

DBJ Research Center on Global Warming
Discussion Paper Series No. 41 (7/2011)

Preserving Our Grasslands :
Learning from Aso - City Residents Choose Cooperation

Masanao Maeda

This paper is a preliminary material in the draft form to stimulate discussion and comments from academics and policy makers. Views expressed in this paper are those of the author(s) and do not necessarily reflect the official views of the Development Bank of Japan.

Preserving Our Grasslands: Learning from Aso --- City Residents Choose Cooperation

Masanao Maeda

1. Introduction

In northern Kumamoto Prefecture, on the island of Kyushu, the district of Aso lies surrounded by the green wall of a circular mountain ridge. Within are a number of active volcanoes; one, Mt. Nakadake, sends up intermittent clouds of smoke. Outside the caldera, red cattle graze on majestic grasslands stretching away as far as the eye can see. Each year, over 17 million visitors come to view this poem to the natural world. But these grasslands, which typify the landscape of Aso, are more than an international tourist destination: accounting for half of Kyushu's grasslands as a whole, they are a precious natural heritage of global scale. Their preservation is our debt to future generations.

Today, however, this green and glorious plain is in danger. Not only are livestock farmers less numerous than in former days, but those that remain are growing older. The liberalization of beef imports has hit the industry hard. And each year, fewer and fewer acres are subjected to the burning that is essential to the next year's healthy growth.

The residents of Aso --- both villagers and city dwellers --- have joined together to stop the region's degradation. By pushing for measures to promote livestock farming and through volunteer activities, they have embarked on a huge effort to build up the region's villages while protecting its invaluable grassland.

2. A Millenium of Life on the Aso Plain

2.1 A Plain Stretching Broad and Far

The horses and cattle that inhabit Aso's Kusasenri meadow are a source of pride to all Japanese. The landscape on which they thrive, however, is not a natural one, but the creation of the residents themselves. Planting grasses on pastureland which is strategically burnt once a year, local people have raised livestock here for hundreds of generations. Without livestock farming, people would cease to tend the land, and with the passage of

time the meadows would revert to woodland.

How long, then, has the Aso grassland existed? According to the *Nihon Shoki*, a chronicle written in the early eighth century, the emperor "arrived in the state of Aso after traveling throughout Kyushu, but there were no houses that he could see, as the plain stretched broad and far." In the *Engishiki*, a set of detailed regulations on government administration dating from the early tenth century, we find the provision, "If, among the horses of Futaemaki, in the state of Higo, there are better animals than those of other herds, they are to be brought to the capital."¹ These excerpts tell us that at least as far back as the eighth century, the Aso plain was so vast that one could look in all directions and not see a single human dwelling, and that the horses raised there were of such quality that they were considered suitable for presentation to the Emperor. People have grown these grasses, and fed them to their livestock, in a cycle that has gone on for over a millennium.

2.2 The Origins of Commonage

How have they maintained and managed this vast grassland over the years? According to the *Aso Bunsbo*, a document from 1409, "The moorland of *Hatabe*" --- the name for the northern and western portions of the volcano's surrounding ridge --- "is the property of the shogunate." But while the shogun was indeed the owner of this relatively unproductive land, there was no rule forbidding trespass by the general populace, who, it appears, could come and go as they pleased.

The current system, under which pasturage cooperatives maintain and manage the land as commonage, is believed to have been instituted in 1633 by the head of the local Hosokawa clan. "Commonage" is a legal term for the practice of using land, particularly pasture, in common with others, to derive profit, provided that the use does not diminish the land in any significant way.

3. Crisis for Grassland Commonage

3.1 Seasonal Burning and Firebreaks

The crisis that now affects the commonage system, and the increasing difficulty of

¹ Above figures are from Otaki (1997), pp. 42-46.

maintaining the Aso grassland, are direct results of the liberalization of beef imports in 1991. Just as it did elsewhere in Japan, the arrival of cheap imported beef pushed many cattle farmers in Aso out of business. With fewer cattle to feed, demand for feed grass dropped off, and there was less of the seasonal burning and firebreak clearing that are essential to keeping the grassland healthy. Each year around the time of the spring equinox, the meadows are burnt to remove the shrubs and dead grasses whose appearance is the first step in the transformation of meadow into woodland. Fires are controlled so as to spare the true grasses that are the preferred food of horses and cattle. The burning is highly dangerous work. To prevent the fires from spreading out of control, firebreaks six to eight meters wide are cut in late summer and early fall where woods and pastureland meet. This, too, is challenging work, especially on the hillsides.

Under the system of commonage, the people of Aso have used their grassland as a shared social asset for innumerable generations. If the land is to continue to exist in this form, we must address the question of how to manage and maintain it in optimal condition.

3.2 The Aso Region Today

The Aso district is made up of twelve towns and villages. Occupying 119,818 ha, or 16.6% of the total area of Kumamoto Prefecture, it is home to 70,024 people (as of 2000). The population has been on a steady decline since its peak at 119,057 in 1955.

Of the total 24,683 households in the district, 7,671 make their living from agriculture and 3,933 from forestry. The population is aging at a rate far higher here than elsewhere in Japan: People over 65 account for 22.8 to 30.4% of the population of the district's communities. The average rate of 26.7% exceeds that for both Japan as a whole (16.7%) and for Kumamoto Prefecture (20.7%).

In addition to its vast grasslands, Aso has the world's largest caldera. Encompassing five peaks known as the *Aso Gogaku*, it stretches 18 km east to west and 25 km north to south, with a circumference of 90 km. In 1934, the Aso district was designated as the Aso-Kuju National Park. The area is home to rare animal and plant species, including such wildflowers the bright blue *higotai* and the beautiful, blue-violet Jacob's ladder (*hanashinobu*). Preserving these species is not the least of the reasons for protecting this region.²

² Figures on population and total numbers of households are from the 2000 National Census; figures on numbers of employed are from the 1995 National Census; figures on numbers of agricultural households are from the 2000

Aso's outer ridge is also a rich source of water. Six water systems --- the Shirakawa, Kikuchikawa, Midorikawa, Chikugokawa, Gokasegawa, and Onogawa rivers --- originate here. Flowing out from the ridge in a radial pattern, they provide water for agriculture, industry, and households across much of Kumamoto, Miyazaki and Oita prefectures (Figure 1).

3.3 Current Conditions on the Aso Plain

According to a study of the region³ made in 1999, pastureland accounts for 22,955 ha, or 19.2%, of the Aso district as a whole. Natural meadow takes up 64.3% of this land (14,761 ha), while pastureland accounts for 27.2% (6,249 ha) and forests for 8.5% (1,945 ha) (Figure 2).

Of Aso's total area, 16,457 ha, or 71.7%, is subjected to seasonal burning (Figure 3). In the years between the 1995 and 1999 surveys, however, seasonal burning had fallen off by 430 ha, or 3%. Some 1,500 ha of grassland are no longer being burnt or used for grazing.

There are 175 cooperatives in the Aso district, and 10,198 households, or four in every ten, have rights to the commonage. Of these, 6,817, or 66.8%, are farmers, meaning that one in every three households with commonage rights depends on a non-agricultural occupation. Some ten thousand animals graze the pastureland, which works out to 5.5 animals for each rancher, or 57 per pasture.

In early autumn, when the days are still oppressively hot, work starts to clear firebreaks on the slopes. During the year of the survey, 5,433 people participated from throughout the Aso district. The work required three days, if we assume that it was done by members of the 1,828 stock-owning households alone, and that one person from each such household took part. The average age of those who worked on the firebreaks was 52.8 years.

The same survey found that 7,539 people took part in the spring burning, 1.4 times the number that helped clear the firebreaks. Assuming participation by one person from each stock-owning household, this would amount to four days of work.

Firebreaks covering a total area of 440 ha were cut across 640 km of the Aso district as a whole. This is backbreaking work conducted for the most part on steep inclines.

Agricultural Census; figures on rate of aging are from records for 2000 from the Social Welfare Department of Fukushima Prefecture.

³ *Survey of the Current Status of Aso Pastureland and Pastureland Cooperatives*, by the Kumamoto Rakuza Hyoteikai, Kumamoto Nichinichi Shimbun, and Aso Green Stock, 1999.

Each person cleared an average of 809 square meters --- an area equivalent to five volleyball courts.

The Aso region is experiencing declines in many of the factors most important to its economic and ecological health: in the number of farmers, particularly those who raise stock; in the number of animals set out to pasture; and, with an aging population less able to take part in grassland maintenance, in the acreage subjected to strategic burning each year. One of the objectives of the survey was to gauge the likelihood of Aso's ranches maintaining their grasslands intact. Of the 175 ranches covered, 35 were found to face "extremely difficult" problems in this respect. Conditions for 40 others, which were managing to cope for the present, were nevertheless rated as "difficult."

4. Protecting the Meadowlands by Eating Japanese Beef

4.1 The Aso Green Stock Campaign

In 1990, a group of Aso residents banded together to form the Aso Green Stock Campaign, a movement dedicated to protecting the grasslands through urban-rural collaboration. Started by Makoto Sato, a professor at Kumamoto University, and Rikio Yamaguchi, a local farmer, the movement was later joined by a diverse range of groups including the Green Co-op, citizens' groups from the town of Aso and other communities, labor unions, local governments and private companies. Following its recognition by Kumamoto Prefecture in April 1995, the movement took off as an official foundation under the name "Green Stock," with an initial endowment of 120 million yen. Contributing enormously to this sum were thirteen thousand co-op members, led by women deeply concerned about the environment and food safety, who put by 100 yen each month for the purpose for three years. Townspeople and farmers worked together for a shared goal in a nascent NPO --- a citizens' campaign in the truest sense.

At present, the Green Stock campaign counts 72 organizations and private companies among its members, along with numerous citizens of every stripe. Its principal activities include direct sales of Japanese beef, volunteer assistance in seasonal burning, and the promotion of ecotourism.

When the movement first took off, most people believed that "preserving the natural environment" meant leaving nature strictly alone; in Aso's case, this meant allowing the plains to revert to woodland. Now, however, a different idea is gaining hold: that the

"nature" that constitutes the Aso grasslands is something that was built up with human intervention over the years, and deserves our protection precisely for that reason.

4.2 Direct Sales of Japanese Beef

To preserve Aso's grasslands, the people of the region must reinvigorate their livestock industry and continue with the cutting of firebreaks and seasonal burning of fields. The first of these will depend on whether consumers can be persuaded to buy local beef rather than the imports which have flooded the market. To achieve this, the people of Aso have come up with an innovative plan: to return the environment to the sort of "commons" that existed in the region for thousands of years. It works this way: food cooperatives and other organizations create expanded sales routes for the local beef, a variety called Japanese Red, which they present as a healthy alternative to imported meat. Benefiting from increased sales, the local livestock industry puts new energy into cutting firebreaks and carrying out seasonal burning. This in turn leads to healthier, more stable grasslands. Left to the forces of the market, the local beef industry would collapse under the pressure of inexpensive imports. Under the plan, Japanese Red beef is traded at slightly higher than market price, the difference being regarded as a monetary contribution toward the preservation of the grasslands.

To ensure that consumers understand the impact of their purchases, the movement has adopted the slogan: "Eating 100 grams of local beef protects 75 square meters of grassland." Consumers can feel that by eating local beef --- leaner and raised by a clearly identified producer, even if a bit more expensive --- they are doing their part in preserving the grasslands.

At present, "healthy local beef" is being sold not only by cooperatives, but also by a growing number of local hotels and restaurants. A pamphlet entitled "Where to Enjoy Aso Beef" is part of an active public relations effort. The movement is seeing results: almost 300 head of Japanese Red are now sold annually through direct sales.

5. Restoring the Grasslands through Tourism

5.1 Volunteer Support for Seasonal Burning

Faced with declining numbers of livestock farmers and holders of commonage rights, Aso

has instituted a system whereby urban residents can volunteer to help in the seasonal burning of fields.

The program was started in 1997, when 120 volunteers took part. Many farmers were less than enthusiastic at first, believing the interference of inexperienced amateurs would only make their work more time-consuming and dangerous. Green Stock well understood the dangers, however, and undertook to ensure that the volunteers would act only on the farmers' instructions, perform only those jobs of which they were physically capable, and take out accident insurance. On this basis, the group appealed to city dwellers to help in the campaign, and response was tremendous. (Photograph 1: Volunteers taking part in seasonal burning; Photograph 2: Volunteers building firebreaks)

That volunteers came not only from Kumamoto and Fukuoka prefectures, but from as far away as the Kanto region, indicated the high degree of interest in the project among ordinary Japanese. Participation is growing rapidly: some one thousand volunteers now help in the combined work of firebreak building and seasonal burning.⁴

The program is designed to attract serious volunteers only. Before being accepted, candidates must go through a hands-on training course lasting two days and one night. On the first day, they learn about the Aso plains and the role of seasonal burning in maintaining them. They are taught the basic operations involved in strategic burning and build their own *bikeshibō*, a traditional tool for tamping down flames. The following day they try their hand at actual burning. Since it is in essence a kind of managed forest fire, seasonal burning involves considerable danger. For this reason, volunteers must be of high school age or above, and must outfit themselves with clothing suitable for mountain work, including a heat-resistant hat, towels, and gloves. The actual setting of the fires is left to representatives of the local pasturage cooperative; general volunteers must follow the directions of local people or volunteer leaders.

Most of the volunteers are from Kumamoto or Fukuoka prefecture. Many are employed people in their forties and fifties, although robust retirees are also common. To the local pasturage cooperatives, these helpers are invaluable and indeed essential to their work. The number of volunteers is currently on the upswing. Looking toward to future, however, there is clearly a need for a new means --- one that does not rely on unpaid volunteers --- of supporting the firebreak clearing and seasonal burning that keep the grassland healthy.

⁴ Yamauchi and Takahashi (2002).

5.2 Green Tourism

"Green tourism" can take many forms. City dwellers engage in it when they travel to Aso to help the villagers burn their fields. But Aso has other programs to promote green tourism, including five-day, hands-on encounters aimed at elementary and middle school students and a plan offering visitors a chance to stay at a farming village. These plans are carried out as tie-ups with Kansai livelihood cooperatives.

The idea of opening up a farming village to visitors originated with Rikio Yamaguchi, the farmer who was one of the founders of the Green Stock movement. Since April 1993, visitors have been able to stay at Aso Farm Village, which features a farmhouse-style inn with 14 guest rooms, a 92-square-meter hall, a dining room and other facilities. As temporary residents of the village, guests take part in harvest festivals and other events and receive a selection of the farm's products. In return, they help out in seasonal burning and other work necessary to maintaining the grasslands.

Aso farmers are eager to have young people understand what really goes into the raising and harvesting of agricultural products. Aso Farm Village has a "Farmers' Primary School" where students, mainly from Kumamoto Prefecture but also from Fukuoka and areas even farther afield, can experience the actual production and harvesting of farm products under the tutelage of local farmers.

By volunteering in seasonal burning, staying at a farmhouse inn, or learning about nature at the Farmers' Primary School, visitors are engaging in eco-tourism in its truest sense, in that they enjoy the bounties of the land while contributing to its enrichment. Programs like these offer the promise of restoring the grasslands through a growing collaboration between urban and rural communities.⁵

6. Two Ideas for Preserving the Aso Grasslands

6.1 Slow Food

Bovine spongiform encephalopathy (BSE, or "mad cow disease") spread from Europe to Japan just as Aso's Japanese Reds were gaining recognition, dealing the industry a severe blow. For generations, farmers in Aso have sent their cattle out to pasture in summer and

⁵ Nobuyuki Okamoto, "Cities as Tourism Resources," Uzawa et al. (eds.) *Reflections on the City in the 21st Century: City as Social Overhead Capital 2*, pp. 159-181, University of Tokyo Press, 2003. (in Japanese)

kept them in village barns in winter. But with the population growing older, farmers have cut costs in a bid to fend off cheap imports, and more cattle have been left out to pasture throughout the year. (This method is also gaining favor as a means of maintaining the grasslands.) One happy result is that Aso's cattle farmers are less reliant on chemical feeds, and can raise their animals on the grass that grows naturally on the plains. In an age of concern over BSE, this has proved to be an unexpected boon to the region's cattle farmers, who can promote their grass-fed beef as healthy and safe.

Local ingredients are showing up in a big way in restaurants and processed foods. Since 1991, the women's division of the local agricultural cooperative has encouraged the processing and sale of produce that fails to meet the cooperative's size or conformation standards. After ten years of trial and error, these processed agricultural goods finally came onto the market, accompanied by a new move toward organic farming and the rediscovery of traditional local recipes. Dishes like *yakimai* (roasted rice), red rice, five-grain cereal, black soybeans, *kukonomi* (the fruit of the Chinese matrimony vine), and *akadōzuke* (a type of pickle) --- all developed for their keeping qualities --- are rejoining seasonal agricultural products on store shelves and restaurant menus.

The local food movement is picking up steam around the world. In Italy, as the Slow Food movement, it has flourished as a means of reconsidering, through the medium of food, one's relationship with one's friends, one's family, and one's community, and even the larger question of humanity's relationship with nature.

In 1986, the poet Folco Portinari wrote the Slow Food Manifesto in the northern Italian village of Bra. The movement took shape in 1989 with the founding of the Slow Food Association. As of June 2002, the group had 76,000 members from 47 countries. At present, the association's goals are threefold: (1) to preserve vanishing regional foods and high-quality wines; (2) to protect small producers of high-quality ingredients; and (3) to educate the palates of all consumers, including children. Since the end of World War II, some 250 varieties of fruit, and 150 cheeses, have disappeared from Italy alone. To maintain diversity at the table as well as in the biosphere, we must protect our regional cooking and small producers and encourage the diversified tastes that will help our children resist the siren call of fast food.

The Slow Food Association uses the word "convivium" to refer to its various chapters. "Con vivere" in modern Italian, this is the Latin for "to live with others." Dante's *Convivio*, a word with the same root, means "to eat together." The close relationship between living together and eating together is at the root of the slow food philosophy.

Like Italy, Japan is also seeing a decline in its culinary diversity as people lose

touch with foods, like the vegetables of Kyōto, that are characteristic of particular regions. As Aso is doing with its direct sales of Japanese Red beef, farmers and city dwellers throughout the country are building producer-consumer relationships that go beyond the standard kinds relied on up to now. Influenced by the Italian Slow Food movement, many Japanese are taking a new look at traditional Japanese ways of eating.

6.2 Conviviality

All this calls to mind the words of Ivan Illich in his book *Tools for Conviviality*. Illich says it is possible to "articulate the triadic relationship between persons, tools, and a new collectivity." He uses the word "convivial" to describe a society "in which modern technologies serve politically interrelated individuals, rather than managers."⁶

The Slow Food movement shows that it shares this idea by referring to its chapters as "convivia."

Lee Felsenstein, developer of the world's first personal computer, SOL, and the portable computer Osborne 1, has been quoted by Furuse Yukihiro and Hirose Katsuya as saying that he had been so impressed by *Tools for Conviviality* that he developed the personal computer in order to realize Illich's vision.⁷

This idea --- to create a computer system that can function as a "tool for conviviality" --- led to the rise of the Internet and of non-profit, open, peer-to-peer systems such as Linux and Napster. It's fascinating to realize that the word "convivial" connects the Slow Food concept with personal computers, the Internet and Linux.⁸

Today's information technology --- "IT" --- represents a sea change from the types of tools envisioned by Ivan Illich. Today's tools, by speeding up decision-making in the corporate world and throughout society, and by demanding incessant change, support the trend to commercialize almost everything. IT, having started from the same inspiration that drove Slow Food, now worships at the altar of speed. Ironically, it seems to be regressing into the kind of 19th century Futurism of which the Slow Food Manifesto is so critical.

"Slow food" and "conviviality": these are key concepts in the discussion of Aso's future.

⁶ Illich (1973), (Japanese translation, 1989, pp. xiv-xvi).

⁷ Furuse and Hirose (1996), p. 6.

⁸ Hiroshi Sakamaki, "Intelligence, Networking, and City" Uzawa et al. (eds.) *Toward an Urban Renaissance: City as Social Overhead Capital 1*, pp. 143-165, University of Tokyo Press, 2003. (in Japanese)

7. The Land as Commons: Sustainability, Diversity, and Relatedness⁹ in Aso's Future

Human effort is essential to seasonal burning, firebreak building, and almost everything else required to keep the grasslands healthy. To get these jobs done, Aso's aging population has little choice but to rely on volunteers. But while volunteers are undeniably important, continued dependence on these unpaid helpers is hardly the best means of promoting sustainability. Aso needs a system that will engage farmers and urban residents in further interchange and more diverse partnerships. And this calls for a basic change in the current state of affairs, in which farmers, the owners of the land, produce food and water, and urban dwellers, who visit the region as tourists, consume it.

First, Aso needs to focus on keeping the grasslands diverse, and making it more so if possible. This means opening up the land to a variety of uses, offering volunteer programs and other forms of eco-tourism, and maintaining the kind of culinary diversity propounded by the Slow Food movement.

Residents of cities downstream from Aso must understand that the region is the source of the water whose benefits they have enjoyed for so long. Similarly, people who travel to Aso to enjoy its magnificent scenery need to reexamine the region's value as a grassland. Communities in the region are considering a number of ways to achieve this, including collecting taxes or usage fees. There are other possible methods, however, that do not involve any direct conversion into money. Today, for example, people take part in such activities as seasonal burning and firebreak clearing on a volunteer basis. A change in thinking might open the way for a community service system, under which people would be required to do such work as a sort of payment for the social capital¹⁰ represented by Aso's natural resources. To fund the system it would probably be necessary to introduce a type of local currency rather than rely on ordinary money.¹¹

Better access to Aso's grasslands and other agricultural areas --- not only to help out in seasonal burning and firebreak clearing, but for more general purposes --- would go a long way toward encouraging more meaningful interchange between urban and rural residents. Rights of common could be extended to people traditionally outside the local agricultural community, with a new framework for the use, maintenance, and management

⁹ Nakamura (2001).

¹⁰ Putnam (1993).

¹¹ Maeda (2002).

of the land concerned.

In Northern Europe, citizens enjoy the right to enjoy nature under the Right of Common Access. Lakeshores, seashores, riversides, forests and meadows are open to all. Everyone may stroll by the seaside or rest in a wood, even in properties that are privately owned. To comply with the law, landowners must ensure that fences have gates or paths that remain open for hikers. On their part, walkers must have the common sense to avoid destructive behavior, such as damaging trees, leaving pasture gates unlatched, or littering. It might be useful to adopt a similar common access law in Aso, as the shogunate did long ago in its policy toward Hatabe.

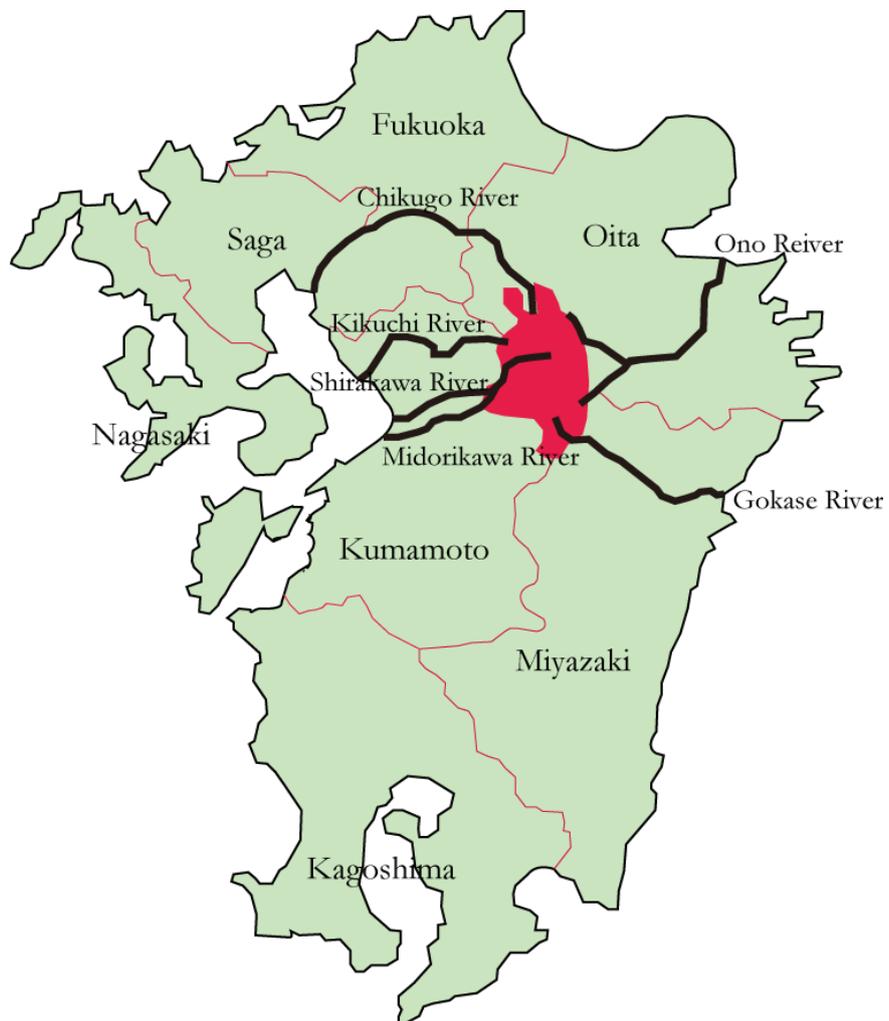
These proposals aim at producing "relatedness" to a degree untried in the past, and new systems will be needed in order to make it a reality. I would like to propose a system of multiple residency, whereby people would be granted residency certificates for communities in regions other than their own, in order that they might feel a greater sense of "belonging" to another community. This could be reinforced through the payment of taxes, a usage fee or a donation. In return, the "resident" would participate in the community's management and upkeep while enjoying use of the land and its resources, as well as discounts on various services. For example, urban residents who take part in certain maintenance or management operations, such as seasonal burning or firebreak clearing, could in return be granted access rights to the region along with discounts on accommodations or local products. Using a local currency, rather than yen, would encourage the cycle of use and consumption of the region's resources while making the newcomers feel part of the community. A system like this would promote something that is deeply needed in today's society: relations that move beyond mere networking into the realm of commitment. Since August 2004, Aso has had its own program in this vein: a new village called Aso Yutatto-mura, which actively recruits residents from other regions.

Now is the time to pool ideas and resources so that Aso can achieve its immense potential. The region must increase the diversity of its grassland space, its tourism resources, and its culinary culture, with slow food --- primarily Japanese Red beef and other local agricultural products --- taking center stage. And at the same time, it must build stronger ties among pasturage cooperatives, local citizens, administrative authorities, private companies, city residents, researchers, volunteers, and people nationwide who are concerned with the grasslands' future. The results will be more than worthwhile: a healthy livestock industry, continued seasonal burning and firebreak clearing, sustainability of the grasslands as public space, or "commons," and a convivial community in which people can live independently yet in harmony with their neighbors.

References

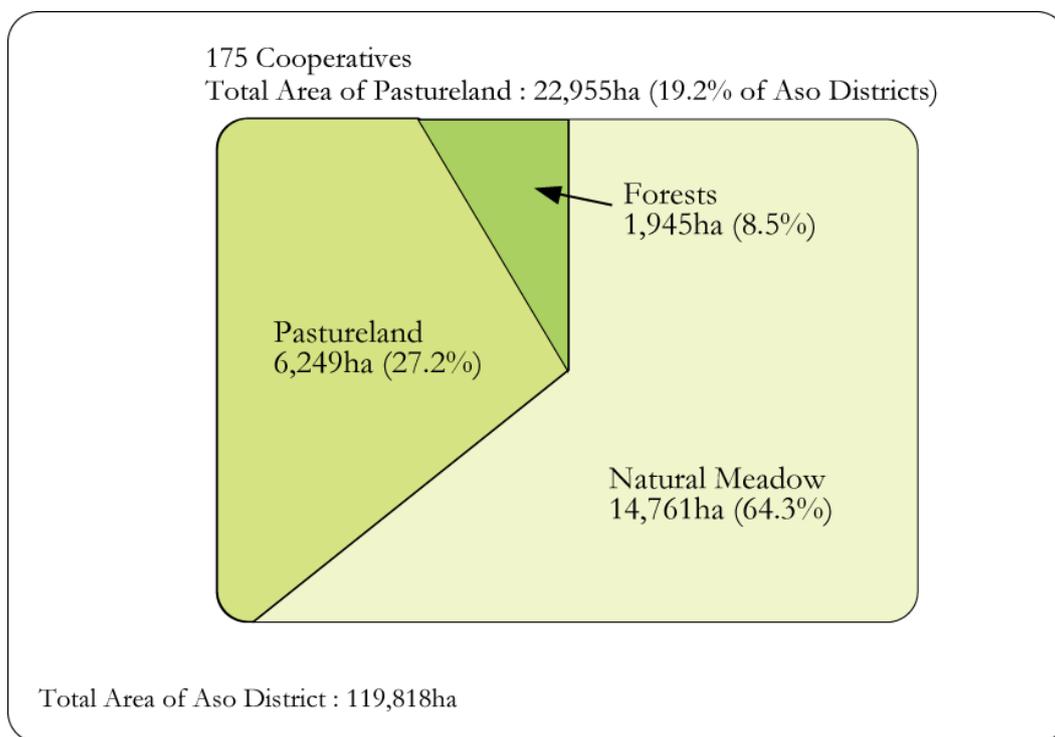
- Furuse, Y. and K. Hirose (1996) *How the Internet is Changing the World*, Iwanami Shoten. (in Japanese)
- Illich, I. (1973) *Tools for Conviviality*, Harper & Row.
- Kumamoto Rakuza Hyogyokai, Kumamoto Nichinichi Shimbun, and Aso Green Stock (1999) *Survey of the Current Status of Aso Pastureland and Pastureland Cooperatives*. (in Japanese)
- Maeda, M. (2002) "Regional Currency: Seeking a Connection with Community Finance." *Kikan Mirai Keiei*, No. 7, Autumn. (in Japanese)
- Nakamura, H. (2001) "From Circulation and Diversity to Relatedness," The Society for Studies on Entropy (ed.) *Questions for a Recycling Society*, Fujiwara Shoten. (in Japanese)
- Otaki, N. (1997) *Grasslands and Human Livelihood*, Ichinomiya-cho. (in Japanese)
- Sato, M. (1993) *Aso Green Stock*, Sekifusha. (in Japanese)
- Shimamura, N. (2000) *The Slow Food Life*, Shinchosha. (in Japanese)
- Tabeta, M. (1990) *The Economics of the Commons*, Gakuyo Shoten. (in Japanese)
- Tamanoi, Y. (1978) *Economy and Ecology*, Misuzu Shoten. (in Japanese)
- Putnam, R. D. (1993) *Making Democracy Work*, Princeton University Press.
- Yamauchi, Y. and Y. Takahashi (2002) "Citizen's Participation in Conservation Activities of Aso Grassland," *Japan Journal of Grassland Science*, Volume 48-3. (in Japanese)

Figure 1: Aso in Kyushu Island



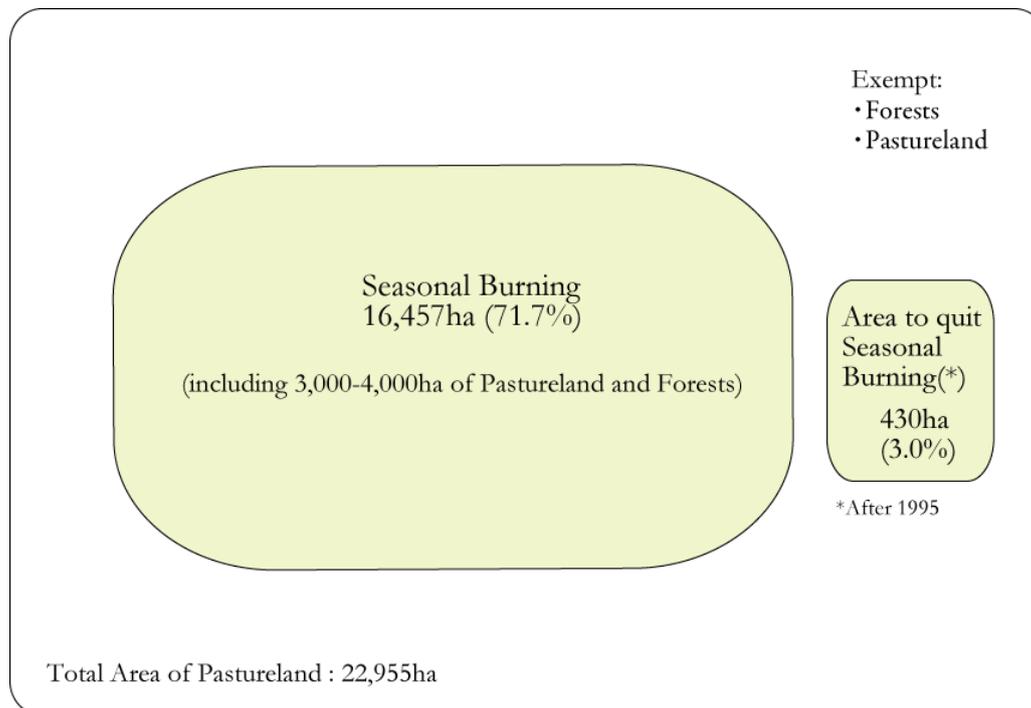
(Source) Office of National Parks and Wild Life
in Kyushu Region, Environmental
Agency.

Figure 2: Area of Pastureland in Aso and the Component



(Source) Kumamoto Rakuza Hyojyokai, Kumamoto Nichinichi Shimbun, and Aso Green Stock (1999).

Figure 3: Area of Seasonal Burning in Aso



(Source) Kumamoto Rakuza Hyojyokai, Kumamoto Nichinichi Shimbun, and Aso Green Stock (1999).

Photograph 1: Volunteers Taking Part in Seasonal Burning



(Source) Aso Green Stock.

Photograph 2: Volunteers Building Firebreaks



(Source) Aso Green Stock.