

Subsidies and the loss of biodiversity in *satoyama* farmland

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1) Introduction

The ecosystem of *satoyama* is an extremely important factor in the conservation of biodiversity in Japan. However the biodiversity of *satoyama* is threatened by declining human activity, changes in land use, the use of chemicals and numerous other factors. In “The Japan Satoyama Satoumi Assessment“ (JSSA) it is pointed out the changes in the ecosystem services provided by the *satoyama-satoumi*, are attributed to direct drivers (such as changes in land use, underutilization) and indirect social drivers (politics, economics, etc.), and to stop the loss of biodiversity it is necessary to attend to these indirect drivers rather than trying to remedy the direct drivers after the fact.

One of these indirect drivers that need attention is stimulation measures such as subsidies. Subsidies are a tool of local and national government used to carry out policy by effecting change in the behavior of citizens and businesses. Since the biodiversity of *satoyama* is closely linked to agriculture, it is strongly affected by subsidies which affect agricultural practices. MAFF’s “2012 Revised National Biodiversity Strategy” besides recognising the negative influence of agricultural, forestry and fishing practices upon biodiversity, specifies that it will address the matter of stimulation measures as called for in Aichi Target 3. Farmers, too, are becoming increasingly concerned about the effect of subsidies on biodiversity.

Below, taking the *satoyama* of Chiba prefecture as an example, we will take a look at the effect on biodiversity of large subsidies for agricultural land improvement.

2) Changes in agricultural land and biodiversity

In the traditional agricultural features of *satoyama*, such as paddy fields and their banks, canals and ponds, orchards, secondary forests and grasslands, though nature is changed by human use, the original “untouched” ecosystem is not greatly changed and rather contributes to maintaining variety in the aquatic environment and in vegetation succession. (Nakamura 1997). The earthen irrigation and drainage canals which supply the rice paddies provide variety in the material and topography of their bottoms and banks, and in the depth and rate of flow, and, because of the aquatic vegetation and populations of bivalves, are suitable habitat for numerous aquatic animal and plant species including the fish, *Lethenteron reissneri*, *Lefua echigonia* and *Tanakia tanago* (Tanaka 1999). However, these earth-banked channels have been progressively surfaced over. In Chiba City, for example, there are 38 “*yatsuda*” (paddy field areas in narrow marsh-valleys among hills) in the

Miyako River watershed, in which only 2 earth-banked sections remain, totaling only 1% by length (Saitou 1998). This change is contributing to local extinction of numerous plant and animal species (Nirei, Nakamura 1997). Because of the modern practice of seasonally draining rice paddies, *Rana japonica*, the Japanese Brown Frog, which formerly spawned in them, is reported to have declined drastically all over the prefecture (e.g. Sano 1991, Ogano et al. 2007, Hasegawa 1995, 1999). Affected plant species include *Nuphar japonicum* and *Najas graminea*, both endangered species (Chiba Prefecture Red Data Book 2009) that inhabit paddies, channels and ponds, and which have disappeared due to agricultural land improvement. Arita (2000) compared the species richness of plant species in rice paddies and the numbers of perennial and marsh plant species in rice paddies in valleys where improvement had not taken place to those in valleys and plains which had been “improved” and found numerous rare species in the unaltered areas, while the numbers of plant species were far greater on the earthen banks of unaltered areas than on the concrete channels of “improved” areas.

Species are being lost not only from rice paddies and water channels. They are also disappearing from the semi-natural grassland around them. The traditional “seven autumn plants” such as *Patrinia scabiosifolia*, *Dianthus superbus*, *Platycodon grandiflorus*, *Adenophora triphylla* var. *japonica* and *Sanguisorba officinalis*, all inhabitants of tall grassland dominated by *Miscanthus sinensis*, were formerly common in grasslands and on the banks between paddies. The former habitat of these plants has been severely reduced with the disappearance of grasslands and well-lit secondary forests, though there are remnant populations on the unmodified paddies around Chiba, in the mown grassy strips between paddies and neighboring secondary forest known as *kariageba* (Niwa 1989, Kitazawa & Ohsawa 2002). With the development of agricultural roads and the lack of maintenance in abandoned fields, these *kariageba* are disappearing even further.

3) Subsidies and agricultural land improvement

Under the Land Improvement Act, “agricultural infrastructure improvement and rural development” projects, though originally intended to improve productivity on agricultural land, also cover more general objectives such as the improvement of farming communities and regional disaster response. Beside “agricultural land improvement” and “irrigation and drainage” projects, others such as “agricultural road improvement” and “disaster prevention measures” are carried out using subsidies from national, prefectural and local government. The fact that the original FY2012 budget apportioned 16.88 billion yen for land improvement, more than 1% of the entire prefectural budget, shows the scale of this public service project. The project promotes repartitioning of fields, soil improvement and improved access, enabling modernization of agricultural techniques such as large-scale operations, mechanization and switching to other crops.

As of the end of March 2010, out of the 70,396 hectares of rice paddies (considering only¹ units larger than 30 ares) in Chiba prefecture, 38,514 hectares (approx. 55%) of the fields eligible had already been improved. The program has progressed gradually since 1960. By 1965 the processed area was in the low twenties (%) (considering units larger than 10 ares) and by 2002 had passed 85%. (Fig. 1)

In other words, more than 85% of the rice fields in the prefecture are related to the use of subsidies for land improvement, and are affecting in some way the life and growth of the plant and animal populations.

The places where most land improvement projects are undertaken are connected to land use programs. Most of the land improvement projects are carried out in the farmland of “Agricultural Promotion Regions” as specified in the “Act on Establishment of Agricultural Promotion Regions.” This is why land improvement projects tend to be actively concentrated on agricultural land. On the other hand, agricultural land located in the “urbanization promotion areas²” of city planning projects is not specified as agricultural land and may disappear due to conversion for housing or

other land use. There also exists “Shiroji³” agricultural land i.e. agricultural land located in “urbanization control areas⁴” which also is not specified as agricultural land. Nakamura and Kevin (2001) pointed out that these “Shiroji” agricultural areas within “urbanization control areas” often contain far more valuable species than the surrounding areas, while the traditional farmland habitat that survives there is rich in biodiversity.

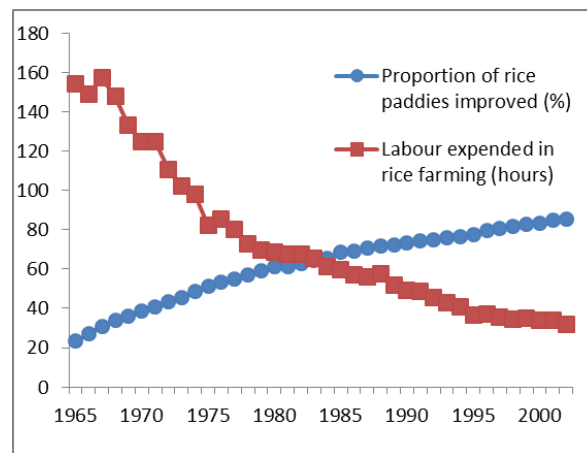


Fig.1. The proportion of improved rice fields and the labour expended in rice farming. Including units larger than 10 ares. Modified from Cultivated Land Development Division and Rural Environment Development Division, Agriculture, Forestry and Fisheries Department data, Chiba prefecture. 2004.)

¹ The minimum “unit” for paddy fields was raised from 10 to 30 ares before 2010, so smaller fields are no longer counted.

² 「市街化区域」

³ Effectively “unused or underused farmland”.

⁴ 「市街化調整区域」

5) Conclusions

In 2000, the Land Improvement Act⁵ was partially amended so that the purpose of the act now clearly states that, in principle, land improvement projects must take into consideration “harmony with the environment” and the comprehensive development and conservation of national resources, while conforming with the economic progress of the nation. As a result, the “Pilot Program To Promote The Preparation Of A Basis For Response To Biodiversity⁶” was implemented with a budget of 67 million yen for FY2012 and responsibility to produce plans for a basic system to manage the conservation of biodiversity. Besides the Land Improvement Act, there is a “Measure To Directly Support Farmers In Conserving The Environment⁷” with a budget of 2.64 billion yen for FY2012, and other projects to draw more attention to the environment. However, compared to the already existent Agricultural Infrastructure Improvement and Rural Development Project⁸ with a FY2012 budget of 212.9 billion yen, it is poorly subsidized and limited in scope. For a fundamental solution it is necessary to adopt attitudes and practical measures for the conservation of biodiversity within existing projects.

Further, from the point of view of the connection to land use, the fact that, despite its value for biodiversity, “Shiroji” farmland, both in areas where urbanization is promoted and in areas where agriculture is promoted, seems to fall between the cracks, suggests that a substantial system of subsidies for conservation of these types of farmland is needed. One example of a response to the problem is Chiba City’s 2001 “Guide To Measures to Conserve the Rice-Paddy Ecosystem.⁹” This policy raises goals of conserving and creating nature conservation, and under its “Prospectus on Conserving the Rice-Paddy Ecosystem” it has made conservation agreements and pays subsidies to local farmers to support the maintenance of the rice-paddy ecosystem.

The examples given here are but a part of the subsidies available in *satoyama* areas. There is still little “on the ground” research on the conservation of biodiversity and the relationship to subsidies. We hope that this paper will contribute to development of the area.

6) References

5 土地改良法

6 「生物多様性対応基盤整備促進パイロット事業」 No official English title found.

7 環境保全型農業直接支援対策

8 農業農村整備事業

9 谷津田の自然の保全施策指針

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