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Trees on Farms for Biodiversity

Global Landscapes Forum

White Paper

Opportunities to maximize the role of agricultural ecosystems in biodiversity conservation in the Post-2020 global biodiversity framework

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1 The first draft of the Post-2020 Global Biodiversity Framework misses the opportunity provided by SBTTA24 to consider managed ecosystem's role in biodiversity conservation

The CBD Post-2020 Global Biodiversity Framework (GBF) was released in its first draft form on 5 July 2021[1]. It had previously been made available to the public as two "zero drafts" and widely commented on by CBD parties and observers.

The first draft continues the weakness of the Aichi Targets in understating to the point of ignoring the importance of agricultural landscapes in the conservation of biodiversity. This is unexpected as the SBSTTA24 document on *Scientific and Technical Information to Support the Review of the Updated Goals and Targets, and Related Indicators and Baselines*[2] strongly emphasises that while "priority should be given to retaining existing natural ecosystems…The conservation and sustainable use of biodiversity is also important in areas beyond 'natural' ecosystems including in agricultural and urban environments.

Such 'managed' ecosystems (those whose biotic composition is the result of deliberate manipulation by people) can provide important habitats, and contribute to habitat connectivity, for some species, as well as being essential for ecosystem functioning and services. (Excerpts of paragraphs 19 and 21).

The SBSTTA24 document backs this up with the statement that "Recent research suggests that maintaining 20 per cent of native vegetation in managed ecosystems can support biodiversity conservation goals and provide useful services for agricultural production[3]". This and other comments from parties and observers have unfortunately not been reflected in the text of the first draft of the GBF.

2 How the Post-2020 Global Biodiversity Framework can maximize the role of managed ecosystems for biodiversity conservation in Targets 1, 2 and 10

Goal A of the draft proposes that the "integrity of **all** ecosystems is enhanced". This is a welcomed improvement over previous drafts that referred only to natural ecosystems. Unfortunately, the proposal is immediately modified by "with an increase of at least 15 percent in the area, connectivity and integrity of natural ecosystems". The rest of the text does not mention productive ecosystems at all.

The Action Targets associated with Goal A barely touch on agricultural landscapes. For example, Target 1 is "Ensure that **all** land and sea areas globally are under integrated biodiversity-inclusive spatial planning addressing land- and sea-use change, retaining existing intact and wilderness areas". The modifier "all" implies that agricultural landscapes should be included; unfortunately, the reference to land- and sea-use change reduces the aspiration of this target to limiting additional biodiversity loss rather than also improving management of existing modified ecosystems.

To achieve the 2050 Vision and the proposed Goals, the loss of existing intact and wilderness areas through land/sea use change must be avoided, reduced and reversed[1]. This should be achieved by both decreasing habitat loss and degradation (increasing retention) and increasing functional connectivity (the ability of species to move between natural habitat fragments[27] both of which could be the outcome of integrated biodiversity-inclusive spatial planning). In that sense, Target 1 should explicitly add connectivity as an outcome.

Our suggestion (in red):

Target 1. Ensure that all land and sea areas globally are under integrated biodiversity-inclusive spatial planning retaining existing intact and wilderness areas *and iincreasing connectivity between them.*

Target 2 is "Ensure that at least 20 per cent of degraded freshwater, marine and terrestrial ecosystems are under restoration, ensuring connectivity among them and focusing on priority ecosystems". The restoration of degraded ecosystems is essential to halt extinction rates and to safeguard genetic diversity of wild and domesticated species. Restoration may include: (a) restoring converted areas back to natural states; (b) improving the ecological integrity of degraded natural areas; and (c) rehabilitating converted and degraded areas (including degraded agricultural lands) to improve both productivity and integrity[1]. So the objective of restoration should be ecosystem integrity, not connectivity between priority ecosystems. In that sense, Target 2 should explicitly mention integrity as an outcome of this target.

Our suggestion (in red):

Target 2. Ensure that at least X per cent of degraded freshwater, marine and terrestrial ecosystems are under restoration *addressing ecosystem integrity.*

Unfortunately, the focus on priority ecosystems weakens any assumption that the target recognizes the importance of agricultural landscapes in their own right. Other targets mention integrating protected areas into wider landscapes and the conservation of wild and domesticated species, but any reference to agriculture must be regarded as oblique and weak.

Goal B is broad in scope and aspiration: *"Nature's contributions to people are valued, maintained or enhanced through conservation and sustainable use supporting the global development agenda for the benefit of all".* This goal encompasses the sustainable use of biodiversity, rather than the conservation of wild biodiversity. For example, Target 10 is *"Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use (author's emphasis) of biodiversity, increasing the productivity and resilience of these production systems".* The term "use" and linking biodiversity with production emphasize that this goal is focused on benefits to people through the sustainable exploitation of biodiversity. The emphasis on sustainability of agriculture is very welcomed, but insufficient to ensure that agricultural landscapes are managed to optimize the conservation of wild biodiversity. Although not the topic of this white paper, it is unfortunate that the target does not more explicitly refer to agrobiodiversity in the shape of crop varieties, livestock and fish breeds and their wild relatives.

Target 10 is "Ensure all areas under agriculture, aquaculture and forestry are managed sustainably, in particular through the conservation and sustainable use of biodiversity, increasing the productivity and resilience of these production systems". In agricultural production especially, sustainability is often synonymous with increased efficiency of production[4] which implies intensification of yield production with less consumption of land, water, and fertilizer[1]. Conventional agriculture is a linear production process, whereby nutrients and water (agricultural inputs) are added to the system and converted into biomass, which is then exported in form of animal or crop produce. Integrated farming systems, on the other hand, are circular systems that combine a diversity of crops, animals and trees with different spatial and seasonal arrangement. They do not have the same negative ecological footprint as intensified systems. They mimic natural water and nutrient processes, with less need for artificial inputs like fertilizers, herbicides and pesticides. Rotating crops in diverse and complex patterns is estimated to reduce by three the nitrogen fertilization requirements of fields[1]. In that sense, Target 10 should promote integrated farming systems rather than focusing on productivity only.

Our suggestion (in red):

Target 10. Ensure all areas under agriculture, aquaculture and forestry are managed sustainably ***while contributing to biodiversity conservation in particular through integrated land use systems, increasing*** the productivity and resilience of these production systems.

3 Why is promoting agriculture as a contributor to biodiversity conservation in the Post-2020 Global Biodiversity Framework so key?

If agricultural landscapes are not fully incorporated into biodiversity prevention, none of the benefits outlined in the next section will be realized. There is a once-in thirty years opportunity to make sure that the world's apex policy-making body, the CBD, effectively and adequately builds agricultural landscape management into its GBF and sends out necessary policy signals. The following are the implications of this:

1. Failure to explicitly recognize the importance of agricultural landscapes to biodiversity will ensure that 50% of the potentially habitable area of the earth's land is ignored in policies to protect biodiversity.
2. Any assumption that simply advocating sustainability of agriculture will benefit wild biodiversity will be flawed. While many measures to achieve sustainability are friendly to biodiversity, sustainability in itself will not assure biodiversity conservation.
3. Governments will align investment and development policies around the agreements that are made at COP 15. If agriculture is downplayed in the Kunming decisions, then national policies will follow suit and very little to conserve biodiversity will be funded outside of the conventional approaches being applied now.
4. Most of the responsibility for biodiversity is given to ministries of environment and forests. "Ministries of agriculture are the guardians of 50% of the worlds" habitable land surface. They generally have a relatively minor mandate for biodiversity conservation. Agriculture is, however, starting to undergo a transformation that recognizes the importance of circular or regenerative agriculture and opportunities are being seen (in some countries) to introduce biodiversity conservation into the transformed practices. It is imperative that the CBD moves with the times and sends out policy signals that ministries of agriculture have a central role to play in the conservation of biodiversity.
5. An agricultural transformation is beginning, but it is at a very early stage. The CBD should support policies that encourage a movement from industrial farming where huge tracts of monocrops destroy every niche for animals and plants and distances are too great for connectivity. The CBD should encourage, where appropriate, the maintenance of mixed farming.
6. References to agriculture in the GBF must be explicit. The current text that obfuscates agriculture will not be effective in drawing attention to these important issues.

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4 Agriculture biodiversity in a bigger context

Changes in farming since pre-industrial times have had a profound effect on biodiversity. The expansion of intensive cropping has eliminated many of the elements of the landscape where an abundance of species used to live. Ecological niches such as trees, wetland and uncultivated grasslands have disappeared, along with the animals and plants that occupied them. One of the earliest responses to this tragic loss was the establishment of protected areas. These are often wilderness areas where plants and animals can be given almost complete protection. Since the first national parks in America, almost all countries have set aside protected areas that now account for 17% of the world's land and inland waters[4]. These protected areas are under increasing pressure from expanding populations around them, and the first priority must be to maintain their protection and where possible open new areas where various degrees of protection can be provided for biodiversity. Some of the world's most seriously endangered animals and plants are likely to be effectively protected only in protected areas.

However, according to one reliable estimate agriculture covers about 51 million km^2 of the 104 million km^2 of the habitable land area of the earth (that is land area that excluded hyper-arid deserts, glaciers and other barren areas)[5]. That is about 50% of the potentially productive surface of the earth, while protected areas account for only 17%. Given the massive loss of biodiversity since agriculture has become widespread, intense and simplified, it is clearly important to understand how the trend can be reversed and how agricultural landscapes can be managed to contribute to biodiversity conservation.

The way that land is managed can have a big effect on biodiversity. Tillage that involves deep ploughing of vast areas of land will eliminate most biodiversity, including having a profound effect on soil biodiversity[6]. Various kinds of no-till farming, or conservation tillage are becoming widely applied for reasons other than biodiversity conservation (primarily soil and water management). The techniques of minimum soil disturbance benefit a range of plants, animals and soil biota[7,8]. When livestock are introduced into the mix, their manure provides valuable fertilizer (especially rich in phosphorus) and leads to a circular form of farming where local biodiversity can find a home[9]. Mixed farming provides opportunities for biodiversity conservation[10]. Different crops provide different niches for different animals and plants, and especially where trees become part of the farming mix, biodiversity is greatly enhanced[11]. Trees are particularly important, and can be incorporated by farmers into their cropping systems where they provide important ecosystem services (such as soil and water management) and/or provide an income to the farmer. Other means of encouraging biodiversity on farms are to leave uncultivated strips between crops, bunds and riverine or other critical areas and plant border hedgerows[12,13,14,15]. All of these can have immediate benefits for the farm by harbouring pollinators and natural enemies of crop pests in addition to providing habitat for wild biodiversity.

While measures to protect biodiversity can be taken on individual farms, their benefits are greatly multiplied when applied across agricultural landscapes[16]. While finding space for trees or wild areas can be challenging on farms, especially where farms are small, there is a great deal of potential to achieve the same results across agricultural landscapes especially where areas outside of farm boundaries can be managed for biodiversity. For example, trees can be planted on riverine margins, where they benefit both biodiversity and help to control water run-off. Trees on upland slopes protect farmland below from water erosion. Leaving wild uncultivated areas provides abundant habitats.

Managing biodiversity in agriculture on a landscape basis begins to deal with one of the most difficult challenges of making agriculture biodiversity-friendly: the need for connectivity between areas of biodiversity abundance. The effects of intensifying and simplifying agriculture has been to fragment habitats, even to the extent of destroying their native plants and animals. Even if uncultivated areas are left on farms, these will be separated from other uncultivated areas by considerable distances, especially where agriculture is at its most intense and most simplified. This will tend to establish very limited pools of biodiversity with little genetic variability, and if a disaster affects an animal or plant the chances of them re-establishing themselves will be remote.

Agricultural landscapes often include important fragments of forest or grassland. Fragmentation of habitats is a symptom of severe ecological degradation, and the biodiversity in small fragments can be highly threatened. Agricultural landscapes provide habitats and refuges that provide the stepping-stones between natural habitats[17]. In agricultural landscapes, flying insects and birds are the most adept at getting from one habitat to another, followed by mammals and reptiles that can move long distances quickly. Slow-moving crawling animals will not easily cross large areas of cropland. Some plants have seeds that travel or are carried long distance, but many plants including many trees are likely to be stuck.

Mixed farming landscapes, with a combination of on-farm biodiversity conservation, landscape management for biodiversity and preserved forest or grassland fragments have a great potential for making an important contribution to biodiversity conservation[18,19].

Well-managed productive agricultural landscapes that include developed, semi-natural and natural land are "permeable" to the widespread movement of species. Some species, especially large animals and slow-spreading plants need properly designed and managed "linkage zones" that allow movement between areas of high conservation value. Linkage zones that cross agricultural landscapes require careful habitat protection and planned land use to prevent conflict between land users and animals. For example, elephant movement in East Africa requires connectivity across large areas of land, and as ancient migration routes become increasing fenced and planted, human-wildlife conflict is increasing[20].

"Wildlife corridors" support animal migration, and consist of protected pathways and remaining habitat patches. They are often set up to facilitate the movement of specific species between protected areas, but best practice suggests that corridors should not be established for single species (and not only "charismatic megafauna")[21]. Wildlife corridors usually have to cross-agricultural landscapes and careful planning and management are needed to prevent competition between humans and wildlife[22].

Humans have massively degraded the world's land surface. Over half of forests worldwide have been destroyed since the 1960s[23] and deforestation is continuing at a rate of about 10 million hectares per year[24]. This has been widely recognized and global efforts are underway to restore forested lands[25]. Less well recognized is the crisis in degradation of agricultural lands. In 2012 it was estimated that 24% of the world's land was degraded, and 1.5 billion people lived on degraded land[26]. This degradation, much of which involves soil and vegetation loss has a serious toll on biodiversity. Many of the measures to restore land are very effective in restoring biodiversity (introducing trees, controlling erosion, reducing water loss and practicing mixed farming).

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Start a Conversation

On how trees on farm can contribute to more robust goals, targets and indicators for the Post-2020 Biodiversity Framework by reaching out to one of our focal points:

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