Fluctuating Boundary of Edibility : Wild Foods in the Post-Fukushima Era

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Introduction

This year marks the tenth anniversary of the accident at the Fukushima Daiichi Nuclear Power Plant caused by the 2011 Great East Japan Earthquake and the resulting tsunami. Radioactive materials released into the air because of this accident partially covered Fukushima and other prefectures on the Pacific coast, contaminating vast areas, including cities and towns.

While significant progress has been made over the past decade in the areas where people live, as well as land used for cultivation and grazing, much less progress has been made in decontaminating the vast forested areas that cover about 70% of Fukushima Prefecture. This shortfall is due to financial and labor costs, as well as the ruggedness of the mountains and water control problems caused by stripping away the topsoil. Consequently, forests in this region has been heavily and negatively affected by radioactive contamination. Another impact from the contamination of forests is the effect on forging for and consuming wild foods, the focus of this paper.

In Japan, at least until the pre-war period, wild foods from mountains, rivers, and seas played a major role in alleviating the food shortages that often occurred for a range of reasons. Particularly in the deep snow areas of eastern Japan, consuming a variety of wild foods helped people survive the winter. In these areas, even today, when wild foods no longer have a significant survival value, wild foods are still harvested and eaten. Also, the local people enjoy gathering food from nature by hunting, gathering, fishing, etc. In the discipline of anthropology, these activities are called minor subsistence.

Given the situation outlined above, this paper highlights how the edible/inedible boundary for wild foods has been shaken by the contamination of forests. In addition, there is a discussion on the characteristics of this boundary of edibility as well the actors that set and maintain the boundary. As discussed in more detail below, in Fukushima and many other prefectures, wild or cultivated food is now a key factor for determining whether or not suspected contaminated wild foods are edible. However, as anthropological domestication studies have shown, there are numerous gradations between wild and cultivated foods, and it is extremely difficult to apply this distinction to wild foods, especially those that were originally collected from nature. This discrepancy between the classification system and reality is causing confusion, especially among local producers of wild foods.

1. Wild Foods in Fukushima after 2011

First, the concept of wild foods in the context of this paper is defined as wild edible organisms that were originally acquired from the surrounding natural environment. Even species that have

been removed from this method of gathering to cultivation are included in the category of wild foods, provided that they are still being foraged from nature. In other words, wild foods in this paper include a wide range of species other than rice or vegetables that are currently being eaten, cultivated, or farmed. These species include *matsutake* (edible mycorrhizal mushroom) for which cultivation technology has not yet been established, as well as many other kinds of mushroom, wild vegetables, and mountain stream fishes for which cultivation technology has been established and are still gathered, hunted, or fished.

In the areas affected by the nuclear accident, foraging for and eating wild foods has changed significantly since 2011. The problem of the contamination of wild food became apparent when radioactive materials deposited in the soil were found in the food chain, and even in 2021, contamination continued, mainly from cesium-137 (half-life：30 years). In the worst-affected prefectures, restrictions were imposed on consuming and shipping wild vegetables and mushrooms, and local governments were forced to supervise these activities year-round.

Under these circumstances, every year in Fukushima Prefecture wild vegetables that should not be sold are shipped and distributed in local markets (according to Mr. T, an employee of the Fukushima prefectural government). In spring 2021, a retail shop in Shinchi Town also ran into problems when wild *taranome* (*Aralia elata*), which should not have been offered for sale, appeared on shelves. In spring 2021, there were an especially high number of these incidents, and the prefectural authorities effectively panicked. In response, prefectural officials now patrol farmers' markets all over the country during the wild vegetable season, but why would sellers put prohibited products on the market? And why do these incidents happen every year? These simple questions are the starting point for the following discussion on the unclear guidelines for the edibility of wild foods, with special reference to wild vegetables in Fukushima Prefecture.

2. Anthropology of Edibility and Contamination

Before looking at case studies, the following is a short summary of some of the research on edibility and contamination in anthropology.

Many anthropologists have studied the question of edible and inedible foods and the boundary between them. Issues with edibility are found in all societies around the world, and whether something is considered edible in a society is more than the sum of individual preferences；it is more likely to be linked to stronger collective moral norms (Ishikura 2018). As E. Leach's (1976) classic cultural semiotic study of the categories of edibility in British society points out, the boundary between what is edible or not is sometimes situational, and this boundary can vary from time to time. As M. Douglas (1985) has argued from the standpoint of symbolic anthropology, in the case of pangolin rituals in Lele society in Africa, objects that are normally inedible or taboo can be temporarily incorporated into the realm of the edible, creating a symbolic ritual space. Aside from these studies, the question of edibility is also linked with the question of cooking. Cooking, where inedible foods are made edible by baking, boiling, or fermenting, was first explored in the field of the anthropology of foods and then in the field of structural anthropology, as exemplified by C. Lévi-Strauss' mythological studies. Seen in this context, classical anthropological studies have already analyzed the boundaries of edibility and variances mainly from the linguistic, semiotic, and

symbolic viewpoints.

The problem of contaminated foods has been addressed in various fields, especially after the Chernobyl nuclear accident in 1986. Social science studies have shown that people are harvesting and eating wild foods from contaminated environments. For example, even in the case of radioactive contamination, contaminated wild foods are being harvested and eaten in many parts of the world, including in Bryansk in Russia, Gabon, and Fukushima Prefecture, among others. The key point here is that people in these areas are aware that their wild foods are contaminated, and this is where the issue of people's risk perception comes into play.

What emerges from the case studies in this paper (below) is that, as noted, the issue of edibility is a sociocultural one that goes beyond individual preferences. While it is ultimately the individual's choice whether or not to eat contaminated wild foods, the issue of edibility is also influenced by community values and the use of the foods, as well as the economic status of the household and the age and gender of the consumer. The anthropology of edibility needs to address the complexity of edibility issues, which are sometimes situational, or based on local value systems, as well as the cultural and social contexts.

In addition, the edibility of wild foods in Fukushima has a unique feature: restrictions on consuming and shipping wild foods are based on whether they are considered wild or cultivated, a distinction set by the prefectural government. The following case studies discuss how and why limits on consuming and shipping wild foods, both those considered to be distinctly wild or cultivated, are set and maintained through the political system, and how and why the criteria (i.e., the boundaries of edibility) fluctuate as they do.

3. Fluctuations in Edibility — Focusing on Wild Vegetables

I conducted a one-time field research trip in the northern and central parts of the Hamadori and Nakadori areas of Fukushima Prefecture between June and October 2021. As mentioned, during the research trip it became clear that in Fukushima the notions of wild and cultivated have become important criteria for eating and shipping wild foods. In other words, if these foods are cultivated, they can be consumed or shipped, but they cannot be eaten or shipped if they are wild foods. In Japan, wild foods range from wild vegetables and mushrooms to fish from rivers and the seas, but in this paper the focus is especially on wild vegetables to show how the important distinction between wild and cultivated is being shaken up.

3.1. Cultivating wild vegetables

Wild vegetables are edible plants found growing in the mountains that have a special value in a community. So, what are *cultivated* wild vegetables? My field research has revealed that the concept of cultivating wild vegetables varies widely. In particular, there is a gradation in the degree of cultivation and management of wild vegetables that were originally native to the area.

3.2. Mr. K's fields

Mr. K is a man in his seventies who lives in the T district surrounded by mountains in the southwest of Fukushima City. After retiring from the construction industry, he started farming on the land

where his parents lived. As well as growing rice and vegetables, he started to grow and process *warabi* (*Pteridium aquilinum*) and other wild vegetables. He proudly says that he was the first person in Fukushima to grow *warabi* for kimchi.

In his fields in the mountainous T district, Mr. K grows the many wild vegetables that he has transplanted from the surrounding forests. This means that even though they are cultivated, they are essentially the same genetically and morphologically as wild species. Some wild foods, such as the mushrooms *shiitake* (*Lentinula edodes*) and *fuki* (*Petasites japonicus*), have been cultivated for a long time and many varieties have been developed. However, wild vegetables have changed very little because they need to have a "wild" taste as if they were grown in the mountains. Therefore, the one major difference between the wild vegetables that Mr. K grows and those that grow wild in the mountains is the growing environment (soft and nutritious soil, fertilizers, etc.).

Interestingly, his fields are often invaded by "wild" wild vegetables from the surrounding forests that Mr. K did not transplant, such as *zemmai* (*Osmunda japonica*). Deep in the mountains, his fields of wild vegetables are not always strictly separated from the surrounding environment, and in some cases, the fields are on the forest floor, so there are many opportunities for wild species to invade his fields. Therefore, are the plants that invaded the fields managed by Mr. K wild or cultivated? How far and to what extent can we use the word *field* in Mr. K's case?

3.3. S Industry's *Warabi* Garden

The next case considers a *warabi* garden to be started in 2022 as a business by S Industry, a small company in the mountainous area of Date City, Fukushima Prefecture. Date City still restricts the shipment of *warabi*, and only growers who meet the conditions set by the city are allowed to ship it. In the spring of 2021, S Industry passed an inspection and was granted permission, as a business, to have a *warabi* garden from this spring.

The most interesting point of this case is that wild *warabi*, which had invaded the growing field, was approved by the city to be shipped as cultivated. Here are the details: First, a peach orchard behind the office of S Industry was abandoned due to the aging of the growers. Second, the president of S Industry cut the weeds in this peach orchard with heavy machinery on a large scale to prevent pests. Third, in the spring of the following year, *warabi*, which likes to grow in sunlight, began to grow in large numbers. S Industry then contacted the city and approached them about having a *warabi* garden. After collecting and analyzing samples of the *warabi* and the soil, eventually Date City approved the *warabi* as "cultivated" and S Industry was allowed to grow *warabi* there. This is a unusual case, but it shows the flexibility of the boundary between what is considered wild or cultivated.

3.4. A System for Boundary Setting and Determining Wild or Cultivated Plants

Therefore, whether a wild plant is determined to be wild or cultivated is sometimes highly ambiguous, and the boundaries are not absolute. So, what are the conditions that must be met for a wild plant to qualify as cultivated? And how are these conditions formulated? To answer these questions, I interviewed Mr. Y from one of the agriculture and forestry offices in Fukushima

Prefecture, asking him to show me internal documents from the prefecture.

The conditions for being categorized as cultivated are (1) production is based on seeds and seedlings sown or planted by the producer; (2) the cultivation area (the limit of the field) is clearly defined, and it is separated from mountains and forests (there is no risk of contamination by radioactive materials); (3) cultivation management, such as fertilization and weeding, is carried out based on cultivation guidelines, and management records are kept. In other words, these are (1) control of origin; (2) control of the fieldr; and (3) control of the cultivation process. More importantly, there is one additional rule: "Vegetables planted in the forest or on the forest floor or planted in a field for ease of collection but managed roughly, are considered wild" (Fukushima 2018, p.1). This means that the final decision on whether a vegetable is considered to be either wild or cultivated depends on the judgement of the local government officials who visit the site, which inevitably leaves room for unpredictability.

According to Mr. Y, the conditions for wild and cultivated vegetables covered by regulations for consuming and shipping wild foods are essentially communicated from the national government to the prefectural government in each municipality. For the cultivation of wild vegetables covered in this paper, the national government first issued guidelines (2017), and based on the standards in these guidelines, Fukushima Prefecture then set the conditions for the cultivation of wild vegetables (2018). In addition, each municipality acts as a contact point for the partial lifting of more detailed shipping restrictions and communicates directly with producers and sellers. In this way, the government, producers, and sellers have reached an agreement, but of course, conflicts often arise. For example, Mr. K negotiated with the prefectural government for permission to ship *warabi* grown in his fields, but the negotiations broke down, so he has now crossed the border to Yamagata Prefecture to collect *warabi* there. During an interview, Mr. K told me, "I think there is a better way to resolve this problem," and that this kind of misunderstanding and miscommunication between producers and government occurs in many places.

3.5. Domestication in the Wild

As can be seen from the two cases of the cultivation of wild vegetables by Mr. K and S Industry, it is sometimes unclear whether edible plants, such as vegetables grown in the wild, are wild or cultivated. Cultivating otherwise wild plants is a borderline case, depending on the cultivation method and the environment, and these can be considered either wild or cultivated (or vice versa). To clarify this point, here is the perspective of the anthropological concept of domestication.

Domestication refers to a *process* where people attempt to bring wild plants under their control (especially by intervening in their reproductive cycles). The fact that domestication is a process implies that it is difficult to establish clear criteria to measure cultivation and domestication, and in this respect the problem of a boundary still arises. In fact, there is a derivative concept called semi-domestication that captures the interplay between cultivation, domestication, aquaculture, and wild conditions. In the case of the wild vegetables discussed in this paper, the domestication of plants, due to the way they are cultivated and the influence of the surrounding natural environment, leaves room for a greater or lesser degree of wildness. When these variables are considered, a wide array

of forms of cultivation with varying degrees of control can be considered.

Here is a review of the cultivation standards for wild vegetables presented in 3.4 from the perspective of domestication. Among the cultivation standards set by Fukushima Prefecture, 1) management of roots is unique in that, unlike fish and mushrooms, in the case of wild vegetables, even those that are transplanted or collected from the mountains by an individual can be considered cultivated if certain procedures are followed. In other words, there is no difference between wild and cultivated species except for the environment in which they are grown. Therefore, for the cultivation of wild plants, (2) management of the field is important, but sometimes, as in the case of Mr. K, the field is contiguous with the surrounding forest and wild plants invade, and sometimes, as in the case of S Industry, invasive species are approved by the local government as cultivated. A wide variety of cultivation management is possible. In the case of (3), management of the cultivation process, there are individual differences among producers for (1) and (2) above, and the degree of management of the entire cultivation process is also gradated. The distinction between wild or cultivated contrasts sharply with diversity in the cultivation of wild plants, and this discrepancy has led to confusion at the local level for production and marketing. The incident involving the retail shop in Shinchi Town (mentioned at the beginning of this paper) also illustrates the fluctuating boundary between wild and cultivated that originated from the domestication of wild vegetables, but more data is needed to establish this point.

Conclusion

In this paper, the focus is on wild foods (especially wild vegetables) and the discussion showed how the boundary and the characteristics for determining edible and inedible have varied in the area affected by radioactive contamination.

In Fukushima Prefecture, the notions of wild or cultivated are important for setting restrictions on consumption and shipping. While the criteria for making this distinction are formulated by the national government (the first step) and the prefectural government (the second step), municipalities are the contact points for more detailed assessments and communication with producers and sellers. In this way, the government, producers, and sellers have come to an agreement, but there are often conflicts.

However, cultivating wild vegetables, which by their nature grow in the wild, raises complex issues related to domestication. The ways that people cultivate wild plants are diverse when viewed from the perspectives of methods and environments, and the distinction between wild and cultivated conditions is not always clear. Mr. K's fields and S. Industry's *warabi* garden are examples of this.

The data presented in this paper is based on one-off, short-term studies and does not include, for example, the perspective of consumers who buy potentially contaminated wild foods. This point needs to be clarified in future research.

References

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