

Biodiversity in Rice Paddies

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Rich and diverse biota of rice paddy ecosystem, comparable to tropical rainforest or coral reefs

(a) Habitats of Flora and Fauna of more than 5,600 species

No one ever knew how many of which species are living in rice paddy ecosystem. Recently, people of different fields co-operated to survey lives there in Japan, and listed the result. The result confirms that the rice paddy ecosystem is consisted of as many as 5,668 species of living organisms (Table 1) (Kiritani, K. ed., 2010). This figure suggests that rice paddies support a rich biota comparable to rainforest or coral reef if they are managed properly.

Rice paddies are connected with various habitats such as ditches, reservoirs, water ways etc. These components form a complex ecosystem known as *Satoyama* landscape in Japan and provide habitats for various living organisms.

(b) Maintained by complex link of various lives

There are various lives in rice paddies. Some are damaging crops, and are called “insect pests”. Some, like spiders and frogs, eat these insect pests and are called “natural enemy”. In rice paddies with a lot of natural enemy, massive outbreak of insect pests are controlled without chemicals. It is absolutely necessary that there are sufficient number of non-target or neutral insects, “*Tada-no-mushi*”, other than pest or natural enemy as food for natural enemies.

Table 1 **Fauna and Flora in Rice Paddies in Japan**
(Keizi KIRITANI ed.,2010)

I	Insecta	1,726	species
II	Archnidae & Reptiles	141	species
III	Amphibians & Reptiles	61	species
IV	Fishes	143	species
V	Molluscs	73	species
VI	Crustaceans & Rotifers	317	species
VII	Nematoda & Annelida	91	species
VIII	Birds	189	species
IX	Mammals	50	species
X	Protista & Cyanobacteria	597	species
X I	Plants	2,075	species
X II	Virus & Bacteria & Fungi	205	species
	TOTAL	5,668	species

(c) Adoption of Rice Paddy Resolution by Ramsar Convention

(Resolution X.31 Enhancing biodiversity of rice paddies as wetland system)

Ramsar COP10 (Changwon, 2008) adopted a resolution on rice paddies that was proposed by governments of Korea and Japan with an initiative of NGOs in both countries. This resolution provided international recognition that rice paddies have extensive wetland functions supporting rich biodiversity, aside from the function as agricultural land.

Importance of Rice Paddy Ecosystem

(a) Sustainable agricultural wetland with a history of more than thousands of years

Rice paddy agriculture originates at the latest up to 3rd to 5th centuries BC. It has been continuing for more than thousands of years. Several thousands of varieties of rice are said to have been grown.

(b) Sustainable agricultural wetland included in the global water cycle system

Rice is a plant of wetland, most adapted to a climate of high temperature and heavy precipitation representing Asia Monsoon. Rainfall on mountains and plains, soaking rice paddies and flowing in rivers, goes up in the air as water vapour, and moistures the earth again as it rains. Rice paddy ecosystem, which has been integrated into the global water cycle in a clever manner, not only produces rice, but also supports various lives around wetlands. That also enables sustainable rice paddy agriculture supporting biological diversity.

(c) Complex ecosystem supporting biodiversity

In Asia, where each farm household cultivates only a small area, we often observe a mosaic landscape of rice paddies, reservoirs, upland crop fields, orchards, coppices etc packed in a small area. Such a landscape, *Satoyama*, with a variety of habitat centring to rice paddy is an integrated system that affords one of the richest insect faunas in the world.

(d) Playing a role of back marsh or buffer zone to natural wetlands

People used to cultivate floodplains as rice paddies. Consequently, paddies can function as substitutes to lost wetlands for lives that have been living in natural wetlands. Rice paddies have double functions as agricultural lands and wetlands. They also play a role of buffer zone to natural wetlands. It is thus necessary to maintain biodiversity in rice paddies for maintaining natural wetlands in the vicinity.

(e) Harmonising biodiversity and multiple productivity

Rice paddy supports various species of animals and plants like fish, amphibians, molluscs, arthropods and waterplants. These organisms, in turn, can also be considered as products of rice paddies. Richness of biodiversity in rice paddy means richness of multi-fold productivity from rice paddy not limited to rice production.