

**Managing Aso Grassland for
Sustainable Agriculture
【GIAHS Initiative Action Plan】**



May 2013
Aso Regional Association for GIAHS Promotion

1. Introduction

This Action Plan outlines the efforts and initiative of the people of Aso region for the conservation and promotion of “Managing Aso Grasslands for Sustainable Agriculture,” which is proposed as GIAHS(Globally Important Agricultural Heritage Systems), to FAO.

The most prominent characteristic of agriculture in Aso region is its relationship with grasslands around the caldera of active volcano. Large areas of grasslands have been disappearing in Japan along with drastic changes of agricultural technology and society, whereas in Aso, there still remain grasslands as large as 22,000 hectares. It is a unique region where considerable areas of grasslands are sustained by local people using them in agriculture, and thus distinctive biodiversity harbored in the grasslands is conserved.

However, like in other regions in Japan and other industrialized nations, in Aso there are also increasing social problems such as agricultural population decline, low birth rates with aging population, and depopulation . With that there is a change in needs for utilization of grassland along with the change of the society. The region now faces a great difficulty in sustaining and utilizing grasslands which have been maintained by human activities so far.

Responding to this crisis, in addition to promotion of agriculture and forestry, private volunteers and business enterprises participate in support activities to sustain and rejuvenate grasslands and to conserve biodiversity. Furthermore some projects have started to establish new business models to utilize grass resources and to promote development of the region which the next generation can be proud of. We believe that such efforts will become a model of sustaining agriculture in an industrialized country.

The designation of ASO as GIAHS should encourage various actions of the farmers, local individuals and also the citizens supporting from out of this region. Younger generation will also begin to regain confidences in the local agriculture and pride of their hometown on their own.

This Action Plan shows how Aso intends to succeed our agri-culture, landscape or biodiversity closely related to the agriculture for longtime. We are going to analyze challenges and the present situation and introduce specific activities.

2. Overview of Aso region

(1) Geographical features

The Aso Grasslands are located in Aso region of Kumamoto Prefecture, which is situated in the middle of the Kyushu Island in south-western Japan. Aso region spreads around active volcanic craters and huge caldera. The Aso volcano has one of the world's largest caldera stretching 18 km from east to west and 25 km from north to south, and famous for its landscape of grasslands(See Photo 1).



Photo1:Aso caldera

This caldera area is designated as Aso-Kuju National Park in 1934, and also became a part of the Japanese Geoparks Networks in 2009.

The Aso region is a rainy district, and because of the pervious volcanic soil and its varied vegetation - forest and vast grasslands which can absorb the water - much of the rain soaks under producing mineral-rich underground water.

(2) Overview of Agriculture

Local people have made improvements to the volcanic soil of the cold uplands and started cultivation by creating paddies and dry fields for farming, and also grasslands for pastures for grazing and mowing. Thus today, we have a variety of agriculture flourishing in this area, such as rice farming, outdoor vegetable horticulture, greenhouse horticulture, livestock industry and so on.

a) Agriculture

Agriculture in the Aso region has been continually adapting itself to the various geographical features of the caldera and to the acidic volcanic soil, which is unsuitable for agricultural production. Thus today we have bountiful of cereal crops such as rice or soya beans, vegetables, livestock breeding, etc(See Photo 2).

As for rice cultivation, in the Kumamoto Plain where the lower Shirakawa River runs, a heat-tolerant variety is being developed to have resistance to high temperature in summer, whereas in Aso, KOSHIHIKARI variety which is suitable for extreme temperature differences is widely



Photo2: Rice field

cultivated around the plain areas in the caldera basin.

In addition to rice cultivation, various summer-autumn vegetables are grown in the cool climate on the plain farmland at the bottom of caldera, such as tomatoes, spinach, asparagus, radish, cabbage and strawberries, or flowers such as gentian and lisianthus.

b) Livestock industry

Today, large-scale stock production is undertaken through utilizing the vast grasslands. About 20, 000 cows are raised. Although the breed of cattle in Japan is mainly the Japanese black cattle, the Japanese red cattle (hereinafter referred to as *Akaushi*) are bred by the people in Aso region as their main breeding stock. *Akaushi* is generally strong in body, docile in character, and easy to take care of. They have also a high tolerance to cold, heat and poor food. These characteristics suit well for grazing on grassland in Aso region.



Photo3: Grazing on grassland

Most of cows grazing in the grassland are composed of *Akaushi*, and this landscape becomes important tourism attractions(See Photo 3).

c) Forestry

Forestry is also a major industry in the Aso region. Most of the present forests in the caldera are artificial forests of conifers, such as cedar or cypress. They are planted on communities' grasslands for the purpose of the water catchment or for log production.

Oguni Town and Minami-Oguni Town, located in northern rim of the caldera, has also a long history of forestation. *Oguni*-cedar became one of the nationally famous brands. In addition to the timbers, the utilization as woody biomass is also promoted recently.

(3) Biodiversity

a) Indigenous vegetables

This region is also bountiful with indigenous vegetables(See Photo 4). The area produces *Aso-takana*, which is a special indigenous plant grown in the volcanic soils in the cold upland climate. *Tsurunoko-imo*, a kind of taro, limited in the area, is only grown in volcanic and poor soils. And, *Kurona*, means black leaf, is a leafy vegetable, cultivated in farm fields with high soil temperatures in the spring heat.



Photo4: Indigenous vegetables Aso-takana, Tsurunoko-imo and Kurona

b) Akaushi

The origin of *Akaushi* is said the cattle came from Korea in the past, and then adapted and settled into the Aso region. *Akaushi* is generally strong in body, docile in character, and easy to take care of. They have also a high tolerance to cold, heat and poor food. These characteristics suit well for grazing on grassland in Aso region(See Photo 5). *Akaushi* were popularly kept all around Aso region as working cattle. The present *Akaushi* is a hybrid of the native one and the Simmental from Switzerland.



Photo5: Akaushi

c) Conserve biodiversity through agriculture

It is estimated that 1600 plant species exist in Aso, of which more than 600 species grow in grasslands. Many kinds of endangered species are also included, and given its rich natural environment of both forestry and grasslands, the area becomes a hotspot of biodiversity with various kinds of birds and butterflies.

Many of these plants are adapting to the cool climate and the grassland environment, whereas it seems to have vanished from most parts of the Japanese Islands because of climate changes after the glacial age. However, they have survived in the Aso region owing not only to the effects of the cool highland and the volcanic activities, but also to human activity in the grasslands subsequently served to their survival(See Photo 6-7).

Many animals live in the grasslands and the marsh. The area is a unique ecosystem which



Photo6: Viola orientalis



Photo7: Lilium concolor var. partheneioni

hosts a plethora of butterflies such as *Shijimiaeoides divina asonis* which eat unique grassland plant named *Sophora flavescens*, and also of migratory birds on

grasslands such as *Emberiza yessoensis yessoensis*, *Gallinago hardwickii*

(4) Traditional culture

The Aso volcano is active and its eruptions can damage food crops. People have prayed to the volcano for good crop growth since ancient times. They worshiped the volcano as a god, and today we have many related agricultural ritual and festivals of Aso Shrine.

These rituals start from the *Tokanosechie* on new year, to the *Tanomi* Ritual in autumn. Seasonal rituals related to rice farming are held mainly by Aso Shrine and Kokuzo Shrine throughout the year. The

purpose of these rituals is to wish for a good harvest and mitigate any damage from volcanic ash caused by eruptions of Aso(See Photo 8).



Photo8:Hifuri-Shinto-retual

3. Background of the GIAHS application

(1) The uniqueness of Aso's grasslands

Aso's grasslands burning is unique in various aspects in comparison with the other burning for pasture which held around the world.

a) Climate

First point is the climate. Different from other major grasslands burning, the climate of Aso region belongs to the climax forest community, so in Aso human's frequent intervention



Fig1: Management of grasslands through agricultural practices

such as burning is indispensable to maintain the grasslands(See Fig1). It should be underlined that such huge grasslands are maintained for thousands of years through human's agricultural behaviors.

b) Purpose

Second, the purpose of grasslands is quite different. In other areas, grasslands burning is for effective pastures by encouraging grass regrowth. Aso's grasslands are used not only for pasture, but mainly for agriculture and daily life. They are regarded as producing grasses for

various use : mowing for feed, green manure, roof materials or fuels, constitute sustainable and circulating agricultural system in Aso region.

c) Biodiversity

Grasslands burning is considered as a favorable farming way which allows sustainable and various use of grasses. Although the heat of the slash and burn farming extinguish most of the seeds underground, Aso’s grasses are burned off in quite short time, so the underground temperature does not rise so high and various grasses can survive, thus conserving biodiversity of the grasslands(See Fig2).

Location		Aso	Yamaikita• Mitsuse
Farming method		Noyaki burning	Slash-and-burning
Vegetation		Silver grass	Cedar
t E l e v a t e d (^o C)	100cm	260-540	170-960
	30cm	330-580	200-570
	0cm	70-160	90-520
	-2cm	0	40-420
	-5cm	0	0-100
	-10cm	0	0-120

Fig 2: Elevated temperature of burning

d)Management

Aso’s grasslands can be regarded as a “secondary-natural” environment, which are formed and maintained through long-term agricultural activities by the local people, such as burning, grazing and mowing.

Most of the grasslands in Aso are managed by cooperative units of communities as their “common lands”. The unit members or the commonage holders in communities are able to access the designated mountains and forests in order to obtain the necessary materials for their production and living.

From ancient to modern times in the Aso region, grasslands have been maintained according to the social needs of the time. This resulted in the rules of grassland use in each community and a desire to avoid competition for resources. Such community regulations contributed to sustainable grassland use and such cooperation.

(2) Contemporary difficulties in preservation of semi-natural grassland

Although the grasslands are indispensable to maintain Aso’s agriculture, biodiversity and landscape etc, the maintenance of these grasslands through agricultural ordinary activities faces severe difficulties.

The Aso region has grassland area of some 22,000 hectares for grazing. However, the way of agriculture has changed due to the mechanization, diffusion of chemical fertilizers, and decrease in use of thatched roofing. Plowing farmers no longer need to use animals for cultivation, and grassland use is limited mainly to the stockbreeders within the community.

In addition, the overall aging of the farming community, shortage of newcomers and free import of beef led to a decrease in the number of livestock farmers. These factors have resulted in dwindling numbers of members joining pasturage cooperatives. The decrease of grassland use for cattle-grazing inevitably resulted in poor maintenance and devastation of grasslands.

A survey conducted by Kumamoto Prefecture says more than half of the 160 pasturage cooperatives experienced difficulties in continuing their own grassland-burning in the past 10 years, mainly due to the shortage and aging of local participants.

The increase of poorly maintained grasslands stimulates the invasion of low bushes like brambles. This will lead to increased difficulty in grassland use, damage to rare flora and fauna, and resulting in plant monoculture, and loss of biodiversity.

In addition, the increase in poorly maintained grassland and tree plantations can lead to collapse of hillsides. Eventually, it is likely to bring unfavorable effects to water resources originating in Aso and people’s lives in the downstream areas.

The Aso grasslands are not only a resource to agriculture but also an important attraction of the local tourism. Thus, any loss of grasslands would cause serious concerns in various areas(See Fig3).



Fig3: Transition of Aso’s grasslands use

4.Our challenges

(1) Four Directions

In this way, grasslands in Aso have been closely related with agriculture, biodiversity, and the landscape. They are semi-natural environment sustained by human hands with special management techniques developed over time by local people who had been engaged mainly in agriculture. Today, however, it is becoming difficult to maintain proper human intervention, and therefore we face difficulty in sustaining such precious semi-natural grasslands and their agricultural utilization cycles, as well as conserving biodiversity.

To cope with this situation, we will indicate specific directions on the action plan by analyzing our challenges and vision based on the direction set in the GIAHS proposal.

a) Promoting agriculture, enlarging grassland use

The most important is to promote the use of grasslands in ordinary agricultural context, such as grazing and mowing. Agricultural products in Aso should fully utilize the nationwide popularity and fame of Aso. Some important questions which we will constantly have in mind will be: What is the “value” of Aso products for consumers, different from others? How to promote consumers’ awareness to this value of Aso product? What and how can farmers benefit from our initiatives?

In Aso region, cooler climate is suitable for less agricultural farming. This attempt can be more enlarged than today.

Grass composting for cultivation of rice and vegetable is very unique to Aso. Grass compost user’s circle independently posts labels on their own products and promoting them. This idea can be introduced more farmers and more systematically(See Photo9).



Photo9: Aso Grassland Restoration Label

The increase of numbers of cattle for grazing, especially *Akaushi* that is rather adaptable for grazing in Aso’s grasslands, will contribute directly to the cyclical use of grasslands. Especially when the number of communities decreases, grazing cows are efficient and effective for the maintenance of grasslands in behalf of human.

Recently the beef of *Akaushi* or red cow is becoming increasingly popular with the rising health-consciousness of Japanese people, and thus its trading price is also increasing. Taking this opportunity, we should develop branding strategies focusing more on grasslands and red cows, such as diffusion of an original evaluation method to assess not only meat quality but also how to raise cows and a research on practical application of large scale supply of fodder.

On the other hand, the varied use of grass resource should be encouraged; composting with grasses can add market value for consumers to the vegetables grown with them. Grass use for biomass resource contributes to an eco-friendly biomass energy system and low-carbon society.

We will also promote “slow food” which is a global movement to improve quality of life by preserving regional traditional culture of food, and promote environmentally-sound agriculture to preserve natural environment such as bountiful groundwater of Kumamoto.

b) Supporting pasturage cooperatives for grassland managing

Aso’s key assets are the grasslands in Aso that have been sustained by efforts of our forefathers over 10,000 years.

However a survey has found that most of pasturage cooperatives are concerned about management of their own grasslands in the long term. As a basis for conserving biodiversity of grasslands, it will be significantly important for the pasturage cooperative members who manage grasslands to assess conditions of biodiversity, and work out how to improve conditions of grasslands based on the grassland record in which changes of plants, changes of utilization and management of grasslands, and utilization and management of grass are recorded.

In addition to supporting activities of pasturage cooperatives like many local governments do, it is important to secure volunteers to supplement shortages of the labor force, improvement of the dispatch scheme, and physical and policy measures for labor saving in *Wachigiri* or creating firebreaks by mowing that especially needs many workers.

It is also important to involve the general public in these activities. As Aso is a shared heritage that offers a variety of benefits to people not only in the region but also outside the region, it is necessary to share common thoughts to support Aso with everyone included.

For this purpose, we will continue to support activities of Public Interest Incorporated Foundation Aso Green Stock which conducts field burning or mowing for firebreaks, where many people participate as volunteers (See Photo 10 and Fig4).



Photo10: Grass burning support volunteers

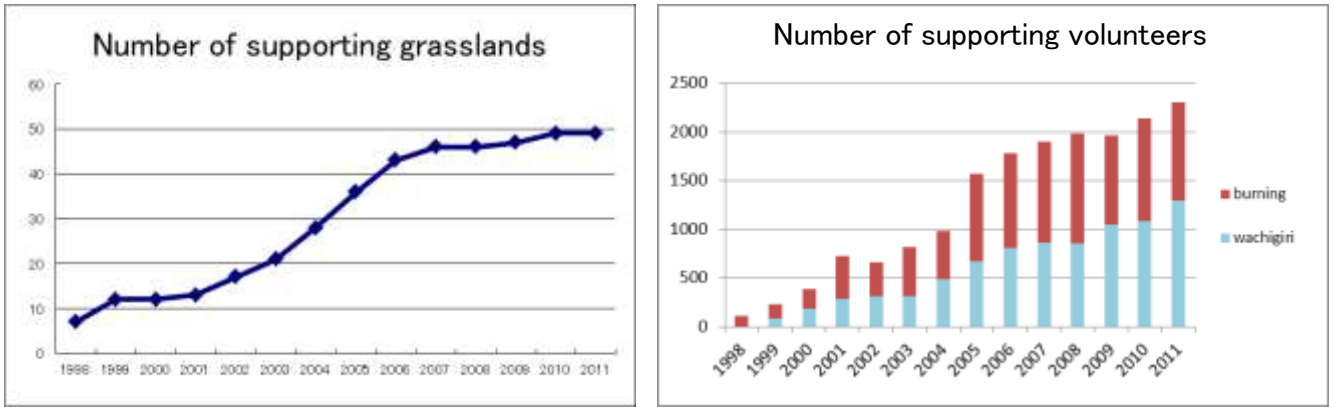


Fig4: Number of supporting grasslands and volunteers

c) Preserving culture, landscape and biodiversity

Grand landscape with grasslands, forests and farmland had been created in Aso over time by diverse production activities adapting to geographical conditions around the caldera. Aso region was designated as a national park in 1934. Through cyclical use of grass resources and sustainable agriculture under the special management system, semi-natural grasslands were created, conserving biodiversity. And units of grassland – forest – farmland - community is collectively managed by individual communities.

We will continue to preserve and the landscape of rural village and grasslands and utilize the resources at the same time, under the proper management of Aso-Kuju National Park. And also we will make efforts to manage man-made forests where forest owners find them difficult to manage.

Also in this region groundwater is recharged by abundant rainfall, unique geological structure, and forests, grasslands, and farmlands in and around the caldera, which becomes sources of many rivers such as Shirakawa River. In order to conserve this bountiful spring water in good condition, we will introduce ordinance and protection measures, and promote environmental studies.



Photo11: Aso's grassland

Aso region is a treasure house of rare flora and fauna where grassland vegetation of Eurasian Continent grows, and where there can be found such insects as butterflies(See Photo 11). However, there is a problem with people who hunt for such flora and fauna.

National and local governments have put a ban on the

removal of wildlife from sanctuaries, strengthening penalties and patrols for the protection of rare flora and fauna. Awareness raising activities for the conservation of nature will be continued with public and private sectors in joint effort.

Furthermore, there is a project to purchase hotspots of unused grasslands where rare wildlife is concentrated and to rejuvenate “flower fields” by conducting field burning and so on.

Efforts are also made to preserve agricultural culture such as “Aso Agricultural Festival” which is designated as a significant intangible folk cultural asset of Japan, and to pass on the traditional food culture of the region in collaboration with a research institute of the region.

d) Participation of citizens for grassland maintenance

Aso is one of the most popular touristic destinations in Kyushu with about 17 million tourists visiting annually, which accounts for one third of the tourists in Kumamoto Prefecture. Ecotourism or green tourism arranged by local travel agents is becoming popular recently to enjoy the nature and culture of Aso. Through such tours, tourists can experience nature, history, culture, and life in rural area which is not available in urban life, and through communication with local people, tourists deepen their understanding of Aso.

There are children who are not very familiar with the grasslands even though they live in Aso. So we will provide learning opportunities about grasslands and verify the results in order for all the children in Aso to have certain knowledge about grasslands and deepen their understanding about conservation of grasslands(See Photo 12).

We believe that we shall be able to sustain Aso

grasslands for the future by sharing our thinking about Aso with future generations.

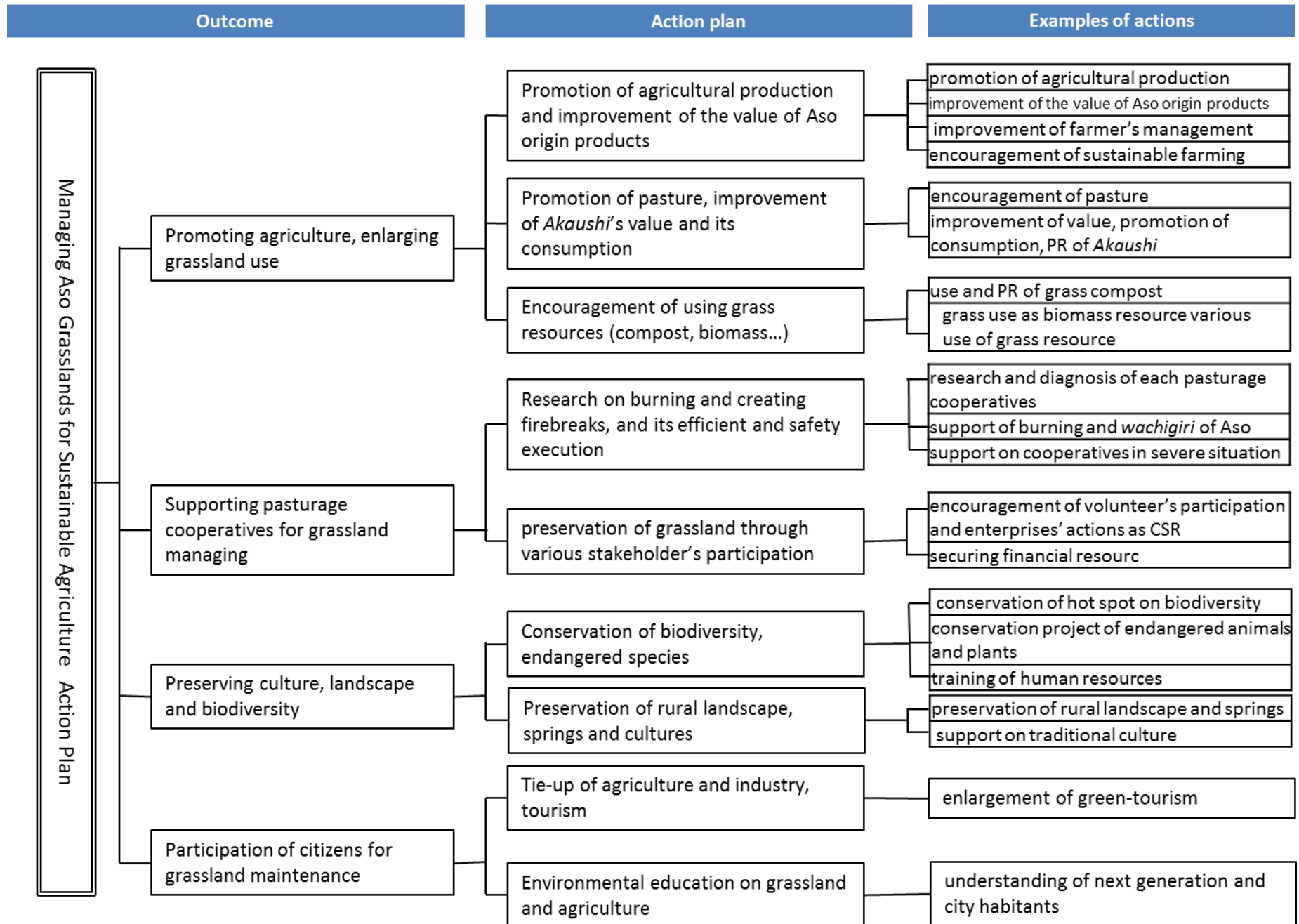
For this purpose urban-rural exchange and environmental education will be needed.



Photo12: Environmental education

Managing Aso Grasslands for Sustainable Agriculture

Framework of Action Plan



6. Action Plan

(1) Promoting agriculture, enlarging grassland use

Name of Action Plan	1) Promotion of agricultural production and improvement of the value of Aso origin products
Objectives	<ul style="list-style-type: none"> ▪ Stable production of various agricultural products due to the unique natural conditions of heavy precipitation and a cold climate located in a warm southwest area ▪ Selection of items suitable to its climate Expansion of production and diffusion of traditional indigenous vegetables such as <i>Aso-takana</i> and <i>Akado-imo</i>, used in the traditional foods <i>Aso-takana-zuke</i> and <i>Akado-zuke</i> ▪ Promotion of added value for the products of Aso in order to successfully promote ways of farming and indigenous varieties of the Aso area ▪ Lowering the production costs and strengthening of farming through increase of farming acreage with improvement to farming facilities and expansion of cultivated area ▪ Production of safe and secured farming products at the same time with promotion of “Kumamoto Green Agriculture” which protects the affluent groundwater and natural environment
Challenges and Current Situation	<p>In addition to producing protected horticultural products, improving agricultural and forestry products as well as transforming the cold highland volcanic soil into paddy fields and farmland are activities being undertaken. Due to its highland cool climate, the Aso area has fewer insect pests, and, therefore, has the advantage of not being so heavily reliant on the use of pesticides. On the other hand, countermeasures to heat and measures for reducing the use of energy are necessary in summer. The rate of paddy field improvement in Aso-dani surpasses the average rate per prefecture and well-maintained paddy fields can be viewed in the caldera. Here indigenous vegetables such as <i>Aso-takana</i>, <i>Akado-imo</i> and <i>Tsurunoko-imo</i> are being produced.</p> <p>Henceforth, it is necessary to raise the added value of farming products grown in Aso by utilization of native grass compost and reducing the use of pesticides and of chemical fertilizers.</p> <p>The recent increase in numbers of harmful bird and mammal species was caused by the aging of farmers and foresters, the abandonment of cultivated land due to lack of successors, as well as an increase in forestry.</p> <p>However, many workers in other areas have become farmers recently and the number of so-called “U-turn farmers”, who are the children of farmers returning to the family business. Therefore, it is required to provide support to them to stay and make their first steps in agriculture proceed smoothly.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Stable production of agriculture and forestry	<ul style="list-style-type: none"> ▪ Steps to make good use of the vast farmland and semi-cool highland, rice paddies, and cultured outdoor vegetables which can differentiate Aso from other areas are to be promoted. ▪ As for protected horticulture, energy-saving measures are to be implemented for countermeasures to heat and stable management in winter. ▪ To support acquisition of hunting licenses and improvement of captive techniques in order to prevent damage by birds and animals, and promote ideas for increased distribution and consumption of deer and wild boar meat. ▪ Maximize the use of timbers produced in the prefecture by utilizing wood in public constructions and expand the use of wood as an energy resource. ▪ Promote reduction of costs in forestry by the integration of forestry facilities as well as introducing container-seedlings. 				
Improvement of added value of agriculture and forestry products in Aso	<ul style="list-style-type: none"> ▪ Utilization of wild grass compost (a traditional way of farming), and certification of farming products with less pesticide and fewer chemicals should be certified in order to add value for the products of Aso. ▪ To maintain and promote respect for the indigenous culture (including food culture), a branch of “Slow Food Japan”, which aims for life quality improvement, should be established. ▪ Establishment of local product shops and sales of farming and forestry products of Aso, cooperation between these shops, expansion of the market by information exchange and the concept of local production for local consumption ▪ To support the sixth industrialization of development of products by agricultural product processing groups and improvement of product appeal ▪ Indigenous vegetables such as “<i>Aso-takana</i>” and “<i>Akado-imo</i>” should be promoted and in order to increase its production and consumption. ▪ To promote the export of high-quality farming products 				
Strengthening business quality of agriculture and forestry	<ul style="list-style-type: none"> ▪ To promote the stability of new farmers, and to secure and nurture personnel involved in forestry, as well as to support farmers to maintain and improve their abilities ▪ Reconstruction of facilities in Aso-dani valley which have higher maintenance rates, knowing the deterioration level of the facilities, and maintenance of cultivated fields corresponding to introduced products should be implemented. ▪ To improve forestry productivity by developing forest road networks and effective use of high performance forestry machines 				

<p>Promotion of environmentally-friendly agriculture</p>	<ul style="list-style-type: none"> ▪ In order to promote environmental friendly agriculture which protects the area's affluent ground water and natural environment, farming production with decreased use of chemical fertilizers and pesticides should be promoted as "Kumamoto Green Agriculture". ▪ To support activities of highly-effective farming for protection of global warming and conservation of biodiversity as well as decrease of chemical fertilizer and pesticide ▪ To promote organic farming through production of organic compost with composted manure and native grass on grasslands as raw material and providing them to farmers ▪ 【written again】 Utilization of wild grass compost (a traditional way of farming), and certification of farming products with less pesticide and fewer chemicals should be certified in order to add value for the products of Aso. ▪ 【written again】 To maintain and promote respect for the indigenous culture (including food culture), a branch of "Slow Food Japan", which aims for life quality improvement, should be established.
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(1) Promoting agriculture, enlarging grassland use

Name of Action Plan	2) Promotion of pasture, improvement of <i>Akaushi</i> 's value and its consumption
Objective	<ul style="list-style-type: none"> ▪ To increase production of <i>Akaushi</i> (Japanese red cattle), which are an indigenous species which have grazed in the grasslands of the Aso region from time immemorial ▪ To sustain and regenerate the vast semi-natural grassland through grazing ▪ To maintain management of common land by a responsible community, and to promote area-crossing grazing in grasslands, which is difficult to manage for an individual community ▪ To increase <i>Akaushi</i> consumption by local restaurants, school lunches, or events in other areas ▪ To raise awareness that the <i>Akaushi</i> is the key to protect grasslands through consumption of <i>Akaushi</i>. To raise added value of the red cow by spreading its evaluation standard, which is different from Japanese black cattle, which are widely bred in Japan and whose meat is valued for its high fat content ▪ To study effects of grazing methods and feed on meat quality, and to maximize the utilization of domestic feed in beef production
Challenges and Current Situation	<p>Grazing occurs on the vast 22,000ha grassland of the Aso region. However, many farmers no longer need cows and horses for cultivation due to changes in agricultural methods and lifestyle, along with agricultural mechanization, widespread use of chemical fertilizers, decreased use of thatched roofs, and so on. Furthermore, import liberalization of beef caused a reduction in the number of beef cattle for livestock due to a resulting decrease in the number of cattle breeders. The lower number of grazing cows resulted in pasturage cooperatives and common rights holders. Under such circumstances, utilization of grassland for grazing has been reduced.</p> <p>Japanese black cattle with high fat content (marbled beef) is valued and traded at high prices based on the conventional evaluation standard, and red cows in the Aso region have been replaced by the black cattle. However, there is a movement to review the value of <i>Akaushi</i> by setting its own value standard.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Promotion of grazing	<ul style="list-style-type: none"> ▪ Subsidize introduction costs to support increase of red cows for breeding and necessary costs for grazing in grassland ▪ Promote year-round grazing and cross-area grazing (grazing cows from outside the Aso region in the grassland of Aso) ▪ Facilitate grassland use coordination by compiling a database of pasturage cooperatives 				

	<p>and conducting surveys on grasslands</p> <ul style="list-style-type: none"> ▪ Take hygiene measures for prevention of livestock infection such as foot-and-mouth disease in pasturelands
Increase consumption and dissemination and awareness raising of <i>Akaushi</i>	<ul style="list-style-type: none"> ▪ Introduce the recognition system of restaurants that serve <i>Akaushi</i> beef produced in Aso to promote <i>Akaushi</i> consumption ▪ Increase consumption of <i>Akaushi</i> beef in restaurants, provide <i>Akaushi</i> beef in events held inside or outside the prefecture or restaurants in big cities, or organize cooking contests of <i>Akaushi</i> beef ▪ Increase <i>Akaushi</i> beef consumption in school lunches of local elementary and junior high schools ▪ Introduce the <i>Akaushi</i> Owner System in which urban residents become an owner of an <i>Akaushi</i> for breeding and regularly receive red cow products directly from production areas. By this system they learn that consumption of <i>Akaushi</i> results in protection of grassland in Aso
Improvement of the added value of <i>Akaushi</i>	<ul style="list-style-type: none"> ▪ Establish its own evaluation standard to evaluate not only the beef quality but also how to raise <i>Akaushi</i> as a background of beef quality, and advertise to raise awareness of consumers through the Internet and TV commercials as to safety and quality of grassland-grazed <i>Akaushi</i> ▪ Disseminate cooking methods and recipes to for low-fat red cow beef, and organize cooking classes for cooks
Research on <i>Akaushi</i>	<ul style="list-style-type: none"> ▪ Develop superior bulls and conduct research on fattening methods of <i>Akaushi</i> by year-round grazing and the use of different kinds of feed

(1) Promoting agriculture, enlarging grassland use

Name of Action Plan	3) Encouragement of using grass resources (compost, biomass...)
Objective	<ul style="list-style-type: none"> ▪ To make compost from wild plants, and promote added value of vegetables that are grown in soil mixed with wild plants ▪ To promote new businesses for the sustainment and regeneration of grassland by selling wild plants from grassland ▪ To conduct research to realize a recycle-based society by utilizing pasture grass as biomass energy resource
Challenges and Current Situation	<p>In the past when many cows and horses were grazed in pastureland, grass was mowed for feed and bedding materials in stables, cows and horses were used for cultivation of fields, and green manure and manure compost were used to fertilize soil of farmland. Nowadays, along with diffusion of agricultural machinery, grassland is utilized by only limited number of people who engage in livestock farming. Furthermore, liberalization of beef imports has caused a reduction in the number of beef cow breeders. The number of pasture cows has also reduced due to the aging of farmers and a shortage of successors with a lower number of people entering pasturage cooperatives and holding common rights. Under such circumstances, grassland has come to be wasted with reduced use for grazing.</p> <p>On the other hand, a biomass operator cooperative was established for the harvesting, collection and transportation of grass, seeking new utilization strategies of grassland through demonstration tests to establish an eco-friendly biomass energy system.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Utilization of native grass compost and its promotion	<ul style="list-style-type: none"> ▪ Produce agricultural products by using native grass as composts and soil coverage material ▪ Promote agricultural products grown with native grass compost by selling at farmers' local sales outlets, events, or gift sales 				
Utilization of Grass Resource for Various Purposes	<ul style="list-style-type: none"> ▪ Study of power generation using grass and livestock manure as well as self-sufficiency of energy by heat supply ▪ Harvest grass from unused grassland and sell it for feed mixture and soil coverage materials 				

(2) Supporting pasturage cooperatives for grassland managing

Name of Action plan	4) Research on burning and creating firebreaks, and its efficient and safety execution
Objectives	<ul style="list-style-type: none"> ▪ Establishing a “Grassland Environment Conservation Plan” (Pasturage <i>Karte</i>), which contains the survey showing the current Aso grasslands situation, indigenous plants of the area from the past to the present, and transitional usage and management of pastures The survey is carried out with the cooperation of the Aso City government and pasturage cooperatives to understand the situation of each grassland, and to seek a better way for their future usage and management. ▪ Specifying the measures to solve the issues found in the survey, and making efforts to save labor and secure safety when the maintenance of grassland such as burning and mowing is carried out ▪ Providing a better environment for the grasslands which have been used, or to the grasslands which are going to be used for grazing ▪ For the pasturage cooperatives which do not practice grazing often, or which don’t mow grasses, usage of pastures by non-members is promoted
Challenges and Current Situation	<p>In the Aso area, 160 pasturage cooperatives control the pastures. Each conducts burning, grazing and mowing activities, but due to the workforce shortage and the aging population, the grassland has experienced severe decline. In particular, the difficult areas around steep slopes are prone to be neglected. As a result, approaches to keep records through the “Grassland Environment Conservation Plan” showing place-names, habitation of flora and fauna, and transitional usage of pastures in the grassland are now promoted.</p> <p>The plan is already completed by 25 cooperatives, covering an area of 7,500ha, which totals 34% of the total grassland in the Aso area.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Survey of each pasturage cooperative to seek approaches	<ul style="list-style-type: none"> ▪ Discussing the maintenance policy of each pasture, the system of mowing and pasturing, and the conservation of flora and fauna of this area, and instituting the “Grassland Environment Conservation Plan”(<i>Glassland Karte</i>), based on the survey showing the distribution of flora and fauna and the grassland management in each pasture 				
Support of burning and creating firebreaks by mowing by pasturage cooperatives	<ul style="list-style-type: none"> ▪ Each of the 160 pasturage cooperatives carries out grassland management through burning, grazing and mowing ▪ Each pasturage cooperative receives subsidies to mitigate the cost of burning and 				

	<ul style="list-style-type: none"> creating firebreaks by mowing. ▪ Based on the “Grassland <i>Karte</i>”, strip roads are developed and small-sized shrubs are removed to ease the labors for burning. ▪ Studying the map showing forests and grasslands, approaches are taken to ease the labor of burning and creating firebreaks by mowing
Support for the pastures which are difficult to maintain	<ul style="list-style-type: none"> ▪ In the grassland where the management is neglected, support is extended to restart burning and mowing
	<ul style="list-style-type: none"> ▪ Discussing the possibility of establishing an NPO wherein retirees from the Defense Force, fire stations, and construction businesses undertake volunteer activities on grasslands where burning is neglected ▪ In pastures where burning is neglected, carrying out burning and creating firebreaks by mowing
Maintenance of grassland by the people in the community	<ul style="list-style-type: none"> ▪ Promoting grassland protection by all people in the community ▪ Promoting “sowing grass-seeds campaign”, mainly by primary school students

(2) Supporting pasturage cooperatives for grassland managing

Name of Action Plan	5) Preservation of grassland through various stakeholder's participation
Objectives	<ul style="list-style-type: none"> Supporting grassland protection activities by local volunteers or CSR programs, as well as through traditional agriculture
Challenges and Current Situation	<p>Aso Green Stock organizes volunteers for burning and mowing grasslands, mainly from Kyushu Island and nationwide. Volunteers must have training for it, and are sent to pasturage cooperatives which have difficulties in undertaking grass burning by themselves because of aging and worker shortages. In 2011, more than 2,300 volunteers were sent to 49 pasturage cooperatives. Nonetheless, there is still the need to increase the number of younger participants and to train volunteer leaders.</p> <p>In 2005, "The Council of Aso Grassland Restoration" was established by local farmers, academics, and administrative authorities, aiming at promoting actions toward the restoration of the Aso grassland. In 2010, "The Millennium Committee for Aso Grassland Restoration" was instituted to inspire volunteers and CSR activities.</p> <p>Also, local banks in the region have created a bank deposit. A part of interest is donated for grassland conservation.</p> <p>The "Organization of Park Volunteers of the Aso region", established in 1994 and based at the Minami Aso visitor center, provides information and explanations about Aso grassland to visitors to the Aso Kuju National Park.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Support for grassland maintenance and restoration efforts by volunteers	<ul style="list-style-type: none"> Calling for volunteers engaged in grass burning and mowing nationwide, and dispatching them to pasturage cooperatives Ensuring security by training beginners in grass burning Supporting purchases of equipment used for grass burning and mowing Providing information and explanations to visitors by taking a stance as volunteers engaged in restoration efforts 				
Support of CSR activities by companies	<ul style="list-style-type: none"> Conducting regional activities by local business leaders for grassland maintenance 				
Securing financial resources for grassland restoration	<ul style="list-style-type: none"> Making contracts on underground water protection activities between farmers and companies, protection of underground water by farmers, and purchasing harvested rice by companies for more awareness of underground water protection Conducting donation activities for Aso grassland restoration 				

(3) Preserving culture, landscape and biodiversity

Name of Action Plan	6) Conservation of biodiversity, endangered species
Objectives	<ul style="list-style-type: none"> ▪ To conserve the biodiversity in the grassland of Aso, each member of a pasturage cooperative evaluates each of their grasslands ▪ As for protection of rare wildlife, conservation is enabled by putting the plan into practice. ▪ Especially in regard to <i>hanano</i>; hot spots where endangered species are intensely concentrated, restoration is enabled by providing proper maintenance such as burning.
Challenges and Current Situation	<p>The Aso area is a reserve for rare species of flora and fauna, with a plentitude of grassland plants, which are widely distributed in the Eurasian Continent, and butterflies which feed on these plants.</p> <p>However, the number of stockbreeders is decreasing, and farming communities are aging. Due to the lack of farming successors, the practices of grazing in the pastures have become less frequent, and shrubs of briers and brambles spread in the neglected areas. If such a tendency progresses, the indigenous grassland plants will be suppressed and the species are left mono-cultured. Rare wildlife is often the target of poaching.</p> <p>Efforts for their designation and protection are exerted, based on the Endangered Species Protection Law, and education is provided at visitor centers for wild life protection. Local government also instituted regulations regarding wildlife protection, prohibiting illegal poaching in the reserve, while promoting their protection by imposing severe penalties and by conducting patrols.</p>

【Activities】	FY2013	FY 2014	FY2015	FY2016	FY2017
Conservation of biodiversity in the grassland	<ul style="list-style-type: none"> ▪ Developing simple methods for the assessment of biodiversity in the grassland in Aso, so that each pasturage cooperative member can evaluate the biodiversity in each of their grasslands with the support of specialists, which results in constant assessment of biodiversity in the grassland and review of the Grassland Restoration Program ▪ For the flora and fauna which are especially endangered, taking measures to protect their reserve ▪ Purchasing lands of specific hot spots where rare wildlife is intensely concentrated among neglected grasslands, and making efforts to restore <i>hanano</i> by focusing on maintenance using methods such as burning 				
	<ul style="list-style-type: none"> ▪ Establishing basic scheme/basic 	<ul style="list-style-type: none"> ▪ Maintenance of marshes in the grassland, conforming to the basic scheme /basic plan 			

	plan	
Protection of rare species	<ul style="list-style-type: none"> ▪ Giving maintenance to the reserve of <i>polemonium</i>, an indigenous species of the Aso area ▪ Surveying the insects inhabiting in the area, and accumulating data on them 	
	<ul style="list-style-type: none"> ▪ Inviting experts who specialize in botany and ornithology to continue surveys of the plants and birds inhabiting this area based on the Endangered Species Protection Act, and discussing the specific measures to protect them ▪ Conducting patrols to prevent wildlife poaching ▪ Supporting the capture of deer to prevent their consumption of rare plant species ▪ Cleaning specific adventive species from the area, and giving education regarding specific adventive species, and distributing the information 	
Establishing systems and supporting conservation activities	<ul style="list-style-type: none"> ▪ Nurturing natural conservation leaders and volunteers, and developing leaders who give education regarding conservation ▪ Supporting biodiversity protection activities that are conducted by environmental conservation groups 	

(3) Preserving culture, landscape and biodiversity

Name of Action Plan	7) Preservation of rural landscape, springs and cultures
Objectives	<ul style="list-style-type: none"> ▪ Reaffirming the value of Aso Kujyu National Park with its history of 80 years, and applying a system for landscape protection and its usage ▪ Conserving the landscape while solving the problem of neglected farms, and promoting awareness of agriculture with the cooperation of education and welfare sectors, and motivating people to be farmers ▪ Maintaining farming landscapes, preventing disasters and conserving water resources, by engaging in proper management of grasslands and forests ▪ Protecting the livelihoods of the people in the community, and promoting industrial activities and tourism by giving proper maintenance to water resources ▪ Succession agricultural culture like the festival held mainly at Aso Shrine which is designated as a ‘national folklore cultural asset’ and local food culture
Challenges and Current Situation	<p>A vast landscape which includes grasslands, forests and fields is established as the result of diversified production activities corresponding to the geographical conditions inside and outside of the caldera. Aso was designated as a national park in 1934, and, over the following 80 years, protection and usage the grassland landscape has been carefully observed.</p> <p>Recently, the number of members in pasturage cooperatives has dwindled and the farming communities are aging. People who succeed their parents in farming are fewer, and the resulting decline in the state of grasslands is conspicuous. Furthermore, there are many forests which are left without proper thinning, and other areas are left unforested due to dropping wood prices. This tendency discourages water resource conservation and maintenance of slopes.</p> <p>The groundwater from precipitation, stored beneath the forests, grasslands, and fields in the Aso area gushes out in places such as Shirakawa Spring. The clean water is to support people’s lives and farming, and it is also a source for tourism.</p> <p>However, some water springs are left without enough maintenance, because the volume of water has dwindled lately. The biggest concern is not only the decrease of groundwater, but also maintenance of culture, tradition, rituals and festivals which are preserved valuing the importance of water.</p> <p>The festival held mainly at Aso Shrine was designated as a ‘national folklore cultural asset’ and this agriculture festival attracts many tourists.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Maintenance of farm landscape	<ul style="list-style-type: none"> ▪ By the proper management of the Aso Kuju National Park, the farming landscape and the usage of grassland are simultaneously promoted. ▪ Supporting local maintenance and education focusing on the multifunctional effects of farming in this mountainous area ▪ Preventing the development of deserted arable lands, and supporting their restoration and management ▪ Devising approaches to solve problems of deserted arable lands, promoting participation of non-farmers ▪ Devising approaches to conserve paddy fields through providing farming experience programs to people living in urban areas ▪ Supporting for forest owners who cannot manage their artificial forests in the thinning of their forests 				
Conservation of springs	<ul style="list-style-type: none"> ▪ Forming regulations to conserve the springs in a favorable condition, and discussing the policies to conserve them ▪ Supporting activities to apply them for local promotion ▪ Providing water environment education to children and adults so that the awareness to value water and to appreciate it will be developed among people 				
Support of maintenance for traditional culture	<ul style="list-style-type: none"> ▪ Supporting traditional events, culture and arts in the area ▪ Giving lessons on agricultural events and culture at schools in Aso ▪ Supporting agricultural ritual and festival which are held mainly at Aso Shrine 				
	<ul style="list-style-type: none"> ▪ Survey about Aso's agricultural culture 				

(4)Participation of citizens for grassland maintenance

Name of Action Plan	8) Tie-up of agriculture and industry, tourism
Objectives	<ul style="list-style-type: none"> ▪ Promoting “eco-tourism” and “green-tourism”. Visitors study the nature and cultural landscapes of Aso which have been nurtured through traditional agriculture, and experience the nature and culture.
Challenges and Current Situation	<p>Visitors to Aso, which has been designated as a National Park for 80 years, amount to 17 million per year. Aso is a major tourism spot on Kyushu Island. Not only sightseeing around tourism spots, but also experiencing regional nature, history and cultures has become popular recently.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Communication with urban cities through “green-tourism”	<ul style="list-style-type: none"> ▪ Promotion of eco-friendly tours and green-tourism ▪ Promotion of experiencing volunteer activities in forests ▪ Development of trekking routes by improving grass-roads ▪ Development of package tours including grass burning and mowing activities and staying together with farming families in farmers’ homes 				

(4)Participation of citizens for grassland maintenance

Name of Action Plan	9) Environmental education on grassland and agriculture
Objectives	<ul style="list-style-type: none"> ▪ Children should study the multiple functions of farmlands, forests, and grasslands through hands-on study programs such as agriculture, forestry, and grassland protection activities. ▪ Urban residents should understand the blessings from grassland. It can lead to practical protection activities like raising volunteers for grassland burning.
Challenges and Current Situation	<p>As some children living in Aso are not familiar with grasslands, all children in the Aso region need to have basic knowledge of grassland protection through practicing and reviewing grassland study.</p> <p>Also, recently, environmental studies focusing on hands-on experiences have become popular, and the number of school study-tours is increasing.</p>

【Activities】	FY2013	FY2014	FY2015	FY2016	FY2017
Communicating the importance of grassland to next generation	<ul style="list-style-type: none"> ▪ Hands-on experiences on agriculture and grassland protection activities, and study of the forest environment for children in Aso ▪ Material preparation for information dispatch on grassland restoration ▪ Delivery lectures on grasslands for various schools and universities outside the Aso region ▪ Dietary education for children in Aso 				
Communicating the importance of grassland to urban residents	<ul style="list-style-type: none"> ▪ Accepting study-tours for secondary and high school students, and offering hands-on experiences in agriculture, forestry, and grassland protection ▪ Enhancing information dispatch and promotion of public awareness at the Minami Aso visitor center ▪ Holding forums to communicate the value of the Aso grassland to urban residents ▪ Preparing materials for information dispatch on grassland restoration 				

7. Management of Programs for GIAHS

Aso Regional Association for GIAHS Promotion, an association consists of Kumamoto prefecture, local municipalities and related organizations of agriculture, forestry, industry, commerce, tourism etc. was founded in September 2012. This association manages various programs based on this Action Plan, and takes actions for developing agriculture and economy, sustainability and biodiversity in Aso region, related to this GIAHS initiative.

Kumamoto prefecture and each municipality give enough support for these programs in political and financial sides, and the UNU Institute for Sustainability and Peace (UNU-ISP), related universities and institutes in technical sides.

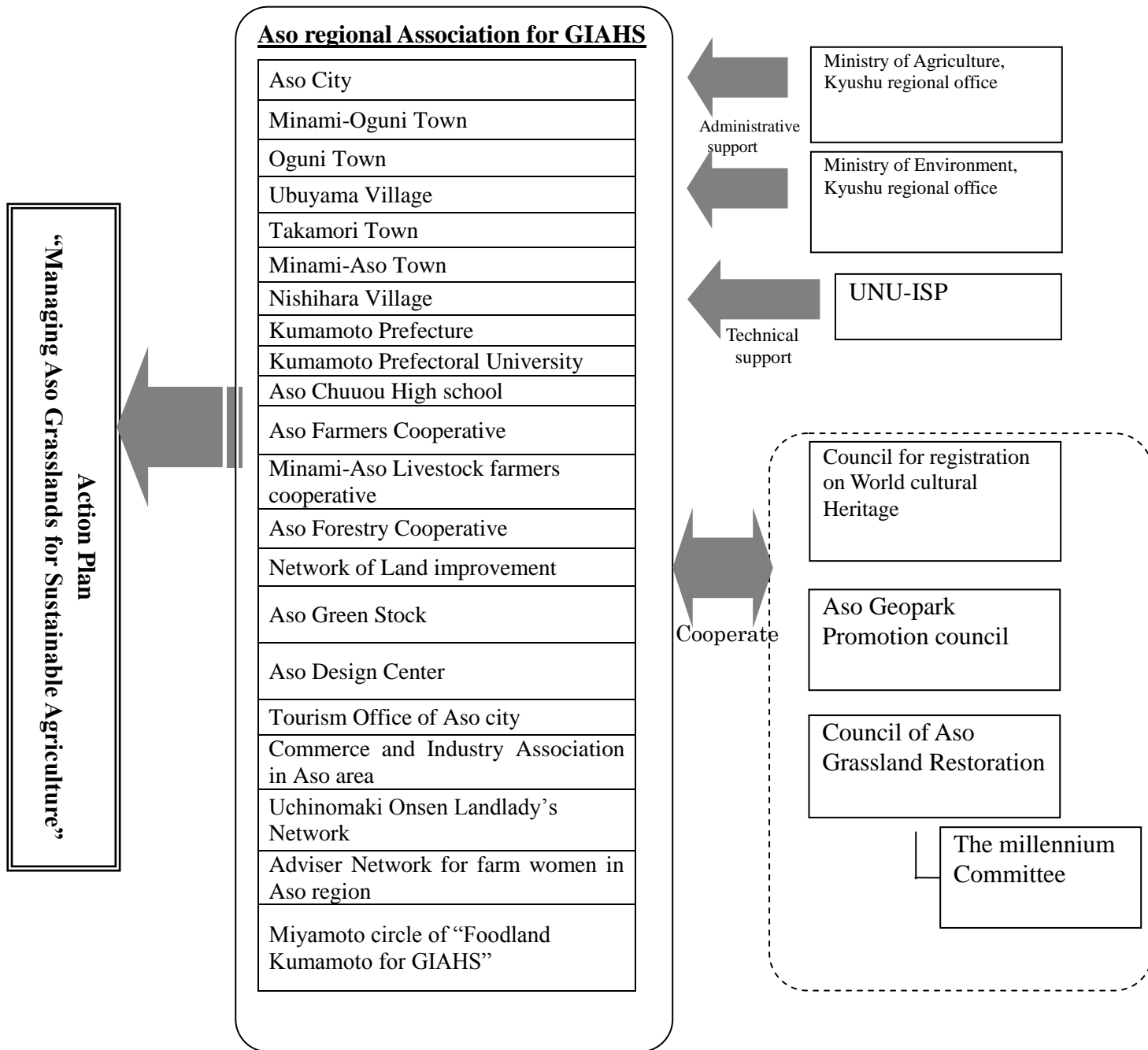
Local councils or committees, such as the Council of Aso Grassland Restoration who aims at promoting actions toward the restoration and preservation of the grasslands, work together and integrally for these programs on agriculture, preservation of biodiversity or landscapes maintained closely related to agriculture.

In addition, Aso region also aims for UNESCO's World Cultural Heritage and Global Geopark Network. These challenges

(table 1 Associations in Aso region)

Council for registration on World cultural Heritage	<ul style="list-style-type: none"> ▪ Consist of 7 municipalities in Aso ▪ Proposal for the provisional candidate list from Japan, as “Aso – Coexistence with volcano and its cultural landscape” ▪ Ranked as provisional candidate <Category Ia>
Aso Geopark Promotion Council	<ul style="list-style-type: none"> ▪ Consist of municipalities, Associations for tourism, Nature preservation ▪ Huge and various geographical features and geology, culture and landscape with human intervention ▪ Member of Japanese Geoparks Network
Council of Aso Grassland Restoration	<ul style="list-style-type: none"> ▪ Consists of 7 municipalities, 168 pasture cooperatives, 56 corporations and individuals ▪ Restoration and preservation of grasslands ▪ Reduction of “the framework of Aso grassland restoration” in 2007, revise in 2013
The millennium Committee for Aso Grassland Restoration	<ul style="list-style-type: none"> ▪ Kumamoto prefecture, Business leaders and academics in Kyushu ▪ Support of activities for Aso grasslands preservation ▪ Fund of citizen's donations for Aso Grassland restoration, 68 million Yen(2010-2012) donation from citizens about

Management system of Action plan



The regional association manages and encourages the progress of actions based on this Action Plan each year.

8. Responsibilities of national and local governments

(1) Ministries

Ministries develop the policies on agriculture encouraging and conservation of biodiversity, based on the cabinet decisions as “the Basic plan for Food, Agriculture and Rural areas (2010)” and “the National Strategy for Biodiversity 2012-2020 (2012).”

To promote “Grasslands management and sustainable agriculture”, agricultural authorities encourage agricultures considering biodiversity and sustainability which reduce environmental impact, new businesses which add original values on Aso’s rural products and services, utilizing biomass Establishment of a recycle-based society, and ameliorating productivities and functions of grasslands.

Based on National Park Act, environmental authorities encourage utilizing grasslands for tourism, through restriction of actions damaging on park’s landscapes, improvement of facilities for tourism use, or promoting eco-tourism.

In addition, presentation of diagnosis and roadmap of each pasturage cooperatives will be supported. An environmental education or public provocation is preceded simultaneously.

(2) Kumamoto Prefecture

Kumamoto Prefecture provides support to pasture cooperatives or prospective cooperatives in cattle-grazing, such as purchase of necessary materials, and providing subsidies to introduce *Akaushi*. Also, it coordinates with less active pasture cooperatives to allow and promote grassland use for the public. Kumamoto Prefecture will go to continue these supports.

In 1991, Kumamoto Prefecture instituted the “Regulation to Preserve Rare Wildlife”, under which 26 endangered species were designated as ‘specified rare wildlife’, of which capture and extraction are prohibited. In 2004, the regulation was revised to strengthen the penalty system for violation, and 40 additional specified rare species and 15 wildlife reserves were designated. Also, the “Red Data Book of Kumamoto” was issued by prefecture to provide the basic information on wildlife preservation and collaborative activities with administration and local residents.

Based on governor’s *Kabashima* initiative in 2012, Kumamoto prefecture published “Prefectural Vision for the restoration of Aso Grasslands” in March 2013. This document declare necessities of increasing volunteer’s participation which is indispensable for the restoration and preservation of grasslands, financial scheme to support these activities continuously, and acquisition of new supportive individuals and corporations as its CSR.

Kumamoto Prefecture prohibits capture and extraction of specified rare wildlife, based on the “Regulation to Preserve Rare Wildlife”. The regulation was revised to strengthen the penalty for violation “Red Data Book of Kumamoto” is used to provide the basic information on wildlife preservation and collaborative activities with administration and local residents.

(3) Members of the Regional Association for GIAHS

The municipalities of Aso region collaborate with agricultural, industrial, commercial and tourism associations on actions over GIAHS, agriculture, biodiversity and preservation of landscape, as below.

1) Public awareness in the region

- study meeting or workshops for the local residents and association
- utilizing stakeholder’s information tool or media
- Educational session for children on experiencing agriculture or silviculture, or on environment

- 2) Conservation of GIAHS system and biodiversity through agriculture
- Support for burning or creating firebreaks by pasturage cooperatives
 - organizing volunteers for pasturage cooperatives who has difficulties in burning or making firebreaks because of lack of younger generation.
 - Strengthen the protection of endangered wildlife and animals
 - Patrol to prevent of endangered animals and plants new conservation action
 - New way of utilizing grasses, as biomass
 - Collaboration of agriculture and food service, and planning promotion of using local products.

9. Aso contributes to the world

Changes in farming's or society's situation have led to a decrease and aging of farmers, like other developed countries, and these changes bring severe threat for local communities in Aso, not only to continue grasslands burning, but also increase of abandoned farmland, difficulties in maintaining communities' relationships etc. Especially in Aso's grasslands, semi-natural environment which is maintained with human's repetitive intervention, have severe difficulties.

In response to this challenging circumstance, Aso grasslands have established social management system. Not only farmers who use the grasslands but also the citizens inside and outside this area comes to take part in its management activities.

In addition, Aso propose a new original business model to add economical values on Environmentally-Friendly products. For example, utilizing grasses in manures or compost, more reduction of agrichemicals and fertilizer. Targeting future generations, experience of agriculture and environmental affairs must encourage children to live in Aso.

In these points, Aso fulfills the criteria of GIAHS in "Aiming at leaving the traditional agricultural methods based on the regional environment and land use system which can sustain biodiversity for the world".

So it will deserve a model of a symbolic agricultural system of managing sustainable agriculture in contemporary and future developed societies. Aso exchanges with other GIAHS sites and appeals in international context.