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A Review of Japanese Ecological Anthropology on Central African Hunter-gatherers

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Mitsuo Ichikawa

INTRODUCTION

- 1 Since early 1970s, we have been studying the hunter-gatherers in various parts of central African forest areas. We first made a series of anthropological studies of the Mbuti and Efe hunter-gatherers in the Ituri Forest of DRC (Democratic Republic of Congo, former Zaire) from 1972 to 1990. The initial studies mainly focused on subsistence ecology, in particular hunting activities adapted to the forest environment (Harako 1976, Tanno 1976, Ichikawa 1983, Terashima 1983), plant utilization (Tanno 1981), and social organization (Tanno 1976, Ichikawa 1978, Terashima 1985). When the political situation of former Zaire deteriorated in 1991, we left Zaire for the Republic of Congo (Congo-Brazzaville) on the opposite side of the Congo River and began studies on the Aka hunter-gatherers in the Likouala Region of northern Congo-Brazzaville. In 1993, when Congo-Brazzaville also became unstable under a state of internal war, we moved again further west, to the southeastern part of Cameroon, where we have been studying the Baka hunter-gatherers, as well as Bantu-speaking and other cultivators living in the same area. Thus, during the past five decades, we have eventually studied all the three major hunter-gatherer groups in central Africa, the Mbuti and Efe in the eastern part of the Congo Basin, and the Aka and Baka in the western part (Figure 1), as well as the shifting cultivators on eastern and western sides of the central African forests.

Figure 1 : Major groups of central African hunter-gatherers studied by Japanese anthropologists

- 2 These forest peoples¹ are facing today serious problems concerning their culture and environment. In the Ituri forest of northeastern DRC, they have been suffering from prolonged political unrest since the 1990s in a state of internal war that is fueled by rich mineral resources in the region. In northern Congo-Brazzaville and Cameroon, large-scale logging operations have been accelerating since the 1980s, destroying the forests that have long accommodated their unique forest-based culture. The waves of market economy and consumerism have today reached to the remotest parts of the forest, stimulating the people to change their life, and to exploit forest resources for short-term benefits beyond sustainable levels. Excessive hunting for bushmeat, for example, is depleting the animal resource base, making the remaining forest almost “empty” (Redford 1992) in some areas. Against these destructive impacts on the forest environment, there are also growing international interest in, and movements toward, forest conservation, in which extractive activities in the protected areas are restricted. Owing to these impacts imposed by external forces, the forest peoples in this region are rapidly incorporated into, then marginalized in the system of a broader world, on national and international levels. The bases of their unique culture are threatened in this process by these external forces from outside which also acts on the society internally.
- 3 Under such circumstances, it is important to understand the life of forest peoples in local ecological settings, as well as in a wider economic and political context. The desirable way to coping with the threats and changed situation is to re-evaluate and exploit the potentials of « what is already there, » rather than to hastily introduce foreign ideas and technology. From this standpoint, I will examine here the relationships of the local peoples with the forest environment, and with a larger economic system, based on the anthropological research conducted by Japanese researchers during the past five decades.
- 4 The first problem is that we still have much more to learn about the ecological potentials of the forest for human life, and how people depend on the forest and its resources. Forest peoples have surprisingly rich knowledge about the forest fauna and

flora, which we can already appreciate if we only walk with them for an hour in the forest. Our first problem is, therefore, cultural ecology; that is, to describe such a unique culture based on the rich knowledge of forest. This approach also shows the diverse cultural potentials of the forests in central Africa.

- 5 The second problem is that of historical ecology; that is, the history of interaction between people and forest environments. While the central African hunter-gatherers heavily depend on the forests and their resources, the forests are, in a sense, historical products, maintained through various forms of human interventions, both intentional and non-intentional. In a sense, forests and the people living there are supporting each other. It is important, therefore, to examine the forest environment from a viewpoint of (historical) interactions between humans and the environment.
- 6 The inter-dependent system of humans and forest is, however, no longer isolated from other parts of the world; the people today have contacts, more or less, with economic and political systems of a wider society. Therefore, the third problem concerns political ecology; that is, to understand the hunting and gathering life in a wider perspective, in relation to political and economic systems of national as well as international levels. There are various problems involved in this relationship, particularly in the economic and political difficulties that central African countries are facing today. I will present some of the examples that we witnessed in DRC to show how the forest people were coping with an unstable and deteriorating national economy in the 1970s and 1980s. I will also show some of the important findings from our recent international scientific cooperation project in Cameroon, which aimed at combining the local people's welfare and forest conservation through sustainable use and commercialization of non-timber forest products (NTFPs).

Cultural Ecology: Forest as Source of Cultural Values

Rich indigenous knowledge of forest plants

- 7 While there are many aspects of human relationships with the forest world, one of the best ways to illustrate these diverse and multiple relationships is to examine the use of forest plants. Just a brief glance at a forest camp of hunter-gatherers will give us an idea how important are the roles that plants play in their life, as food, medicine and other materials of life. We were impressed by this fact in the initial stage of our research and collected about 1200 plant specimens in the Ituri forest of DRC, along with their vernacular names, and information on their uses and other ethnobotanical information. I will first show the brief results of this study (Tanno 1981, Terashima & Ichikawa 2003).
- 8 First, the plants are used for food. While almost 60 to 70 percent of their present diet is comprised of cassava, plantain and other agricultural crops, hunter-gatherers still use more than 100 species for food, out of approximately 750 species collected in the study area (Terashima & Ichikawa 2003). These include various nuts with high lipid contents, such as those of *Irvingia* spp. and *Ricinodendron*, that are widely used in central Africa as oily condiments in *pot-au-feu* style cooking. Energy-rich starchy food like *Canarium schweinfurthii* and wild yams (*Dioscorea* spp.) are eagerly collected, and the sweet and sour fruits of *Landolphia* spp., *Annonidium mannii*, and *Aframomum* spp. are also frequently eaten.

- 9 Many plants in tropical rain forest accumulate various toxic secondary compounds, some of which, if administered properly, could be used as medicine for curing diseases, or as poison for hunting and fishing. About 200 species have so far been recorded as being used for such purposes. Also important is the use of plants for material culture, with about 350 species so far recorded in the Ituri Forest. The traditional material culture of hunter-gatherers is simple, consisting of fewer than 100 items in total (Tanno 1981), including small semi-spherical huts and simple beds made of wooden poles, tools for hunting, gathering, transporting, cooking and dining, as well as for dress and decoration. Of these, more than 80 percent are made, either totally or in part, of plant materials that are abundant in the forest.
- 10 In addition to the plants directly used, hundreds of plants are useful in indirect ways, as nectar sources and food of animals that are hunted, fished and collected by the people. Hunter-gatherers have precise knowledge of the food plants of wild animals, and ambush the animals that approach to feed on the plants in their fruiting seasons. While many of the high trees have no direct use, they are important sources of honey, highly prized food as a concentrated natural sweet. They also like to eat various insects feeding on the forest plants.
- 11 Many of these plants are used in multiple ways. The large leaves of Marantaceae plants provide a good example (Terashima & Ichikawa 2003, see also Hattori [2006] for the use of Marantaceae plants by the Baka). The seeds of some species (such as *Megaphrynium macrostachyum*) are eaten roasted, and the skins of long petioles or stems (of *Marantochloa* spp.) are used for binding and weaving baskets and mats. The leaves are used for thatching, wrapping, making sleeping mats, cooking and for many other purposes. One of the common local recipes is *liboke*: fish or livers of game meat, mushrooms or other food are wrapped with the large Marantaceae leaves, mixed with palm oil, salt and red pepper, and cooked in the hot ashes. The leaves add an excellent flavor to the food.
- 12 The Mbuti believe that the forest is imbued with a supernatural being called Apakumandura, literally meaning the « father of forest », who controls all the life in the forest. They attribute continued failure in hunting to the deed of Apakumandura, saying that he has made the forest « cool » or « closed. » There is a plant species called *akobisi* (*Uvariopsis congolana*, belonging to Annonaceae), that is the visible agent of Apakumandura, and it is strictly forbidden to cut or break this tree (Ichikawa 1996).
- 13 Thus, the plants are used, both directly and indirectly, for material as well as spiritual purposes. While most of these plants have little or no commercial value, except those mentioned later, they are indispensable to maintaining the life and culture of hunter-gatherers. The forest plants also provide the people with the basis of their cultural identity. The destruction of forest, therefore, would result in the deterioration of the culture, which is heavily dependent on the forest.
- 14 The rich ethnobotanical knowledge of the forest people represents a cultural heritage that has been accumulated over centuries. It is necessary to preserve such knowledge and to understand the diverse potentials of the tropical rain forest. From such a viewpoint, we have constructed a database, called “Aflora,” which aims at compiling information on traditional knowledge of plants in tropical Africa. For each specimen collected in the field, botanical as well as ethnographic information is recorded and put into a computer, using the Aflora information format (Aflora Committee 1987, Ichikawa *et al.* 2001, Terashima & Ichikawa 2003, see also Figure 2). This database, we hope,

facilitates quick reference for specific taxa or usage types, or to obtain a general view of the plant use in a particular area. We have accumulated the data for about 1,200 specimens from the Ituri Forest, and similar ethnobotanical information was uploaded onto the same database on the Aka in northern Congo and the Baka (Hattori 2006, 2007) in eastern Cameroon.

Figure 2 : Aflora information format and the search screen

AFlora on the Web

The database of traditional plant utilization in Africa

What is AFlora?

Characteristics and Merits of AFlora

Structure of AFlora

Information items in each record.

1. ID number of the record
2. Species name of the plant (scientific name)
3. Family name of the plant (scientific name)
4. Common names in English, French, Swahili
5. Date of the collection of the specimen
6. Collector(s) of the specimen
7. Area information region category, typical vegetation
8. Location: information on the location of the research
9. Specimen information: the place of the specimen
10. Identification: made by
11. Plant form tree, herb, shrub, or liane
12. Environment: micro habitat of the plant collected
13. Frequency: of the plant
14. Other botanical information
15. Ethnic group with which information is concerned
16. Vernacular names given by the ethnic group
17. Etymology of the vernacular names
18. Usage type: usage and plant categories
19. Usage: details of usage written in free text style
20. Informant(s): the name, age, ethnicity and sex
21. Chemical substances that were contained in the plant
22. Figure or Photograph, when available
23. References
24. Remarks
25. Record author: the person who reported the record
26. Date of registration of the record into AFlora database

Search Record

<p>Ethnic group</p> <p>Select All</p> <p>Aka</p> <p>Bongando (Ngandu)</p> <p>Bushman (Central Kalahari)</p> <p>Dorobo (Suai)</p> <p>Family</p> <p>Select All</p> <p>ACANTHACEAE</p> <p>ADIANTACEAE</p> <p>AGAVACEAE</p> <p>AIZONACEAE</p> <p>Field name</p> <p>Not Selected</p> <p>Word contained in the above field</p> <p></p> <p>Fields to show</p> <p>Select All</p> <p>ID_number</p> <p>Species</p> <p>Family</p> <p>Common_Name</p>	<p>Area</p> <p>Select All</p> <p>C Congo (Brazzaville) LF</p> <p>C Congo (Kinshasa) Equateur LF</p> <p>C Congo (Kinshasa) Ituri LF</p> <p>E Kenya Mathew DS MT</p> <p>Usage</p> <p>Select All</p> <p>Medical Use</p> <p>Food/Drink</p> <p>Material Culture</p> <p>Ritual Use</p> <p>Show records with photo only</p> <p>☐ Yes</p> <p>Edit database (user ID and password required)</p> <p>☐ Yes</p> <p style="text-align: center;">submit search</p>
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The database is currently closed to the public

Variations in the people's knowledge

- 15 While the central African forest people have surprisingly rich knowledge of plants, their knowledge system is not uniformly shared among the people. There are differences in the knowledge among different groups living in the same forest environment. Differences are also found among different residential groups of the same ethnic groups, or even among individuals of the same residential group. Let me examine such inter- and intra-group variations in the people's knowledge.
- 16 During the research in the Ituri Forest, we noticed the differences in knowledge of plant uses among different groups belonging to different linguistic groups, or even among the groups of the same linguistic groups, with similar lifestyle and environmental backgrounds. This is known as inter-cultural or intra-cultural variation, which has become an important issue in anthropology, and ethnobotany, in particular. Ichikawa & Terashima (1996) and Terashima & Ichikawa (2003) made a comparative study of the vernacular names and uses of plants among four different groups of hunter-gatherers, two from Bantu-speaking Mbuti and two from Sudanic-speaking Efe, all inhabiting a similar natural environment of the Ituri Forest, eastern Congo. The study showed considerable differences between the groups, even between the groups of the same language group. The plant vernacular names are mostly shared within the

same language groups, and knowledge of important food plants is shared relatively well among these groups. The knowledge of medicinal plants, however, shows considerable differences, with only 10-26 % shared by any pair of the two groups, even between groups belonging to the same language group (Ichikawa & Terashima 1996). The authors further discussed the social background for such differences and suggested that there exist no strong social forces toward unification or standardization of knowledge in their society. Compared to other societies, theirs is characterized by a lower degree of social integration and a lack of centralized authority, of systematic school-like education, and of any other social mechanism that would otherwise facilitate cultural integration (or homogenization) of the society.

- 17 Such differences in the knowledge of plants are also found on individual levels in the same residential group, as Hattori (2007, 2020) reported on the knowledge of the Baka hunter-gatherers in Cameroon. She collected about 600 plant species, each with detailed ethnobotanical information among the Baka. For 90 commonly found species, she compared the knowledge possessed by 10 adult Baka informants belonging to different sex and age categories and found considerable differences in their knowledge. In particular, the knowledge of medicinal and ritual plants showed the greatest variation. Of the plants used for these purposes, less than one-fifth (20%) were known to be used by six or more of the 10 informants. The knowledge of plants used for food and material culture was more commonly shared, with more than three-quarters of food plants used by all the 10 informants (Hattori 2007). These results show a similar tendency to the above-mentioned intergroup differences in the Ituri Forest case. Like the results from the intergroup comparison in the Ituri case, higher inter-individual similarity in food and material culture seems explicable: there are commonly acknowledged material bases for the plants used for food and material culture, such as nutritional value often represented by taste and smell, and hardness of wood or ease of work of the materials. As to the factors affecting the greater degree of difference for the medicinal plants, Hattori (2007) argued that this is due to the process by which such knowledge is transmitted. More than 80% of the knowledge of individuals was acquired from their parents, and most of the remaining knowledge from elder siblings, grandparents, and other elders. Typically, individuals learn about the medicinal plants when they are treated with these plants by their parents or other elders, or when they witness treatments done by their close relatives. As a result, the knowledge of medicinal plants is more or less of a personal nature, reflecting the life history of a person. In addition, the differences in medicinal and ritual uses of plants are maintained or even reinforced by their culture, which is characterized by a highly individualistic attitude toward knowledge of other people. They often let other people do things in their own ways, saying that “each person has his or her own medicine,” effective for his or her cases of diseases (Hattori 2007).
- 18 The knowledge of medicinal and ritual plants is generally transmitted vertically within small family groups. In contrast, knowledge of plants used for food and material culture is transmitted not only vertically within families, but also horizontally, in particular, among children’s play groups when they go out to the forest for foraging activities together. Moreover, the above-mentioned material bases of the plants facilitate such a horizontal transmission process.

Potential of the forest for hunter-gatherer subsistence

- 19 Another finding from the study of cultural ecology is the potential of central African forest for hunter-gatherers' subsistence. Central African hunter-gatherers had long been thought to be the original inhabitants of the forest who had lived there long before the arrival of Bantu-speaking cultivators in the region. A question was raised in the late 1980s, however, against this idea of indigenous forest hunter-gatherers. The question was based on; 1) there is virtually no hunter-gatherer group today that depends solely on wild food resources without cultivated food obtained either from their own fields or from neighboring agricultural people, 2) no archaeological remains of hunter-gatherers had been found in tropical rainforests (but see Mercader *et al.* [2000], Mercader & Brooks 2001, Mercader 2002), and 3) there is not enough wild food in the forest to sustain a self-sufficient hunting-and-gathering lifestyle, particularly in the dry season when little fruit, honey, or other food is available.
- 20 For this last reason, the question is often called the "wild yam question" because wild yams constitute a key food resource in humid tropical forests (Bailey *et al.* 1989, Bailey & Headland 1991, Headland 1987, 1997). Such arguments were apparently influenced by the "revisionism" developed through the historical studies on the Kalahari hunter-gatherer societies by Wilmsen (1986, 1989) and others. The "indigenous" isolated life of the central African forest hunter-gatherers was also called into question.
- 21 Concerning the food resource base in the central African forests, several studies were conducted, mainly on the availability of wild yams (Hladik *et al.* 1984, Bahuchet *et al.* 1991, Hladik & Dounias 1993, Dounias 1993). Sato (2001) also examined the potential of wild yams, and the possibility of a hunting and gathering life through the experimental survey of foraging life of the Baka people in Cameroon (Sato *et al.* 2014). There was, however, no empirical study based on the actual foraging life the Baka in the area.
- 22 We have been carrying out the research on the Baka hunter-gatherers since the middle of the 1990s, when the political unrest in DRC became accelerated. Hirokasu Yasuoka, who joined the research in 2001, accompanied a Baka group of 50-60 people over the entire course of their hunting and gathering expedition, called *molongo*, which took place in the dry season. Based on quantitative data on their subsistence over this period, he demonstrated that a life dependent only on wild food (obtained from hunting and gathering in the forest) was possible, even in the dry season, a time generally regarded as being poor in food sources. They took as much as 2400 to 2800 kcal of food per person per day on average, which consisted of the meat of over twenty kinds of mammals and reptiles, ten kinds of plants, river fish, honey and edible insects. The most important sources of calorific intake were the wild yams, as the "wild yam question" had suggested². In particular, the two species of yams with annual stems, *Dioscorea praehensilis* (called *safa*) and *D. semperflorens* (called *esuma*), accounted for three-quarters of the total food intake during this period (Yasuoka 2006a).
- 23 In a follow-up survey, Yasuoka (2009a, 2009b) investigated distribution of the wild yam, and based on that study, he made a very interesting point in terms of the history of the forest. He showed that the two yam species with annual stems were found in gaps, the forests with open canopy, called *bi* by the Baka, in contrast to yam species with perennial stems, which were mainly found in darker, closed forests (*manja*). In other words, the key food species that sustain *molongo* life are distributed in forests with sufficient light.

- 24 While the forest gaps (*bi*), suitable for the annual yam species, are found everywhere in the forest, the yams are actually found only in certain places. Namely, the distribution of annual yams is spatially limited; they grow gregariously in certain *bi*, but there are many similar forest gaps (*bi*) without any annual yam species. This pattern matches the point made by Dounias (1993) on the considerably uneven distribution of yam species in the forest.
- 25 How is it then that such patches with concentrated yams, which could support 50-60 people's subsistence for a few months, were formed? A hint to this question was provided by the old map drawn by Max Moisel (1910), a German cartographer, who had made a detailed map of southeastern Cameroon, which we found in the national archives in Yaounde, the capital of Cameroon. In this map, published in 1910, the old village sites and paths connecting them were shown along with the courses and width of major rivers and streams. Yasuoka examined the old village sites shown in the map, and also located abandoned village sites based on the information obtained from interviews with old Baka people. He found that most of the yam patches utilized during the *molongo* are distributed within a range of several kilometers from the old village sites. These old village sites are now located in the Nki National Park, and far from the present villages, almost 30 km in a straight line. However, the Baka people know well of the location, and go there to lead a life dependent on the rich yam growth.
- 26 The proximity between the yam patches and old settlement sites does not seem accidental. The forests around the villages were cut, which eventually had made the environment favorable for the growth of light-demanding annual yam species. The people may have replanted parts of yam tubers under the ground, which is called paracultivation (Dounias 2001, Yasuoka 2009b). The past human activities and residence must have imposed positive impacts on the formation of yam patches on which the present-day Baka depend for their subsistence during *molongo*.
- 27 Therefore, it is necessary to examine the human impacts on the forest environment in order to understand the possibility of hunter-gatherers' subsistence in the forest. The wild yam question has thus been reframed as one concerning the historical ecology of past human impact on the forest environment.

Historical Ecology: Human Impacts on the Forest Environment

- 28 During our ethnobotanical research in the Ituri Forest, we found that some of the major food plants are light-demanding trees that require sufficient sunlight for germination and growth (Ichikawa 1996, 2001, see also Hart & Hart [1986]). *Antrocaryon* and *Ricinodendron*, for example, are such sun trees. While they are often found today as big canopy trees in the dense forest, they must have germinated and grown in places where there was sufficient light. The sweet and sour fruit-bearing lianas of *Landolphia* species often grow in disturbed areas or on forest fringes. As mentioned above, *Dioscorea* spp. with annual stems also require sufficient light for accumulating starch in the tubers. While a big tree of *Canarium schweinfurthii*, also a light-demanding species, which produces delicious olive-shaped fruit, is now found in the remote forest, such a place was once inhabited by humans, either as a village or as a camp site. These plants

must have grown from the discarded parts (tubers or seeds) left in the gaps where sufficient light reached to the ground.

- 29 In the forest, there are scattered gaps made by storms, lightning and other natural causes. While walking in the forest after a storm in the rainy season, we often found such newly formed gaps. In addition to these natural gaps, there are also traces of human activities in the forest. The hunter-gatherers sometimes cut down a tree with an ax for collecting honey, when they find it difficult to climb the tree to reach a beehive. In this case, a gap similar to natural ones is made artificially. When the hunter-gatherers open a new camp, they clear the underbrush and small to medium-sized trees, which allows sunlight to reach the ground. When the camp is abandoned, herbaceous plants of Zingiberaceae and Marantaceae grow quickly, followed by light-demanding, fast-growing trees. The campsites will soon be covered with secondary vegetation similar to that regenerated from natural gaps.
- 30 Also found in the old campsites are seedlings germinated from the discarded food parts, such as the seedlings of *Landolphia* spp., *Treculia*, *Ricinodendron* and other food species. Moreover, large quantities of mineral nutrients and organic matter are concentrated in the campsite soils, resulting from the remains of food, fuels and other resources that are collected from a wide range of the forest and consumed at the camp.
- 31 I once estimated that a hunter-gatherer household of 5 persons uses 10 to 15 kg of firewood a day. The firewood consumed by 10 households, or 50 people, which is the average size of an Mbuti camp, during a month-long period, thus amounts to 3 to 4.5 tons, and the ashes from the firewood are deposited around the campsite. Food residues also contribute to the accumulation of mineral nutrients and organic matter in campsite soils. While not all of these materials remain in the soil, the nitrogen supplied from food and deposited as human excrements, alone is estimated to be equivalent to 200 kg of ammonium sulfate (Ichikawa 2001).
- 32 The materials in the soil are thus circulating in the forest, absorbed by the plants from the soil, then returned to the soil through consumption of the plants by animals. Human activities and habitation have also been playing a role in this circulating process. Their activities and habitation have contributed to concentrating these otherwise thinly distributed materials in localized patches, that is, in campsites. The campsites and the surrounding areas may provide a favorable place for the reproduction of food resources, though we need more data to verify this impression.
- 33 In the Ituri Forest, such forest campsites are situated at intervals of 3 to 6 km in a hunting-gathering territory, which ranges from 150 to 250 km² (Ichikawa 1978). The Mbuti hunter-gatherers move from one camp to another every two weeks to two months in the hunting season (Ichikawa 1978). Sometimes a new camp is established in the forest and old ones are abandoned. I recorded in one of their territories as many as 30 such abandoned old campsites, which had become secondary forest at the time of the research. In these ways, the Mbuti often have positive impacts on the availability of food resources. Such extensive impacts of hunter-gatherers' activities and habitation on the surrounding vegetation and food availability call into question the clear-cut dichotomy of hunting and gathering versus cultivation.
- 34 However, hunter-gatherer habitation and subsistence activities have imposed only a limited impact. The villagers' settlements and agricultural activities have stronger impacts on the forest vegetation, because, in slash-and-burn agriculture, the original

vegetation is largely removed from the fields. In the central part of the Ituri forest, DRC, the villagers' settlements are distributed today along the major roads penetrating the forest from north to south, and west to east. However, before the 1930's when these roads were constructed, there had been scattered small villages of shifting cultivators throughout the forest. Some of these former village sites can still be located in the satellite images as old secondary forest (Ichikawa 2001). Moreover, before the colonial period, villages more frequently shifted their location. Even in the colonial period, villages were often relocated owing to the re-arrangements of administrative zones and changes in the major routes of communication (Ichikawa 2001). All these movements and activities had extensive impacts on the forest vegetation.

- 35 On the ground level, these old secondary forests can be distinguished from mature forest by tree composition. The mature forest of Ituri is dominated by evergreen high trees of Caesalpinioid legumes, such as *Cynometra*, *Julbernardia* and *Gilbertiodendron*. The secondary forests, by contrast, are composed of a mixture of trees belonging to Euphorbiaceae, Moraceae, Meliaceae, Ulmaceae, and Malvaceae, some of which are deciduous trees. In some areas, there remain oil palm groves that were planted by former inhabitants or grew by themselves from the discarded fruit. It is noteworthy that there are twice as many major food tree and liana individuals in the secondary forest as in the primary forest; the former contained 13 individuals/ha on the average, compared with only six in the latter, according to American ecologists Terese and John Hart (1986).
- 36 All these observations suggest that we have to look more carefully into the history of human-nature interactions in the forest, particularly the ecological influences of past human habitation and subsistence activities on the forest environment.
- 37 The Baka in Cameroon today cultivate small crop fields (Kitanishi 2003, Yasuoka 2012), but they often move into the forest for foraging, leaving the unharvested crops in the fields. Cultivation for them is not entirely different from foraging. It is better to understand their simple cultivation as an extension and continuum of human intervention in the resource regeneration process, from partial vegetation modification, soil enrichment, seed dispersal and replanting parts of tubers, all of which eventually facilitate the growth and regeneration of resources, though these interventions do not always take place intentionally.
- 38 In our recent international cooperative project in Cameroon (described in more detail below), we investigated the distribution and abundance of the major wild food species in the forest of southeastern Cameroon. Hirai (2014) surveyed a total of about 4,000 plots in current and abandoned fields, and the vegetation of these plots around the village of Gribé, inhabited mainly by Kounabembe (Bantu-speaking) cultivators and Baka hunter-gatherers. In the season of 2012, a total of 47 hectares, comprised of 450 plots, were cleared for cultivation. In the cleared fields, a total of 3142 tree individuals (belonging to 240 species) with 10 cm DBH and over were left uncut, i.e., 66-67 individuals per ha of cleared fields. The villagers were asked about the reasons for leaving these trees³. Some said these trees provide shade to protect the fields from intense sunshine, especially in the fields of cacao, which need shade trees. Others said these trees are too hard to cut with small axes they usually use to cut down the trees. The wood of *Irvingia gabonensis*, in particular, is extremely hard, and trees of this species are often left uncut in the crop fields. *Irvingia gabonensis* produces a quantity of oily nuts, which are used for cooking, and is an important source of cash income

(Ichikawa 2020, Toda & Yasuoka 2020, Hirai & Yasuoka 2020). Therefore, they are left in the fields also for an economic reason. Another food tree species often found in the fields is *Ricinodendron heudelotti* (called *gobo* by the Baka), which also produce edible nuts (used for making “*sauce jaune*,” yellow-colored sauce) for sale. They were probably left deliberately because their wood is not hard but easy to cut down. These facts suggest that there may be relatively more useful (with edible fruit) tree species in the abandoned fields than in the uncut forest.

- 39 Fongzossie *et al.* (2014), Cameroonian counterparts of this project, compared the distributions of eight major wild food species in the forest, and found that some were more abundant in the secondary forests in the agricultural zones (non-permanent forest zone reserved for cultivation, usually the forest in a strip several kilometers in width along the road) than in the production forest (in the permanent forest zone) used for logging. *Afrostryax* trees (the fruit and bark are used as a condiment for seasoning stews), for example, were found at densities of 52.4 individuals per hectare in the secondary forest, but only 10.8 in the permanent forest zone. *Pentacletha* (with edible nuts used when other food fails) were likewise more abundant in the secondary forests than in the permanent forests (16.6 individuals/ha vs 6.3 individuals/ha). The results seem explicable, because these trees are sun-loving trees that require sufficient light for germination and growth. Ngansop *et al.* (2019), also members of the project, confirmed these results, pointing out that seven out of eight major food species are more frequently found in relatively new secondary forests than in mature forests.
- 40 We should not forget, however, the diversity and variability of the tropical forests in central Africa. The variability is exemplified, for example, by the distribution of *Afrostryax* mentioned above. The density of this species in a particular area shows almost ten-fold differences among different research sites (Hirai 2014, 2015, Tajeukem *et al.* 2014, Fongzossie *et al.* 2014, Ichikawa 2020). *Irvingia gabonensis* trees may also be unevenly distributed in the forest. It is not clear whether such uneven distributions are naturally caused or result through some human interventions. Hirai is now investigating this issue in the forests of southeastern Cameroon.

Political Ecology: Commercialization and Local Exchange System

Stable exchange in an unstable national economy: the Mbuti case

- 41 The peoples and forests in central Africa are no longer isolated from other parts of the world. Even the people in the remotest part of the forest have today more or less contact with economic and political systems of a wider society, on national as well as international levels. The forest destruction in Africa and nature conservation movements against it are in themselves closely linked to the global dynamics of economy, politics and information. If we imagine an area where humans and nature coexist independently from such a larger society, it would be like a “living museum of humans,” an image strongly opposed by development planners, local governments and by hunter-gatherers themselves. Living people and their society are changing through interactions between internal dynamics and external relationships.
- 42 Central African hunter-gatherers have been famous as brave elephant hunters. They became known as such in the late 19th and early 20th centuries through increasing

demand for ivory in the Western world (Sommerville 2014, Ichikawa 2021). Since the 19th century, ivory had been one of the major export items (Nelson 1994). The ivory, together with wild rubber (also called “red rubber” for the bloody nature of its exploitation), accounted for 85% of exports (in monetary value) from the Congo Free State and the Belgian Congo (Jewsiewicki 1983). In the Ituri forest, the Mbuti also provided the tusks of elephants until recently.

- 43 More recently, net hunting among the Mbuti in southeastern parts of the Ituri forest was intensified by the changing economic conditions of the region, such as the growth of local towns in the region that demanded quantities of bushmeat, or the rush for gold dust, both of which accelerated the bushmeat trade for providing people with a protein source. People in towns also value bushmeat as a source of “wild power” that cannot be obtained from domestic animals (Ichikawa *et al.* 2016).
- 44 The sedentarization of the forest hunter-gatherers along the major roads, and their subordinate relationship with neighboring farmers, were probably linked to the increasing demand for their labor force for promoting the production of cash crops, which in turn was influenced by the world capitalist economy that seeks a cheap labor force and primary products in African rural areas. This was probably the case in the southeastern part of Cameroon, where the introduction of cacao growing and sedentarization of the Baka hunter-gatherers were taking place almost simultaneously in the late 1950s to early 1960s (Althabe 1965). In addition, in order to have access to industrial goods, medical care, school education and other modern services, the Baka themselves needed contact with outside economy and to exchange their labor and forest products for these goods and services. International movements toward forest conservation will inevitably influence their relationships with the forest and with their agricultural neighbors.
- 45 It is therefore necessary to examine the relationships of the forest hunter-gatherers’ life and culture with the political and economic situations of a wider society. There are various problems in these relationships, particularly in the current political and economic crises that African countries are facing. One of our tasks was to show how the forest people can cope with these problems; that is, how they can establish their relative autonomy faced with the prevailing external influences. I will show a suggestive example that I witnessed in DRC in the 1970s and 1980s; that is, the example of bushmeat trading (see Ichikawa 1991 and 2000 for more details of this example).
- 46 Hunting for bushmeat in recent decades became a hot issue in conservation (Wilkie & Carpenter 1999), because it may deplete the faunal resources in the forest, resulting in the so-called “empty forest syndrome” (Redford 1992). In central Africa, excessive hunting and trade for meat were accelerated by the economic changes in rural and urban areas, which resulted partly from the economic crisis and structural adjustment programs in the late 1980s (Ichikawa 2006). In most parts of central Africa, the bushmeat trade was increasing remarkably in the 1980s and 1990s⁴.
- 47 The bushmeat trade in the Ituri forest in the 1970s and early 1980s was, however, not carried out to such a destructive extent (see, Ichikawa [1996]). This is probably because of the stable local exchange system that served as a “buffer” to protect the local exchange system from the disruptive effects of outside economy, and eventually maintained the hunting pressure at a moderate level. Let me explain this briefly.
- 48 The national economy of DRC (former Zaire) had been worsening year by year since the country’s independence. In spite of devaluation and sudden change of high-value

banknotes, the prices of commodities rose 60-fold during the 15 years since independence, whereas the real wage dropped to one-quarter of its initial value during the same period (Young & Turner 1985). The national economy further deteriorated in the 1980s, with the annual inflation rate reaching as high as 100 per cent (the annual inflation rate rose to 1000 % or more in the 1990s, and the former Zairian economy finally fell into a state of hyperinflation). Under such conditions, townspeople, wage laborers in particular, could hardly survive, if they had to depend solely on the cash economy of the formal sector.

- 49 In the Ituri forest where the Mbuti people live, the prices of commodities also rose by several hundred to a thousand times during the 12 years from 1975 to 1987 and continued to rise in the 1990s. A considerable change mostly disadvantageous to the Mbuti⁵, also occurred in the relative cash price of meat or labor force to other commodities (Figure 3). The Mbuti, however, rarely receive cash for their labor and meat, except when they need cash for some specific purposes, such as for paying tax, fine or bride wealth, or for alcoholic drinks. When they provide the farmers with day labor (called *par jour*), they receive three cassava plants with about 15 kg of tubers. This amount remained constant throughout the research period, though the relative cash price of cassava to wage labor rose more than a double during the same period. Likewise, they usually barter bushmeat for agricultural food and other commodities. One unit of meat (equivalent to about 2 kg) was exchanged for ten glasses (or six small bowls) of cassava flour (about 2000 g), and this exchange rate remained fairly stable during the research period, in spite of the changes in the relative cash prices of meat and cassava flour (Ichikawa 1991, 2000).

Figure 3 : Change in the relative cash prices between goods and wage in the Teturi region, Ituri Forest

* actual zaire/US\$ exchange rate

- 50 For the Mbuti, the most important thing is the amount of agricultural food obtained from the exchange, no matter how the cash prices of meat and agricultural food may

change. It is the food, clothes or other consumer goods that they want to acquire from the exchange. Such a stable exchange aiming at acquiring concrete use values has served as a buffer against the extremely unstable national economy of former Zaire.

- 51 If there had been no such buffer, they would have been forced, for example, to hunt more animals when the relative cash price of meat decreased. Moreover, they might have pursued maximization of hunting yields, which would have resulted in higher hunting pressure on the forest animals. We should therefore acknowledge the implications of such a stable exchange system for maintaining the local resource base and the forest people's life in the unstable national economy. We do not know if such a type of exchange could be maintained for a long time under the prevailing influences of cash economy and consumerism. Nor would I suggest that this will remain a desirable form of exchange in the future. I would rather suggest that such a barter style exchange has contributed to maintaining a stable life, or "human security," in the difficult economic situation in the region. If market economy imposes increasing impacts on the forest people's life, it is necessary to secure their rights over the forest resources, which would eventually enable them to manage forest resources from a longer-term perspective and utilize them on a sustainable basis.

Forest conservation and commercialization of NTFPs: The Baka case

- 52 There are two important issues raised recently that influence the relationships between man and nature in central Africa. These issues are raised by the Stern Review (Stern 2006), a report from the British Government on global warming and its impacts, and by the UN declaration on the rights of indigenous peoples (United Nations 2007). How to cope with these two issues in an integrated manner is crucial to the people whose culture and life are heavily dependent on the natural environment (Ichikawa 2014).
- 53 Protection of the natural environment and economic development have been thought to be in a trade-off relationship, in that the pursuit of the former would undermine the latter. According to the Stern Review, however, it would be economically better at the global level to protect the environment. The economic loss in global GDP from global warming would be 5% each year (it could be as high as 20%), whereas the cost of mitigation of global warming would be 1% (Stern 2006). The reduction of greenhouse gases is, therefore, necessary and economically viable.
- 54 The UN declaration on the Rights of Indigenous Peoples, adopted in 2007, stipulates that indigenous peoples have the rights to "...freely pursue their economic, social and cultural development (Art.3)" and "...maintain and strengthen their distinct political, legal, economic, social and cultural institutions..." (Art. 5)." This declaration clearly supports the indigenous movements toward pursuing economic development while retaining their culture.
- 55 How can hunter-gatherers pursue economic development while retaining their unique culture and preserving the forest environment? We think the use of non-timber forest products (NTFPs) will be the key to integrating these seemingly contradictory goals. NTFPs are produced by living trees, unlike the timber which is the final and dead product of trees, and in this sense exploitation of NTFPs would be compatible with forest conservation. As the people have long been using the NTFPs for maintaining

their livelihood, the use of NTFPs is culturally appropriate and contributes to the household economy, if the products are commercialized in a proper, sustainable way.

- 56 People living in the southeastern region of Cameroon have been facing difficulties. Their forests have been destroyed by industrial logging since the 1980s, and they are also excluded from protected areas that in the past were a source of sustenance. Moreover, a large part of production forests (logging zone) was allocated to sport hunting for wealthy people from Western countries. As a result, nearly 90% of the forest area has been allocated to external stakeholders, and local people are excluded from the forests they had been utilizing for centuries (Figure 4). Activities of the Baka in these areas are either totally or severely restricted. This is a typical scenario of land grabbing or green grabbing (Fairhead *et al.* 2013), and a similar scenario is encountered in various parts of the tropical rainforests in central Africa where people inhabit land with rich biological diversity. Establishing a sustainable system of land and resource utilization is now an urgent problem for these people, in particular, the Baka people who heavily depend on the forest resources. We embarked, therefore, on a project for establishing a sustainable use of NTFPs in the southeastern region of Cameroon.

Figure 4 : Zoning of project area, southeastern Cameroon

The community hunting zone in the logging zone (dotted area with grey color) to the southeast of Gribe is now leased to sport hunting company

Adapted and modified from Hirai (2014) and Ichikawa (2020)

- 57 The project was carried out in cooperation with the Cameroonian counterpart (IRAD = *Institut camerounais de Recherche Agricole pour le Développement*), and sponsored by JICA (Japan International Cooperation Agency). A field research station was built in Gribé, a village in southeastern Cameroon comprising approximately 400 Baka hunter-gatherers and a similar number of Bantu-speaking (Kounabembe) agricultural peoples (Toda 2014). A newly constructed road connects Gribé to Ngato in the east and Lomie in the west. Gribé is adjacent to Boumba-Bek and Nki National Parks on the southern and

western sides, with UFA (*Unités Forestières d'Aménagement*, or Forest Management Unit) on both sides of the village (Figure 4, see also Ichikawa [2020]).

Figure 5 : Research station at Gribé, southeastern Cameroon

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- 58 The research consisted of three parts: (1) the ecological potential of NTFPs (their abundance, productivity, and availability in the forest), (2) actual use of NTFPs and their contribution to people's subsistence and household incomes, and sustainability of NTFP uses by comparing them the results from part (1), and (3) local practices and customs of forest use for avoiding excessive competition over the resource and designing sustainable resource management strategies (Ichikawa 2020). Let me introduce some of the findings from this project, focusing on the use of *Irvingia gabonensis* nuts (called *peke* in Baka language), one of the most important NTFP species in the region.
- 59 As to the ecological potential of *Irvingia* nuts, Hirai and Yasuoka (2020) estimated the average annual production of nuts at 6-7 kg (dry weight)/ha, reaching 14 kg in good years. This means a total of 210-220 tons of dry nuts produced in an area of 360 km², which they have been customarily using for their livelihood. While the production of the nuts fluctuates considerably from year to year, they usually collected only 5-6 % of the total production (Hirai & Yasuoka 2020). The resource base of *Irvingia* nuts is, therefore, super-abundant.
- 60 There are, however, constraints on the use of this abundant resource. One is the time-consuming work of splitting the fruit with machetes, and removing the kernels from the stony endocarp. It usually takes 5-6 hours to get 2-3 kg (dry weight) of nuts. More efficient tools could improve the efficiency of this work. Another constraint is restricted access to the gathering ground (Hirai & Yasuoka 2020). As mentioned above,

90 % of the area they have been customarily using has been designated as protected area (Boumba-Bek National Park), to which access by local people is restricted. Moreover, a large part of the logging areas surrounding the parks has been allocated to ZIC (*Zone d'Intérêt Cynégétique*) for sport hunting by wealthy foreigners. While gathering activities in this zone are not legally prohibited, the operator of sport hunting opposes the entry of the local people into their ZIC out of fear that the people might also set animal traps in the forest while gathering the nuts (Hirai & Yasuoka 2020). In these ways, the forest policy and zoning of the Cameroon state is endangering the basis of Baka subsistence and cash income.

- 61 There is also a problem in the transaction of the *Irvingia* nuts. Most of the nuts in the area are collected by the Baka. They collect the fallen fruit in the forest where there are abundant *Irvingia* trees and remove the kernels on the spot. After several hours of monotonous work, they return to the forest camp with a few kilograms of nuts wrapped with Marantaceae leaves. The nuts are exchanged for food or alcoholic drinks with the Bantu villagers (mostly Kounabembe people) waiting at the camp. They are also used to repay the credit for agricultural food or alcoholic drinks the Baka have received in advance in the village (Toda & Yasuoka 2020).
- 62 The nuts are usually exchanged at a fixed rate, one *combo* (nuts filling a 2_litre enamel bowl, weighing 1.4-1.5 kg dry weight) for 10 *beignets* or 5 sachets of whisky, equivalent to 500 CFA (the actual rate becomes somewhat higher, because of the unpaid advance borrowings by the Baka). The Bantu villagers dry the nuts, either with fire or sun (for better quality) and transport them to the village where traders from both within and outside the village are waiting. The price of the dried nuts in the village is 1500 to 2500 CFA/*combo*, although it fluctuates depending on the availability of the nuts and on the number of competing traders in the village. The traders then transport the nuts in large bags to towns, sometimes as far as Nigeria. A part of the nuts is also sold at a market in Yokadouma (prefectural center), where the retail price is 100 CFA for 40g of dried nuts, or 3500 to 4000 CFA for a *combo* (Hirai & Ichikawa 2018). The price of the nuts in Yokadouma, therefore, rose to 7-8 times higher than that in the forest camp.
- 63 While most of the nuts collected in the forest are exchanged with the Bantu people in the forest camp, some of the Baka sell the nuts for cash to the traders in the village. The amount sold by the Baka is, however, much smaller than that of the Bantu villagers. In the 2012 season, the total amount of nuts sold by the Baka to the traders in Gribé was about 190000 CFA in total, about one-tenth of that sold by the Kounabembe villagers (1830000 CFA). The average individual sale by the Baka to the traders in the same year was about 7000 CFA, whereas the Kounabembe villagers sold more than 120000 CFA per individual seller (Hirai & Ichikawa 2018).
- 64 Amount sold by the Baka per transaction (sale) was also much smaller. In most cases, Baka sold only 1-2 *combo*, and spent the money immediately on food, kerosene for lamps, alcoholic drinks, and other consumer goods. Money has general purchasing power and can be kept for future use or to buy some expensive goods. It can also be used for their children's school fees, or for medical care, when necessary. It can even be used for "investments," such as hiring manpower to expand their crop fields, and other profit-making activities. However, they are not accustomed to store money for purposes that are not among their immediate needs. Their consuming behavior is characterized by their "interest in the present."

- 65 Furthermore, the unit price at which *Irvingia* nuts are sold differs between the Baka and Kounabembe villagers. In 2012, for example, the average unit price of the nuts sold by the Baka was 1061 CFA/*combo*, compared with 1264 CFA (20 % higher) by the Kounabembe villagers (Hirai 2014). As such a difference (of 15-20 %) in the unit price between the Baka and Kounabembe was also found in other years, it is not accidental, but the usual case.
- 66 In these ways, the Baka are placed in a disadvantageous position. While the commercialization of NTFPs provides the Baka with a small income opportunity, the economic benefit of such an opportunity is not enjoyed equally between the Baka and the Bantu villagers. The Bantu villagers make much more profit from the commercialization, not because they themselves collect more nuts, but because they control the circulation of the nuts. The economic opportunity of commercialization of NTFPs has thus been increasing, rather than reducing, the existing economic disparity between the two groups.

Discussion and Conclusion

- 67 Hunter-gatherers in central African forests have diverse and multiple relationships with the forest environment. The plants and animals are used in various ways, for food, medicine, material culture, rituals, etc., both directly and indirectly, and for material as well as spiritual purposes. Their knowledge of the forests has been accumulated for many centuries through careful observation of the environment and represents an important human intellectual heritage. It is necessary to preserve such knowledge, before it is lost through lifestyle change, school education, and other processes of development and modernization. We have promoted the project to construct a database called Aflora to preserve such intellectual heritage, which we hope will be useful to the people themselves.
- 68 In various parts of the world, projects of so-called “conservation by commercialization” have been promoted (Evans 1993), in which forest conservation is attempted through commercialization of NTFPs. We have also been engaged in this kind of project in Cameroon. However, commercialization of the NTFPs for sale to outside markets might lead to overexploitation and deterioration of the resources. While negative effects of excessive harvesting activities have not become apparent for the plant NTFPs in southeastern Cameroon owing to the rich resource base, commercialization of bushmeat in the study area has imposed serious adverse impacts on the animal population (Ichikawa *et al.* 2016, Yasuoka 2006b). The impacts of hunting on animal populations are now investigated by our team, using multiple ecological methods, such as day and night censuses of animal tracks, and a new technology using camera traps (see Yasuoka [2006b] Kamgaing *et al.* [2018], Hongo *et al.* [2020])
- 69 While most of the forest plants and animals used by the hunter-gatherers are not commercialized, nor exchanged with the people from the outside world, they are used in a diversity of ways, and have important meanings to the hunter-gatherers’ life and culture. We should appreciate, therefore, the use values of these plants and animals. The culture of the forest hunter-gatherers is dependent on and inseparable from the diversity of forest plants and animals. It is essentially different from the market economy, which demands only a few resources with high market value, such as timber, ivory, bushmeat, etc. The commercialization of forest resources might therefore distort

the hunter-gatherers' rich forest-based culture, which can be seen as a criticism of our too practical and commercially-oriented use of the forest.

- 70 While central African hunter-gatherers depend heavily on forest resources, they may have contributed to regeneration of the resources through their habitation and subsistence activities in the forest. Through frequent shifts of campsites and livelihood activities, places with open vegetation and nutrient-rich soils are formed, which favor the reproduction of edible plants. The mineral nutrients and organic matter in the resources are circulating in the forest system, returning to the forest through human consumption, if the resources are not carried out of the forest. The forest world can thus be depicted as a system in which people and the forest are coexisting, interdependent on each other.
- 71 We have presented a few examples to show that the forest environment of southeastern Cameroon as a human habitat has been improved by human activities. If these findings on the positive impacts are confirmed in different areas or in wider areas, we can confirm that the forest people not only depend on the forest resources, but also have contributed to maintaining, or even improving, the resource base for their subsistence. Then, the current scheme of forest protection based on the opposition between human and nature should be reconsidered. The current model of establishing "wildlife sanctuaries" from which human activities are excluded may be replaced by a model of coexistence between humans and the forest.
- 72 Various studies suggest that the availability of plant food is improved by intentional and/or unintentional human impacts on vegetation. Australian hunter-gatherers and Native Americans are known to fire the land to facilitate the growth of specific edible plants. In California, the land has been managed through burning, tilling, weeding, and various other ways by native Amerindians for more than 10000 years, which has influenced the abundance and composition of the flora and fauna in the region (Anderson 2005). Around some Jomon prehistoric sites in Japan, archaeologists pointed out the patches of concentrated chestnut trees, which had presumably formed as byproducts of sedentarization (Nishida 1997). Such positive impacts of human activities and habitation on the surrounding vegetation and food availability call into question the clear-cut dichotomy of hunting-and-gathering versus cultivation.
- 73 The forest patches distributed on the savanna-forest borders in northern Guinea, a west African country, are good examples of positive intervention on the environment by people. These forest patches, known as "forest islands" by researchers and administrators, were believed to be the relics of forest vegetation that had once covered the entire region, but had been destroyed by cultivators who preferred savanna to forest. British anthropologists Fairhead & Leach (1996) showed, however, based on old aerial photographs, satellite images, and historical materials as well as villagers' oral traditions, that these "forest islands" were historical products formed by human interventions.
- 74 Another example is the Marantaceae forest, a forest with thick undergrowth of Marantaceae herbs, in the west African wet zone. While this type of forest provides the African great apes (gorillas) with an important habitat (Wrangham 1986), the research indicated that a large part of this forest in west Africa was actually formed under human influences, in particular by fires associated with slash-and-burn agriculture (White 2001). It would be interesting to determine whether such an important habitat

of the great apes might have been generated through human interventions, which are usually thought to be destructive to the forest environment.

- 75 Moreover, recent examination of human history in tropical rain forests in a global scale (Roberts 2019) revealed extensive human impacts on these forests, which had often been thought to have little human traces.
- 76 The traces of human activities in the Congo Basin were found in quite old time; some of the prehistoric sites date back to about 1000 years BC (Vansina 1990, see also Roberts [2019]). During research on the Aka hunter-gatherers and Bantu cultivators in the densely forested area of upper Motaba River in Congo-Brazaville, our colleagues found several charcoal layers in the soil, when they dug pits to examine the soils. The charcoals from the deepest layer were dated to 2,600 BP (Chujo 1993, Hanawa & Komatsu 1993). These charcoals likely indicate the traces of early slash-and-burn agriculture. We were impressed by the evidence of agriculture in this area at such an old time.
- 77 An aerial view of the Congo forest gives us an impression that there still remains a vast stretch of intact forest. However, as Vansina (1990) and other historical studies suggested, the Bantu-speaking shifting cultivators had migrated into the heart of the Congo Basin by the end of the first millennium, and have lived there for more than a thousand years. Their population density was probably not high, but one thousand years of occupation may be long enough for them to have left their traces throughout the forest. As the ecologist Richards (1996) wrote, African forests that appear to be primary forest are actually often old secondary forests. Therefore, it is necessary to reconsider the local forest environment in the light of “environmental revisionism” (a term phrased by Headland [1997]), which sees the forest in a different way from conventional ecology, postulating historical human interventions in the forest vegetation.
- 78 The commercialization of NTFPs provides Baka hunter-gatherers with an opportunity for cash income and means to combine their welfare with forest conservation. However, this opportunity has not been enjoyed equally among the local peoples. The existing economic disparity between the Baka hunter-gatherers and Bantu (Kounabembe) farmers is increasing through this commercialization, because the latter control the circulation of the forest products. If the Baka were to transport the nuts to the village and sell them directly to the traders, they could get 3-4 times more money than by selling them in the forest. If they were to further transport the nuts to towns by themselves, they could gain 7-8 times more money. However, they have not been engaged much in such activities and are unlikely to do so anytime soon. This owes to the interethnic relationship between the Baka and the Bantu farmers. There has been a long-standing relationship between them, in which the Bantu villagers play an intermediary role between the Baka and the outside world and control commercial activities with the outside world.
- 79 The consequences of such a disadvantageous social position of the Baka are seen in various fields in their social life. There are increasing trends in Cameroon today toward decentralization and local participation in forest governance, and the issues on conservation and use of tropical rainforests are not an exception. The local people are granted the right to exploit the timber resources in the “community forest” in the “non-permanent forest zone”, on the condition that their management plan is approved by the government. They can sell the wood to the logging company operating

in the area. Moreover, the community hunting zone (ZICGC = *Zone d'Intérêt Cynégétique à Gestion Communautaire*) is also allocated to the local community, and it is leased to an overseas safari hunting (sport hunting) company to get the royalty. The committee members of the community forest and COVAREF (*Comités de Valorisation des REssources Fauniques*), responsible for negotiations with logging company or safari hunting agents, include representatives of the Baka people, reflecting the outside (international and national) pressure to involve the Baka people in local forest management. The representatives of the Baka are, however, arbitrarily selected by the Bantu leaders, and they have little voice on issues originating from the outside world, because the contact with outside world has been almost entirely monopolized by the Bantu villagers. Moreover, they themselves are not accustomed to such a “representative system,” as their non-hierarchical, egalitarian social structure does not fit with such a system.

- 80 Now, the commercialization of NTFPs as a way to combine forest conservation with people's welfare is attracting increasing interest from the local people and government, and international development and conservation organizations. In order to spread the benefits of such new economic opportunities equally among local people, it is necessary to take appropriate measures based on a deep understanding of the local ethnic relationships and their historical background.

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NOTES

1. The “forest peoples” in central Africa are comprised of hunter-gatherers and small-scale shifting cultivators. I will mainly focus on hunter-gatherers in this review, and mention about cultivators when they are relevant to the life of hunter-gatherers, or when comparisons are made between the two groups.
 2. In a recent study, Hirai & Yasuoka (2020) reported the abundance of *Irvingia gabonensis* nuts in the forest of southeastern Cameroon. The nuts are available from July to October, but only several percent of the total production is actually collected. If they were collected in a more intensive way, the nuts could comprise one of the major food resources in the rainy season, when few yam tubers are available (see also Gallois et al. [2020]).
 3. Carrière (2002) had made similar research on selective sparing of trees in the swidden fields among the Ntumu farmers in southern Cameroon, and discussed about its long-term impact on the rainforest landscape.
 4. The bushmeat trade now seems to be declining, owing to the pressure from international organizations to protect game animals and in order to avoid infectious diseases caused by wildlife, such as Ebola, Covid-19 and other zoonotic diseases.
 5. The relative price of meat to cloths rose in 1985 when cheap cloths were imported from east African countries.
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ABSTRACTS

Contemporary hunter-gatherers in central Africa face similar problems concerning their culture and environment: destruction of the forests that have been accommodating their unique forest-based culture, influences of market economy and consumerism, and nature conservation initiatives that restrict their extractive activities in protected areas. In order to cope with these problems, it is important to understand their life and culture in local ecological settings, as well as in historical and wider economic and political contexts. I will describe here three approaches that have been taken and developed by Japanese ecological anthropologists to the study of central African hunter-gatherers. The three approaches are (1) cultural ecology, which describes the way the hunter-gatherers perceive, understand and utilize the forest environment, (2) historical ecology, which shows how they modify the forest through interacting with it, and (3) political ecology, which analyzes how the economic and political situation influences their relationship with the forest. I will then examine the implications of the results from these approaches for addressing the current problems faced by the central African forest hunter-gatherers and their environment.

Les chasseurs-cueilleurs contemporains d'Afrique centrale sont confrontés à des problèmes similaires en ce qui concerne leur culture ou leur environnement ; la destruction des forêts qui ont nourri leur culture unique, les influences de l'économie de marché et du consumérisme, et la conservation de la nature qui restreignent leurs activités d'extraction dans les aires protégées. Pour appréhender ces problèmes, il est important de comprendre leur vie et leur culture dans les contextes écologiques locaux, ainsi que leurs situations historiques, économiques et politiques dans une société plus large. Je décrirai ici trois approches qui ont été adoptées et développées par des anthropologues de l'environnement japonais pour l'étude des chasseurs-cueilleurs d'Afrique centrale. Les trois approches sont (1) l'écologie culturelle, qui décrit la façon dont les chasseurs-cueilleurs perçoivent, comprennent et utilisent l'environnement forestier, (2) l'écologie historique, qui montre comment ils modifient la forêt en interagissant avec elle, et (3) l'écologie politique, qui analyse comment la situation économique et politique influence leur rapport à la forêt. J'examinerai ensuite les résultats de ces différentes approches pour répondre aux problèmes actuels auxquels sont confrontés les chasseurs-cueilleurs forestiers centrafricains et leur environnement.

INDEX

Keywords: hunter-gatherers, tropical forests, cultural ecology, historical ecology, political ecology

Mots-clés: chasseurs-cueilleurs, forêts tropicales, écologie culturelle, écologie historique, écologie politique

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