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*Articles*

## Coexistence and exclusion between humans and monkeys in Japan: Is either really possible?

David S. Sprague and Nobusuke Iwasaki

*The Japanese people face a cultural and ecological challenge in seeking a new relationship between themselves and the Japanese monkeys (*Macaca fuscata*). Monkeys are a major agricultural pest. Monkey habitat often lies within a short distance from fields and villages, and vice versa, especially in mountainous areas. The idealized solution is a form of coexistence where humans and monkeys somehow negotiate a harmonious compromise. A word used often in Japanese is *kyosei*, to live in common, implying a more intimate relation than mere side-by-side coexistence. In practice, *kyosei* is a word used by policy makers or scholars, but less often used by primatologists and agricultural officials. Primatologists aid agricultural extension programs that encourage farmers to implement practical measures to reduce the attractiveness of farmland and villages as feeding sites to monkeys. However, agricultural extension programs may be operationalizing *kyosei* by encouraging rural communities to reformulate their relationship with monkeys.*

**KEYWORDS:** agriculture, conservation, forestry, pest, wildlife

### Introduction

At the closing ceremony of the Aichi World Exposition on September 25, 2005, Mr. Junichiro Koizumi, the Prime Minister of Japan, called on the world to seek ways to live together with Nature. The word he used in Japanese was *kyosei*, which means to live together, to live in common, or co-habit. This word is a relatively philosophical or sentimental term implying some intimacy between actors, and sets an idealistic tone to his declaration. *Kyosei* is used in Japan along with another similar word, *kyozon*, to coexist, in statements calling for humans to live in harmony with Nature. However, *kyozon* is a more neutral word, implying mere common presence in time or space. Thus, the choice of the word *kyosei* suggests that the Prime Minister had called on the world to achieve a higher form of coexistence, in which both Humanity and Nature fulfill their destinies.

*Kyosei* is invoked in many arenas of debate concerning human-wildlife relations in Japan. This relationship is especially acute in rural Japan, where wildlife and humans do actually coexist in disharmony. The critical question for many rural residents is that some form of coexistence is inevitable between wildlife and humans. Practically, complete exclusion is difficult. Humans have the choice of persisting in a coexistence based on perpetual conflict, or attempting to achieve a coexistence that at least humans perceive to be more fulfilling and proper, some form of *kyosei*.

The Japanese monkey (*Macaca fuscata*) is one wildlife species that many rural residents perceive to be a serious threat to their lives and property. Monkeys are a major agricultural pest. While not as ubiquitous as deer (*Cervus nippon*) or dangerous as boar (*Sus leucomustax*) or bears (*Ursus thibetanus* and *U. arctos*), rural residents perceive monkeys to be a particularly difficult pest forcing itself into the human realm because of its agility and intelligence (Izawa, 2005; Muroyama, 2003; Watanabe, 2000). Thus, for both rural residents and conservationists, the debate on the proper relationship between humans and monkeys is summarized by the question: can humans *kyosei* with monkeys?

This paper reviews the policy debate concerning humans and monkeys. The debate is carried out in the news media, government policy documents, web pages, and books produced by government officials, scientists, and farmer advocates. This is an important arena for debate where various stakeholders are attempting to find a working relationship with each other, and ultimately reach agreement on policies and agricultural extension programs that will help both farmers and monkeys to survive in rural Japan.

We examine the usage of the words *kyosei* and *kyozon* as signals of whether the participants in the debate are seeking to find a proper relationship between humans and monkeys. First, we introduce how the word *kyosei* is invoked in the context of wildlife issues. Second, we describe the severity of the conflict between monkeys and farmers with government statistics on crop damage and pest control. Third, we searched in the literature for examples of how *kyosei* is used in reference to Japanese monkeys. Finally, we point out what may be practical attempts by farmers, local governments, and scientists to operationalize *kyosei* between rural communities and monkeys. The issues presented here will be familiar to many Japanese scholars and scientists. The goals of this paper are to introduce to a non-Japanese audience how Japan debates wildlife issues, as well as invite a Japanese readership to reconsider their own objectives in the debate on the relationship between humans and wildlife in Japan.

### **Invoking *Kyosei***

*Kyosei* is invoked by a large variety of people and organizations involved in nature conservation in Japan. An academic example is a university that uses *kyosei* in the title of a department. The Tokyo University of Agriculture and Technology, a prestigious institution tracing its roots to 1874, is one of the leading universities in Japan in the study of rural issues. Within the Faculty of Agriculture is a program named, in its own English title, the Department of Human and Social Studies for Man-Nature Relations. The direct translation of its Japanese title, however, is Human-Nature *Kyosei* Studies Course. The faculty teaches courses in environmental ethics, law, history, and policy.

*Kyosei* is invoked by organizations involved in a variety of environmentally friendly projects. An “Eco-Road” with overpasses and underpasses that allow deer to cross over roads is presented as a technological solution to achieve *kyosei* between roads and deer by the Hokkaido Development Agency in Japan’s northernmost island of Hokkaido (Highway Environment Research Institute Eco-Road Evaluation Committee, 1996). The Natural Environment Coexistence Technology Association (where *kyosei* is translated as coexistence), carries out programs for ecological restoration, builds nature park facilities, and sponsors symposia on human-nature relations (NECTA, 2004).

*Kyosei* is invoked by government agencies. The most prominent such agency is the Ministry of the Environment (MOE), the national government ministry with primary responsibility for wildlife protection in Japan. *Kyosei* between humanity and nature is set forth as a major policy goal in the National Environmental Plan drawn up in 1994 after the promulgation of the Basic Law on the Environment, an umbrella act setting the national goals for environmental issues in Japan. As a key policy term, MOE defines the term in the glossary of the Environmental Information and Communication Network (MOE, 2005a). The definition first introduces the biological usage of *kyosei* as ecological symbiosis. Then it points out that *kyosei* is used now more often in contexts involving nature conservation, and that the word refers to the harmonization of socio-economic activities with the natural environment through the protection or management of nature. *Kyosei* appears in many policy statements of the MOE. For example, a colorful booklet introducing the Nature Conservation Bureau of the MOE is titled “For *Kyosei* of People and Nature” (the English version of the same booklet uses “coexistence,” MOE, 2005b). The Biodiversity Center of Japan under the MOE maintains an internet web site titled the Internet Nature Research Institute (MOE, 2005c). A key policy issue presented here, along with the national park system, endangered species and other policy realms of the MOE, is “*Kyosei* with Wildlife.” The contents deal with the administration of a key environmental law in Japan concerned with wildlife protection and hunting.

More directly relevant to conservation, *kyosei* appears in government guidelines for wildlife management. A document titled “Basic Guidelines for Implementing Projects for Wildlife Management” accompanies the law governing wildlife protection and hunting (MOE, 2005d). The guidelines state that wildlife projects should be implemented on the basis of ensuring *kyosei* between humans and wildlife as well as preserving biodiversity. These projects include designating wildlife protection areas, hunting suspension areas, and the prohibition of certain hunting methods. The projects to ensure *kyosei* can include scientific management to control wildlife populations under a legally defined type of project called the Specified Wildlife Conservation and Management Plan.

Local governments may also invoke *kyosei*. An example is the Forest Animal *Kyosei* Office under the forestry department of Hyogo Prefecture in central Japan (Hyogo Prefecture, 2005). This office also deals with the administration of the laws on hunting and wildlife management since the MOE delegates the authority to actually implement policy to prefectural government. These include issuing firearm licenses and hunting permits, designating hunting seasons and wildlife protection areas, and the formulation of wildlife management plans. Hyogo Prefecture implements wildlife management plans for deer and bear, but not monkeys.

### The Reality of Coexistence

For both farmers and primatologists, a severe reality exists in the rural landscape where agriculture and monkeys coexist. Farming and wildlife do not mix amicably. Farmers have undoubtedly fought wildlife in Japan for centuries, and continue to do so now (Knight, 1999; Sprague, 2002).

Today, the three top mammalian agricultural pests are deer, boar, and monkey, in that order. (The Ministry of Agriculture, Forestry, and Fisheries (MAFF) provides statistics on crop damage by wildlife.) Crop damage by monkeys, although worse in some years than others, continues unabated in terms of area, quantity and cost (Figure 1). As might be expected for a frugivorous animal, the crops damaged most by monkeys are orchard crops (Table 1). Of the 4,725 ha damaged by monkeys in 2003, orchard crops accounted for 2,056 ha. However, monkeys do not confine their damage to fruits, and eat all varieties of crops, especially vegetables. Orchard crops and vegetables together accounted for approximately three-quarters of the crop damage inflicted by monkeys in 2003.

Type	Orchard fruits	Vege- tables	Potato	Rice	Wheat	Pulses	Misc. Grains	Craft/ art	Fodder	Other	All
Area (ha)	2,056	1,471	249	555	46	152	25	10	37	126	4,725
Tons	2,541	3,078	730	479	32	109	44	103	304	90	7,510
Yen*	6,519	5,251	992	1,309	45	407	80	128	53	416	15,201
Tons / ha	1.24	2.09	2.93	0.86	0.70	0.72	1.76	10.30	8.22	0.71	1.59
Yen* / ha	3.17	3.57	3.98	2.36	0.99	2.68	3.20	12.80	1.44	3.30	3.22
Yen* / ton	2.57	1.71	1.36	2.73	1.42	3.74	1.82	1.24	0.17	4.63	2.02

\* x 100,000 yen

Table 1. Crop damage by Japanese monkeys in 2003. Data by Ministry of Agriculture, Forestry, and Fisheries, Japan.

Crop damage by monkeys may be more intensive than other animals in terms of monetary cost, as calculated from the crop damage data of 2003 (Table 1). Deer accounted for the largest weight per unit area of crop damage at 7.8 tons/ha compared to only 1.6 tons/ha harmed by monkeys. However, monkeys, where they did cause crop damage, inflicted as much cost per ha as boar at about 320,000 yen/ha. Furthermore, damage by monkeys resulted in the highest cost per ton of crops of the three animals, at over 200,000 yen/ton compared to about 160,000 yen/ton by boar and only 18,000 yen/ton by deer. The price of the crops damaged by each animal probably explains the cost intensity. Deer damaged relatively

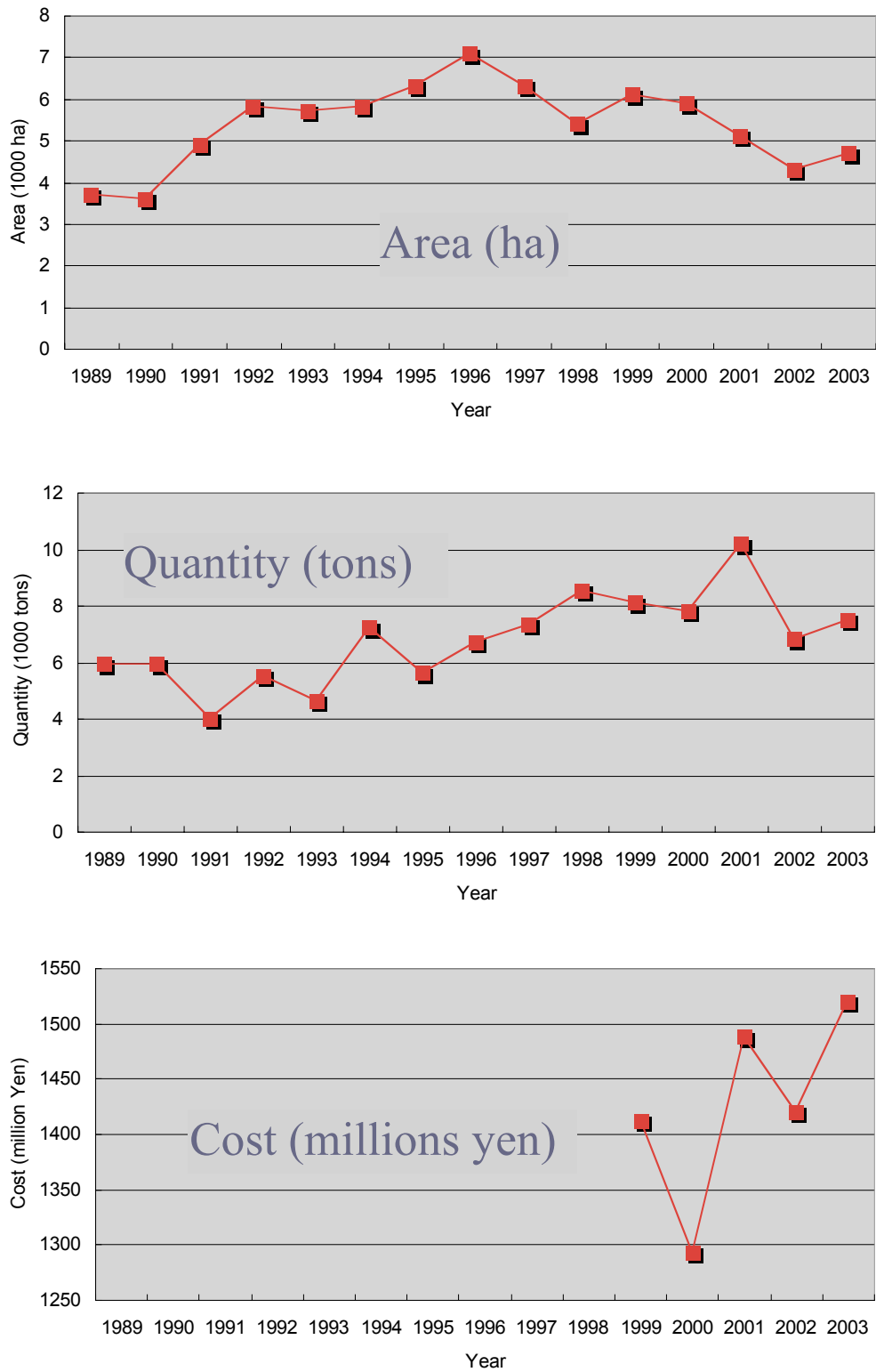


Figure 1. Area, amount, and cost of crop damage by monkeys in Japan. Data by Ministry of Agriculture, Forestry, and Fisheries, Japan.

inexpensive fodder crops, boar damaged more expensive rice, and monkeys concentrated on the most expensive fruits and vegetables.

For primatologists, the severity of the human-monkey relationship is acutely expressed in the number of monkeys removed as agricultural pests (Figure 2). No hunting season exists for the monkey because it is not classified as a game animal, unlike deer and boar, but monkeys are subject to provisions for nuisance animals. Agricultural pests can be removed with the permits issued under the nuisance animal provisions in the Japanese law (NACS-J, 2003). The number of monkeys removed rose rapidly from the 1970s, and has averaged about 10,000 animals per year in the last few years, but it is difficult to predict whether the numbers removed will rise or fall in the future.

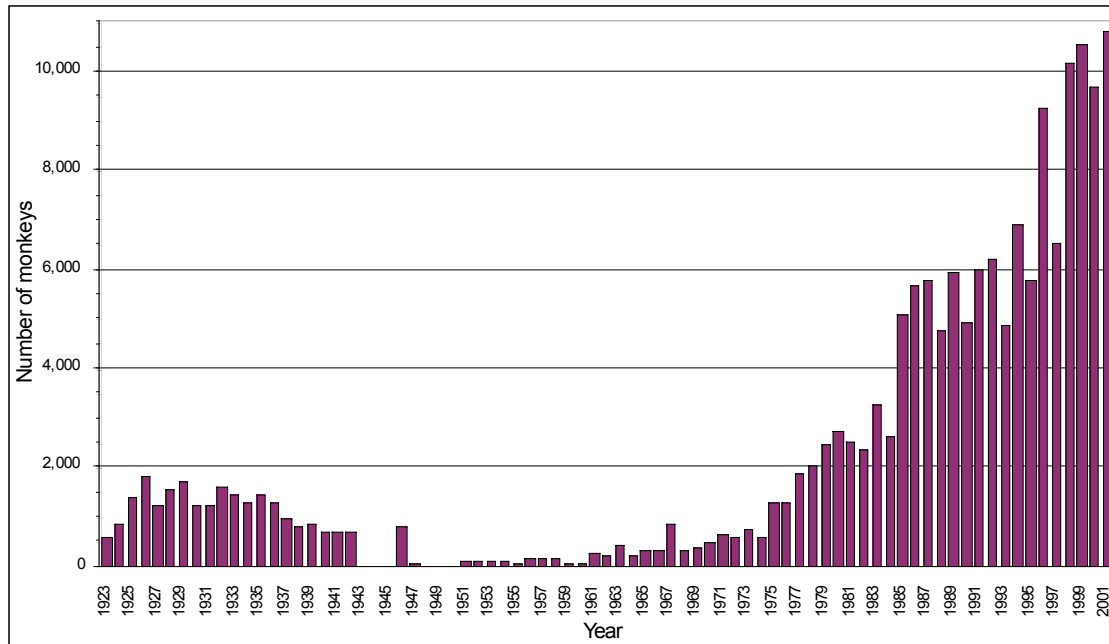


Figure 2. Number of monkeys removed by hunting (up to 1948) and as nuisance animals (after 1948) in Japan. Data by Ministry of the Environment.

### Mapping the Human-Monkey Interface

Crop raiding by primates is a world wide conservation issue (e.g. Chhangani and Mohnot, 2004; Naughton-Treves et al., 1998; Saj et al., 2001). In Japan, ecologists have proposed several hypotheses to explain the rise of crop damage by monkeys, including the declining agricultural population and widespread commercial forestry (Watanabe, 2000; Sprague, 2002; Muroyama, 2003). Another, major background factor is the spatial configuration of farms and monkey habitat that bring human and monkey populations into a state of coexistence. Land use configuration can be extremely complex in the hilly or mountainous parts of Japan, joining human communities and monkey populations into close proximity. A characteristic of Japanese topography is that flat-land can end abruptly with the steep slope of a hill. Steep slopes are often wooded and potential habitat to forest wildlife. The Japanese people have farmed even the smallest flat-lands, including those along narrow river valleys. These river valleys can extend deep into hilly topography. Farms and forests intermingle, juxtaposing crops with wildlife habitats. Consequently, in many parts of Japan, farms are vulnerable to wildlife depredation, and, conversely, a large proportion of wildlife populations are at risk of becoming pests.

Geographic analysis can help assess the risk of crop damage by wildlife. For forest dwelling animals, one spatial indicator of this risk is the amount of forest that is close to farms. The question we will try to

answer are what proportion of land adjacent to farmland consists of broad-leaved forests that are potentially higher quality monkey habitat, because Japanese monkeys feed on the berries, acorns, and leaves of broad-leaved trees (Agetsuma and Nakagawa, 1998; Hill, 1997; Iwano, 1999).

We chose a monkey habitat region in the Boso Peninsula of Chiba Prefecture, across Tokyo Bay from Tokyo, for our geographic analysis of a Japanese monkey habitat. The southern parts of the peninsula are forested hills supporting a diverse wildlife fauna, including monkeys. No monkeys live in the northern half of Chiba Prefecture, and thus this monkey population is isolated and self-contained. Primatologists began studying a population of Boso monkeys in the vicinity of Takagoyama Mountain from the 1950s (Iwano, 1999; Nishida, 1966). At the time, the Boso monkey population was so small that it was brought under protection, and the Takagoyama monkeys were designated a Natural Monument in two phases in 1956 and 1958. Since then, the monkey habitat range has expanded, leading to a growing monkey pest problem. We used the monkey habitat boundary drawn by researchers in 1999 (Boso Monkey Research and Management Society, 2000).

We carried out a buffer analysis in a geographical information system (GIS) of land use within the monkey habitat range based on a vegetation map made by the Japanese Ministry of Environment. We created 1 km buffers from farmland within the monkey habitat region, dividing the monkey habitat region into two zones, one within and the other beyond 1 km of farmland. The average day travel distance in the Boso population was 1.5 km and 1.8 km for two monkey troops studied by Iwano (1999), and the 1 km distance is approximately the width of one day-range for a monkey troop.

The buffer analysis found that forest accounted for 90% of the land area within 1 km of farmland (Table 2). The farmland is located in river valleys that wind their way into the hills, creating a land use configuration where forests are often close to some type of farmland. Broad-leaved forests accounted for 49% of the total area and 60% of the forested area within 1 km of farmland, indicating that the zone close to farms is reasonably good habitat for monkeys. Conversely, the zone within 1 km of farmland accounted for 90% of the monkey habitat region.

	Zones defined by buffer distance from farmland:		Habitat region total
	> 1 km	< 1 km	
Farmland	0	17	16
Conifer	35	25(30)	26(31)
Broadleaf	64	49(60)	51(60)
Grassland	0	2(2)	2(2)
Bamboo	0	1(1)	1(1)
Town	0	3(4)	3(4)
Other	1	2(3)	2(3)
Total	100	100	100

( ): excluding farmland

Table 2. Land use (%) within the monkey habitat region of the Boso Peninsula, Chiba Prefecture, Japan, in the early 1980's.

At first glance, the Boso Peninsula monkey habitat region may appear to be secure for monkeys in the sense that most of the habitat region was forested. Forests account for nearly three-quarters of the habitat region, and broad-leaved forests account for 60% of that forested area. The agricultural fields occupied 16% and towns only 3% of the monkey habitat region (Table 2). However, the results of the farm proximity analysis can be interpreted to mean that approximately 90% of the monkey habitat region is located within about one-day travel distance of farmland for a monkey troop. There is little reason to believe that the monkey population is concentrated in the central zone more than 1 km away from farmland, since this sector is small and differs little in the proportion of broad-leaved forests compared to the zone within 1 km of farmland. Monkey troops within the Boso Peninsula habitat region can be expected to routinely come into contact with farms.

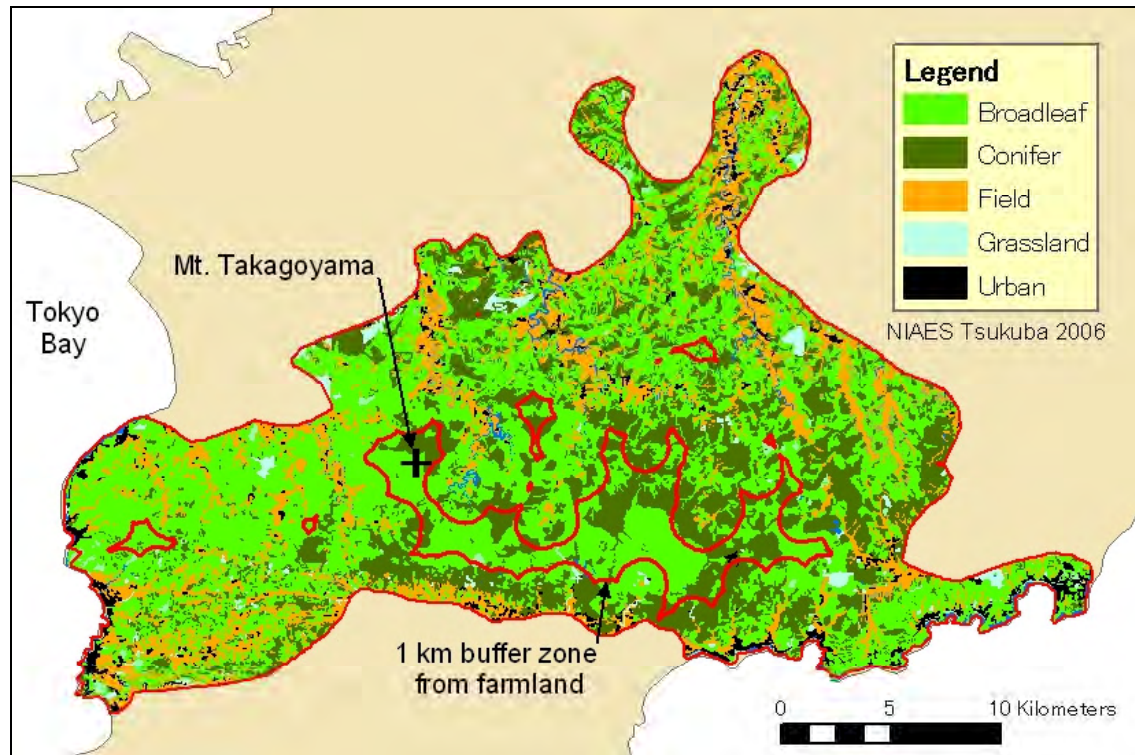


Figure 3. Buffer analysis of the monkey habitat region in the Boso Peninsula, Chiba Prefecture, Japan. Vegetation map by the Ministry of the Environment, showing vegetation in the 1980's.

### ***Kyosei* on the Ground**

Forced to coexist with wildlife, rural communities are struggling to decide whether they wish to find some type of accommodation with wildlife, or attempt to exclude wildlife entirely. Both are difficult, because both, in fact, require considerable effort on the part of rural residents. What that effort should be, is the nexus of a widespread debate between farmers, scholars, and government. *Kyosei* and *kyozon* play large roles in many of these debates, but the closer to the ground, the stakeholders are less likely to mention *kyosei* in a positive way.

An editorial in the *To-Ou Nippo*, a local newspaper published in the northern prefecture of Aomori, expresses the feelings of rural residents. The editorial is titled “*Kyosei* with the wild is not easy” (*To-Ou Nippo*, 2005). The contents are a complaint addressed to distant city residents. The editorial tells the story of a *batoru* (i.e. battle) with the wild in Aomori Prefecture, and the events leading to the capture of several monkeys from a population designated to be a National Natural Monument as the northern-most population of non-human primates in the world. According to the editorial, the monkeys of Shimokita



Peninsula were designated Natural Monuments in 1970. Good relations existed between humans and monkeys until the balance of *kyosei* crumbled with the brazen and delinquent behavior of the monkeys. The monkeys took advantage of the kindness of the villagers and began to enter without any caution into the vicinity of the village. The editorial does not state what it means by the “kindness” of the villagers, but it may refer simply to the general tolerance of villagers to the presence of monkeys. The editorial ends by saying, “It is easy from the point of view of animal rights to say that the monkeys can have no fault. However, regional residents, forced into *kyosei*, have their livelihoods on the line. Local government is also struggling. The national government only looks toward protection for natural monuments. [The national government] should seriously consider policies for *kyozon* and *kyosei*, including financial measures (translation by the authors).”

A prefectural government manual on crop damage prevention does not mention *kyosei* at all. The manual was produced by Fukui Prefecture (2004) as a practical guide for rural communities to prevent damage to crops by a variety of animals: wild boar, deer, monkey, tanuki (raccoon dog), bear, civet, raccoon (the introduced US species), crow, and miscellaneous birds. The manual provides information on the ecology of these animals. Then it advises on how to build netting and electrified fences suitable to stop each species. Next, the manual calls on villages to organize themselves, the entire village together, to carry out preventive measures. The manual instructs readers to carry out a series of measures, including the following. Wildlife should be chased away immediately. Women and the elderly should participate in chasing animals to prevent animals from learning that they need not run from women and the elderly. Wildlife should be chased away in all seasons, not only in harvest or growing seasons, to prevent animals from considering fields as regular feeding sites. Garbage and vegetable refuse should not be thrown away at the mountain's edge. Inspect farmland and the village to ensure there are no unharvested fruits. Plow under paddies and fields as soon as possible after harvest to prevent animals from feeding on secondary crop growth. This manual is a good example of how agricultural authorities are attempting in recent years to provide advice to farmers that actually work, with the cooperation of ecologists and engineers familiar with the crop damage problem. This is not an idealistic call for harmony with nature. The manual not only does not use the word *kyosei*, it does not even mention *kyozon* in the text. *Kyozon* appears only in the titles of cited literature. In providing practical advice, the manual focuses entirely on keeping wildlife out of fields and villages.

Another work on wildlife crop damage that does not use the word *kyosei* has been written by Y. Muroyama, a primatologist. His book titled *Getting Along With Monkeys Around the Village* is a comprehensive treatise on the ecological and social causes of wildlife crop damage and how to mobilize villages to prevent it (Muroyama, 2003). In a concluding chapter, he poses the question, “Is *kyozon* with monkeys possible?” He is addressing an audience that does not desire even *kyozon* with monkeys, and points out that it is difficult to convince farmers of the intrinsic value of wildlife when they simply wish wildlife would go away.

A recent volume on wildlife crop damage, however, invokes *kyosei* in its title, *Wildlife Programs in Pursuit of Kyosei* (Agriculture, Forestry, Fisheries, Technical Information Society, 2005). This book collects papers and testimonials by a variety of stakeholders involved in wildlife damage prevention: scientists, agricultural extension officers, and NGOs. Despite the book's title, most of the articles do not mention *kyosei*. The paper on monkeys by T. Oi emphasizes the necessity for a comprehensive approach to preventing crop damage (Oi, 2005). Written in the spirit of the technical manual giving practical advice, Oi's paper does not mention *kyosei*. His objective is to convey the point that there is no single, magic technical solution. He first reviews impractical methods, such as noise-makers that monkeys quickly learn are harmless or chemical repellents based on smell or nausea that either do not work or work just as well on humans. He concludes by pointing out that relying on any single technology will result in the monkeys finding its weakness. He recommends fencing, either electrified or of a flexible material that does not allow monkeys to climb over it by eliminating hand-holds or weight-bearing

structures. However, he points out that farmland must be managed to remove crop residue or abandoned fruit trees, and this should be combined with patrols to chase away monkeys. Capturing monkeys may seem to be effective, but without farmland management, farmers are creating a contradictory situation where they produce crop-damaging monkeys while working hard to capture them.

The only article with *kyosei* in its title is by a forestry official of the Tokyo Metropolitan Government (Arai, 2005). The article is on how to pursue *kyosei* with deer in afforestation projects. Foresters are loath to leave bare hills unplanted with trees, but deer often eat the saplings planted by foresters. The author reports on a technique to place nets over tree saplings to prevent deer from browsing on them. The nets are part of an afforestation strategy in which key saplings are protected by the nets, but deer are allowed to browse freely in some of the intervening spaces, designated in this strategy as the deer *kyosei* space, where the deer can browse down unwanted bushes, a chore humans would have to carry out if the deer did not.

A compelling article mentioning *kyosei* negatively is written from the viewpoint of an on-the-ground practitioner, T. Aramaki (2005), of the Eastern Japan Monkey-Deer-Boar Fence Association. This article claims to represent the farmer's view, as opposed to scientists or fence manufacturers. The author lists important considerations for building a fence, e.g. don't believe in scientific research or experiments, as they suggest only possibilities for your situation. He goes on to provide detailed instructions on how to build electric fences using local labor and inexpensive local materials. He also gives details on how to build cages for capturing animals.

Even while providing detailed technical advice, Aramaki takes a moral stand. He exhorts farmers to accept the responsibility for defending their own fields. He dismisses people repeating idealistic theories, such as "The entire region must work together to defend fields" or "Let us seek *kyosei* between humans and wild animals," because one cannot defend fields with ideals alone. Although dismissing the idealistic, Aramaki invites the reader to think about the crop damage problem from a monkey's point of view in a section written as a monkey telling his life story. The story starts, "I am a monkey," parodying the famous novel narrated by a cat by Natsume Soseki (Soseki, 2002). The monkey recalls his youth when he and his troop could feed freely in the natural forest. Then the distance diminished between monkeys and humans. Monkeys learned to acquire food with little effort from grave offerings and fields. This easy life did not last, as humans began to throw stones or chase them with sticks. The most horrible humans used electrified fences or shot at them to kill them. The monkey laments, how can humans do all this to us after depriving us of our habitat? The message of the story seems to be that farmers should have some sympathy for monkeys to truly understand the crop damage issue and carry out effective countermeasures.

### **Defending the fields**

Many primatologists have joined agricultural authorities in searching for the means to minimize crop damage by monkeys and other wildlife (Izawa, 2005; Muroyama, 2003; Sprague, 2002; Watanabe, 2000). Primatologists wish to reduce the number of monkeys captured. Agricultural authorities wish to preserve farming in their respective regions. These two expert communities are contributing to a growing literature on field protection. The public can choose from a number of books on how to control wildlife, including monkeys. A magazine for farmers, Gendai Nogyo [Modern Agriculture] publishes a special issue every year devoted to wildlife damage, and recently published a special edition collecting key articles for the major pest animals.

Many stakeholders are starting to realize that one critical point for effective village defense against wildlife is to incorporate the defensive measures into the everyday livelihoods of rural communities. A prominent advocate of this approach is M. Inoue, an agricultural extension official in Nara Prefecture. In a series of publications, he encourages farmers to reengineer farm practices and the farm landscape

(Inoue, 2002, 2005). With the advice of primatologists, he and his team of extension workers have developed a program for examining farm practices, field locations, and village vegetation to identify the features that attract monkeys to a village. Pointing out that a village can be a “gourmet” feeding site for monkeys, he proposes field management techniques to avoid inadvertently feeding monkeys, many of which are reflected in the literature cited above (Fukui Prefecture, 2004; Oi, 2005). He is the original proponent of the flexible fence built with cheap materials and designed to avoid hand-holds that monkeys can grab to climb onto the fence.

An important aspect of his argument, for the purposes of this paper, is that he asks farmers to change their attitude toward the crop damage problem. His goal is not just to give practical advice. He wishes farmers to take a more active role in the defense of their own fields and not rely on the government programs for wildlife management programs or large, subsidized electric fences. Inoue’s program requires farmer to systematically examine the role played by farm villages as feeding sites in the ecology of monkeys. He admonishes farmers not to become discouraged so easily. He encourages farmers to apply the same critical thinking and systematic action to combating monkeys as they would to fighting insect pests or weather damage. Systematic action does not mean that humans can or should cut off all interactions with monkeys. The goal is to rebuild the relationship between the village and wildlife. Inoue argues also that village defense will ultimately lead to the protection of monkeys. He points out that a serious obstacle to scientific wildlife conservation is the unpredictability in monkey population growth created by villages that allow monkeys access to a high quality diet.

A further development of this strategy is to turn field defense into an extension of productive farming. Then, making a living will result in defending the fields. A recent example of this strategy is reported in the Japan Agricultural Newspaper (Nihon Nogyo Shinbun, 2005). To stop monkeys from entering the village, farmers in Akiruno City within Tokyo Metropolis have organized a co-op to harvest fruits left growing in orchards left unattended by elderly farmers. Monkeys started to damage crops in the village about 20 years ago. Villagers tried many techniques to chase away monkeys, including red-pepper bombs, loud-speakers broadcasting barking dogs, and radio transmitters on monkeys to aid in detecting raiding monkeys, but such measures turned into an endless cat-and-mouse game. Declaring “don’t leave bait out over the winter,” seven farmers set up a production co-op in 2004 to manage 1,000 citron trees with the help of student volunteers from a veterinary school. The citrus is turned into juice and other products for sale. The co-op aims to kill two birds with one stone by producing a saleable product and preventing wildlife damage.

## Discussion

*Kyosei* and *kyozon* are key words that provide insights into the way Japan negotiates the human-wildlife interface. At the most abstract level, *kyosei* should probably not be interpreted to be more than a pleasant vision of harmony between humans and nature. This visionary and idealistic version of *kyosei* seems to be considered so impractical by on-the-ground advocates of both wildlife and farmers that neither side mentions *kyosei* in many of their writings. In more concrete usage, *kyosei* possesses two-sides. One side favors wildlife protection. The conservationist can call for *kyosei* with wildlife instead of killing them. This is the side that farmers and their advocates reject by emphasizing the one-sidedness or difficulty of *kyosei*. By contrast, *kyosei* can be a declaration that rural residents too have a right to live the rural life, and they can regulate or hunt wildlife if need be. Rural residents will make accommodations for Nature, but they will not give up their livelihoods or willingly hand over their land to wildlife. The two sides of *kyosei* find the most delicate balance when the word appears in the government policy guidelines for wildlife management. The use of *kyosei* implies that the policy goals preclude the complete expulsion of either humans or wildlife. Nevertheless, in order to achieve *kyosei* from the human point of view, government will be permitted to manage wildlife populations. However, that management must follow a “scientific” plan that assures the survival of wildlife populations.

As seen in its usages, *kyosei* may seem to be a compromised term, either because it is too vague and idealistic, or because it has become a policy term. However, we believe that the variable uses or dis-uses of *kyosei* demonstrate how *kyosei* is, indeed, a crucial concept. What we suggest here, is that all parties in the debate are, in effect, attempting to operationalize *kyosei*. *Kyozon*, to many rural communities, has been an undesirable but unavoidable reality. Given the state of *kyozon*, rural residents are faced with the need to adapt their own actions and attitude towards wildlife which will allow both themselves and wildlife to live their lives in the same rural landscape.

Human communities have coexisted with wildlife in the Japanese archipelago for millennia (Knight, 1999; Sprague, 2002). There has always been an interface between humans and wildlife. Farmers in the past probably did not set out to manage land to live in harmony with nature. They managed land to extract the natural resources as best they could to produce the necessities of life, such as charcoal, fertilizer, and lumber. In doing so they created a landscape that may have been much less hospitable to monkeys in the vicinity of villages. For example, Chiba Prefecture, introduced above, had large grasslands and pine woodlands under traditional agriculture in the nineteenth century (Ogura, 1996). Iwasaki and Sprague (2005) found that in one part of the monkey habitat region of Chiba Prefecture, grasslands and pine woodlands had comprised major land uses in the 1880s, but most had turned into broad-leaved forests by the 1980s.

Changes in rural land use have brought the spatial interface between humans and wildlife to the farm's edge. The long and complex interface is difficult for human communities to define. The issue presented to the Japanese people today is where to locate that interface, and how to perceive the human-wildlife relationship along that interface. The interface is often perceived to be a line of conflict. Primatologists face the unpleasant prospect of watching thousands of monkeys culled as pests every year. Farmers face a foreseeable future of constant struggle to guard their fields, a struggle that may end only when the government will somehow remove all the monkeys, or they give up farming entirely.

The end result that rural communities most fear is less the physical damage, but more the discouragement felt by farmers leading them to abandon farming. A MAFF committee on wildlife crop damage notes that wildlife can exacerbate a vicious circle in which crop damage reduces the farmers' will to continue farming, causing more farm abandonment, that in turn leads to further crop damage (MAFF, 2005). The perceived ineffectiveness and the constant maintenance required of various types of anti-monkey defences discourage farmers from pursuing further steps to protect crops, and may lead them to call more vigorously for removing wildlife.

However, many rural communities have started to incorporate effective crop damage prevention programs into their normal rounds of productive rural activity. Faced with the necessity to manage land around the villages, rural communities are searching for new organizations and new meanings to manage the land. The farmers of Akiruno City, cited above, demonstrate that land management can be reinstated as part of the productive activities of rural life. If field defence is an extension of productive farming, making a living will result in defending the fields. Then farmers may feel that they have the upper hand over wildlife, and become more willing to *kyosei* with wildlife in Japan.

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