chemical fertilizers and pesticides in valley-bed fields known as *yatsuda* with naturally com-

plex topography. The water of these rice fields, which flowed into Lake Kasumigaura, used to be of very good quality, and so was the water of the lake.

I heard that until the 1970's, aquatic plants such as gorgon waterlilies and fringed water lilies used to be acervate to such an extent that they were said to be among the greatest in Japan. Takahamairi Bay, which can be viewed from the top of our office building, used to have gorgon waterlilies growing in heaps. However, towards the 70's, the bay started suffering from concentrated pollution due to a combination of multiple factors such as the inflowing of domestic waste water and the impact of shore protection works. As pollution increased, gorgon waterlilies disappeared and have never revived to date, I heard.

Now, the countless *yatsuda* scattered around the lake have all been dried up and ruined, with weeds propagating everywhere. They added that these *yatsuda* were not polluted - they had simply been left unattended.

The Fund then went on, "Let's work together on these ruined fields and restore them as paddy fields to grow rice without pesticides and chemical

fertilizers. Water will be drawn to the fields and living creatures will come back and be diversified and an ecosystem will be built up. We, humans, can then just help the natural system to restore itself further with its own power.”

“The Japanese government is now taking a rice acreage reduction policy, but if we claim the purpose of growing rice is *sake* production, we will be able to easily satisfy various administrative requirements. Why don't we work together to grow a breed of rice suited to *sake* brewery?”

I found their proposal very attractive - to us as a *sake* brewer, it meant we could help restore our local lake without having to do something special. We could just continue our business as usual! That was how we joined this nature restoration project in 2003.

In November 2003 when NEC employees first stepped into *yatsuda* that had been left unattended for several decades, they were astonished to see weeds proliferating all over, wondering, “Can we really restore this ruined place to revive as paddy fields?”

They anyway got on with the work in February 2004, cutting down thickets for a start. In March, waterways were created and ridges built. They flooded the paddy fields in April and managed to see the rice ears standing in golden waves in autumn the same year.

Six NEC personnel are taking the lead in this project - they are not doing it as corporate volunteers but as part of official corporate duties. Engaging in physical activities in *sato-yama* full of living creatures, away from the stressful city environment, helps keep participants healthy both physically and mentally. It also serves as a valuable welfare program for them.

Kids grown, nature flourished

This nature restoration project is led by the Environmental Management Division of NEC, with the aim to pro-



vide hands-on environmental education for its employees and their families and make a social contribution.

They were surely delighted to have rejuvenated *yatsuda* and to see Lake Kasumigaura getting cleaner with its water clarified thanks to rice growing. However, I thought it would be a pity for their job to end when they tasted the rice they had harvested. So I came up with the idea of giving them some extra fun-to do the *sake* brewing processes themselves with the rice they harvested!

When I told NEC and the Fund about this idea, they said inclusion of brewery activities would make a perfect year-round program. Rice planting starts in May, which is followed by weeding, harvesting and threshing. Then, a Shinto ritual will be performed before brewery. Afterwards, a new brew comes out and a special *sake* delivery event takes place. They will have this sort of events almost every 2 months, with a more effective and enjoyable annual plan.

When I asked NEC participants what they thought of these events, they all said they had much more chances to spend time with their children. They used to find it difficult to do something together with their kids in their spare time, without a wide range of recreation options available, except for places like amusement parks. But now they see their children in high spirits, really enjoying themselves in *sato-yama* here, which is now richly endowed with nature.

Some of the children who had been nervous to get into the paddy field or running away from insects gradually got used to the natural environment. They now volunteer to plant seedlings and can run after insects, instead of running away from them! Seeing their children grow up in nature makes parents feel their everyday stress is released and spirits enriched.

After a year or so from the launching of the program, I was astonished to see how strikingly fast nature had been restored in *yatsuda*. As our office is

just a few minutes away from the site, I sometimes visit the place and always find that it keeps improving. The site is now so abundantly blessed with nature that I cannot actually believe my eyes. The Asaza Fund said some 10 or so threatened species have revived there. Many Japanese rhinoceros beetles, golden ringed dragonflies and fireflies are around, and northern goshawks, which are at the top of the ecosystem, are building nests there.

You get a healing experience just staying there. The environment is unbelievably different from how it was when I first saw the site. It makes me fully aware of how effective it is not to use pesticides and chemical fertilizers.

However beneficial an activity would be to the environment, it is impossible to act if this means neglecting the feelings of the local communities. If done that way, nobody can escape criticism for being typical of city dwellers' egoism. But local communities felt at ease and had sense of trust when they just knew that Shiragiku Shuzo, one of their local merchants boasting 300 years of history and tradition, was involved.

Most of the members of local communities have some connections to the brewer - for example, their grandmothers and grandfathers have worked for the sake bottling factory or have been in charge of feeding boilers. As a matter of fact, the local communities often expressed their support as soon as they saw the name of Shiragiku Shuzo was on the list. It is surely one of the great strengths of a locally-based enterprise distinct from big companies.

NEC, the Asaza Fund and Shiragiku Shuzo-they represent an integrated collaboration between a big company, an NPO and a local enterprise. The Ministry of the Environment also has an interest in and looks forward to the progressive initiative of this project.

Significance of collaboration

The project is quite demanding, I mean, it requires lots of preparations.

Every piece of work such as rice planting and harvesting is done manually. NEC employees and families had to do everything, such as stranding ropes and cutting out bamboos. They also take part in seasonal local customs and festivals taking place around the *yatsuda* they are working on. We have a new-year rice-cake making event in a local square.

It is important to get local farmers involved in the activities. At first, the local communities were wondering, "What are these people doing?" Yet, they gradually got used to and joined our activities, even though slowly. Earlier on, about 20 people from the Fund and NEC would stay overnight in preparation for an event, but now that local farming ladies are there to help, cooking *tempuras* for hundreds of participants is as easy as anything!

This is how they produce *sake*. The wrapping paper for the *sake* carry messages from the participants, like, for example, "Thanks to the gift of the land" and "Wish you feel the power and blessing of nature as we all did."

We were consulted by NEC regarding the delicate work to wrap the bottles with the paper. As part of efforts to make a social welfare contribution, we looked for a vocational-training group of people with disabilities and found one nearby. Partly because they had a connection to Shiragiku Shuzo, we managed to outsource the job to them.

The workers showed astonishing efficiency, accuracy and concentration. It was a pleasure having a chance to work with them in this nature restoration project. None of these would have been possible without the collaborative efforts of the NPO, the manufacturer giant and the local enterprise.

Since the project was launched, paddies and thickly wooded areas have continued to revive because NEC employees kept on participating in various events through-

out the year. It seems to represent real-life CSR activity beyond an arm-chair theory.

The local communities also benefit from it and so do many living creatures. The project seems to make everyone happy.

Familiar landscapes and nature are our true treasures

We are currently planning to grow rice in the same way as the Fund and NEC are doing, brew *sake* with it and sell the product at local shops in Ishioka City to serve the city residents. I expect this will help regenerate deserted local shopping streets. I also believe one of our challenges is to help local communities understand how *sake* is produced and what it means to them and to the lake.

As a local resident who grew up just a stone away from the lake, I must say I was largely motivated by my personal intention. I simply thought it would be nice if I could play a part in rejuvenating *yatsuda* and cleaning Lake Kasumigaura through our main business.

Four years on, I must admit I am rather surprised to find myself being quite environmentally conscious now. As a matter of fact, our *satoyama* - which consists of thickly wooded areas and rivers - has now become extremely rich in nature, just because we actually took actions and directly helped out on site to restore the *yatsuda*.

This made me realize that the familiar landscapes and nature - which I used to take for granted - were in fact valuable assets to us. They would have been ruined if we hadn't actually taken care of them. I also realized that restoring our familiar natural environment can lead to the environmental restoration of a wider region. I am really glad I had the chance to take a role here and would like to stay committed to making collaborative efforts to expand this local project with the ultimate goal of helping create a sustainable society.

Kajima Corporation's Promotion of Biodiversity Efforts for a Sustainable Society

Yoriyuki Yamada

Office of Global Environment, Kajima Corporation

Building sector and biodiversity

The building sector has a considerable impact on the environment, for example, when building a huge building, changing the surface of land or making a landfill in a coastal area. Owing to worsening environmental problems, as reported by the media and knowledgeable people, many construction companies are engaged in recycling, the effective utilization of resources, the control of hazardous materials and the prevention of global warming. On the other hand, the efforts for biodiversity conservation in Japan are less advanced if compared to those listed above, because of the lack of scientific data, a wide range of problems and little awareness of environmental and social benefits.

Under these circumstances, Kajima established the Kajima Ecosystem Conservation Guidelines in August 2005. This guideline, which is the first one in the Japanese construction industry, shows a framework of our biodiversity conservation activities.

Background of biodiversity conservation

Interest in conservation of ecosystems and biological diversity has grown around the world following such developments as the 1992 global summit where the Convention on Biological Diversity (CBD) was formulated. Yet, awareness of these issues in Japan has remained low until now. Japan has long had a deep relationship with nature, and harmony with nature forms a central element of Japanese lifestyle and culture. This may explain why awareness of the importance of the issue has been low. Kajima has consistently

incorporated measures for ecosystem conservation in many aspects of its business and made substantial contributions to the conservation and creation of a rich natural environment.

Building on this considerable record, in March 2005 Kajima established a Biodiversity Conservation Committee to study the compatibility of the building sector with biodiversity conservation. After this study, we recognized these risks and opportunities.

Risk management and business opportunities about biodiversity

As a result of investigating various construction projects, Kajima understood the necessity for risk management and business opportunities about biodiversity. For example, some companies used inappropriate invasive seeds for slope protection work. They had to start over from first step and sow local seed. Hence delays in construction and increased reclamation costs. Even if these cases are not our projects, we have to take careful note of local ecosystems and biodiversity in order to continue the construction business.

Another aspect is business opportunities by using ecosystem services. We try to explain that healthy ecosystems are a new value for landowners. For instance, the parks - which are rich in biodiversity - raise real estate price by 10% in Tokyo. The reclamation of Cheong Gye Cheon River in Seoul, which destroyed the existing highway and revived the old river, has an impact on room rates of the riverside hotel. The forest, which is rich in biodiversity, is known from recent research to get excellent health bene-

fits. Because of these cases, we realize healthy ecosystems create added value and we can produce high-valued projects by using ecosystem services.

Kajima Ecosystem Conservation Guidelines

Without healthy ecosystems, safe and comfortable living environments for human society cannot exist. Kajima sees ecosystem conservation as a crucial issue in the establishment of a sustainable society. Kajima has become a leader in the efforts to realize the harmonious coexistence of healthy ecosystems and the construction business. In August 2005, Kajima established the Kajima Ecosystem Conservation Guidelines as a framework for its activities in this important sphere.

Kajima Ecosystem Conservation Guidelines

(Adopted in August 2005)

Fundamental Principles

Kajima conducts its construction business with the aim of establishing high-quality infrastructure for the society that supports human lifestyles and industrial development, as a social mission to realize a "truly comfortable environment for people". In the 21st century, building a sustainable society on the basis of the coexistence with nature is fast becoming the most pressing issue for humanity. Japan formulated its revised National Biodiversity Strategy in 2002 and the importance of biodiversity and ecosystem conservation has now been widely accepted throughout society. In recognition of this, Kajima has placed high priority on the social mission of conservation of ecosystems and based on the following

guidelines is pursuing sustainable development for society, its clients and the company through strategic measures for ecosystem conservation

Guidelines

1. Management Systems

Kajima recognizes ecosystem conservation as an important part of its environmental management and will give consideration to ecosystems in its business activities.

2. Compliance

Kajima will comply with all laws and regulations concerning ecosystem conservation and will make an effort to understand related policies and social requirements and reflect these in its business activities.

3. Education

Kajima will conduct internal training to provide its employees with information on the basic knowledge necessary for ecosystem conservation activities, as well as information on laws, technologies and successful examples and will raise awareness of the value of ecosystems.

4. Construction Business Measures

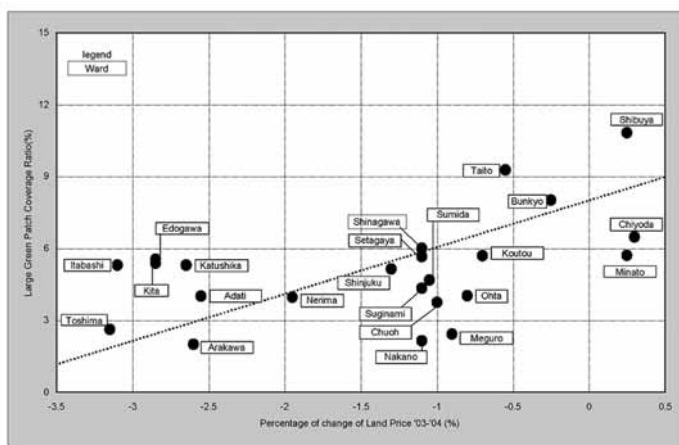
Kajima will utilize information and technology regarding ecosystems to incorporate environmental considerations into the proposals and work undertaken for its clients and will support communication between its clients, communities and society at large with the aim of creating and conserving rich biodiversity through its construction business activities.

5. R&D

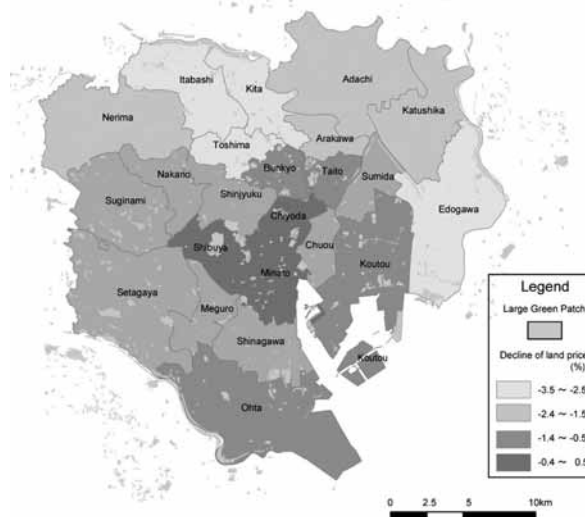
Kajima will accumulate information and technical expertise regarding ecosystems and proactively pursue related research and technology development.

6. Social Contributions

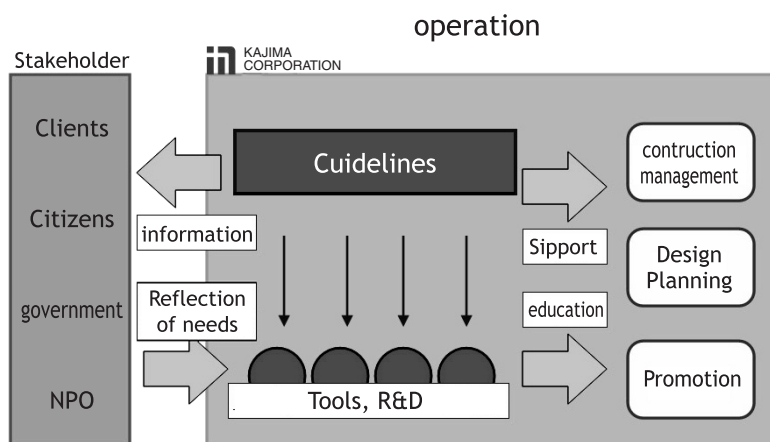
Kajima will support citizens' initiatives and employee volunteer activities to enhance biodiversity and actively cooperate with related organizations and associations.



Relationship between Percentage of change of land price from 2003 to 2004 and Large Green Patch Coverage Ratio



Percentage of change of land price from 2003 to 2004 and Large Green Patch



Position of Kajima Ecosystem Conservation Guidelines

Achievements of biodiversity conservation activities

1) Analysis evaluation of the Ecological network in urban areas

Kajima conducts analysis evaluations of ecological networks in urban areas in order to create urban environments balanced with nature. This technology uses high resolution satellite data, a digital surface model (DSM) and geography information system to recognize features that are normally difficult to be fully assessed, such as the number of trees in residential areas and along roadsides. We proposed evaluation of future scenarios such as decrease of green space with the purpose of studying effective green space planning by using the habitat evaluation method of Japanese Pygmy Woodpecker, a species indicator of the ecological network.

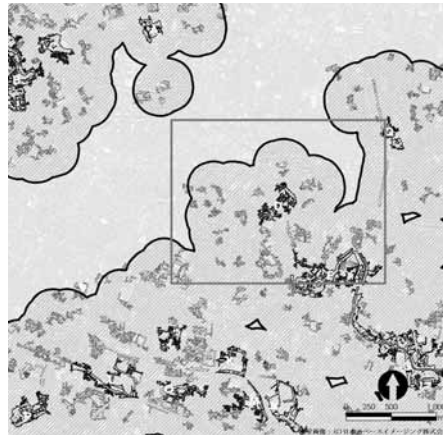
2) Habitat evaluation and forecasting technologies for wetlands

Kajima and Taisei Corporation have jointly developed technologies for the restoration of wetlands since 2000, creating a habitat evaluation model for clams, crabs, eelgrass and other representative wetland organisms. Environmental factors such as terrain, water quality, sediment and waves are entered into the model, allowing the evaluation and forecasting as a numerical value of the population of the living organisms in that environment.

3) Cooperation with the local natural science program offered by the Natural History Museum and Institute, Chiba

Kajima has developed a Wildlife Sounds Recognition System that uses a voice recognition engine to automatically distinguish the calls of birds and other animals, part of the expansion of its environmental monitoring and education businesses.

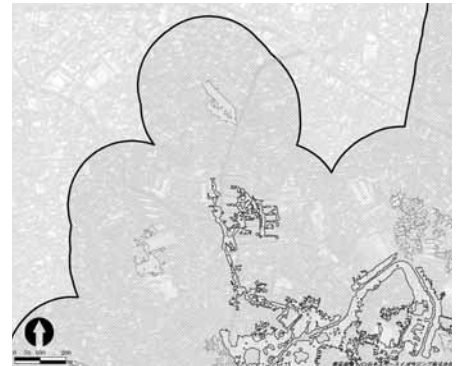
Since 2004, we have provided handheld terminals (called *Kikimimi Zukin*) incorporating this sound recognition system in an education program con-



Analysis of the ecological network on Sugunami City in Tokyo



Scenario B: Conserve parks and street trees



Scenario A: Conserve all trees



Scenario C: No conservation plan

ducted by the Natural History Museum and Institute - Chiba with the support of the Japan Science and Technology Agency that encourages children to use their sense of hearing to explore the local natural environment. Children observe birds by listening to their calls, recording the identification and place of discovery on maps, fueling their curiosity about the natural world around them.

4) Ecosystem Information Management System

It is important to understand the scientific data and best practices for biodiversity conservation. To fully understand the current situation, Kajima carried out surveys of all its civil engineering project sites among local communities and customers regarding their expectations and needs in the area of ecosystem conservation. The surveys also covered how each project site was responding to these ecosystem conservation needs. On the basis of the results of these surveys, we are includ-

ing key matters relating to ecosystem conservation in each project site's environmental management plan. As a result, we created an ecosystem information management system in 2006 which is a database of laws, regulations, technologies, case studies and literature relating to ecosystem conservation and biodiversity. All employees can access this system on the Internet.

5) Hualalai resort project

In 2005, the U.S. Environmental Protection Agency (EPA) conferred to Hualalai Resort in Hawaii developed by Kajima its annual award for environmental responsibility. The award specifically cited the Punawai Pond within the resort. The award citation commented on the pond's beauty and energy efficiency and highly evaluated some features, like the resort's restaurants serving fish, shrimps and oysters bred in the pond. The Punawai Pond uses floating islands of plants as well as microorganisms and pebbles as a



Protect the habitat of eelgrass



Children enjoy bird watching by using Kikimimi Zukin



Receives an Award from the U.S. Environmental Protection Agency

natural water filter to remove pollutants and excess nutrients. As a result, the electricity needed to maintain the pond's water quality is only 1/25th of the amount that would be normally required. In recent years, many of Hawaii's canals have faced a worsening situation with pollution. It is hoped that the ecologically based water filtering technology used at Hualalai Resort will be applied to solving this environmental problem.

Conclusion

In its activities the construction company Kajima intends to provide a "truly comfortable environment for people." It supports the goals of Japan's national biodiversity strategy, biodiversity and ecosystem conservation and places high priority on the social mission of conservation of ecosystems. Kajima considers biodiversity from both the point of view of business risk and opportunities, in order to sophisticate its efforts towards biodiversity. We try to improve our business and service to

contribute to biodiversity and ecosystem conservation because we have a critical role to play in conserving biodiversity. Biodiversity and ecosystem conservation is becoming one of the most important issues of Kajima as long-term sustainability in company management.

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A revetment was included as a habitat for crabs as part of a canal construction project

Initiatives on Biodiversity by Nippon Keidanren Committee on Nature Conservation and Its Member Companies

Nippon Keidanren Committee on Nature Conservation



One of the most popular activities of the Japanese private sector is environmental education related to forestation and forest management

Nippon Keidanren Committee on Nature Conservation

In the last decade, the Japanese private sector has been working very hard on environmental issues especially on waste management and climate change. Recently, companies have also started paying more attention on biodiversity. This was mainly led by the Japanese government's decision to host CBD COP10 in Nagoya 2010, as well as the decision adopted in CBD COP8 on private sector engagement. This was also influenced by the forthcoming biodiversity guidelines for private sector stipulated in the Third

National Biodiversity Strategy of Japan(see page60).

It was early 1990s when the Japanese business sector as a whole started to commit to the conservation of biodiversity. Nippon Keidanren, the Japanese largest business federation - comprised 1,343 companies, 130 industrial associations and 47 regional economic organizations - adopted its "Keidanren Global Environmental Charter" in 1991, in which taking care of ecosystems was stipulated as one of the basic principles for their all business operations. Following that, Nippon

Keidanren Committee on Nature Conservation and Keidanren Nature Conservation Fund (KNCF) were created in 1992. Since then, some 2.4 billion Japanese Yen were invested into more than 800 conservation projects carried out by NGOs around the world. In 2003, Nippon Keidanren took a step forward by adopting "Keidanren Nature Conservation Declaration" with the idea of realizing "an economic society co-prosper with natural world" through reconsidering relationship between nature and business activities.

Apart from these initiatives taken by



Animal pathway jointly developed by private company and NPO



Eco-tour in Cambodia participated by KNCF members



Environmental education activity in rice field is becoming popular in Japan

business sector as a whole, each company has been taking its own initiatives and approaches for biodiversity. Some companies like Richo Company, Ltd. and Mitsubishi Corporation are actively working on conserving and regenerating rainforest and coral reefs outside of Japan whereas there are also many various activities underway in Japan reflecting each company's own technology, resources and policies. But one of the most popular activities by the Japanese private sector is environmental education activities related to forestation and forest management.

Company's action on biodiversity

Asahi Breweries Ltd. identified forest management to maintain quality of water as one of the most important biodiversity agenda for their business. In this respect, they have created a special option for their shareholders to make donations to their environmental fund called "Planet Water" so that environmentally-conscious shareholders can assist forest conservation activities using their benefit as shareholders instead of just receiving conventional shareholders' special benefit. Asahi Breweries is also carrying out forest

management activities in collaboration with local NPOs and municipalities to maintain their own nine forest lands located in water source areas throughout Japan. Mr. Kouichi Ikeda, chairman of the Board and CEO of Asahi Breweries, pointed out that "it is important to implement conservation activities in which our main business activities are closely related."

Mitsui & Co., Ltd. maintains 73 forest lands with 44,000 ha throughout Japan. These forest lands were originally obtained about 100 years ago for the timber production business. But the timber production business is in a very difficult situation since several decades ago owing to a plenty of cheap imported timbers. Regardless of this difficult situation as a business, Mitsui & Co. reaffirmed to own and maintain these forests in 2006. Mitsui & Co. estimates these forests capture 180,000 tons of CO₂ annually and create 120 billion JPY in terms of its environmental and other non-market benefits. Mitsui & Co. also use these forests as a place for environmental education for their employees and elementary school children.

Toshiba Corporation and its group companies started a 1.5 million tree plantation program since 2006 in order to contribute to climate change mitigation and biodiversity conservation. The goal of this program is to plant 1.5 million of trees throughout the world in collaboration with various NGOs to commemorate Toshiba's 150-years anniversary. In addition, many other Japanese blue-chip companies, such as Oji Paper, Kyushu Electric, Tokyo Gas, Toyota Motors, Nippon Life Insurance Company, Fuji Xerox, Hokkaido Electric, Matsushita Electric and Mitsubishi Electric are implementing various kinds of environmental education programs with forestation or forest management activities through participation of their volunteer employees.

Another area of activities recently attracting many Japanese private companies



Since its creation in 1992, KNCF invested some 2.4 billion JPY into more than 800 conservation projects

is participatory environmental education through volunteer activities in rice fields. Sekisui Chemical Co, Ltd., in collaboration with an NPO called *Tanbo* - a Japanese word of rice field - is actively implementing participatory environmental education program through rice planting in paddy field and restoring abandoned rice terraces. NEC Corporation is also implementing a participatory environmental education program for their employees in collaboration with an NGO (see page 48). As this kind of environmental education activities related to rice fields is spreading, the first international symposium on environmental education and rice fields was organized last year by Nippon Keidanren Committee on Nature Conservation and NPOs with the

support from many other relevant organizations, including the World Bank. The objective of the symposium was to send a message from Asia, including Japan, that rice field with its natural, cultural, social and economic functions is an important element for biodiversity conservation in this region and an ideal place for environmental education activities as a symbol of sustainable society.

Using own technology and products for conservation

In the meantime, some other companies started to implement conservation activities using their own technologies and products. Typical examples can be seen in the construction industry since their business activities cannot be separated

from nature and natural conditions. Taisei Corporation and Shimizu Corporation, two Japanese construction giants, established a study group together with an NPO called KEEP foundation in 2003 to create animal pathways for small tree animals like Japanese dormouse (*Glirulus japonicus*) so that they can safely cross roads in the forests. They have been working together to develop a prototype product and to implement, monitor and evaluate it. Another construction giant, Kajima Corporation, is also actively working on biodiversity by developing corporate guidelines on ecosystem conservation. (see page 52) Electric appliance manufacturers are also supporting conservation activities through their products and technolo-



KNCF members visiting a project site in Borneo



Tropical rainforest conservation project in Borneo supported by KNCF

gies. Canon Inc., for example, is supporting conservation activities of Tokyo metropolitan government by providing digital cameras and binoculars. NEC Corporation together with Wild Bird Society of Japan carried out a study on the migration of Steller's Sea Eagle (*Haliaeetus pelagicus*) using NEC's small transmitter technology and computer simulation technology. Panasonic (Matsushita Electric Industrial Co., Ltd.) also provides imaging products and technical assistance to high school children for nature watching and recording activities.

What could nature teach us?

Japan is one of the most advanced manufacturing countries in the world.

While many companies are supporting and implementing various kinds of conservation programs, we have another kind of approach to biodiversity which is designing products and technologies by learning from nature. Some people call this approach Biomimicry. It studies nature's best ideas and then imitates these designs and processes to solve human problems. In Japan, Dr. Hideki Ishida, a professor of Tohoku University, called this approach Nature Technology and some companies have started to study and develop new products according to this principle.

INAX Corporation, a sanitary ware manufacturer, was struck by the fact that no snail in the world lives in a dirty shell. They studied snail shell structure in detail, as well as its mechanisms to prevent dirt and then imitated this mechanism to develop new tile and sanitary ware products which are more resistant to dirt and easy to clean with water. The surface of snail shell is not smooth if analyzed by microscope. There are many fine ditches on its surface. INAX discovered this structure on the snail shell surface and found out that this is key to prevent dirt on its shell.

Sekisui Chemical succeeded in developing a new engineered timber product by using natural tannin to bind wood chips. With this successful new technology, Sekisui Chemical has created a new grant program to assist academic research projects which exploit wisdom gained through nature. These are some of the examples which indicate that Japanese companies have started to explore new manufacturing horizons by using nature technology thus contributing to create a sustainable society.

Towards a sustainable society

Various activities have already started and are underway in Japan towards CBD COP10 which will be held in 2010. Initiatives on biodiversity by the Japanese business sector are likely to be further accelerated and diversified in the near future. At the same time, we can say there is no unique answer or solution regarding the private sector engagement for biodiversity. Various approaches are being used by companies depending on their own technologies, business activities and environment. The positive side of this trend is that this diversity of activities carried out by the private sector - which has a huge social and economic impact on today's world - could spread beyond their boundaries through employees, customers, local communities and their business partners resulting in increased support for biodiversity not only in Japan but also in the rest of the world.

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Formulation of the Third National Biodiversity Strategy of Japan

Global Biodiversity Strategy Office
Ministry of the Environment of Japan

The Third National Biodiversity Strategy of Japan was decided by the cabinet in November 2007. The National Biodiversity Strategy is the plan that puts together the principles and government's measures and policies concerning conservation and sustainable use of biodiversity in accordance with the Convention on Biological Diversity (CBD). Japan became a party to the CBD in 1993 and formulated the first National Biodiversity Strategy of Japan in 1995. The 2nd National Biodiversity Strategy, the full-fledged revision of the first strategy, was formulated in 2002. The Third National Biodiversity Strategy, the current revision, aims at "Building a Sustainable Society Coexisting with Flourishing Biodiversity" where rich biodiversity is nurtured through harmonious coexistence of man and nature and by secured better balance between man and nature.

Developments at national and international level after the approval of the 2nd National Biodiversity Strategy

In April 2002, after the 2nd National Biodiversity Strategy of Japan was established in March of that year, the "2010 Biodiversity Target" which "commits Parties to achieve a significant reduction of the current rate of biodiversity loss by 2010" was presented at the 6th meeting of the Conference of the Parties (COP6) to the Convention on Biological Diversity. Biodiversity assessment including Millennium Ecosystem Assessment (MA), the first comprehensive assessment of global ecosystem announced by the United Nations in 2005 and Global Biodiversity Outlook 2 (GBO2) announced by the secretariat of Convention on Biological Diversity revealed that the 2010 target was difficult to attain.

With respect to global warming, the Kyoto Protocol came into force (2005) and actions are already under way at home and abroad with scientific knowledge as to the global warming accumulated. The Fourth Assessment Report of Intergovernmental Panel on Climate Change (IPCC) (2007) revealed that biodiversity has been affected by global warming and will be more signifi-

cantly affected by warming in the future.

After the 2nd National Biodiversity Strategy of Japan was adopted, various efforts were undertaken within the country. These are institutional actions concerning biodiversity such as the enactment of the Law for the Promotion of Nature Restoration (2002), the Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Cartagena Law, 2003), the Landscape Law (2004), the Invasive Alien Species Act (2004) and the National Spatial Planning Act (drastic revision of the Comprehensive National Land Development Act, 2005) and revision of the Natural Parks Law (2002), Wildlife Protection and Appropriate Hunting Law (2002, 2006) and the Law for Protection of Cultural Properties (2004).

Every year since the adoption of the 2nd National Biodiversity Strategy, the Inter-Ministerial Committee on the National Biodiversity Strategy of Japan has checked the implementation of government measures to announce the results, that is the status of the implementation of the measures of the ministries concerned, as well as of the

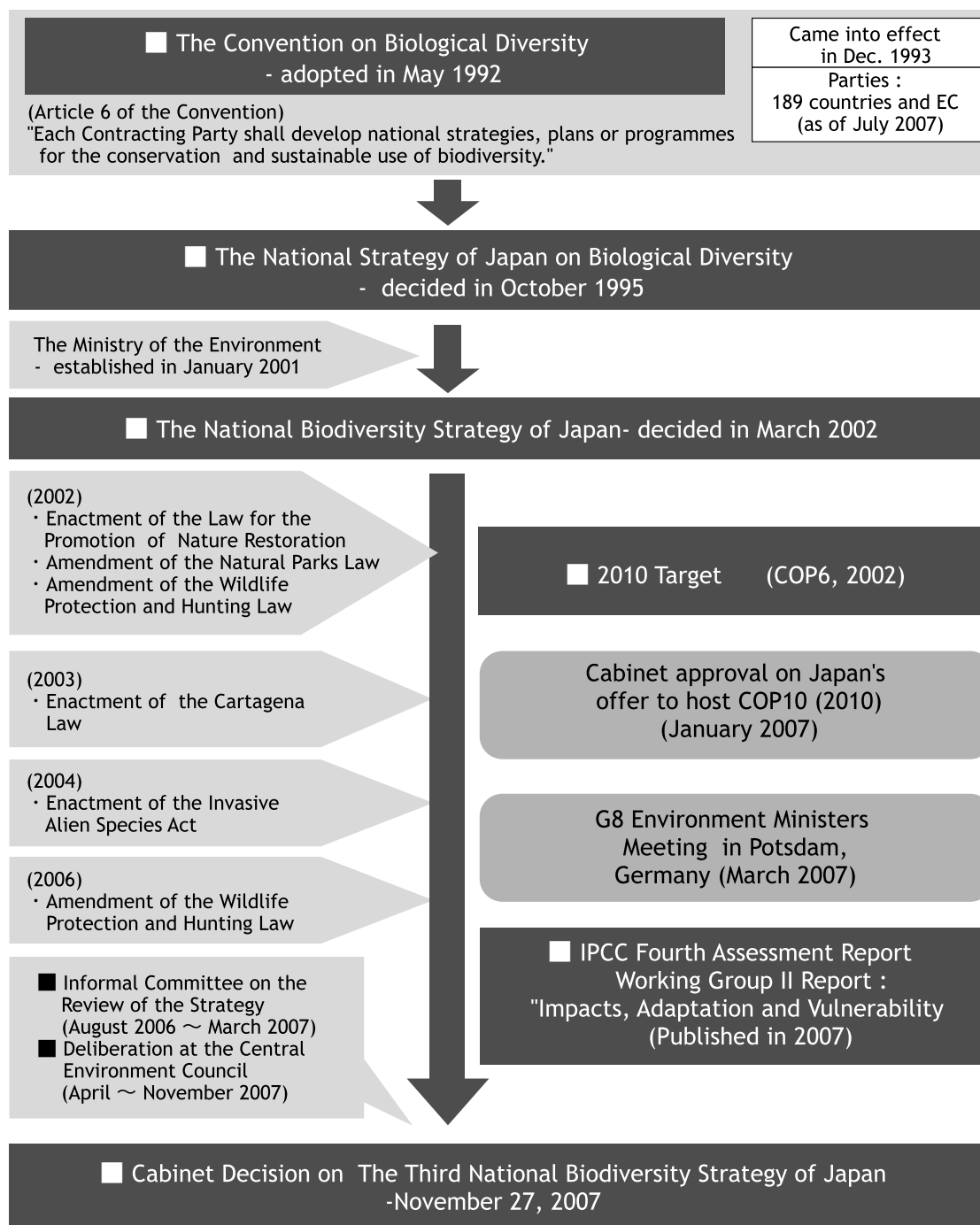
actions taken by local governments, corporations and private entities as to conservation and sustainable use of biodiversity. In the comments on a series of check results, the Central Environmental Council highly evaluated the progress of the measures at the various levels, but often suggested further promotion of biodiversity education and popularization activities, as well as encouragement of efforts at regional level.

In January 2007, Nagoya City's (Aichi Prefecture) bid to host the 10th meeting of Conference of the Parties of the Convention on Biological Diversity (2010) was approved at a Cabinet meeting. Now that the main agenda of the G8 Environment Ministers' Meeting held in Germany in March of this year included biodiversity, as well as climate change, and the declaration by leaders at the G8 Summit contained the critical importance of biodiversity, as well as the intensification of efforts to achieve the 2010 target, biodiversity draws the highest degree of attention ever from all over the world.

Current status of biodiversity in Japan

The number of known species in Japan is estimated to be over 90,000 and it exceeds 300,000 when unclassified

Background of The National Biodiversity Strategy Review



species are included. Japan with a small land area has rich biota and also features a high rate of endemic species.

Furthermore Japan - with 67% of the total land area being covered by forests - is rich in natural environment where wild monkeys (only among

developed countries) and many other medium and large wildlives such as bears and deer live. However, more than 30% of reptiles, amphibians and brackish/freshwater fishes, more than 20% of mammals and vascular plants and more than 10% of birds living in Japan are threatened species.

Although rapid development during the postwar economic growth has now slowed down, the area of agricultural and forestry lands converted to urban use and the area of reclaimed lands in the coastal areas have increased at a steady rate, continuing to affect biodiversity. The population of our country

that decreased in 2002 currently remains at the same level, but it is projected to significantly decrease in the future. A change in the relation between man and nature - typified by increased serious conflicts between man and wildlife causing damage to agriculture and forestry or causing other troubles - the reduced number of people engaged in agriculture or forestry, accelerated demographic aging and other situations around biodiversity of our country, are reaching a turning point. With an increased globalization of economy, the increase of cross-border distribution of goods or transnational movement of people was followed by the invasion of Japan by alien species or other phenomena that affected the biodiversity of our country. The increase of the world population and the high economic growth in India and China may possibly change the circumstances surrounding our country that has long been depending on overseas natural resources.

To cope with such changing situations at home and abroad, the Third National Biodiversity Strategy of Japan was formulated through an open way such as the Central Environment Council and public comments etc.

Third National Biodiversity Strategy of Japan

The outline of the Third National Biodiversity Strategy of Japan

The Strategy consists of 2 parts, "Part 1: Strategy for Conservation and Sustainable Use of Biodiversity" and "Part 2: Action Plan on Conservation and Sustainable Use of Biodiversity". Part 1 gave a new description of the importance of biodiversity that supports life and livelihood and biodiversity's relationship with global warming that may significantly affect biodiversity; 5 fundamental frames of reference including performance of a comprehensive assessment of biodiversity in our country, grand design as a future vision of the national land from the point of

view of biodiversity, "Scientific Recognition and Preventive and Adaptive Attitude" and so forth; four basic strategies including mainstreaming biodiversity in our daily life; and orientation for the period of the forthcoming 5 years of activities to promote conservation and sustainable use of biodiversity in the light of the situation at home and abroad. Part 2 systematically described all our measures and policies on biodiversity as practical action plans and itemized particular measures and policies to show the path towards their implementation.

Importance of biodiversity and its rationales

What is biodiversity? Why is it important? These questions are seemingly not easily understood, thus biodiversity has not been mainstreamed into society. Therefore, Part 1 of the Third National Strategy describes firstly that it was none other than innumerable lives that formed the environment of the earth and also that lives that have been nurtured over the long history of the earth are irreplaceable, then it explains the "Importance of Biodiversity" with the following four rationales, using the term "Biodiversity that supports life and livelihood" in a comprehensible way.

1 "basis for existence of all life on earth"

Living organisms on the earth are closely related to each other thanks to a link: the ecosystem. They live linked one to the other. Basic requirements for the existence of the entire life at present and in the future are prepared through functioning including oxygen release and CO₂ absorption by plants or forests, climate control or circulation of atmosphere through transpiration, creation of soil by decomposition of dead animals and leaves and others.

2 "use value including culture"

We, human beings, rely on food, timber, medicines or diverse organisms

for our daily life. Biodiversity allows us to apply the functions and morphology of living things to industry's use and to indirect or potential utilization including breeding of farm products in the future. These values lead to a good life at present and in the future.

3 "basis for enriching culture"

Since ancient times, Japanese have had an attitude towards nature that maintained that all living beings are interconnected and mutually supportive. We have thought highly of and co-existed with nature to cultivate enriched sensitivity, as well as beauty sense which has led to the creation of diverse culture in Japan. Biodiversity has built up a basis of such spirit. Moreover it provides a source for these cultures as should be called indigenous assets such as foods, crafts, festivals and so forth fostered by the local natural environment.

4 "security of livelihood"

Proper forest conservation to create diverse and sound forests and abstention from inappropriate conversion of landscape contribute to the prevention of sediment discharge and disruption and to ensuring safe drinking water. From a long-term perspective, this leads to efficiently ensuring life safety over generations.

Biodiversity crisis

Biodiversity is important, as described above. However, although a wide range of efforts have been made throughout the nation, biodiversity is still declining. The current status of biodiversity loss in Japan is organized into the following three crises:

Crisis 1: Decrease/extinction of species that is directly brought about by human activities or development, or reduction/loss of habitats through destruction, fragmentation and deterioration of ecosystems

Crisis 2: Changes in environmental

quality in Satochi-Satoyama areas (rural landscapes formed by sustainable use of natural resources), decrease in species and habitat status change due to reduced or discontinued human approaches to nature, changes in society and economy, like changes in lifestyle and industrial structure and decrease in population

Crisis 3: Disturbance of ecosystems caused by artificially-introduced factors including alien species

In addition to these three crises, the progress of global warming is seriously affecting global biodiversity, which is predicted to cause various problems, including extinction of many species and disruption of vulnerable ecosystems. With this background, the relation between global warming and biodiversity is described as "the crisis brought about by global warming" indicated as an inevitable and serious problem for biodiversity.

Grand design targeting the next 100 years and four basic strategies

In the light of the current situation described above, the targets aiming at the next 100 years of the grand design in each of the following seven areas are presented from the perspective of biodiversity: Natural mountain area; *Satochi-Satoyama* (Rural area/countryside); Urban area; River/wetland area; Coastal area; Oceanic area; Island area. These images are elaborated on the basis of the understanding that the restoration of natural ecosystems requires long time and efforts developed in a long term perspective are needed for the realization of a "Society in Harmony with Nature".

Then the main direction of the national policies on which to focus on in the forthcoming five years or so towards conservation and sustainable use of biodiversity is described with the following four basic strategies:

1. Mainstreaming Biodiversity in our

daily life

2. Rebuilding a sound relationship between man and nature
3. Securing linkage among forests, countryside and sea
4. Taking action with a global perspective

"Mainstreaming Biodiversity in our daily life" includes:

- Developing guidance for local governments to develop local strategies with a view to lead the national strategy to local actions and guidelines for private companies to promote conservation and sustainable use of biodiversity in their business activities,
- Citizen participatory monitoring with local experts and NGOs taking the lead,
- Creation of places for hands-on experiences through children's interaction with indigenous nature of the region after school and for primary five senses experiences, and
- Proposals for a change in lifestyle including purchase of biodiversity-friendly food and timbers.

"Rebuilding a sound relationship between man and nature" includes:

Selecting important Satochi-Satoyama areas which should be bequeathed to the future,

- Developing a system where Satochi-Satoyama areas are maintained as common resources by a wide range of actors including urban residents and corporations,
- Developing communities coexistence with wildlife through separating habitat and capacity building,
- Promoting primary industry which contributes to conservation of biodiversity,
- Managing habitats for rare wild fauna and flora including storks and ibis, and
- Further promoting preventive measures against alien species including those unintentionally introduced as adhering to other living organisms or materials, or introduced by domestic migration.

"Securing linkage among forests, countryside, rivers and sea" includes:

- Developing conditions towards the formulation of ecological network plans at various levels and mapping of ecological networks at country level,
- Conducting a comprehensive review of National and Quasi-National Parks, the core of the ecological network at country level and actively conducting assessments on laurel forests, Satochi-Satoyama areas and sea areas,
- Reviewing nature restoration from a wide-area perspective and system of supporting nature restoration activities taken in privately-owned lands,
- Creating diversified forests and networking of water and green in urban areas as well as networking of water areas including rivers, wetland areas and paddy fields,
- Collecting more data on marine biodiversity and increasing designation of protected areas in neritic areas, and
- Reviewing self-imposed resource management consistent with various uses including fisheries and Marine Protected Areas to promote conservation of biodiversity.

"Taking action with a global perspective" includes:

- Proposing the "SATOYAMA Initiative" to the world as a model for harmonious coexistence with nature,
- Technical support to the Asia Pacific countries based on the country-wide comprehensive ecosystem assessment of Japan,
- Developing a comprehensive ecosystem monitoring system including effects of global warming, and
- Promoting mitigation measures against global warming from the viewpoint of biodiversity and reviewing adaptation measures such as ecological networks highly adaptive to global warming.

Concrete measures

Part 2 describes, systematically and exhaustively, specific measures and

Outline of the Third National Biodiversity Strategy

— For "Building a Sustainable Society Coexisting with Flourishing Biodiversity"
where Human and the Nature Live Together in Harmony —

Part 1 : Strategy

Importance of Biodiversity

Biodiversity Supports Life and Livelihood

- ① Basis for existence of all life on earth — eg. oxygen supply, forming rich soil —
- ② Use value including future options —eg. food, timber, medicine, breeding, uninterpreted genetic information —
- ③ Basis for enriching culture —eg. cultural diversity fostered by local natural environment, Japanese traditional attitude toward nature: cherishing all life on earth—
- ④ Security of livelihood — eg. disaster reduction, food security —

Challenge

- Crisis 1 Species and habitat degradation due to excessive human activities
- Crisis 2 Degradation of satochi-satoyama* due to insufficient level of management
(*Rural landscapes formed by sustainable use of natural resources)
- Crisis 3 Ecosystem disturbances caused by the introduced alien species and chemical contaminations

Crisis caused by Global Warming —inevitable and serious—
• Huge potential for **species extinction and ecosystem collapse**

Long-term perspective

Grand Design, targeting 100 years ahead

- Grand design of the national land from the viewpoint of biodiversity is presented as the "Centennial Plan", which aims to recover the nation's ecosystem over the next hundred-year period

Involvement of various stakeholders

Involvement of local governments and the private sector

- Needs for **efforts by local governments and businesses** are emphasized with a view to linking biodiversity conservation to local activities

FOUR "BASIC STRATEGIES"

- I Mainstreaming biodiversity in our daily life
- II Rebuilding sound relationship between man and nature in local communities
- III Securing linkages among forests, countrysides, rivers and the sea
- IV Taking action with global perspective

Part 2 : Action Plan

- Approx. 660 specific measures and policies
- Ministries and agencies in charge of implementation, specified
- 34 numerical targets

policies aimed at ensuring conservation and sustainable use of biodiversity in the form of government action plans for the next five years. Since the measures and policies cover a wide range of areas, they are categorized and compiled for the following two areas; Measures and Policies

for National Land Area and Cross-Sectoral and Fundamental Measures and policies.

Chapter 1 "Measures and Policies for National Land Area" consists of two bodies. The first body specifies nation-

wide and other wide-area measures under the title of Measures and Policies Based on Wide-Area Coordination, which is divided into four sections: Ecological networks; Conservation of Priority Areas; Nature Restoration; Agriculture, Forestry and Fisheries. The

Examples of numerical targets(targeting 2012FY)

• Ramsar sites	33 sites (2007)_43 sites
• The population of Japanese crested ibis introduced to the wild and settled	60(2015)
• Nature restoration committees	19 (2007) _ 29
• Specified Wildlife Management Plan	90 (2007) _ 170
• Certified "Ecofarmers"	110,000 (2007) _ 200,000 (2009)
• Awareness rate of the term "Biodiversity"	30% (2004) _ 50% and more
• Species to be protected by Law for the Conservation of Endangered species of Wild Fauna and Flora	73 (2004) _ 88
• Hands-on activities in rural villages for elementary school children	23,000 schools

second body describes measures in line with the characteristics of individual regions under the title of Measures and Policies for Local Areas, which is divided into five sections: Forests; Countryside and *Satochi-Satoyama* Areas; Urban Areas; Rivers and Wetland Areas; Coastal Areas and Oceanic Areas. Chapter 2 "Cross-Sectoral and Fundamental Measures and Policies" has seven sections: Conservation and Management of Wildlife; Sustainable Use of Genetic Resources; Communication and Implementation; International Approach; Information Management and Technology Development; Efforts against Global Warming; Environmental Impact Assessment. In total, Part 2 has 16 sections.

Specific measures and policies are itemized with clear indications of the contents of the measures and policies to be implemented and the ministries and agencies in charge of implementation. Numerical targets are also set if possible so as to make descriptions more concrete.

Part 2 shows about 660 specific measures and policies in total, for 34 of which numerical targets are included. The below are examples of those targets:

- Add ten more inscribed wetlands under the Ramsar Convention to the current 33 sites (Ministry of the Environment)
- Increase to 170 Specified Wildlife Management plans based on Wildlife

Protection and Appropriate Hunting Law from 90 plans as of November 2007 (Ministry of the Environment)

- Increase the number of certified "ecofarmers" to 200,000 by the end of 2009 from 110,000 as of September 2006 (Ministry of Agriculture, Forestry and Fisheries)
- Increase the awareness rate of the term "biodiversity" to 50% and more from 30% as of 2004 (Ministry of the Environment)
- Promote hands-on activities for elementary school children to stay in rural villages for about a week and develop conditions of acceptance, aiming at participation of 23,000 schools (1.2 million students per grade) in five years (Ministry of Internal Affairs and Communication, Ministry of Education, Culture, Sports, Science and Technology and Ministry of Agriculture, Forestry and Fisheries)

The Third National Biodiversity Strategy of Japan has the following features:

1. It was set up as an action plan that included as many targets and indicators of individual efforts as possible so as to represent a clear path towards the implementation of the Strategy
2. It lists the tasks of individual ministries as clearly as possible, the Strategy arranged them in groups under the categories such as coastal area, oceanic area according to the respective roles of ministries
3. It describes biodiversity in relation

to human life to help the public easily understand the concept

4. It provides the image of a long-term target for ecological management of national land under the so called "Centennial Plan", in particular referring to its relation to global biodiversity
5. It suggests that local governments, private enterprises, NGOs and the people should be encouraged to participate in the activities

Towards the future

Awareness of biodiversity is increasing internationally as biodiversity includes effects of global warming and our life largely depends on natural resources. Japan needs to further increase efforts based on the Third National Biodiversity Strategy.

Although the National Strategy is a plan of the government, active efforts by a wide range of actors are essential to realize conservation and sustainable use of biodiversity. We, the government, are determined to enhance the cooperation between ministries concerned and implement steadily the measures and policies responding to the Third National Biodiversity Strategy, while increasing various parties' (including citizens and private companies) awareness of "biodiversity" to promote proactive actions.

Japan is also offering to host CBD/COP10 in 2010 and will continue to contribute to global conservation and sustainable use of biodiversity.

The First Prefectural Biodiversity Strategy of Chiba

Environmental and Community Affairs Department, Nature Conservation Division
Chiba Prefectural Government

The first prefecture government biodiversity strategy in Japan was adopted at 26th of March 2008 in Chiba Prefecture, with the overarching philosophy of "Handing down the riches of biodiversity to our children" in order to conserve biodiversity through close cooperation and collaboration with citizens, NPOs, experts, as well as government.

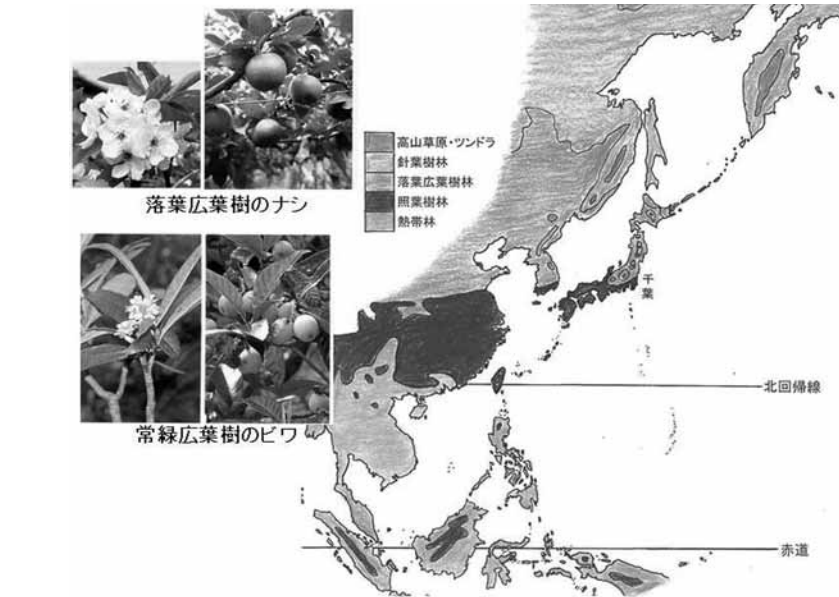
Background of the strategy

Chiba, one of 47 Japanese prefectures, consists of 5,157Km² of land, forming the Boso Peninsula that sticks out from the middle of Honshu Island into the Pacific Ocean. Surrounded by the sea on three sides, and possessing mild climate and fertile soil, this land has long supported rich biodiversity. For example, its some 2,700 species of vascular flora rival that of the whole of Germany.

Being located at an Eastern fringe of the Asian continent that is washed by both warm and cold ocean currents, this area received biota of various origins from tropical to boreal. The northernmost spawning river for chum salmon on the western Pacific coast is in Chiba.

Such rich biodiversity has supported local human life for a very long time. As a matter of fact, Chiba has the highest density of Neolithic shell mounds in the world. Rice cultivation that dates from around the first century has gradually shaped a sustainable farmland landscape that has come to be referred to in the form of *satoyama*. Similarly, wisely and sustainably used seashore and lakes are known as *sato-umi* and *satonuma* respectively.

Industrialization and urbanization, however, caused considerable deterioration of the biodiversity and landscapes of Chiba in the last century. A decreasing population in the primary industry resulted in the abandonment



Chiba is located in the middle of Honshu Island and forms a peninsula with mild climate and fertile soil

and consequent devastation of *sato-yama*, *satonuma* and *sato-umi*. Accordingly, the traditional culture - rooted in the natural environment - also started disappearing. In addition to these, global warming presents another unignorable threat to biodiversity.

Considering that every single organism on earth is a consequence of 4,000,000,000 years of evolution of life, the current biodiversity crisis cannot be overlooked. With a population of more than six millions, roughly equivalent to that of Israel, Chiba Prefecture cannot ignore its responsibility towards biodiversity conservation. To address this issue, The First Prefectural Biodiversity Strategy of

Chiba was drawn up, followed by two year of thorough discussions among experts and people of diverse lifestyles and livelihoods.

Overview of the strategy

The strategy employs three major viewpoints or approaches which consist of:

- A comprehensive approach to address both climate change and biodiversity;
- Taking into account people's various lifestyles and livelihoods; and
- Integrating biodiversity into every policy development and implementation.

The strategy is also characterized by its participatory development process. The strategy was elaborated by citi-

zens during dozens of meetings with more than 2,800 participants from its very beginning. This participatory planning process of the strategy was named Chiba method.

The strategy's overarching philosophy is "Handing down the riches of biodiversity to our children" and with three specific goals namely:

- A society which embraces the diversity and interconnectedness of life;
- A sustainable society that recycles biological resources; and
- A society where humans and nature live together in harmony.

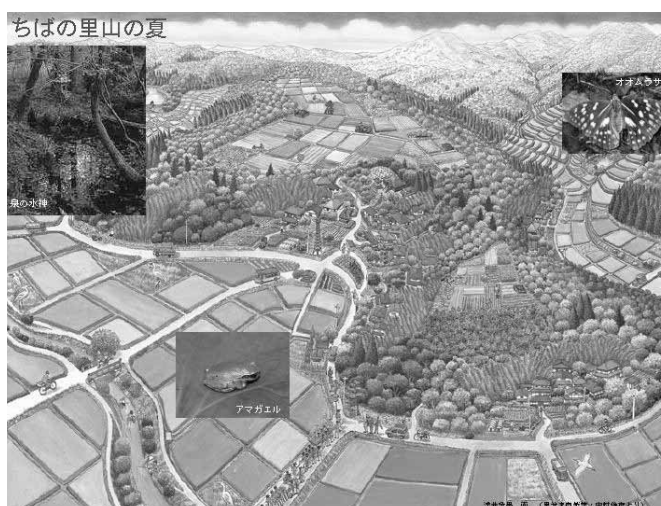
The strategy also specifies policy directions to be implemented by the prefectural government:

- Conservation and restoration of biodiversity through the promotion of countermeasures against global warming, conservation and restoration of various type of ecosystems, management of wildlife, and control of alien species and genetically modified organisms;
- Sustainable use through promoting sustainable use of biological resources by primary industries, improvement of regulation and stabilization functions of ecosystems, preserving culture and health of mind and body cultivated by biodiversity, and development and use of bio-indicators;
- Research and education through promotion of research and monitoring activities concerning biodiversity and popularization of biodiversity education; and
- Institutional development through establishing Chiba Biodiversity Center, collaboration with various stakeholders, and enactment of regulations.

Chiba prefecture government will try to implement this strategy in collaboration and cooperation with various stakeholders including national government, municipalities, private sectors, schools and other educational institutions, experts, citizens and NPOs in the region.



Chiba is surrounded by the sea on three sides and its coastal environment is very rich in biodiversity



Satoyama in summer in Chiba



Satoyama in autumn in Chiba

Home Building with Artisans: Helping Rebuild Forests

Kiyotaka Suzuki

Director, Head Office of the Association of Creative Tokyo House for the Future



Members joining in the cutting down of a Japanese cedar



Building a house with Tokyo timbers - the framework completed



Planting a ceremonial tree in a mountain in Tokyo

Philosophy

Few people seem to know Tokyo has forests or the fact that about one third of its land area consists of forests. In particular, the Nishitama region has long engaged in vigorous forestry operations. Traditional Japanese houses used to be built by local artisans using local wood. The use of locally produced timbers would help renew local mountain forests and protect the urban

environment downstream as a result. However, this cycle has ceased functioning due to the rise of cheap exported timbers and new construction methods. With forestry going into a steady decline, the mountain forests of this country have been ruined, and those in the Nishitama region in particular are about to disappear.

It all started when Tokyo was struck by heavy snow and the mountains suffered severe snow damage about 20 years ago. Teams of weekend volunteers started working on the mountains and through these activities they developed collaborative relationships with forest producers and gradually became completely attracted by the mountains. Among these volunteers, those involved in the building industry set up the Association of Creative Tokyo House for the Future ("ACTHF") in April 1996. The objective was to build hous-

es with timbers produced in Nishitama, Tokyo, to help regenerate forests and mountain forests and conserve the urban environment. The ACTHF is not merely driven by the desire to increase the demand for wood - it also seeks ways to make home building more transparent by promoting vigorous cooperation between forest producers, timber merchants, architects, builders and home owners. It was incorporated as a cooperative in September 2001.

The ACTHF set forth the following cooperative philosophy:

1. We aim to promote the building of environmentally-friendly houses using living wood and the skills of artisans that give life to the material;
2. We aim to promote the mutual understanding between those living at the foot of mountains and urban residents downstream to build hous-



A house built with Tokyo timbers

es with a renewable material - wood - to help bring the blessings of nature to the urban environment, regenerate mountain forests and thus conserve the natural environment in Tokyo; and

3. We aim to promote coordinated home building efforts through direct communications between forest producers, timber merchants, builders, architects and home owners.

This philosophy has not changed since establishment in 1996, and will remain effective in the future.

Sharing the philosophy

The ACTHF links the mountains with cities, consisting of members from upstream (forestry producers and timber merchants) and those from downstream (builders, architects and home owners). Its Head Office receives various inquiries, from those keen on

building their houses with natural materials to those who need healthier houses for their atopic children. We always ask home owners what they want from their house to give them a chance to stop to think about what they really want from their house. Once the design process has started, they may be too involved in details to keep the whole picture. We know for experience that taking time to let them do this before starting the design process makes the whole process much smoother.

People in the building industry and home owners might have certain knowledge about wood as a building material, but may not be very familiar with how trees are grown and become timbers. We invite them to visit the mountains to see how Japanese cedar sugi and cypress hinoki are grown and taken care of before becoming tim-

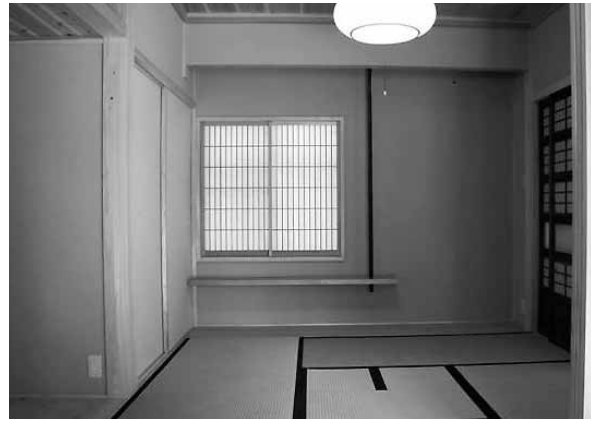


Wooden frames under the roof

bers. Looking at the bark and shapes of branches, observing how trees are maintained, harvested and sawed, experiencing thinning and planting - all these activities help them understand the simple and precious fact that trees are grown for decades with the help of humans before they are turned into timbers. Through these experiences, people gradually come to understand that wood has a life of its own as a



Interior view of a house made with Tokyo timbers

Japanese style *tatami* room

material. We also introduce forest producers and timber merchants to architects and home owners to ensure they are motivated by the positive feedbacks from home owners - a huge change from the conventional modern practice.

Home building system and sales channel

We have built about 100 houses since the establishment. On average, it takes about 6 months from the beginning to the completion of work. We ask home owners to spare enough time for us to prepare wood before starting the work. We invite them to the mountains and to the timber merchant to deepen their understanding and in the spring, after the completion of their houses, we invite them to the mountains again to plant commemorative trees by themselves.

We have not made any particular PR efforts. People come to us because they learn about our activities from the media, such as magazines, books and the Internet. While we are aware that we may need to make ourselves known a little more, we also believe people who really need us can somehow reach us - we will continue to be this way.

Public education

We adopt a membership system through which members are invited to

join on-going site tours, visit newly completed houses, have hands-on mountain work experiences and participate in various other events. Interested non-members are also invited to these events which may be available at the time of inquiry. We also issue a bimonthly newsletter "Fudoki" and provide bimonthly lecture sessions called "Home and Forests." All these events and publications are aimed at promoting communication between members and further developing their understanding towards mountain forests and home building. The owners of newly completed houses actively participate and collaborate in these activities - they are a precious asset of the ACTHF and represent the success of our activities, as they always think, give advice and take actions regarding how sustainable and recyclable mountain work and home building should be.

Ongoing initiatives

One of the initiatives we have taken is a joint research on LCA (life cycle assessment) for wooden houses. We have been engaged in it for the past 5 years as part of an industry-government-academia collaboration with Tokyo Norinsuisan Shinkozaidan (Tokyo Agriculture, Forestry and Fishery Promotion Foundation) and Tokyo University of Agriculture and Technology. In this research, we focus on environmental loads induced during

the whole home building process (i.e. from production to disposal).

As a project to revive Tokyo forests, we have launched the "TAMAKI" brand, which represents a novel concept of creating a sustainable recycling society. The brand color is hunter green, and the word "TAMAKI" means a ring, circulation or cycle in Japanese, which rhymes with "*Tama no ki*" meaning "trees in the Tama region". Various products made of wood and other materials produced from forests in Tokyo will be designated under this brand. Purchasing the products of this brand is expected to help protect forests, as well as our lives, support the forests and ultimately contribute to the prevention of global warming.

Fundamental issues

When the ACTHF was founded about 10 years ago, the building industry expected wood to be one of those homogeneous and dimensionally precise member materials that should be delivered straightaway at cheap prices. The real challenge for the ACTHF did not lie only in winning customers but in choosing either to accept this industrial attitude as it was and get on with it or to seek ways to change the attitude, however hard it would be. We chose the latter path. It seems that many other wood promotion initiatives have taken the former, and as a result, the

sales of wood products have increased. On the other hand, what happened to our forests and local economy, builders and artisans? The ACTHF has been struggling to a certain extent, but never changed the original course of action. Aiming to supply wood in a sus-

tainable way, we are still in the process of establishing a system that will allow deeper understanding by home owners, effective utilization by carpenters, efficient processing by timber merchants and sustainable production by forest producers. Fortunately,

we are winning customers, even though not many. We will stay committed to the promotion of wood utilization with new perspectives and home building by artisans.

A Home Owner Talks about Being Part of the ACTHF

I heard about the Association of Creative Tokyo House for the Future (ACTHF) from my sister, who learnt about their activities while listening to the radio. At that time, I was planning to have my 60-year-old house rebuilt with domestic wood and wondering how I could go about it. As a matter of fact, I did not know that forestry existed in Tokyo. I of course knew we had forestry in Japan, but did not care that much about it to be honest - I had this vague image of mountains naturally growing forests on their own or something.

Having become a member of the ACTHF, I started visiting mountains and participating in various programs. I gradually came to know that mountains and forests needed our care and realized their conditions were closely linked with cities downstream. After I decided to commission the rebuilding of our house to the ACTHF, I was very excited about having a new house and, at the same time, felt that I was assuming some sort of a social role in my small way. I grew interested in mountains and forests.

They say "wooden houses are forests in town." I found it true after seeing for myself the process of using wood everywhere in the house, from structural frames to the interior finish. I was also amazed to see how alive wood really was even after incorporated it into the building - the cracking sound of pillars and beams during dry winter and the disappearance of gaps between floor boards in the rainy season at the beginning of summer all made us realize wood was still breathing, shrinking and expanding. The house consists of wood that is alive - it is indeed a "forest in the town."

It's been about 18 months now since we moved into the new house. The colors of pillars and floor boards are already different from they were at the time of completion. We seem to be accustomed to the scent of wood at home, but our guests always mention how nice it is. I'd like to take care of my house and keep this "forest in the town" healthy for as many years as possible.

I also appreciate the efforts of the architect and artisans, who revived some of the items used in the old house - like old balustrades and shoji screens. The old pine tree in the garden was also reborn as a material for the new house. All these would have not been possible if I had not joined the ACTHF.

I did not imagine my personal experience of having my house rebuilt would help save forests, rivers, cities and the sea, even though in a very small way. I will keep enjoying being part of the ACTHF activities.

The Association of Creative Tokyo
House for the Future
Head Office: 9-1-7-102 Kabemachi,
Oume City, Tokyo. 198-0036
Phone: +81-428-20-1088
Fax: +81-428-20-1099
www.forest.gr.jp office@forest.gr.jp

*31 Professional members
(10 forest producers; 1 timber merchant;
10 builders and 10 architects)*

Targeting Sustainable Society by Utilizing Used Timber and Old Buildings

Kozai Bunka No Kai (Association for the Preparation of the Bank of Reusing Timber)



Beautiful design of a Kyoto machiya, the traditional tradesman's house style preserved in Kyoto

Introduction

Buildings are the closest constituents of the environment surrounding us. They are doubtlessly materials but at the same time parts of our mental environment. Conservation of buildings contributes to the conservation of the cultural landscape, thus leading to the conservation of our environment. Based on such views, the Kozai Bunka No Kai is taking actions with the following three objectives:

1. Promoting the preservation and utilization of old buildings and used timber as part of the Japanese architectural culture;
2. Promoting succession and development of traditional culture of wooden architecture and architectural techniques; and
3. Aiming at a sustainable society that can preserve natural resources.

We have been working on how to uti-

lize architectural waste materials including old timbers and plasters and how to preserve and utilize old buildings so that they do not become waste. Our ultimate goal is to achieve a sustainable society through these activities.

Wooden architectural culture in Japan

Japan has wide forest areas occupying some seventy percent of the country. Japanese people have fostered wooden architectural culture utilizing rich forest resources and natural materials including plants for thatching. The Japanese climate is generally characterized by relatively high-temperature and high-humidity with a large amount of precipitation, so wooden architecture based on a framework of linear parts (column, beam, etc.) and inclined roof have been developed. The main parts of the spatial construc-

tion are the roof, columns and beams. Eaves are long and the wooden floor is built with a veranda, resulting in an open structure that connects the building softly with the outside world. The ability to control humidity of the natural materials used in the wooden architecture (timber, plaster, etc.) contributes to improving the housing environment characterized by high humidity in Japan.

Shrines and temples in Japan are very much affected by the Chinese architecture which was introduced in Japan initially with Buddhist architecture among others. In addition to foreign influence, simple and elegant designs, carefully selected materials for each part and detailed fine techniques have been developed to form an architectural style specific to Japan. Characteristics of Japanese traditional architecture are the harmony with nature, focusing on horizontal lines rather on vertical ones and occasional deviation from symmetry.

On the other hand, folk dwellings - residence of ordinary people - are influenced by various factors including regional nature, history, society and lifestyle. They show distinct regional characteristics and contribute to the richness of architectural styles and spatial constructions. Folk dwellings were basically built by local workers using local materials and techniques, so they show regional characteristics with planes, structures, exteriors, designs, materials and facilities adjusted to the regional climate and lifestyle. Similar tendencies can be observed in town houses that are the residences of merchants and craftsmen.

In Japan's traditional architecture, people changed the details of their houses adjusting them according to the four seasons to make space rich and comfortable. In the summer, removable doors and windows were replaced by those with good ventilation characteristics. The interior space of houses became thus open to outside and adjusted to summer. The architectural style made life comfortable and life inside improved the appearance of the architecture. Such good relationship between architecture and residents is the basis of the architectural culture of Japan.

Folk dwellings and town houses used to be built on the assumption that they will be handed to the following generations. Everyday life, annual events and ceremonies in life (wedding, funeral, etc.) are handed to the following generations along with related equipments. The workers who built and maintained the buildings lived in the same region. Generally, families used to live in the same houses for a long time with occasional extension and repair even after some changes in their lifestyle. It was also common to rebuild old houses and to reuse timbers for various purposes. Life and society were really based on recycling and succession.

Not only old shrines like Horyuji temple in Nara that was built more than 1500 years ago, but also old folk dwellings and town houses prove that they can be used for more than one hundred years if they are built and maintained properly.

Current status related to wooden architecture and changes in cultural values

Originally, Japanese wooden architecture was supposed to require only occasional maintenance. Builders and workers, who built the house, maintained it afterwards. The human network in the region contributed to the longevity of housing. There was a social system that did not allow to dispose of buildings easily.



A traditional house style called *Gassho-zukuri* with steep thatched rafter roof

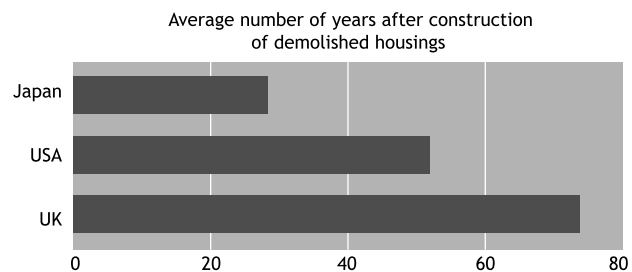


Figure 1 : Japan: Statistical survey on housing and land (1998-2003)
USA: American Housing Survey (2001-2005)
UK: Housing and Construction Statistics (1996-2001)

But after World War II, simple housing increased rapidly in order to solve the problem of insufficient housing. In the era of rapid economic growth, overpopulation in urban area and depopulation in rural area accelerated and nuclear families and single households increased rapidly. The society changed from one that uses things carefully into one of mass production/mass consumption/mass disposal. The lifestyle and set of values changed enormously.

The style of housing changed according to the social and economic changes mentioned above. Building companies who regard housing as a commodity gained power. Housing that was created by the techniques of workers in the region changed to a consumer product provided by the economic system called the "housing industry". As a result, the average age of demolished

houses in Japan is thirty, which is low when compared to the USA and UK.

In recent decades, architecture and living environment in Japan have become comfortable. Rational functionalities and physical comfortableness have been adjusted to improved design technologies and mechanical equipments like air conditioners. But mental comfortableness and cultural richness are lacking. The depth and warmth that houses get after people have lived in them for long and carefully are lost. Current houses only show temporary characteristics.

Nowadays, people do not pay attention to careful maintenance of houses, including daily cleaning. This is one of the reasons why buildings need to be rebuilt more often. It is necessary for the whole society to generate people's

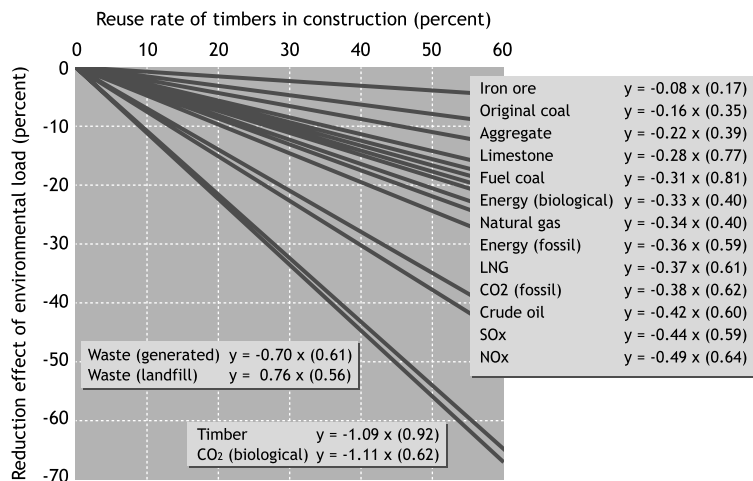


Figure 2 : Kozai Bank No Kai: Effect of rebuilding folk dwellings on reduction of environmental loads and costs

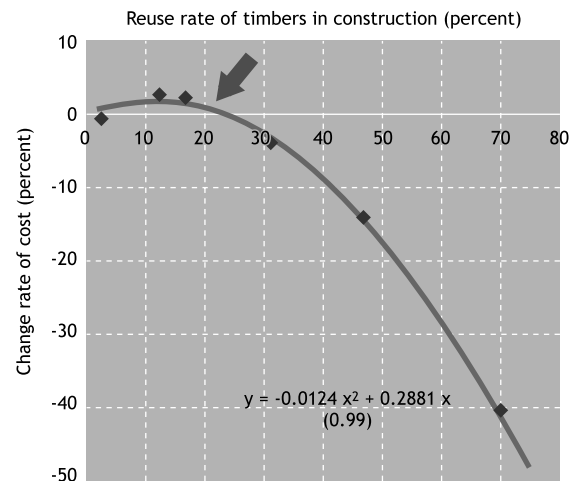


Figure 3 : Kozai Bank No Kai: Effect of rebuilding folk dwellings on reduction of environmental loads and costs

interest in saving housing and the resources constituting them.

Buildings, including houses, are basic elements of the regional landscape and culture and are important also from an educational point of view. As housing is a big social property, it is important to promote the utilization of existing high-quality housing to protect Japanese architectural culture and to work on the social issue of accomplishing longevity of buildings. Protecting existing buildings is not enough. We must also improve the longevity of newly constructed buildings in order to sustainably use domestic natural resources, including forests.

Reduction of the environmental load by rebuilding old folk dwellings and utilizing used timber

Conserving traditional architecture and historical cityscape can also contribute to preventing global warming. As mentioned before, timber was used in Japan in numerous phases. Buildings were used with occasional repair and improvement. Constructional materials were reused as secondhand materials and then used to make fittings and furniture. Such long-term usage of timbers enabled a recycling system that allows trees to grow up meanwhile. But because many buildings with a short

life were built by using resources from overseas, forestry in Japan declined and many villages in the mountain area that produced recyclable resource of timber were destroyed.

Living in a traditional building might be uncomfortable, even dangerous in some cases. Traditional buildings that became inadequate for living can be recycled to a comfortable housing of good quality by using the original framework. Elements of old folk dwellings can be used as constructional material if removed carefully. Used timbers that are damaged and cannot be used as constructional material can be reused as raw material for furniture.

Reusing timber contributes to the direct effect on the environment, including reduction of disposal. But it also reduces energy consumption and the amount of CO₂ generated in the process of producing new materials. This is an indirect environment conservation effect.

Figure 2 shows the results of a survey conducted by a researcher at our association on the reduction effect of the reutilization of timbers in recycling construction. It shows that higher reuse rates result in a bigger reduction of timber consumption, CO₂ (biological)

emissions, waste and landfill utilization. The amount of CO₂ (biological) emissions is the amount of CO₂ emissions mainly generated by the incineration of waste timber. Additionally, we can reduce the consumption of energy resources (crude oil, natural gas, coal, etc.).

The results of the survey on the cost comparison between rebuilding of folk dwellings and demolition/new construction are shown in Figure 3. Rebuilding utilizes more than twenty percent of the used timber of old folk dwellings and thus it is more economical than constructing a new building of the same size from the scratch.

Rebuilding old folk dwellings and utilizing used timber contributes to the reduction of environmental loads and is also rational from an economic point of view. We hope that our activities of utilizing architectural waste materials including old timber and plaster contribute to the creation of a sustainable society. We cannot hand a dirty global environment to future generations. We continue our activities with a strong will to solve current environmental issues responsibly. As for the activities of our association, please visit our website:<http://www.wood.jp/kbank/index-e.htm>.

About the Cover

“山川草木悉皆成仏” reads “San-sen-sou-moku-shikkai-joubutsu” and describes a traditional view of nature in Japan. It means “the mountains, rivers, grasses and trees all have Buddha Nature”. In other words, Buddha Nature (the enlightened consciousness of the Buddha) is immanent in all nature elements. This view is also deeply influenced by ancient Japanese religion, Shintoism. (see page 32)

Afterword

Biodiversity is closely related to cultural diversity and it cannot be discussed in a vacuum. One of the ambitions of this publication is to profile these cultural, historical, and even religious aspects of biodiversity which, we believe, have hitherto not been sufficiently illustrated or discussed in Japan.

We don't intend to present that the views and actions presented in this publication are the best or the only way, but we rather want to put them on the table to stimulate further discussion from a wider audience.

We sincerely hope that this publication will contribute to exploring more creative and innovative approaches to conserving biodiversity globally.



Naoya Furuta

Member of Editorial Committee
Biodiversity Network Japan

ABOUT BIODIVERSITY NETWORK JAPAN

Biodiversity Network Japan was established in 1991 by biologists, politicians, attorneys, journalists and citizens to disseminate and facilitate biodiversity conservation. Its mission is to conserve biodiversity through scientific research, policy advocacy, training, and dissemination of scientific knowledge. As a member of IUCN - The World Conservation Union, Biodiversity Network Japan works in close collaboration with experts and institutions around the world. Some of its achievements include organizing a series of symposia on global warming and invasive species, convening expert meetings, dispatching research missions, coordinating eco-tours and producing publications.

<http://www.bdnj.org>

ABOUT COUNTDOWN 2010

Countdown 2010 is a powerful network of active partners working together towards the 2010 biodiversity target. Each partner commits additional efforts to tackle the causes of biodiversity loss. The secretariat - hosted by the World Conservation Union (IUCN) - facilitates and encourages action, promotes the importance of the 2010 biodiversity target and assesses progress towards 2010. An Assembly of all partners meets annually to review the overall direction of Countdown 2010. In its implementation, Countdown 2010 is guided by a core Advisory Board.

<http://www.countdown2010.net>

ABOUT KEIDANREN NATURE CONSRVATION FUND (KNCF)

The Keidanren Nature Conservation Fund (KNCF) was established in 1992 and authorized as a public trust by Japanese Government in April 2000. The Sumitomo Trust & Banking Co., Ltd. was selected as the Trustee of the Fund. After its establishment, a lot of corporations (mainly Nippon Keidanren member corporations) and the general people have been contributing donation to the Fund on the approval of substance of KNCF. The KNCF has continuously supported the nature conservation projects every year with about the total amount of ¥200 million (JPY). The KNCF raises applicants for the Fund on this Web Page every fiscal year, and Project Selection Committee has assumed the rigid responsibility of appraising and selecting supported projects among submitted applications.

<http://www.keidanren.or.jp/kncf/en/>

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