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7 **Agriculture as a key element for conservation: reasons for caution**

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

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

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

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

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

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

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