

# THE KUMAMOTO EARTHQUAKE'S CREATIVE RECONSTRUCTION EFFORT LED BY A DIVERSE RANGE OF ORGANIZATIONS

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**ABSTRACT:** This study analyzed the creative reconstruction efforts led by a diverse range of organizations from the Kumamoto earthquake in the Aso region in chronological order. In addition, this study was aimed to clarify the efforts of the residents and communities of the Aso region ranging from disaster relief to tourism and various forms of exchange. This study conducted an interview survey, subsequently analyzed the recovery efforts of the grassland conservation volunteers, the exchange center, and the collaboration between local residents and earthquake volunteers in a chronological order using the following time frames: the time to secure survival (10 days after the disaster), the time to secure living conditions (one month after the disaster), the time to secure livelihood (three months from the time of the disaster), and the time to prepare forecasts for the resumption of business activities. These efforts utilized the unique human networks and organizations during the period for ensuring survival (10 days after the earthquake) and the period for securing living conditions (1 month after the earthquake) and also provided quick support where the government could not reach. Furthermore, this study clarified how the unique efforts undertaken by each subject have made it easier to continue the relief effort and how they developed into tourism, exchange and disaster prevention education programs reviewing local communities.

*Keywords: Kumamoto Earthquake, Aso region, Reconstruction, Tourism*

## 1. INTRODUCTION

The Aso area is located in the northwestern part of Kyushu (Fig.1). The main topographic feature of Aso is the huge caldera which was created by four volcanic eruptions with pyroclastic flows. The vast grassland landscape spreads over the central cone and the top of the caldera. In Japan, the designation of national parks started in 1929 and 5 years later Aso was designated as a national park in 1934. The grasslands of Aso were certified as Globally Important Agricultural Heritage Systems (GIAHS) in 2013, and they were also certified as Geoparks in 2014.



Fig.1 Aso Region

The grasslands of Aso have been managed by local agricultural activities such as controlled burning, mowing and pasturage.

Tourism is one of the main industries of the Aso region. The number of tourists who visited the Aso area in 2012 was 16,559,613, which was the highest number in the whole of Kumamoto prefecture [1].

The Kumamoto Earthquake struck the Aso area of Kumamoto Prefecture on April, 14 and April 16 in 2016, killing at least 20 people. The earthquake with a Magnitude of 7.3 triggered a sediment disaster in the mountain slope. The sediment disaster was further aggravated by the subsequent torrential rainfalls (19-25, June 2016). The sediment disaster caused ground cracks and sediment movement cracks across the grasslands. As a result, road and rail transportation was shut down. Also, some tourist facilities were closed down since the hot springs ran dry.

Kumamoto Prefecture formulated a policy for the disaster recovery called "Build Back Better" [2] which aimed to not only restore the area to its former condition, but to rebuild it to a state better than before so that it would lead to further development in the future.

Learning from the Great East Japan Earthquake,

Yamakawa (2018) [3]. points out that "Build Back Better" is important not only as infrastructure development, but also as a support for the affected people and the local communities.

According to the overview of "Build Back Better" of the Great East Japan Earthquake, which supported the affected people and local communities in Minami-sanriku Town, Miyagi Prefecture, it has been reported that the network of people, organizations, and regions before the earthquake had transformed into supporting the victims and developing tourism [4]. In Miyako City, Iwate Prefecture, various forms of tourism utilizing resources that will remain in the region after the disaster have led to regional revitalization [5]. In addition, visitors to the Sanriku Reconstruction National Park Tanesashi Coast Michinoku Shiokaze Trail have been effectively increasing their degrees of attachment to the area and their intentions to revisit thanks to their interactions with local residents [6]. There has also been raised awareness and formulations of networks through volunteer tourism to the disaster-stricken areas. Even more importantly, new leaders of regional development are being trained through these reconstruction activities.

During "Build Back Better", the creative recovery effort a diverse group of actors which included the Grassland Restoration Committee, grassland conservation volunteer groups, accommodation providers and residents strove to provide disaster relief to the victims and to revive the local community using the preexisting networks.

For example, the Grassland Restoration Committee and the grassland conservation volunteer group "NPO Aso Greenstock" provided immediate support to the livestock farmers by repairing the pastures and thereby restoring their livelihoods. These activities then developed into various tourist and exchange projects.

The accommodation facility "Namino Yasuragi Exchange Center", which provided environmental education programs before the earthquake, urgently set up evacuation centers and provided mental care for infants and their mothers. Once the support programs were no longer needed, they were turned into disaster prevention education programs.

In addition, a group of young disaster volunteers together with local residents have contributed to the revitalization of the community by organizing sightseeing tours for reconstruction and opening a community cafe (GIAHS Cafe) that also functions as a shelter.

The reported impact of the Kumamoto earthquake on people's lives and communities in the Aso region has been housing damage, agricultural damage, and damage to tourism.

Specifically, the damage to houses in the Aso region was as follows: 1,280 completely

destroyed houses, 2,230 partially destroyed houses, and 4,467 partially damaged houses. The reported damage to housing is therefore of particularly large scale [7].

The damage to agriculture and forestry in the Aso region was 7.8 billion yen. Damage to the waterways caused by the cracks in the paddy fields made it difficult to secure water, and consequently the resulting damage to paddy rice farming was significant [8].

According to data on the number of tourists in Japan between 2016 and 2018, the number of domestic and foreign tourists has not recovered to the levels prior to the Kumamoto earthquake [9].

However, there are few research reports that shed light on the actual reconstruction activities of the local residents and various other actors such as NPOs, and communities in the Aso region following the Kumamoto earthquake.

The supporting measures of "Build Back Better" were split into categories based on periods such as the time to secure survival (10 days after the disaster), the time to secure living conditions (one month after the disaster), the time to secure livelihood (three months from the time of the disaster), and the time until the resumption of business activities [10].

The purpose of this study was to analyze the sequence of efforts of the local residents, communities, organizations from the immediate support of the victims to the reconstruction efforts through tourism and exchange.

## **2. METHOD**

The local residents were able to overcome after the disaster by the reconstruction assistance from the grassland conservation volunteers, and Support for infants form exchange facilities. In addition, the local residents succeeded in the reconstruction and revitalization of the local community through the individual reconstruction assistance form each group and the collaboration between the local residents and the Kumamoto earthquake volunteers.

By clarifying the reconstruction assistance of The organizations that played a leading role in creative reconstruction in chronological order using the time frames, it is possible to clarify the efforts of reconstruction support from the immediate support of the victims to the reconstruction efforts through tourism and exchange.

This study conducted the interview survey with the members of the Aso Green Stock, the Grassland Restoration Committee, Namino Yasuaragi Exchange Center and numerous disaster volunteers (Table1).

The question topics were as follows: the

reconstruction assistance and the implementation periods following the Kumamoto Earthquake, the support activities, methods of information distribution and funding. The interview surveys were conducted on May 4, 2017, September 12, and September 13, 2017, and September 8, 2018. In addition, literature surveys related to the reconstruction from the Kumamoto Earthquake were carried out using the written reports of Aso Green Stock and the Grassland Restoration Committee (Fig.1).

This study analyzed the recovery efforts of the grassland conservation volunteers, the exchange center, and the collaboration between local residents and earthquake volunteers in a chronological order using the following time frames, on a time series basis: the time to secure survival (10 days after the disaster), the time to secure living (one month after the disaster), the time to secure livelihood (three months from the time of the disaster), and the time to make a forecast for the business resume.

### 3. RESULTS

#### 3.1 The Grassland Restoration Committee

The Act for the Promotion of Nature Restoration in 2003 established the system to restore the lost natural environment in collaboration with various bodies. Under this law, The Grassland Restoration Committee discusses the conservation of grasslands

with various members from local people government, volunteers and academic experts totaling 224 members since 2015.

The Grassland Restoration Committee was established as the fund for the restoration of the grasslands in Aso since 2011. The fund is used for the promotion of livestock and for the restoration of grassland.

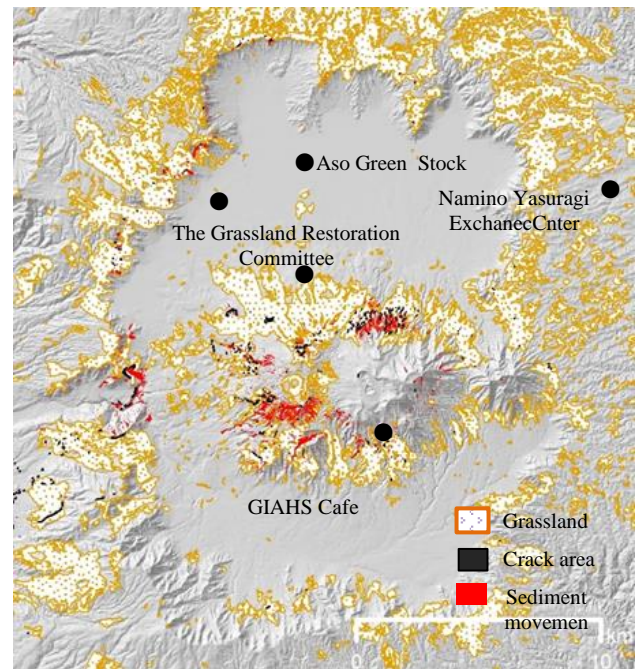


Fig.2 Research Area

Table 1 The interview survey of subsequent creative reconstruction effort

Interviewee	Context	Pre-earthquake activities	Creative reconstruction effort
The Grassland Restoration Committee	Various members (livestock farmer, government, volunteers and academic expert)	Discussions for restoration and conservation of the grassland	The disaster support for livestock farmer
Aso Green Stock	NPO	Support the grassland maintenance tasks such as the controlled burning	①The disaster support for livestock farmer ②Plan of sightseeing tours
Namino Yasuragi Exchange Center	Accommodation and training facility	Providing environmental education programs	A shelter for mothers with infants and toddlers.
GIAHS CAFÉ	Inhabitant	Earthquake volunteer	①Opening a community cafe that also functions as a shelter ②Plan of a restaurant bus
GIAHS CAFÉ	Inhabitant	Vegetable pastry chef in another city	① Participation as a vegetable sweets pâtissier in a "restaurant bus" ②Management of GIAHS Cafe

Although the improved grasslands were subjects of the National Disaster Assistance of the Kumamoto Earthquake, the Wild grasslands mainly composed of Nezasa and Susuki plants which have been managed by controlled burning, mowing and pasturage were not eligible for the National Disaster Assistance. This made it difficult for livestock farmers to foresee the resumption of the livestock industry.

Therefore, the Grassland Restoration Committee conducted an emergency questionnaire to the livestock farmers on the disaster support, immediately after the Kumamoto Earthquake.

On June 15, about two months after the earthquake the Grassland Restoration Committee has restored a pasturage road in Nishimura village, which was damaged by surface ruptures. On June 17 damaged water wells, feeders and farm fences were repaired or replaced.

Three months after the Kumamoto Earthquake, on July 19 new water tanks were installed in the grasslands of Minami-Aso Village.

Also, 11 months after the Kumamoto Earthquake, the Grassland Restoration Committee carried out supporting activities in order to restart the fire controlled burning for the livestock farmers on the grasslands where the land had been damaged by surface ruptures. The methods of information of the Grassland Restoration Committee was the mass media such as the newspapers and the report of the Grassland Restoration Committee. These creative reconstruction efforts were financed by the fund of the Grassland Restoration Committee.

### **3.2 Aso Green Stock**

The decline of the livestock industry and the increasingly aging population, the landscape management of grasslands has become increasingly difficult. To address the shortage of manpower, the volunteer activity in Aso attracted a lot of motivated people outside of Aso since 1990's. A volunteer group was founded to support the controlled burning work under the name Aso Green Stock in 1995. Also, approximately 960 volunteers carry out maintenance tasks such as the controlled burning together with the local inhabitants presently.

Aso Green Stock implemented three projects as emergency support for the livestock farmers.

Firstly, it supported the resumption of the fire controlled burning in the ruptured grassland areas. Secondly, it repaired the grassland roads that were damaged by the earthquake. Thirdly, it raised fences

for preventing cattle and horses from slipping into the cracks across the grasslands. It also repaired the barns and cattle sheds damaged by the earthquake.

3 days after the Kumamoto Earthquake, on April 19th, Aso Green Stock surveyed the area struck by the disaster and assessed the extent of damage to the grasslands.

11 days after Kumamoto Earthquake, the Aso Green Stock started raising funds for the affected livestock farmers. The donations have reached approximately 2.8 million yen in four months.

Aso Green Stock organized sightseeing tours and exchange opportunities in order to facilitate constructive participation efforts. These tours included grassland management experiences, barbecues and visits to the local hot springs. The tours began in Oct, 2016; buses departed from the cities of Fukuoka and Kumamoto in Kyushu. In total, 119 people have participated in these events.

These creative reconstruction efforts for Aso Green Stock were financed by donations from the Kirin Kizuna Project and by Coca-Cola

### **3.3 Namino Yasuragi Exchange Center**

The Namino Yasuragi Exchange Center was opened in 2002 as an accommodation and training facility and to serve as a venue of interaction between urban and rural areas. The Exchange Center has also been providing environmental education programs such as camps and nature watching programs.

During times of disaster, mothers in evacuation centers often worry about the noise of their children crying and bothering other evacuees which causes them great stress. To tackle this problem, immediately after the Kumamoto earthquake, the Namino Yasuragi Exchange Center opened up as a shelter for mothers with infants and toddlers.

To support the victims, they lent the facility's baths and launderettes to families with infants. In addition, they provided updated information on baths, launderette facilities and road traffic information in Aso, based on the information published by the city.

The Namino Yasuragi Exchange Center initiated a program called: "Playing and Healing – Recovery Starting with the Hearts of Mothers and Children", which provided mental care. The program drew on the actual experiences gained from the earlier environmental education programs. It started 5 days after the Kumamoto earthquake and ran for 18 days between 2016, April 19 and May 8. The activities included reading sessions, hardcover and paperback rentals, creating chalk artworks, yoga, head

massages and chiropractic sessions for mothers.

They held "Play Activities" every Saturday from May 8th to July 2016 and they held "Healing Activities" twice a month from September 2016.

From May 2016 they opened a recycling shop for home appliances such as refrigerators and washing machines, and storage furniture in collaboration with a logistics company.

From July, 2016 they held disaster prevention workshops in collaboration with NPOs specializing in disaster prevention.

2 years and 5 months after the earthquake, since local residents and children's level of interest towards disaster prevention was still high, they held a disaster prevention workshop in collaboration with universities. The workshop featured the following contents: introduction of the local community's mutual assistance during the Kumamoto earthquake, explanation of the characteristics of the sediment disaster in the Aso area, preparation of emergency food, proposed emergency action plan utilizing Aso region's hazard map and 3D topographic models.

The methods of information were the web site of the Namino Yasuragi Exchange Center and social media platforms such as Facebook. These creative reconstruction effort were financed by several grants.

### 3.4 GIAHS Café

GIAHS Cafe is a community cafe established by a female farmer living in the Aso area who was previously actively involved in the efforts to recognize the Aso area as a Globally Important Agricultural Heritage System.

The concept of GIAHS Cafe is to serve as a hub for local communication in daily life and to function as a shelter at times of disaster.

The interview subject is a person who participated as an earthquake volunteer at the evacuation center immediately after the Kumamoto earthquake, and visited Minamiaso Village.

She sympathized with the concept of the GIAHS cafe and moved to Minamiaso village four months after the earthquake to open GIAHS Cafe (Fig.2).

A workshop was held to remodel the venue for the opening of the GIAHS Cafe. The renovation workshop was attended by more than 30 people in their 20s and 30s who participated as volunteers. At the renovation workshop, the walls and the ceiling of the barn were painted.

In order to allow the GIAHS Cafe to function as a shelter during times of disaster, it was equipped with a biomass toilet, a solar power generator, a pellet stove, and a pellet fired pizza kiln.

The other interviewee was working outside

Minamiaso as a vegetable sweets pastry chef.

Her opportunity to move to Minamiaso village came about when she participated as a vegetable sweets pâtissier in a "restaurant bus" ran by a female farmer in Minamiaso village in May 2017.

The idea of the restaurant bus came from female farmers and young people who moved to Kumamoto after the earthquake [12]. The restaurant bus was set up in collaboration with the East Food Society and WILLER Co., Ltd., which creates local attractions using the restaurant bus. The restaurant bus is an open-top double-decker bus with a kitchen on the first floor and a dining room on the second floor. The course of the restaurant bus tour ran around farmlands, sake breweries, and brewery cellars which were recovering from the disaster. The restaurant bus successfully connected the landscape, food and people creating local production for local consumption in the Aso area.

Two years have passed, GIAHS Cafe is holding workshops sharing life-related techniques and wisdom with residents.



Fig.3 GIAHS Cafe

### 3-5. The Subsequent Creative Reconstruction Effort Led By A Diverse Range Of Organization

The following three points can be considered as results of the creative reconstruction effort led by the organizations (Table 2).

The first key to success was that each body utilized its networks and facilities to support subjects that typically lack support at times of disasters such as supporting infants who are highly vulnerable or supporting the grasslands that couldn't qualify for government aid. The other crucial point was taking quick action that led to the speedy recovery.

They secured living conditions within the first month of the earthquake and secured livelihood within three months.

Second, each body continued its activities from the stages of securing survival to securing livelihood. During this process the activities have

Table 2 The subsequent creative reconstruction effort led by a diverse range of organizations

Interviewee	Context	Time to secure survival (10 days after the disaster),	Time to secure living conditions (one month after the disaster)	Time to secure livelihood (three months from the time of the disaster)	The time until the resumption of business activities.	Transmission of information	Fund
The Grassland Restoration Committee	Various members for the conservation of the grassland in Aso	Questionnaire to the livestock farmers on the disaster support	Coordination of disaster support	Restored a pasturage road/ Damaged water wells, feeders and farm fences were repaired or replaced/ New water tanks were installed	Supported activities in order to restart the fire controlled burning on the grasslands where the land had been damaged by surface ruptures	Newspapers and the report of the Grassland Restoration Committee	Fund of the Grassland Restoration Committee
Aso Green Stock	NPO (Support the controlled burning with the local inhabitants by volunteers)	Survey of the area struck by the disaster and assessed the extent of damage to the grasslands/ Started raising funds for the affected livestock farmers.	Fundraising/ Coordination of disaster support	Restored a pasturage road/ Damaged water wells, feeders and farm fences were repaired or replaced/ New Barn were installed	Sightseeing tours and exchange opportunities in order to facilitate constructive participation efforts	Postal mail and social media platforms such as Facebook	Donations from the members and the Company
Namino Yasuragi Exchange Cente	Accommodation and training facility	Opened up as a shelter for mothers with infants and toddlers/ Lending the facility's baths and launderettes to families with infant/	“Playing and Healing – Recovery Starting with the Hearts of Mothers and Children”, which provided mental care.	Opened a recycling shop for home appliances	A disaster prevention workshop in collaboration with universities.	The website of Namino Yasuragi Exchange Cente and social media platforms such as Facebook	Several grants
GIAHS CAFÉ	Inhabitant	An earthquake volunteer at the evacuation center	An earthquake volunteer at the evacuation center	A workshop for the opening of the GIAHS cafe	Open of the GIAHS café/ Plan of the restaurant bus  Participation of the restaurant bus	Social media platforms such as Facebook	Donations from the members and the Company

expanded into new forms such as tourism and disaster prevention education, where creative reconstruction activities were proposed and implemented by local residents.

These creative reconstruction efforts also served as triggers to young migrants and led to the revival of the local community.

Thirdly, each body independently disseminated information through social media and other channels to raise awareness and gain support for the creative reconstruction.

#### 4. CONCLUSION

This study analyzed the creative reconstruction efforts led by a diverse range of organizations from the Kumamoto earthquake in the Aso region in chronological order. In addition, this study was aimed to clarify the efforts of the residents and communities of the Aso region ranging from disaster relief to tourism and various forms of exchange.

These efforts utilized the unique human networks and organizations during the period for ensuring survival (10 days after the earthquake) and the period for securing living conditions (1 month after the earthquake) also provided quick support where the government could not reach.

Furthermore, we clarified how the unique efforts undertaken by each subject has made it easier to continue the relief effort and how they developed into tourism, exchange and disaster prevention education programs reviewing local communities.

Therefore, we can conclude that the characteristics of the creative reconstruction effort of the Aso area are that the prompt support was based on leveraging the preexisting strengths of each entity, and the efforts were linked to tourism, exchange and other activities which resulted in providing new value and appeal to the Aso region.

The research subject is one of the key people or platforms in the Aso area. New proposals for creative reconstruction efforts built upon the cooperation of each entity is a topic of further interest.

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