



From rice to revegetation: wildlife conservation on rice farms

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in a rice hull

- Patches of remnant vegetation provide important habitat for much of the existing wildlife on rice farms
- Planting trees, shrubs and other native plants in cleared areas increases species richness in agricultural landscapes
- This project aims to promote wildlife biodiversity on rice farms through revegetation and monitoring programs

The loss of natural vegetation has caused a decline in biodiversity throughout the world. Revegetation activities in urban and agricultural landscapes are being used to enhance habitat for wildlife conservation.

In this study, we will use revegetation experiments to promote biodiversity on rice farms and monitor changes in species richness to evaluate the program's effectiveness. The outcomes of this study are expected to help rice growers develop more biologically diverse and productive farms.

Biodiversity can be broadly defined as every species of wildlife (plants, animals and microbes), the ecosystems in which they live and their various ecological functions. Biodiversity is often quantified as the number of species present in a specific area, or species richness, from data collected while conducting inventory and monitoring programs.

Biodiversity is valuable in many ways. For instance, it has economic value in the form of material goods such as timber and plant and animal based pharmaceuticals, as well as aesthetic and recreational value. Moreover, plants, animals and other organisms are vital in maintaining healthy ecosystems and play key roles in pollination, seed dispersal, nutrient cycling and pest control. In agricultural systems biodiversity can help restore degraded land and water resources by reducing soil erosion and salinity, and through improved nutrient input and cycling lead to increased productivity.

Rice farms support many common & threatened species

Despite the overall reduction in species richness that is associated with land clearing, a great deal of biodiversity can still be found in some agricultural landscapes. In an earlier study (reported in *Farmers' Newsletter*, No. 165,

pp 21–23 'Reconciling farming & wildlife') in which we conducted a baseline survey of vertebrates in the Riverina, we recorded more than 200 species of birds, mammals and reptiles using rice farms.

We found many common species inhabiting the farms, with some conspicuous groups such as the water birds and frogs being dependent on the seasonal flooding associated with rice production. Other species were found only in remnant vegetation.

We were pleased to detect the presence of several threatened species including the Southern Bell Frog and Superb Parrot. We also located the nests of both species, suggesting that they were reproducing on the study farms. Although these findings are encouraging, the need to maintain and promote biodiversity in the rice ecosystem is still present since the existing species richness is probably a small fraction of what once occurred in the region.

The importance of remnant vegetation

Patches of remnant vegetation (ie the natural vegetation that remains after some portion of an area has been cleared) support a wide range of wildlife in many different types of landscapes. The number and types of animals that use these habitats often depend on the size, shape, location and complexity of the remnant. On rice farms in the Riverina, for instance, we found a greater number and variety of species in remnants with more understory vegetation.

Enhancing biodiversity through revegetation

Revegetation is the planting of trees, shrubs and other plants in areas where the natural vegetation has been cleared. It also includes other activities that allow the regrowth of native vegetation through natural processes. Most revegetated areas function as windbreaks, shelterbelts, hedgerows and



shade trees, and are often fenced-off to exclude grazing livestock. There are many benefits that flow on from these activities including the provision of additional habitats for wildlife and movement corridors and linkages for migrating species. Under the stewardship of the rice industry's Environmental Champions Program (ECP), many rice growers are working to enhance biodiversity and ecosystem health through the planting and maintenance of natural areas.

New study of the importance of revegetation

While there is recognition that revegetation activities can help restore various habitats, there have been few studies that have monitored and quantified changes in wildlife populations following revegetation. Our three-year research program (2006–2008), supported by RIRDC, RGA and the University of Canberra, aims to:

- maintain and promote biodiversity on rice farms through revegetation programs
- assist in the establishment of guidelines for the improvement of on-farm biodiversity in collaboration with the ECP
- monitor certain vertebrate groups throughout the study to demonstrate the effectiveness of the revegetation activities
- conduct ecological research on significant vertebrate species to better understand their role on rice farms and to facilitate management decisions.

This study will take place on rice farms in two ECP cluster groups: Gogeldrie and Jerilderie. These farms were chosen because of their participation in the ECP and their on-going revegetation efforts.

Significant species research

Many species are considered to be significant when they are of conservation concern, for example endangered or threatened species, or if they play a particularly important role in their environment (Figure 1). In our previous study, we predicted that very large numbers (likely to be in the order of many millions) of Spotted Grass Frogs (*Limnodynastes tasmaniensis*) are being produced in rice bays each year (Figure 2). Both adult and juvenile frogs are staple dietary items for much of the wildlife on rice farms, including waterfowl and some reptiles. Thus it is evident that farms play an important role in the conservation of this component of biodiversity. However, what is less well-considered is the specific benefit of frogs to other aspects of the rice production system. Because of their very high abundance and the fact that frogs prey on invertebrates they potentially consume vast quantities of invertebrate pests.

In the present study, we will estimate the number of frogs produced in rice bays and calculate their annual invertebrate consumption. We will also exclude frogs from some rice bays and measure changes in invertebrate numbers and plant health in order to determine if this species plays an important role in the natural control of pests and other invertebrates and in nutrient recycling. 🌱

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Figure 1: Inland Carpet Pythons use a variety of natural habitats including woodlands and savannas but are also found living in barns and attics of homesteads where they feed on mice and rats. (Photo: Ben Corey)



Figure 2: Adult Spotted Grass Frogs breed and lay eggs in rice bays, and the tadpoles grow and metamorphose into adult frogs. (Photo: Lydia Fucsko/frogs.org.au)