

# Indigenous Pigs Growing on Nora Land in Okinawa, Japan

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## 1. Preface

In Okinawa, which is located in the south-western part of the Japanese archipelago, indigenous pigs called agu or ayo have been raised as domestic animals. These pigs were developed as the indigenous Okinawan variety by the agency of Okinawa's geographic conditions and its trade with other parts of Asia, as well as through the process of naturalization. As studies on biodiversity suggest, indigenous varieties have historically been created by humans to be capable of adjusting to the geographic conditions of each part of the world but, today a global phenomenon has arisen whereby indigenous species are considered less important and are being replaced by a limited number of varieties that are more cost-effective. Apace with the global trend, the number of agu raised in Okinawa has been decreasing. Domestic animals are being dismissed only because they are not useful in modern living, or are no longer profitable, and such short-sighted policies may lead to the depletion of natural resources. In the face of the extinction of domestic animals, FAO issued a warning, and developed the "World Watch List for Domestic Animal Diversity". Indigenous animals are considered important as genetic resources for livestock products in human society, and the selection of those best suited to their environment results in the development of animals indigenous to a region, as well as the diversity of livestock products. This also brings about the diversity of food and life-styles which are unique to a region. The genetic resources of indigenous livestock have been created and developed through interaction between the natural environment and the culture of a region. This really reflects human activities making use of nature. Today's domestic animals are not without defects but, nevertheless, they fulfil their roles as economic commodities despite their weaknesses, so that the gene pool is required to compensate for such shortcoming.

As part of an effort to understand the relationship between humans and nature, recent zoological geography, together with cultural geography, has discussed the role that animals play in the process of the formation of human society, and has accumulated case studies (Philo and Wilbert eds, 2000; Wolch, Emel and Wilbert, 2002). They tell us that "domesticated animals are also powerful symbols of places

and ways of life and livelihood". For instance, they observe that "cattle were thus agents embodying the complex history of urban-rural, east-west and class-based relations, serving to shape urban spatial structures, instructions and social relations in Chicago". Furthermore, the same paper refers to the fact that "rare and endangered livestock breeds" are now "powerful and fungible and transformed the links between breeds, place and culture". As a farmer raising domestic animals and an experimental geographer, Takada has attempted to revive *agu* or *ayo* as domestic animal resources. An important factor that has been deeply involved in raising and utilising the pigs is the 'nora', presented by Nonaka (2008). The nora provided an environment for them to grow.

In modern Japan, as an economic nation, farmers produce more or less similar kinds of products throughout the country, and their quality has been improved. On the other hand, however, people have come to pursue products with regional characteristics, nostalgia, and healing; recently, it is slow life and slow food that is being advocated, as well as the eating of local products within the areas in which they are produced. People have begun to seek such values in indigenous pigs. Indigenous pigs naturalized to the environment in nora can be utilized in this global economic society. They can take part in animal-assisted therapy, giving them an opportunity to enjoy contact with the animals in a nostalgic atmosphere that is evocative of the past. Also they are of significance when used in traditional dishes because of their uniqueness.

Based on Takada's own activities, this paper will describe the relation between the process of developing genetic resources for domestic animals and the nora environment; the revival, conservation, and utilisation of the pigs in the modern global economic society; ways to maintain biodiversity, and what must be done for that purpose; and actual activities to be practised by both communities and individuals in their everyday life.

As a biogeographic study of indigenous domestic animals, this may contribute to a pragmatic demonstration from the viewpoint of biodiversity and cultural history, as well as the utilisation of the environment.

## 2. Study Area

Located in an area stretching 1,000km from east to west and 400km from north to south in the Pacific Ocean off the Eurasian Continent, Okinawa consists of approximately 160 islands, the total area of which

is 2,267km<sup>2</sup> (Figure 1). The islands constitute the south-western part of Japan. With an average temperature of 23.5 degrees and an average precipitation level of 2,068mm (record of Naha in 2006, Okinawa belongs to the subtropical zone and is visited or approached by 7-8 typhoons every year. Okinawa Prefecture has a population of 1.35 million, with an average female life expectancy of 85 years in 2005, which ranks highest among Japan's 47 prefectures Okinawa synthesis guidance 2005. Many indigenous pigs are raised in a village called Nakijin-son in the northern part of the main island of Okinawa. At present, a corporation of producers with 13 members and a zootechnical experimental station are breeding about 200 indigenous pigs.

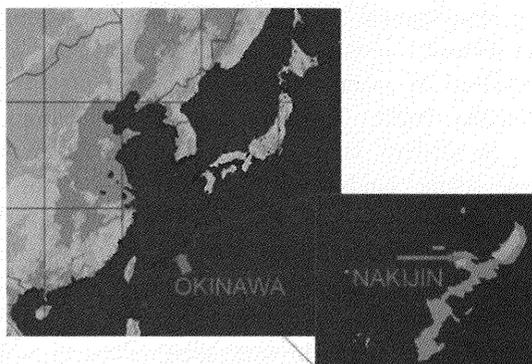
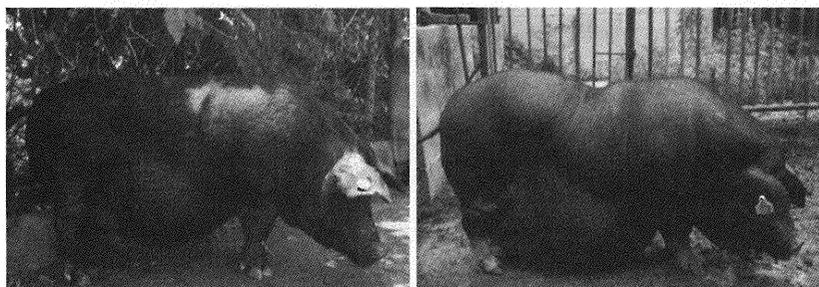


Fig1. Study Area

### 3. Agu, an indigenous breed of pigs

#### Characteristics of Agu

In terms of their ability to adapt to the environment, the pigs are able to withstand heat, so they do not easily suffer from sunstroke or heatstroke. They are also quite impervious to vermination, including skin diseases, as well as swine fever, swine erysipelas, and so on. This indicates that they have a resistance to enzootic diseases. Adjusting to the environment of extensive farming, the pigs feed on leftover food, sweet-potato vines, etc., which are digested efficiently, and they grow and reproduce (Furugen 1935). As to their physiological characteristics, they come into season for the first time as early as about three months old, and females give birth for the first time at 7-8 months old. In terms of growth, it is shown that they grow slowly and easily accumulate fat. Compared with an adult European-type pig weighing 250-350kg, the indigenous pigs are smaller and adults weigh 70-90kg (Figure 2). Physically, they are characterised by features such as thick black fur, a long face, and ears which hang down to cover the face. The back is sunken and the belly hangs down. They produce fatty pork, but the melting point of the fat is low, so it is characterised by a distinctive



Agu

Ayo

Figel2. Agu and Ayo

flavour (Ohsiro Nakamura Suzuki Ohta and Toguchi, 2003).

The ancestor of the pig is the wild boar, but the boars that inhabited Okinawa were not domesticated. The ancestors of the indigenous pigs were introduced to Okinawa, together with cereals, via routes along the tidal current some 2000 years ago (Watanobe Ishiguro Nakano Takamiya Matsui Hongo 2002). Then about 600 years ago, during the period when Okinawa had active trade links with other areas, pigs of Chinese origin were introduced (Tokashiki 1996). These pigs paired off with the pigs already living on the islands, and today's pigs are considered to be the result of repeated crossbreeding. Regarding the environment in which they grow, they have never been raised systematically under the strict control of humans, but have been allowed to run freely on nora land (Nonaka 2008). During the period that they lived freely in nora fields, they acclimatised to elements of the Okinawan environment, such as viruses, pathogens, parasites, temperatures, etc., thus becoming domesticated animals naturalized to the islands. With the tides serving as routes connecting Okinawa with the continent, humans and cereals flowed into Okinawa and trade continued. The ancestors of the agu arrived in Okinawa as part of such exchanges. Subsequently, these animals became indigenous to the region through a long history of repeated selection by both human society and the natural world, in addition to the process of naturalization. The introduction of pigs of the Berkshire variety approximately 100 years ago improved upon the agu (Tokashiki 1988).

#### Utility value

Pigs are an essential formative aspect of Okinawa's diversified food culture, for not only the flesh but also the fat, blood, internal organs, and all other parts are useful (Figure 3). The meat is also salted for

preservation. The blood is applied as the base of Japanese lacquer ware, and is also used as a disinfectant for fishing boats and nets. The urinary bladders are used as balls for children to play with, and the bones are used in prayers intended to drive away evil spirits or plaques. It is the relationship among people providing mutual support that is important in maintaining Okinawa's rural communities. To



Figel3. Pig-related products

- 1) Pettitoes
- 2) Face skin (left) and boiled meat (right)
- 3) pig innards
- 4) Bacon and ham
- 5) Smoked face skin
- 6) Ryukyu lacquerware of the pig blood groundwork
- 7) A rest room united the pigpen

provide opportunities to cement such relationships, there are rituals and celebrations, where food is shared amongst many people eating together. Such customs play an important part in bringing people even closer together, and the main ingredient of these meals is pork from the indigenous pigs. Traditionally in Okinawa, places where pigs were being raised would also be used as toilets. Human excrement was fed to pigs, together with leftovers from farms and households. Today, such 'pig-toilets' are prohibited for sanitary reasons. Such practices, however, may be considered the practical application of a zero-waste policy. The fact that such systems were practised under circumstances where few resources were available is a tribute to the resourcefulness of the people.

### Production, raising, and preservation

Some 20 years ago, Nago Museum in the northern part of the main island of Okinawa preserved agu as part of its collection of indigenous domestic animals. Since then, the strain has been conserved by Okinawa Municipal High School of Agriculture. At this early stage, however, only a small number of agu pigs had been conserved, so inbreeding has occurred, which sometimes leads to weakness or problems with litter size. Therefore, the number of pigs of a pure line is still limited. There is a tendency for the pigs to be bred with larger-sized pigs for better cost-effectiveness, and to be sold with a particular brand name. Another tendency is to adhere to the pure line in the attempt to ensure that their

genetic characteristics are inherited by future generations. The farmer endeavours to maintain the balance between energy, protein, minerals, and vitamins in their food, create a hospitable habitat for the pigs, and to ultimately draw out the natural capabilities of the agu bloodline. With the aim of preserving the indigenous pigs, an association was established in Okinawa in the year 2000 by the producers, as well as the staff, at the experimental station, the agricultural high school, and the museum. They engage in activities such as considering methods of raising the pigs, deliberating on breeding, examining the process of the development of the pigs, studying cooking methods, and establishing a system of certification.

### Distribution

Unless the value of the pigs is recognised, distribution channels will not be established, for they are not cost-effective from an economic standpoint. It is also important for them to be accepted within their native region, so that the first priority is to ensure that the pork is consumed within the region where it is produced. Also, direct sales should be made outside the region. Prices are to be set to meet the cost of production, and the pork is not to be put up for auction like ordinary pork for promoting the diversity of food and life-styles which are unique to a region. It is desirable to restrict sales, selling the pork only to high-grade restaurants and hotels, as quality ingredients.

### Economic independence and utilisation

The social motility of indigenous pigs being raised privately must be acknowledged and, at the same time, they must function independently as economic commodities. It is necessary to use the media to spread the value of the existence of the pigs, develop goods for publicity to make them more appealing to the public, promote them as part of green tourism, and include them in teaching materials and animal-assisted therapy.

## 4. Future possibilities and issues

Spontaneous creativity will be necessary in order for producers to play the central part in the revival of the indigenous pigs that have been nurtured on nora land, and the actual practices involved in raising them. Together with philosophy, motivation, and passion for the indigenous pigs, they need to have vitality and the ability to bring their images

and ideas to life. Furthermore, science and technology are essential in supporting their activities. It is thought that the only way to make possible the revival of the indigenous pigs, and lead to the revitalisation of the communities that raise them is to strike a balance between these elements. Moreover, traditions and racial characteristics, such as the food culture, in Okinawa are significant social and environmental factors. The pig breeding system will not be complete until a relationship is established amongst the community, environment, and producers. In order to make the system function effectively, it is necessary to promote studies through cooperation among industry, academia, and government to adequately respond to social changes, and finally consummate the indigenous pigs. Also, for that purpose, it may be useful to plan a theme park as an appeal to the people to hand down to future generations the nora fields and landscape, and related knowledge, that will evoke feelings of nostalgia.

This case study has shown that the breeding of agu involves a complex interconnectivity between domestication and the place in which it occurs, and is related to local people's livelihood, and also proposed that an awareness of these facts is essential in endeavours to revive the pigs. It was also suggested that the activities presented in this paper have potential as new ways of conserving the diversity of genetic resources. Thus, this study indicates that the diversity of animals may be sustained by close links between a given place and the human community.

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