

## Agricultural abandonment influences the ecosystem carbon pools

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Land abandonment, which is increasing globally, has significant impact on terrestrial carbon (C) budget, vegetation, and biodiversity. Invasive alien plants often outcompete native plants after agricultural abandonment, which can lead to the alteration in ecosystem C and nutrient balance. Perennial plants have been an exceptionally successful invader in agricultural abandoned fields around the world. Irrespective of soil nutrient status, alien plants rapidly dominates abandoned agricultural fields in the temperate regions. While negative impact of alien plants on local and regional biodiversity is well established in conservation ecology, its impact on C sequestration potential is much less studied. Paddy fields used for rice (*Oryza sativa* L.) production are the dominant human land-use systems for a long time throughout Japan. Japan has increased to nearly 10% of the total cultivated land area. The aim of the present study was to investigate how the rice paddy abandonment influenced the storage of C in ecosystem components during the secondary succession over decadal time scale.

If paddy fields, the typical agricultural land in Japan, are left abandoned, the amount of soil C in the abandoned fields up to 20 years after being abandoned is lower than that of paddy fields under cultivation. If the field is abandoned for a long time, the amount of soil C increases due to organic matter from weeds, but it is considered that the process will take more than 20 years. We hypothesize that the invasion of alien plants to the abandoned paddy fields enhances ecosystem C storage by their high N use efficiency and high productivity. As results, the temporal change in soil C was similar among vegetation type through amount of input C was similar in present study.

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