Fallowing

Impact: Biodiversity

Reference 1

Koshida, C; Katayama, N 2018 Meta-analysis of the effects of rice-field abandonment on biodiversity in Japan CONSERVATION BIOLOGY, 32(6), 1392-1402. 10.1111/cobi.13156

Background and objective

Rice fields have become substitutes for natural wetland ecosystems. The abandonment of rice fields is thus likely to have strong negative impacts on biodiversity of species dependent on wetland ecosystems. In addittion, management of rice fields often includes the maintenance of seminatural grasslands on levees and edges of surrounding forests. Thus, abandonment of rice fields may also cause loss of grassland organisms. To examine how rice-field abandonment affects species richness and abundance and how the impact of rice-field abandonment on biodiversity is affected by multiscale factors, such as management state, climate, and topography. Finally, to consider how the influence of these factors varies by taxon or ecological niche of organisms. Here, only results on the effect of recently abandoned lands (fallows) are reported.

Search strategy and selection criteria

Search was conducted in the ISI Web of Science for publications in English and the CiNii (Scholarly and Academic Information Navigator) for publications in Japanese. Different combinations of 3 keywords were used: either abandon* or fallow; either biodiversity, animal, plant, bird, mammal, amphibian, reptile, fish, vertebrate, insect, or spider; and Japan. We translated the above search string into Japanese for CiNii. We found additional studies through cited references. To minimize publication bias, we included grey literature (e.g., reports, conference proceedings, and books) as well as peer-reviewed articles. 1) Reports data on species richness or abundance in any 2 of 3 rice-field management states: cultivated, fallow (or recently abandoned field: tilled or mowed once every 1–3 years), and abandoned; 2) Only abundance data for nonpest species was acepted.

Data and analysis

Authors calculated the mean effect size and 95% CIs. The effect size was weighted by the inverse of a simplified estimate of the variance: w = (Nt × Nc)/(Nt + Nc), where Nt and Nc are the treatment (fallow fields in this case) and control (cultivated fields in this case) sample sizes, respectively. A mixed-effects null model was used as a general statistical approach for the meta-analysis with the effect size (log response ratio) as the dependent variable and the study being examined as the random factor. A Q-test was used for the heterogeneity analysis. Publication bias was explored by illustrating the funnel-shaped distribution of the data points when plotted against the sample size, as well as by conducting an Egger regression test. The sample coverage to check for possible bias in species richness due to unequal sample sizes was also estimated.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
35	Fallow or recently abandoned rice fields in Japan	Fallow or recently abandoned field (tilled or mowed once every 1–3 years)	Cultivated field (tilled, flood irrigated, rice planted, and harvested every year)	Metric: Species richness and abundance (plants, invertebrates, amphibians, fishes birds and mammals); Effect size: Logarithm of ratio of the considered metrics in the intervention to the considered metrics in the control	100%

Results

- There was no significant effect on organisims of rice-field fallowing compared to cultivation.
- NA
- NA
- NA
- NA

Factors influencing effect sizes

- NA : NA
- NA : NA
- NA : NA

Conclusion

Fallow fields supported an equal level of biodiversity than cultivated rice fields. These results suggest rewilding will not necessarily be achieved by rice-field abandonment. Moreover, wetland species are particularly prone to being negatively affected by abandonment.