

Agricultural wetlands as alternative habitats for waterbirds

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Abstract

The intensive loss of natural wetlands as a consequence of human activities has lead to the use of new habitats by the species linked to water presence. In India, thousands of hectares of agricultural lands are used by waterbirds as alternative habitats. For this study, wintering waterbirds were counted in the agricultural lands found in three districts of Tamilnadu during 2005 to 2010 and totally 89,217 birds belonged to 69 species were recorded. The present study indicated that the agricultural wetlands are providing alternate habitats for waterbirds. Therefore, the long-term information provided here can be useful for establishing management strategies for these agricultural wetlands.

Key words: agricultural ecosystem, conservation, waterbirds, wetland ecology.

Wetlands are unique habitats for many waterbird communities, but most of the weltands are under heavy pressure with the intensification of human activities and climatic changes (Turner et al., 2000; Froneman et al., 2001). Almost half of the world's wetlands have disappeared in the last century due to urban development (Shine and Klemm, 1999). Due to rapid changes and degradation of nature of the wetlands habitats, waterbirds are shifting and utilizing agricultural wetlands as foraging and breeding grounds. The agricultural lands as a type of aquatic systems were originally designed and managed for human kinds, but only secondarily acquired a role in biodiversity conservation (Maeda, 2001; Múrias et al., 2002; Elphick and Oring, 2003; Ma et al., 2004; Sánchez-Zapata et al., 2005). Several studies already reported the relative importance of agricultural lands, and also found that they could provide appropriate habitats for waterbirds (Toureng et al., 2001; McKinstry and Anderson, 2002; Paracuellos and Telleria, 2004; Santoul et al., 2004; Okes et al., 2008, Rendon et al., 2008).

In the recent decades waterbirds in Asia are facing trouble, because of rapid and improper planning and development that leading to a lack of adequate official conservation of the important wetland sites, which forms the keys reasons for their declining numbers, as report by Wetlands International, on the basis of the observation covering over 6,700 wetland sites in 27 Asian countries. Further they added that every year, millions of waterbird species migrate up and down between Australia, South and Southeast Asia towards Russia, China and Alaska. However, these waterbird species depend on networks of productive wetland areas in all the countries. The waterbirds expect that these chains of wetlands should meet out the requirements of migration such as resting, feeding and breeding during their annual migrations and to help

*Corresponding author : email: dunlinpandiyan@gmail.com them survive the severe winters in more northern latitudes (Wetland International 2007). More over they described that the declining of waterbirds, might be due to a long gap existing in designation, implementation and proper management of kinds of important wetland habitats, together with a lack of international measures leaving them vulnerable to human developmental activities. Finally they concluded that wetland reclamation is the most destructive cumulative threat to the wetlands that are being used by waterbirds globally.

Apart from that waterbirds are facing critical disturbances because of over-fishing, hunting, excessive cattle grazing, pollution of wetlands through pesticides, fertilizers, and sewage (Wetland International, 2007; Status of Waterbirds in Asia - Results of the Asian Waterbird Census: 1987-2007). Due to these intensive pressures waterbirds are shifting their original foraging habitat into other places like agricultural wetlands. Degradation and vanishing of natural wetlands are affecting waterbirds breeding and migratory cycles. Powell et al. (1999) reported that in many bird species, reproductive success is influenced not only by the number and quality of offspring produced during a single breeding attempt, but also by the number of breeding attempts made within a single season. Another study suggested that several factors can limit the number of breeding attempts made, including energetic constraints of reproduction and rearing of young (Tinbergen and Dietz, 1994, Ogden and Stutchbury, 1996), and exogenous constraints such as length of breeding season (Wilson et al., 1997). Resource depletion and other factors such as temporal changes in habitat structure, can lead to short-term declines in habitat quality within an established home-range (Soderstrom, 2001). In such circumstances, breeding activity may be curtailed unless there is the availability of alternative sites or habitats can be used. Many studies reported that there are strong associations between, water level, prey abundance and waterbirds density

(Ashley et al., 2000, Panidyan, et al., 2006). But nowadays, most of the tidal flats of east coast of southern India are degrading and the abundance and distribution prey species are also in very poor conditions (Pandiyan and Asokan, 2008a). With these prime reasons most of the waterbirds are shifting their foraging grounds day by day. In these conditions the agricultural landscapes of fast-growing crops, seasonal variation in habitat structure is often apparent and can strongly influence habitat suitability waterbird species (Brickle and Harper, 2002; Browne and Aebischer 2003; Newton, 2004). It has been estimated that agricultural land accounts for up to 30% of terrestrial lands in the world (Fisher et al., 2000)

There is also supporting evidence that production of agriculturally managed wetlands for water and pollution management purposes can exhibit biodiversity benefits (Bradbury and Kirby, 2006; Thiere et al., 2009). In fact economically marginal agricultural landscapes of high nature value, wildlife can deliver tangible economic benefits through tourism (Dickie et al., 2006). In intensive production systems, agroenvironment managements are now a core element for birds, mammals, invertebrates and wild flora (Vickery et al., 2009). However, more studies are needed to assess their actual and potential contribution to delivering other services like biodiversity conservation (Kohler et al., 2007).

Out of these arguments, our important observation was that a group of diving birds were hunting insect in the paddy field i.e. the species is Little Cormorant (*Phalacrocorax niger*), naturally it is belonged to the order Ciconiiformes, the family Phalacrocoracidae which is originally a diving behavior waterbird (see further field characters in Ali, 2002). They have good adaptation for diving (possess webbed toes), hence they are hunting fishes in the underwater habitats. A minimum of 7-12 feet of water level is required to meet out their day to day foraging behaviour. But, nowadays they seemed to be foraging into the agricultural paddy fields, which seems to be a miracle to us, never observed such a behaviour in the species during the study periods. In fact, we have recorded that they are hunting insects such as herons and egrets type of mechanism (data collected at Cholakan patty, near Thanjavur District).

Apart from that we conducted a survey of waterbirds in the agricultural wetlands of four districts in Tamilnadu viz., Thiruchirappally (2005-2007), Nagapattinam, Thiruvarurand Thanjavur (2007-2010), which are intensive agricultural practicing areas of Cauvery Deltaic region of Tamilnadu, India. Birds were counted by using the transect method. During the end of April 2010, and we recorded 89,217 birds belonged to 69 species of waterbirds and they were using agricultural lands for feeding and breeding habitats

(author unpublished data). Already Taureng et al., (2000) had stated that the agricultural lands are vital habitat for waterbirds. Further they added that among waterbirds, Tree-nesting Herons, Little Egret (Egretta garzetta) and Cattle Egret (Bubulcus ibis) used paddy fields largely for foraging particularly during their breeding season. The ecology of both species has been extensively studied (Tourenq et al., 2000). According to Elphic (2000) both Little and Cattle Egrets are opportunists and show great variability in habitat use. However, Little Egrets exploit more aquatic habitats (both fresh and salt, permanent or temporary waters) than do Cattle Egrets which frequent open wet or dry pastures and agricultural lands. Elphick (2000) suggested that when the agricultural lands are managed appropriately, they could provide valuable foraging habitats for waterbirds, replacing the function of natural wetlands on which paddy fields were cultivated. During the winter or the summer, paddy fields may be extensively used by waterbirds for foraging on rice grains left over from the harvest, and on aquatic vegetation and/or invertebrates that would otherwise be absent (Beck et al., 1999; Elphick, 2000).

Based on the above said information, this is an important time for bird conservation through agriculture in Asia. However, we can succeed when we have a through understanding of the causes of the loss of biodiversity from the wetland ecosystems, we can ensure that bird conservation and recovery become reality and sustainable through-out the world. The world environmental organizations and biodiversity conservation authorities should take necessary steps to preserve watebirds by providing alternative habitat like agricultural wetlands. If it is not executed seriously then the loss of biodiversity will certainly continue as ever exsiting process. Finally the common species could enter into the vulnerable list and as a result most of the waterbirds will face extinction from the world.

Apart from that the world agricultural sector could govern a system like CAP (Common Agricultural Policy), which can introduce all the agricultural based countries to sustain common agricultural practices. The CAP should strengthen the agricultural practices, which will avoid factors causing damages to waterbirds. Apart from that the CAP will emphasize cultivation of plants and conservation of species that can give more holistic and integrated fields to rethink the efficiency of agricultural policy towards sustainable development for the nature and natural resources.

But in the latest scenario, the developing countries particularly in Asia, most of the agricultural lands are vanishing due to urban development, construction of buildings and promotion of real estates and changing human life style. Hence it is suggested that globally we could strengthen the quality of agricultural practices

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through a CAP; and we have to take a decision and put a common agenda in the agricultural practices i.e. CAP, for the well being of waterbirds, which will regulate the avian biodiversity conservation. Otherwise, globally hundreds of waterbird species will become extinct very soon due to improper management of wetland ecosystems.

We have to take necessary steps to conserve and retain the natural wetlands from natural disasters, natural calamities, anthropogenic pressures and other climatic pressures. It is obvious that the artificial or man made wetlands support avian species by providing temporary foraging areas. So, conservation of natural wetlands is the most prime factor, otherwise the time is not far off for the aquatic water birds to enter into the Red Data Book .

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