

Comparative eco-resource utilization studies in Asia: Poor management in rich areas and wise use in poor resource areas

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Abstract: Tropical rain forests in South East Asia were once the richest forests in the world. But because of the loggings from 1950's, almost all the good resources were lost now by excessive exploitation without any consideration of sustainability. On the other hand, in the poor resource areas like high mountain areas in Eurasian continent or small remote islands in the Pacific, well-thought sustainable utilization of eco-resources were conducted for generations. There are several attempts showing ideal eco-resource utilization in temperate and tropical areas by the people's own efforts. In the eastern part of Yunnan, China, the villagers started eco cultural village to conserve their historical village and surrounding fine landscapes. These projects were established by the villager's bottom up wish to keep their own culture and resources. In the Kitayama forest areas in Kyoto, Japan, foresters were producing beautiful timbers by planting high density with high pruning techniques. Slow growing of taper trees and artificial waving on the surface of polished pillars were originated from there. Ladakh in northern India, people using small amount of wood resources with careful management. Developed areas need to learn from indigenous people's way of simple life.

Key words: Eco-resources, tropical rain forests, sustainability, indigenous people

Introduction

South East Asia (SEAsia) and East Asia are the highest population areas in the world. Drastic change of environmental issues were seen in these areas after 1950's. Tropical rain forests in SEAsia were once best forest resource area in the world before 2nd World War. But after independence of tropical countries, the heavy logging operation caused the big loss of biodiversity in the area. On the other hand there are still maintaining sustainable way of life in the remote parts of the region where the simple and harmonious life together with nature is still continued. In the former case, destruction of the rich area was so quick to lose most of the good forest sites within 50 years. Whereas in the latter case, poor resources are well maintained for their simple way of life. With increasing population, we need to consider how to live in the future. Since the high economic growth could not be expected any more, we have to learn from indigenous people's way of living.

In this paper, I am focusing on the comparative studies of two extreme areas; rich tropical areas and poor resources area in the remote region, and think over important role of harbor cities in between them.

Materials and Methods

I have been working in South East Asian tropical rain forests in more than 40 years starting from 1965. Field works have been carried out in Indonesia, Malaysia, Brunei, Philippines to measure biomass in the forests and continuous measurement of thousands of trees in the survey plots. Part of the results were summarized in my book (Yamada, 1998). During that time, I have also conducted interview of the surrounding people in the sites and found the rich tropical timber resources have gone within 20 years (Yamada, 1995).

After tropical areas, I have started my works in other type of the areas such as high mountains and small islands where amount of resources are very poor. There I found sustainable way of resource management in Ladakh in India, and Aru in Indonesia, Kitayama in Japan and Yunnan in China (Yamada, 2000; 2006).

Based on those long term research experience, I come to think over the concept of eco-resources. Eco-resources is

a fundamental resource management concept as shown in Fig. 1. Eco-resource is divided into three parts, one is global environmental issues and second is a biodiversity. Third one is more important related to the human behavior, named human eco resources, which is divided into three parts, i.e. one is life resources, second is eco cultural resource, and the third is spiritual world. The most important is the central eco cultural resources. Most of the natural scientists who have been working in the global environmental issues have been concentrating only in the natural phenomena for many years. Only recently interdisciplinary studies of natural science, humanities and social sciences, are conducted. I have been working in many areas based on this concept for more than 20 years. All the materials come from my fieldwork.

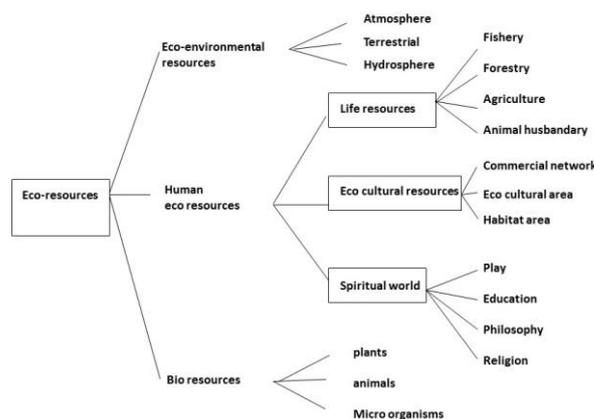


Figure 1. Diagram of eco-resources concept

Results and Discussion

Disturbance of tropical rain forest in Southeast Asia after 1950: My first step on SEAsia tropical rainforest was 1965 to make botanical collection trip to Thailand, Cambodia and Malaysia. At that time the destruction of the tropical rain forest was not so severe. In 1969 to 1970, I spent one year in Bogor National Biological Institute where I had my Ph.D. field work in Mt Pangrango, Java, Udjun Kulon, Sumatra and East Kalimantan, the logging has just started in East Kalimantan but not so severe. But

after 1970's, the logging of tropical rain forest in Indonesia and Malaysia has spread with enormous speed especially in Borneo island which is the center of rich resources of tropical timber. For cutting Dipterocarp trees, of which straight bole is suitable to make rotary veneer, most of the areas has been designated as a concession and production sharing system was engaged. The logs were mostly sent to Japan and used for building construction. Japan, at that time, was a bubble economic era so the demand of the logs were never stopped. In the late 1980's, almost all the good forest sites were logged over and Indonesia declared ban on log export. But for inner saw mill, the loggings were continued and they saw in their own sawmill and export to outside (Fig. 2). Because of the heavy logging of the area, export amount of log from this area is reduced now and many major logging companies seek their resources out of the area. In 1988, huge scale of fire occurred in the Borneo island which spread all over neighboring countries and 40,000 people are suffered at one time. This fire is still occurring even nowadays.



Figure 2. Mega rice project sites of peat swamp forests, Central Kalimantan, Indonesia

Tropical rain forests of SEAsia were the richest bio resources in the world. Fine Dipterocarp trees are really the treasure of the area. Since it was abundant in natural condition, people never think sustainability. Even there are some sustainable management system like Malayan system was considered but not widely adopted. In 1969, wherever we go, we could see beautiful rain forest, but now, it is very difficult to find such good forests. We lost one of the most important biological heritage within 50 years.

Eco-resource management of poor resource areas in the frontier area of Eurasian Continent and remote island in the Pacific

(I) Ladakh-Shangrila in the sky: After tropical SEAsia, I shifted my interest to remote area in Eurasian continent. Here I show the field work in Ladakh, which is located in the mountain top of India surrounded by Pakistan and China. Before Ladakh, I have been working in China from 1990's and Yunnan and Tibet were my major field. To compare the situation of Tibet, I have visited Ladakh to see their life and eco-resources. Ladakh is a high mountain areas beyond Himalaya and very dry area with little rainfall. Cold temperature and dry land means scarcity of bio resources. Almost no original forest, except for

Juniper. People are planting willow trees and poplar trees along the river. They use their farm land to plant willow seedling with dense spacing and the stems were cut so that coppices are to be grown. These coppices are collected to use for ceiling. For the bigger branches, which are used for roof supporter are trimmed every year. At the first year, they cut down smaller size branches so that remaining branch became much bigger. And the second year, they cut bigger branches. For the bigger stem which is used for the pole of the house is also taken from the bigger coppices of poplar trees. For this purpose, main stem is cut and multi stems are produced. Water is only available near the stream. To maintain good water resources, one family who are succeeded from their ancestors are responsible to maintain of water canal and plant willow trees along the stream (Fig. 3).



Figure 3. Cutting willow tree branches in Nyemo, Ladakh

Before entering the Ladakh, I thought it is difficult to get wood materials for daily life. But because of their scarcity of natural resources they tame their minor resources as much as possible. They are all belong to Tibetan Buddhists. Their temple- Gompa is always located in the deep valley. When we reached the temple, we found many trees are planted along the stream and all well maintained. The location of Gompa is splendid. Most of them are built on the hill top or slope which is surrounded by the gigantic snow mountains. People are very religious and doing very humble and sustainable way of life.

(II) Aru islands: Aru islands are located south of New Guinea Island, Indonesia, which is the second largest island in the world but Aru are the gathering of small island which means the area producing resources are not big enough if it is not well maintained.

People of Aru have their own regulation called *sasi*-which is widely known in Wallacea region (Akimichi, 1995). In the case of Aru, almost all the eco-resources are setting *sasi*, e.g. birds of paradise are not allowed to hunt all year round. This is the most valuable resources in the island so they have strict regulation for stop hunting every 2 months. Similar moratorium is set for bird's nest. Bird's nest here is easy to approach which can be found under the ceiling of lime stone cave just behind the mangrove. The ownership is clear and people watch the outside invaders during *Sasi* period, Sea cucumber, hawksbill turtle, Sago and even planted coconuts and Rambutan have their own *sasi*.

Sasi is a unique autonomous regulation aiming not too much disturbance of the natural life cycle. The real sustainable way of living is found in these small islands. To maintain small amount of eco-resources in small land, this kind of self regulation seems most favorable for the small community. No outside regulation can be adopted in the area (Fig. 4).



Figure 4. Sago palm in Aru

This similar attitude to minor resources are also found in indigenous people life in SEAsia. For instance, Penan, who are originally hunting gatherers in the tropical rain forest of Borneo island, have similar sustainable way of life. Although most of the Penan people are now settle down in one place, there are still some people who are moving around the forests. Since they have to move one place to another, their daily materials are limited and no odd things are around. Only very necessary things they carry and found animals and plants needed in their life.

Their knowledge about the forest are deep and wide. Almost all the plants and animals are known to use as a medicines, foods, materials for daily life. They never cut too many trees, not take too much fruits and animals. They know their consumption capacity. Since there are no ice box in the forest, they have to consume what they get in the day. This is quite natural attitude because if they don't think sustainability, they can not survive.

Once they get some products, they share equally in the community. There are many important habitat of them, in which they name the place with their memory and keeping their position always in the forest. Their way of wandering in the forest is not arbitrary. They know where their necessary products are found and remember the place with naming the spot. These life style is found even in the traditional forestry area in Japan.

(III) Kitayama forestry: Kitayama forestry area is located at the north western part of Kyoto city, central Japan. This area is covered by the medium size mountains between 500-1,000m level and people here once engaged in the shifting cultivation on the steep slopes. In the primary forests in the area, Sugi (*Cryptomeria japonica*) is the main species which grow mixed in the broad leaved trees. From the stump of the big size Sugi more than 1m diameter, coppice shoots can grow. First stage of forestry practice are started to cut these coppice pole for construction in 600 years ago (Fig. 5). With the demand of Kyoto city house construction, most of the houses are built

by using Kitayama forestry timbers. People in Kitayama area create new technology to polish the pole by natural sand which is only found in nearby Bodainotoki waterfall area. Sand is granite origin and when it is used to polish the surface of timber, grain of the sand became smashed and fine brilliant surface of the pillar is appeared. To grow straight good pole, they plant seedling densely as much as 10,000 tree per ha. Frequent thinnings and prunings are carried out until harvesting time for 40 years. The land is not fertile but rocky soil which is good for slow growth and non-nods good timbers are harvested.



Figure 5. Old stump of Kitayama Forestry Area

I have been visiting this area frequently with many guests from abroad. They are surprised to see the beautiful landscape on the steep slopes on both sides of Kiyotaki river. German forester was very much impressed to see in such a steep slope plantation. In Germany, they can never plant trees in such steep slope condition. Final products peel off bark, sand polished and wrapped carefully and sent to Kyoto.

Many carpenters have personal connection with producers and come to buy with their own taste and built beautiful wooden house called Sukiya zukuri. There sometimes found waving on the surface of timber, which is called Shibo. Eighty years ago, people create new technology to make this waving on the surface of timber wiring small pegs on surface of timber 2 years before cutting. This make artificial waving and be sold 4-5 times higher price than ordinary timbers. Most of the plantation is now using cuttings from the mother trees. The mother trees are well treated and make special shape as called Dai sugi. This special shape tree is used for Japanese garden in many temples and private gardens in Kyoto. Small sized timber called Taruki is also obtained from the stump and specially used for tea room.

Kitayama was once the richest forestry area in Japan as well as in the world. Their way of forestry practice is always based on their daily observation and practices in the forests. Their deep insight to the forest and create new technology make unique artificial forestry area. Whenever I visited Kitayama forestry area, I found very thoughtful local practical knowledge are succeeded in this area for generation to generation.

(IV) Eco cultural village in Yunnan: Yunnan is located at the south western part of China bordering to continental southeast Asia. There are nearly 50 minority groups living

in the mountains and in the basins. They have own autonomous policy and keeping good tradition. One 600 year historical village in eastern part of Yunnan, the villagers are starting to build eco-cultural village by themselves. They built small museum in the village where they stored traditional tools and historical documents and their techniques are also practiced in here so that young generation can learn from their ancestors. Songs and music are practiced in this museum.

This village is surrounded by the lime stone hills and lakes which are used for eco tourism inviting whole Yunnan population. The important point of this project is that all the design is done by villagers headed by young village head and some supporters from local government and university professors. It is very unique in China because most of the local activities have been mostly decided from the central government top down policy. This eco-cultural village project is purely bottom up basis and they have their own regulations not to damage traditional landscape so that they don't use modern material for the renovation of the houses and roads. Surrounding sacred places are maintained not changed and total area is declared as a nature and cultural resources. This project is not touristic purpose but many people are visiting now from all over China and villagers entertain outsiders by traditional local food. Fig. 6 shows their activities.



Figure 6. Eco cultural village in Yunnan

There are now five similar eco-cultural villages in Yunnan. To learn from this village, visitors from other provinces often visited. This is an ideal case in China to put important value on their own local history.

Forest and human society

As mentioned above, there are two opposite faces. One is rapid decrease of rich forest areas without any sustainable management and the other is bottom up traditional way of management by indigenous people. In the case of tropical rain forest, not so much destruction occurred before the Second World War. But after many tropical countries made independence from western developed countries, they need financial basis for development. Timber is the most easy and abundant resources for the tropical country to get income from natural forest. The speed of loggings were very quick starting from the Philippines in 1950's and come to Indonesia and Malaysia in 1960's onward. Within 20 years, most of the good sites were logged over and logging operation invade deeper and deeper in the

forests. There are many conflicts between logging companies and Penan people in the 1980's up until now. This trend is not confined in SEAsia, but in Amazon in South America and even in Crayquot in Canada the logging of primary forest create conflicts between loggers and indigenous people. Many international NGO and NPO groups supported indigenous people and some of the area was kept untouched because of the strong international movement, especially at the occasion of UNCED in Rio de Janeiro in 1992. But after that, logging are still continuing in many places and the rate of the destruction of the world forests are still very high.

Whenever I spent among the indigenous people, I feel very comfortable with their simple way of life, They take only what they need for the day. Not with high demand like the people in the modern society, they are happy and satisfied and share their products equally in the community. Human relations are so good so that each people help each other when it is needed. The human relations in the modern world is quite different from them. We are losing many important basic culture and mentally important factors with losing forest. Forest is a simple world where we can see many organisms are living together. For millions years, trees, insects, animals and micro organism are survived comfortably. There are many good relationship by which we learn how the living organisms behave each other. Biodiversity conservation means to keep the variety of these millions creatures interaction.

The attitude of indigenous people is good example for the future of human life. We have to keep more simple life. The term "sustainability" is the word made by modern people but reality is existed in the life of indigenous people. Their daily life itself is the sustainable life. The summary of forest and human society are as follows:.

Forest and human society

- Era of warning from Indigenous people's life to present world
- Limit of modern technology and Information
- How to survive from environmental degradation and resource shortage
- Satisfaction under limitation and sustainable utilization
- Equilibrium of spirit and materials
- Effort to rehabilitate ecosystem – diversification and development non disturbing utilization
- Strengthen close relation between city and forests.
- Reconsideration of present civilization from the point of simple life

Role of Harbor cities in East and SEAsian

From wide scale view, there exists three part in the eastern part of Eurasian continent. One is mountainous Tibetan and Himalayan regions in the north western part of eastern Eurasian continent. And the second is the tropical lowland in maritime world which include big islands like Borneo, Sumatra, New Guinea, and so on. In between them, there are many harbor cities like Hong Kong, Singapore, Kobe, Yokohama, Bangkok, Tenjin, Shanghai and so on. This area has a long trade history of the eco resources from

both areas. Especially after the opening of the market in China, 1980, huge amount of material flow are concentrating in this region. Tropical timbers export are now decreasing more than half compared to 1970-80', but most of them are sent to China. To satisfy 13 billion people's demand, world trade are focusing to China. But with high speed development, many obstacles such as severe pollution, rich and poor gaps, mental and spiritual disorders, are frequently occurred in the area.

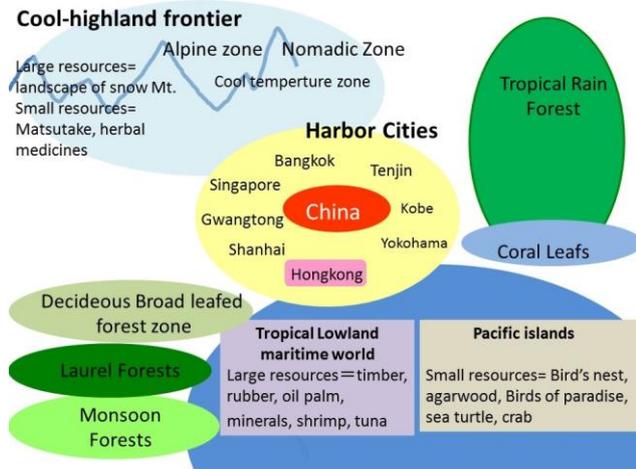


Figure 7. Diagram of two opposite sites and harbor cities in between

This trend was once seen in Japan in 1960's at the time of bubble economical conditions. Almost all the timber resources were imported from SEAsia to Japan.

Production of industries are so high without any regulation to protect from pollution. As a result, all the rivers and cities were polluted badly and many critical deceases were occurred in Minamata, Agano, Yokkaichi and so on. But in 1970, onward, Japanese policy for protecting environmental pollution become very strict so that all the sources of pollution were checked and new technology were created which lead good result for many aspects. We should not repeat Japanese failure in the future. Since East and Southeast Asia are very near each other, most of the pollutants are easily spread all over the areas. Careful treatment which is basically found in the primitive areas where the simple and sustainable way of life are existing is needed. We have to learn from indigenous people. Their way of life is a good warning to the times.

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