Bittern-friendly rice growing: depolarising water resource management

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ABSTRACT

Achieving food security for a growing human population while conserving biodiversity is a key global challenge. New agricultural areas and more intensive production in existing ones are accelerating biodiversity declines (Millenimum Ecosystem Assessment, 2005). Among the most promising solutions are wildlife-friendly farming initiatives. This 'land-sharing' can complement dedicated conservation areas like national parks and seize potential win-win scenarios where agricultural production and biodiversity conservation can be integrated (Fischer *et al.*, 2008; Kremen, 2015). Since 2012, our waterbird surveys on randomly selected rice farms in the southern Murray-Darling Basin have indicated important, previously overlooked biodiversity values. They are highlighted by the discovery that these agricultural wetlands support the largest known breeding population of the Australasian Bittern (*Botuarus poiciloptilus*), a globally endangered waterbird.

Compared to Europe and North America (e.g. Elphick, 2000; Czech and Parsons, 2002; Longoni *et al.*, 2011), the potential conservation role of agricultural wetlands is not widely recognised in Australia and water resource management in the region remains polarised, with conservation and farming posited as mutually exclusive. In 2012, the Australian Government enacted the Murray-Darling Basin Plan, which is centred on recovering 2750 GL of environmental water by 2019. Through buybacks and infrastructure upgrades, the plan is designed to address the over-allocation of water for irrigated agriculture and use the recovered water to restore degraded ecosystems and conserve biodiversity (MDBA, 2016).

Bitterns typically arrive in crops about two months after sowing when there is sufficient cover and the rice height is around 40 cm. Most nesting begins shortly afterwards in January. The incubation period is around 23 days and then the chicks require 7-8 weeks before fledging (Kushlan and Hancock, 2005). The Australian rice industry has been compelled to reduce water use, decreasing the period of inundation and condensing the rice season. Direct-drill sown crops with delayed permanent water, shorter season varieties and mid season drainage are creating a potential ecological trap for bitterns, where successful breeding is no longer possible. This paradoxical situation, where water use efficiency gains are threatening the breeding success of an endangered species, highlights trade-offs in natural resource management. However, it also provides an opportunity to develop and test integrated water management scenarios, moving beyond the environment versus agriculture paradigm.

We have identified a range of bittern-friendly rice growing actions that, with appropriate support, rice farmers could undertake to incorporate bittern conservation. A sufficient

period of inundation for successful bittern breeding before harvest is central, but the actions include fox and cat control, and the provision of supplemental habitat refuges. We have begun assessing the costs of the various aspects of bittern-friendly rice growing and the most cost effective means of applying them. We identify and discuss three key areas for future research: 1) the novel use of environmental water within irrigation infrastructure and its public acceptance; 2) the feasibility of premium branded bittern friendly rice products, including the public willingness to pay; and 3) the suitability of different incentives for rice growers, including payment for ecosystem services and cost-sharing for stewardship. There is strong support for the bitterns in rice phenomenon from both farming and environmental communities, and promising opportunities to depolarise and integrate the management of water in the Murray-Darling Basin.

Keywords: wildlife-friendly, biodiversity, environment, conservation, incentives.

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