Agriculture in Harmony with Nature in the State of Queensland, Australia

1. Introduction: Background to the Topic

The State of Queensland located in the northeastern part of Australia is one of the regions of Australia where biological resources are particularly diverse. In the Par North Queensland area, approximately 900, 000 hectare of the forest known as the "world's oldest rain forest in existence since the age of the continent of Gondwanaland" was designated a "Wet Tropics World Heritage Area" (WTWHA) in 1988.

Map of the Wet Tropics World Heritage Area

However, the agriculture and forestry that began there in the latter half of the 19th century have divided the precious rain forest and destroyed the biological diversity. Moreover, the chemical substances and soil particles, which run-off from the agricultural areas, cause problems such as damaging the coral reef in the coastal areas. In such a environment, the WTMA 2004 and FNQ NRM Ltd and Rainforest CRC have taken measures to coexist with the bountiful natural resources.

In this report, we discuss how the agricultural measures that are harmonious with nature and are adopted by the farmers in the vicinity of WTWHA are high in sustainability.

2. Overview of the Investigation

Queensland is located in the northeastern part of Australia and has a population of approximately 4.4 million (2009). The main industries are agriculture (sugar cane, tropical fruits, cotton), cattle ranching, and tourism.

The current investigation included the tropical fruit-producing farmers of the Tully

region and the sugar cane farmers of the Ingham region between 19 and 29 November, 2009, by Ryutaro Otsuka (The Natural Environment Research Centre Foundation), Masatoshi Sasaoka (The Natural Environment Research Centre Foundation), and Mr. Stefan Ottomanski (Nagao Foundation).

3. Case(1) : Nature –Friendly Fruits Farm (Mr. Peter Salleras)

3.1. Overview of Fruit Farm of Mr. Peter Salleras

This farm is located in a forest approximately 140 km south of Cairns in the Mission Beach area of the northern part of Queensland, an area where the low lying tropical forest is still intact and it is considered an iconic area of Queensland's nature conservancy, and an important area in the preservation of the endangered and protected southern cassowary (*Casuarius casuarius jhonsonii).*

Peter Salleras's wife Alison purchased a 220-acre (89 hectare) area in the Feluga area adjoining the Misson Beach area in 1983 and began to farm various tropical fruits, mainly jack fruits, durians, and rambutan, and distributed and sold these agricultural products to restaurants, resorts, and supermarkets in the neighboring cities.

Peter Salleras is also the chairman of the Community for Coastal and Cassowary Conservation (C4), which conducts environmental protection activities, including investigative research into the southern cassowary, regeneration and protection of the natural environment, and a refuge for cassowaries who were the victims of accidents.

Box. Southern Cassowary(*Casuarius casuarius jhonsonii*)

There are three subspecies of cassowary (all species classified in the same species of cassowary, *Casuarius*), and the one found in Australia is the *Casuarius casuarius jhonsonii.* This subspecies is currently found in Australia only in three forested areas of wet tropics in the Iron range of Cape York in the northernmost part of Queensland. [Australian Rainforest Foundation 2009: 7]. It is estimated that there are approximately 1500 individual specimens remaining in existence in the wild [FNQ NRM Ltd and Rainforest CRC 2004:43].

The cassowary plays an important role as a distributor of seeds of various constituent plants in tropical rainforests. Cassowary is one of the indispensable constituent elements in sustaining the diversity of the plant population in wet tropics. However, the number of cassowaries are currently in decline as a result of the destruction of rain forests due to agricultural work, expansion of residential areas, destruction and isolation of their habitats, road kill (i.e. killed by passing road traffic), as well as competition with wild boars for food resources and breeding grounds (Web site of the Community for Coastal and Cassowary Conservation).

Photo 1 Southern Cassowary

Source : Community for Coastal and Cassowary Conservation.

3.2. Protection of the Forests within the fruit farms

Within the 89 hectares of land of the fruit farm of Peter Salleras, some 2/3 are still tropical rain forest, and part of it is connected to the tropical rain forest, which is a wet tropics world heritage area. According to Peter Salleras, retaining the tropical rain forest within the fruit farm can not only help protect the fruits from strong winds, but also protect them from extremely high temperatures, and sustain microclimate suited to the cultivation of the fruits. Such an effort also gives rise to benefits to fruit farm management due to the protection of biodiversity. For example, bandicoot (small animal belonging to the Peroryctidae family) and sugar gliders (*Petaurus breviceps*) are able to live in these forests. These animals consume the beetles, such as the Christmas beetle (*Anoplognathus* spp.) that are harmful to the fruits, and the pythons (*Morelia* spp.) eat the rats that cause enormous damages to the fruit crops and sweet potatoes. Moreover, he also maintains that since there is a forest nearby, there are many insects that help with the pollination of fruits.

Photo 2 The forest remaining beside the freit farm.

3.3. Extermination of the Wild Boars to Protect the Cassowaries

In the eastern and northern regions of Australia, the non-native species of wild boars have a devastating effect on agricultural crops and are very disruptive to the natural ecosystems.

Even in the fruit farms of the Mission Beach area, wild boars are considered to be the most harmful pest because they eat the seedlings of the fruit trees and dig up the cultivated ground.

Photo 3 A cage trap for capturing the wild boar

The wild boar is also directly responsible for the decline in the number of southern cassowaries. For instance, as wild

boars eat many of the same fruits, small animals and mushrooms that southern cassowaries eat, the two species are in close competition for the same habitat. Moreover, the wild boars destroy the nests of southern cassowaries and eat the eggs.

Therefore, extermination of wild boars not only serves to protect crops, but also contributes to maintaining a good environment for southern cassowaries. However, the conventional traps used to capture the wild boars often end up trapping the southern cassowaries and result in injuring them. Because of this, the members of C4 along with Peter Salleras have developed traps that capture can only wild boars so that southern cassowaries can be kept safe. One such trap is a cage trap that capitalizes on the wild boar's behavior to raise their snout when hunting for food. Inside the cage is bait like banana with some kind of a bar on top. When the wild boar eats the bait and push up the bar with their snout, the cage door is set to get closed down.

4. Case(2)：Nature–Friendly Sugarcane Farm (Mr. Mario Porta)

4.1. Overview of the farm of Mr. Mario Porta

In the Herbert River Catchment area of the southern region of WTNRMR, there are extensive sugar cane plantations, cattle ranches, and tropical fruit farms mainly specializing in mango and banana.

The subject of the interview was a Mr. Mario Porta in the Ingham neighborhood who is a farmer managing approximately 1000 hectares of sugarcane plantation and 1000 hectares of cattle grazing land. He produces approximately 110,000 tons of sugarcane annually and is proud to be one of the largest operators in that area.

4.2. Cultivated Land Management to Prevent Soil Erosion and Water Contamination

Since the mid 1990s, Mario Porta has been conducting the following environment-friendly farming practices with the support from NGOs in the Herberton River basin, Terrain, and the Bureau of Sugar Experiment Stations (BSES), which is an experimental agency engaged in research into sugarcane production funded by sugarcane producers.

First, he has eliminated the use of heavy machinery in leveling the sugarcane fields and he cultivates the flat land as far as possible. For this, he uses a laser measurement device to precisely measure the height of the ground and uses a laser leveling technology to make the ground flat.

Photo 4 Mario Porta. His farm has received accreditation as "Land for Wildlife".

In addition, he pays great attention to drainage ditches. Until recently, to make expand the area of his sugar cane fields, he made the drainage ditches as narrow as possible. However, this resulted in severe soil erosion in the vicinity of the drainage ditches. To combat this, he has made the ditches 5 m wide and shallow, and planted grass in them. He says that such work has reduced the speed of run-off from the sugarcane fields during the rains and prevented soil erosion and outflow of nutrient salts. All this resulted in the retention of the fertility degree of the soils and savings in the amount of added fertilizer and costs.

Also, when preparing the cultivated land described above, he created large-scale artificial lagoons in the middle of his large scale sugar cane plantation where run-off is collected. The accumulated residues in the lagoon and wet areas can be recycled later to the fields, which results in enabling the retention of soil fertility. In addition, the artificial lagoons help trap the run-off silt and soil nutrients in the lagoon and wet areas. It is considered that such artificial lagoons contribute to the retention of the quality in the river and coastal environments because the quality of water flowing into the rivers improves dramatically.

Photo 5 The wide drainage ditches running through the sugarcane fields of Mario Porta. They have grass planted in them.

Photo 6 Man-made wet area

In addition, he also planted a variety of soil-retaining scrub species such as

Nauclea orientalis and *Eucalyptus platyphylla* in the ponds and wet areas. He has 12 arterial lagoons and wet areas in his plantation; 6 of these have already had this scrub species planted on site, thereby forming a green corridor.

It has been pointed out that the creation of the lagoons and wet areas as well as the green corridors could form breeding grounds for endangered species, such as false water rat (*Xeromys myoides),* grass owl (*Tyto capensis)* as well as various water fowl and migratory species

[Smith 2008:9]. According to Mario Porta himself , he has seen a markedly greater number of birds and water animals than before.

He reports that the introduction of such an environmentally friendly agriculture cost him a total of A$250,000, some of which was refunded as grant by The Australian Government Envirofund, and the rest was bored by himself. Nonetheless, eventually such efforts bore fruit; he was able to earn some money because much of the low land that he could not use before is now available, the soil degradation has suppressed, and costs incurred for fertilizer has been much reduced (he saved fertilizer of A$65,000 worth in 2006).

Table The Environment-Protective Agriculture Measures Practiced by Mario Porta

Protective Techniques Introduced	Sought-After Effects
◆ Leveling of cultivated land ◆ Creation of wide shallow drainage ditches ◆ Plant grass in the drainage ditches	• Prevention of soil erosion and nutrient run-off • Reduced expenditure on fertilizers for the fields • Protection of the coral in the coastal areas downstream, etc.
◆ Creation of man-made lagoons and ponds	• Reductions in the cost of maintenance and investment in the region • Protection of the coral in the coastal areas downstream, etc.
◆ Joining up of the green corridor around the lagoons and wet areas by the planting of scrub	• Contribute to biodiversity in the region • Improvement of the visual aspect of the agricultural scene

Source: Field Survey.

5. Conclusions

Few ecological studies are found in light of investigation of how environment-friendly agriculture, as we have seen in the cases of Peter and Mario, have a positive impact on the retention of biodiversity in any given area. It is critical to perform a scientific environmental evaluation in order to clarify the impact of such efforts on the biodiversity of a region.

In light of investigation, it should be noted that there is the Reef Rescue Fund that aims

to protect the coral in the Great Barrier Reef, which the farmers could avail of as a mechanism to engage in environment-friendly agriculture. This is a fund that the Australian Government provides as a mechanism to fund effective soil management to suppress the run-off of nutrients, agricultural chemicals and red silt from the agricultural land. In addition, apart from this fund, there is a great voice of desire that we should introduce an eco-accreditation system to distinguish between the agricultural produce from nature-friendly agriculture and the produce not from nature-friendly agriculture, to provide a market based mechanism for the producers of eco-friendly produce, or to lessen tax burdens on farmers practicing eco-friendly farming as an incentive mechanism.

References

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