Briefing

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Policy pointers

Policymakers and planners at all levels — international, national and community — must recognise major trade-offs between agricultural production and nature conservation and encourage a culture where these can be openly discussed and negotiated.

Engage the full range of stakeholders in trade-off management, especially those who have strong interests in the outcomes but little influence and therefore are more likely to lose out.

Focus on the major drivers of agricultural expansion in sub-Saharan Africa — in particular growing domestic food demand — and reconcile conflicts with policy commitments to nature conservation.

Take advantage of the full range of options for improving trade-off management, including communication and more inclusive governance alongside technical interventions such as spatial and land-use planning.

Conservation versus food production in Africa: better managing trade-offs

Agricultural expansion is the greatest driver of the loss of nature and its biodiversity and ecosystem services worldwide. In Africa, this is primarily the expansion of food crops to meet growth in domestic food demand. Further losses are inevitable before the situation stabilises. But they could be greatly reduced by better managing the trade-offs between conserving nature and increasing agricultural production. The much-discussed 'transformative change' needed to make this happen will be as much if not more about better governance than improved technology. This briefing explains basic concepts of better trade-off management and identifies four key changes in policy and practice needed to bring this about.

What's driving the loss of nature and biodiversity?

With the global biodiversity crisis, we may not yet be as close to the point of no return as we are with climate change. But at least with climate change we have strategies to reduce emissions and adapt, which are clearly working even if not nearly to the necessary extent.

In the realm of conserving nature, and its biodiversity and ecosystem services, a success story is protected areas — not all but a growing proportion of a total of more than 250,000, which increasingly includes areas owned and managed by indigenous and local communities. But all too often, protected areas are islands of success in a sea of failure. The bigger picture remains bleak as highlighted by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES): "Biodiversity is declining faster than at any time in human history."[1] The crisis is not that we are right now on the brink of global ecological breakdown but that 40 years of efforts to conserve nature beyond protected areas have largely failed to change the trajectory — 'to bend the curve' — and we have no technological fixes to solve the problem.

The greatest driver of biodiversity loss worldwide is the conversion of natural habitats to agricultural land use.[1] In Latin America and Southeast Asia, most of this loss is driven by production of export commodities (soy, beef, palm oil). But in Africa, the main driver of agricultural expansion is growing domestic demand for staple food crops. This results from much-needed poverty reduction and economic growth, and population increase. Domestic demand for cereals in sub-Saharan Africa is projected to nearly triple between 2010 and 2050 according to the IMPACT model of the International Food Policy Research Institute (IFPRI).[2] This briefing is based on research in Ethiopia, Ghana, Tanzania, Zambia and the Democratic Republic of Congo (DRC) where

projections for the growth in domestic demand for cereals over the period 2010–2050 are 2.6, 3.5, 2.9, 3.8 and 3.9 times, respectively.

On their current trajectory, many countries in Africa will lose most of the natural forests and woodlands that lie outside of protected areas just as has happened in the UK. A recent analysis of land cover in Ghana indicates that it has nearly reached this point. Only 8% of Ghana's land cover is forest, most of which lies in protected areas.[3] At the other end of the spectrum with around 60% forest cover are Zambia and DRC.[4] FAO studies note that DRC has "huge agricultural potential" with up to 80 million hectares of land (35%) suitable for agriculture (of which only 10 million ha is currently used).[5]

Policymakers must engage the full range of stakeholders in trade-off management processes

Wishful win–win thinking

Nationally, at the level of specific conservation areas and landscapes, the idea of win–win outcomes (where nature and its biodiversity and ecosystem services are conserved, and farmer well-being is improved) has largely been abandoned after 30 years of disappointing results with integrated conservation and development (ICD) approaches. A 2011 landmark study on this topic concluded that "win–win scenarios, where both natural resources are conserved and human well-being is improved in specific places over time have been difficult, if not almost impossible, to realise. Compromise, contestation and conflict are more often the norm."[6]

Yet policies continue to reflect wishful win–win thinking. Among the five countries studied, this is particularly evident in Ethiopia. It has committed to eliminating deforestation by 2030. But its current five-year plan aims to increase food production by 50%, partly through expanding the agricultural area by 3.9% per year — and historical trends show that 70% of such expansion comes at the expense of forests.[7] In Zambia and Ghana, policy commitments to reduce forest and biodiversity losses are less ambitious. But both countries are committed to being self-sufficient in staple food crops. This would mean at least doubling the cropped area, even with agricultural intensification delivering significant improvements in productivity.

What about agricultural intensification?

Can agricultural intensification improve farmers' livelihoods while also reducing the loss of nature and biodiversity? The conventional assumption is that if people can produce more food on existing land, they will be less likely to expand their farms. Sadly, if intensification increases a farmer's profits and environmental governance is weak, the opposite is more the norm: farms expand. Called Jevons paradox, this phenomenon is widely recorded in the Amazon Basin[8] where it has been a powerful driver of deforestation. Yet the myth that agricultural intensification will save nature and biodiversity persists. And it is dangerous. It allows policymakers and planners to dodge the inconvenient truth that a lot more natural habitat will be lost. Instead, they must recognise that trade-offs — compromises — are the norm, but they can be managed so as to greatly reduce the risk of negative impacts.

Recognising trade-offs

A trade-off is where a gain for one objective results in a loss for another — in most cases gains in agricultural production at the expense of nature conservation. This may be to some extent inevitable. But much can be done to reduce the severity of a trade-off, making losses in biodiversity and ecosystem services much less than would otherwise be the case. Trade-offs can also have major impacts on the distribution of benefits and costs within and between stakeholder groups at local, landscape and national levels. What might seem to be a small trade-off overall can hide big wins for some and big losses for others, and the losses often hit poorer people the hardest as they have less influence over the relevant decision-making processes.

There have been major advances in concepts, methods and tools for understanding, analysing and managing trade-offs in recent years. These advances can reduce negative impacts on people and the environment. However, there is little capacity to use them in many countries in sub-Saharan Africa. But there is a more fundamental constraint — the lack of recognition that trade-offs even exist. This can be for a variety of reasons:[9]

- Trade-offs may be invisible to people working in their sectoral siloes (eg ministries for agriculture or the environment)
- Perceptions of what is a win or a loss may be very different according to knowledge, values, beliefs or well-being etc
- Trade-offs may be deliberately hidden for a variety of reasons including win–win solutions being more socially, psychologically and politically attractive or because the topic is taboo.[10]

Our most fundamental recommendation for policymakers at all levels — from parties of the

Convention on Biodiversity (CBD) to community-level planners — is to recognise the trade-offs between agricultural production and nature conservation and encourage a culture where these can be openly discussed and negotiated.

Trade-offs between agricultural production and nature conservation are usually analysed as a matter of competing uses of ecosystem services. Agricultural production is a provisioning service (food) and nature conservation provides a mix of all four types of ecosystem service (provisioning, regulating, supporting and cultural services). However, this framing has a major weakness when it comes to trade-off management which — in the real world — is as much social, economic and political as it is ecological. Efforts to better understand and manage agriculture–forest conservation trade-offs in DRC have been driven very much by biophysical modelling.[4] This approach implicitly gives an advantage to those whose interests can easily be described and modelled as ecosystem services (eg environmental agencies, conservation NGOs) while disadvantaging smallholder farmers who are often cast as the cause of deforestation rather than legitimate stakeholders in the outcome.

Stakeholder engagement

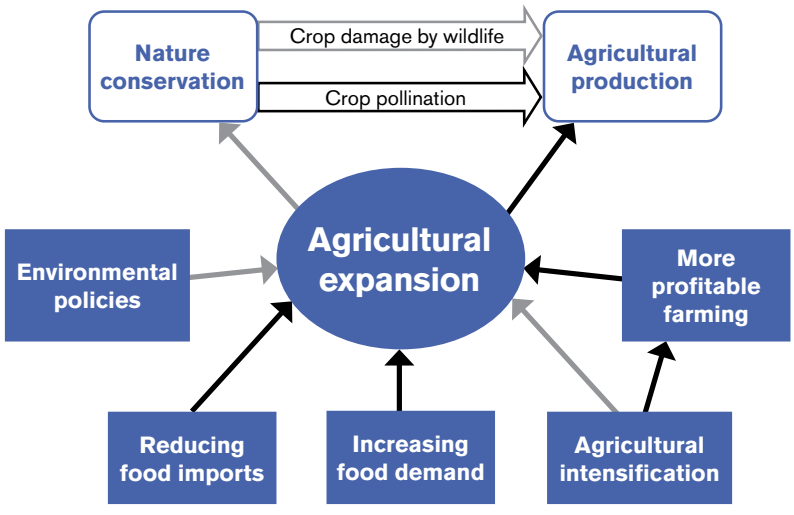
There is an alternative to the classic ecosystem services framing of trade-off analysis and management: a socio-ecological approach. This is based on the notion that trade-off management is not just a technocratic process. It is fundamentally a process of negotiation between stakeholders who have different interests in the range of possible ecosystem service outcomes. The room for reconciling different interests — finding compromise — depends both on the possible ecosystem service outcomes and on differences in stakeholder preferences. This means that interventions to improve trade-off management may include strengthening stakeholder engagement as well as technical interventions designed to solve specific problems.

Table 1 gives examples drawn from Turkelboom et al.[11] and case studies of successful trade-off management on Ethiopia and Zambia.[12] The case study in Ethiopia was a community-level land-use planning process. Although successful in terms of generating technically strong land-use plans, this process is led by technical advisors in local government in consultation with some community representatives with, as always, a real risk that some groups miss out — in this case poorer members of the community and young people. No matter how successful an intervention such as land-use planning may seem, there will almost always be winners and losers. Our key message here is that policymakers and planners must engage the full range of stakeholders in trade-off management processes, especially those who have a strong interest in the outcome but little influence and are therefore more likely to lose

Table 1. Examples of successful trade-off management interventions

Major category	Examples of interventions
A. Stakeholder engagement: communication and governance	1. Awareness-raising campaigns 2. Public meetings 3. Contacting the press 4. Multi-stakeholder, participatory processes 5. Women's empowerment 6. Strengthening land rights 7. Adaptive management informed by monitoring and learning
B. Problem solving: increasing benefits, reducing costs, enhancing synergies, alleviating trade-offs	8. Land-use and spatial planning 9. New regulations and safeguards 10. Enforcing regulations 11. Improved land/natural resource management 12. Conditional incentives, eg payments for ecosystem services 13. Processing and marketing of agricultural products

Figure 1. Trade-offs between ecosystem services: mechanistic pathways



- Solid shapes indicate drivers of trade-offs between ecosystem services (oval for direct and rectangle for indirect drivers).
- Solid arrows are actions of drivers, hollow arrows are interactions of ecosystem services and associated functions and processes
- Black arrows indicate drivers/interactions causing an increase, grey arrows indicate drivers/interactions causing a reduction

out. This applies to any level from CBD policy to land-use planning at community level.

The cause of trade-offs: drivers and interactions

What causes a trade-off (or synergy) can be understood in terms of 'mechanistic pathways'.[13] Figure 1 shows how the competition in supply of different ecosystem services may be related either to:

A. Interactions between ecosystem services and underlying process and functions — in this case how forests are a good habitat for bees that improve yields of crops dependent on them for pollination, but also harbour monkeys that damage the same crops (an ecosystem disservice).

B. Both ecosystem services differentially responding to a common driver of change — in this case an expansion in the area of agricultural land.

Interactions can be quite significant, but in most cases it is the drivers that are the dominant factor and therefore the main focus of efforts to better manage trade-offs. Our research confirms that in all five of our focal countries the primary driver of agricultural expansion is growth in domestic food demand. It is not, as is often assumed, the growth in export commodities.[14] To what extent increasing food demand drives agricultural expansion depends in particular on how much food a country imports and the success of efforts to intensify agriculture (in a changing climate), whether or not there is a Jevon's paradox effect, and the extent to which environmental safeguard policies exist and are enforced (see Figure 1). All of these are drivers of expansion. In turn, they are affected by major macro-level drivers, notably the quality of governance, the rate of economic growth and the degree to which climate change will impact the agricultural sector.[15]

In addition to these and other major drivers of agricultural expansion, there are key drivers that enable or constrain trade-off management processes. Many of these are related to governance — both to core issues of governance (such as stakeholder participation) and less tangible but sometimes equally powerful factors such as manipulation of land allocation/planning by vested interests (eg in large-scale farming) and false narratives (eg intensification reduces pressure on natural habitats).

Improving trade-off management

Technocentric approaches to trade-off management tend to emphasise spatial and land-use planning. This is a powerful tool for managing the spatial distribution of land use to minimise losses of the most important areas for biodiversity and ecosystem services. But as Table 1 illustrates there are many other types of intervention that operate through different mechanisms — changing perceptions (1, 2), increasing the influence of key stakeholders (4, 5), fostering adaptive management (7), improving the efficiency of the whole system (11), disincentives (9, 10) and incentives (12, 13). In short, it is important to focus on the major drivers of agricultural expansion in sub-Saharan Africa and to take advantage of the full range of options for improving trade-off management, including communication and more inclusive governance alongside technical interventions such as spatial and land-use planning.

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Notes

[1] IPBES (2019) Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES Secretariat, Bonn. / [2] See www.ifpri.org/program/impact-model / [3] Oppong Hackman, K, Gong, P and Wang, J (2017) New land-cover maps of Ghana for 2015 using Landsat 8 and three popular classifiers for biodiversity assessment. *International Journal of Remote Sensing* 38(14). / [4] Diaw, MC and Franks, P (2019) Food production, agricultural expansion and deforestation in Mai-Ndombe, DRC. IIED, London. https://pubs.iied.org/17652IIED / [5] Diaw, MC and Franks, P (2019) Production alimentaire, expansion agricole et déforestation au Mai-Ndombe, RDC. IIED, London. http://pubs.iied.org/17652FIIED / [6] McShane, TO, Hirsch, PD, Trung, TC, Songorwa, AN, Kinzig, A, Monteferri, B, Mutekanga, D, Thang, HV, Dammert, JL, Pulgar-Vidal, M, Welch-Devine, M, Brosius, JP, Coppolillo, P and O'Connor, S (2011) Hard choices: making trade-offs between biodiversity conservation and human well-being. *Biological Conservation* 144(3) 966–972. http://bit.ly/2WyWOBB / [7] Federal Democratic Republic of Ethiopia (2011) The path to sustainable development: Ethiopia's climate-resilient green economy strategy. http://bit.ly/2OH5yz1 / [8] Ceddia, MG, Bardsley, NO, Gomez-y-Paloma, S and Sedlacek, S (2014) Governance, agricultural intensification, and land sparing in tropical South America. *Proceedings of the National Academy of Sciences of the United States of America* 111(20) 7242–7247. / [9] Galafassi, D, Daw, TM, Munyi, L, Brown, K, Barnaud, C and Fazey, I (2017) Learning about social-ecological trade-offs. *Ecology and Society* 22(1). https://doi.org/10.5751/ES-08920-220102 / [10] Daw, TM, Coulthard, S, Cheung, WWL, Brown, K, Abunge, C, Galafassi, D, Peterson, GD, McClanahan, TR, Omukoto, JO and Munyij, L (2015) Evaluating taboo trade-offs in ecosystems services and human well-being. *Proceedings of the National Academy of Sciences of the United States of America* 112(22) 6949–6954. / [11] Turkelboom, F, Leone, M, Jacobs, S, Kelemen, E, García-Llorente, M, Baró, F, Termansen, M, Barton, DN, Berry, P, Stange, E, Thoonena, M, Kalóczkai, A, Vadineanu, A, Castro, AJ, Czúczk, B, Röckmann, C, Wurbs, D, Odee, D, Preda, E, Gómez-Baggethun, E, Rusch, GM, Martínez Pastur, G, Palomo, I, Dick, J, Casaer, J, van Dijk, J, Priess, JA, Langemeyer, J, Mustajoki, J, Kopperoinen, L, Baptist, MJ, Peri, PL, Mukhopadhyay, R, Aszalós, R, Roy, SB, Luquea, S and Rusch, V (2018) When we cannot have it all: ecosystem services trade-offs in the context of spatial planning. *Ecosystem Services* 29(C) 566–578. http://bit.ly/2QLrR9p / [12] Hou-Jones, X, Franks, P and Chung, J (2019) Creating enabling conditions for managing trade-offs between food production and forest conservation in Africa: case studies from Ethiopia and Zambia. IIED, London. https://pubs.iied.org/13611IIED / [13] Bennett, EM, Peterson, GD and Gordon, LJ (2009) Understanding relationships among multiple ecosystem services. *Ecology Letters* 12 1394–1404. http://bit.ly/2XwC3nf / [14] Franks, P, Hou-Jones, X, Fikreyesus, D, Sintayehu, M, Mamuye, S, Danso, E, Meshack, C, McNicol, I and van Soesbergen, A (2017) Reconciling forest conservation with food production in sub-Saharan Africa: case studies from Ethiopia, Ghana and Tanzania. IIED, London. https://pubs.iied.org/17605IIED / [15] Gusenbauer, D and Franks, P (forthcoming) Agriculture, nature conservation or both? Managing trade-offs and synergies in sub-Saharan Africa. IIED, London.

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