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Agriculture as a key element for conservation: reasons for caution

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We agree with Wright et al. (2012) that it is important to consider species of open habitats when assessing the impact of agricultural policy on landscapes where such species occur. However, there are at least four reasons why conservationists should be cautious about the idea that agriculture is a key element for conservation in the developing world (or indeed anywhere):

(1) Observing that most individuals of some bird species make use of agricultural habitats at some stage of their life history is insufficient to tell us whether preserving those habitats is desirable for the long-term conservation of other biodiversity, of all birds or even of those species themselves. All species have survived without agriculture for most of their evolutionary history. Most species which are now found largely on agricultural land use non-agricultural habitats as well, including open natural and semi-natural habitats. The methods we implemented in a recent analysis (Phalan et al. 2011a) assess the proportion of species which would benefit most from maximising the area of low-yielding agriculture, maximising the area of natural habitat by producing the same quantity or value of agricultural goods from a smaller area of high-yielding agriculture, or an intermediate strategy. Our approach depends upon measurements of population density across a range of land uses (and not, as Wright et al. incorrectly state, an assumption that "population density is always maximal in an existing and available natural habitat, with lower densities in all forms of agriculture and a monotonic decline with increasing yield"). The paper by Wright et al. does not present any such measurements.

(2) Decisions about land use have off-site consequences (Phalan et al. 2011b). There might be landscapes where data suggest the best way to conserve certain species is to attempt to "fossilise" some low-yielding farming practices. However, sparing low-yielding farmland in the face of rapidly rising demand for farm products would require us to accept agricultural expansion or yield increases elsewhere, with impacts on other species. Our approach offers a method to quantify those leakage effects on particular species, and on wider groups of species. Some of these other groups may have an even smaller proportion of species that tolerate agriculture than do birds. For example, low levels of cattle grazing might maintain open habitats suitable for some birds, but might not be compatible with the conservation of the native herbivores that previously created such conditions.

(3) Intervention to keep constant those farming practices in low-yielding agricultural landscapes that allow birds to live in them is difficult. Species with most individuals currently living on agricultural land are at risk from future changes in agricultural technology and the demand for different crops. Of the

bird species identified by Wright et al. as being “dependent on low-impact agriculture,” many are in fact threatened by changes in small-scale agriculture, and not just by large-scale “industrial” agriculture. Liben Lark *Heteromirafra sidamoensis* is an example, where relatively small changes in farming practices by local people have taken the species close to extinction (Donald et al. 2010).

(4) There is an alternative to being constrained by current patterns of land use: habitat restoration might be an effective way of conserving some species in landscapes where most or all natural habitats have been converted. Once again, expanding or re-creating areas of natural habitat will be practical only if increasing production elsewhere reduces demand for farmed land. Density-yield analyses of the type we advocate would help to clarify whether such a restoration-based approach might be appropriate, not just for a handful of bird species but for a broader sweep of the regional biota.

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