THE TRIPLE CHALLENGE:

SYNERGIES, TRADE-OFFS AND INTEGRATED RESPONSES TO MEET OUR CLIMATE, FOOD AND BIODIVERSITY GOALS

WWF FOR YOUR WORLD

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Written by
William Baldwin-Cantello[1], Michael Clark[2], Stephen Cornelius[1], Angela Francis[1], Jaboury Ghazoul[3], James Gordon[1], Sarah Halevy[1], Nathanial Matthews[4], Pete Smith[5], Dave Tickner[1], Simon Walmsley[1], Mark Wright[1], Lucy Young[1]

[1] WWF-UK
[2] University of Oxford
[3] University of Edinburgh and ETH Zurich
[4] Global Resilience Partnership
[5] Institute of Biological and Environmental Sciences, University of Aberdeen

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CONTENTS

GLOSSARY OF TERMS 2
EXECUTIVE SUMMARY 3
1. INTRODUCTION: THE TRIPLE CHALLENGE 4
CASE STUDY: THE TRIPLE CHALLENGE AND ONE HEALTH IN THE GREATER VIRUNGA LANDSCAPE 7
2. SYNERGIES AND TRADE-OFFS 8
2.1 PRIORITY POLICY RESPONSES 8
BOX 1: NATURE-BASED SOLUTIONS AND THE TRIPLE CHALLENGE 11
2.2 NAVIGATING TRADE-OFFS 12
2.2.1 INTEGRATED POLICY MAKING ON FOOD, BIODIVERSITY AND CLIMATE CHANGE 13
CASE STUDY: THE TRIPLE CHALLENGE POLICY OPPORTUNITY IN THE UK 15
BOX 2: A JUST TRANSITION 19
2.2.2 TRIPLE CHALLENGE DIALOGUES 22
CASE STUDY: THE LLANOS OF COLOMBIA - AN EXEMPLAR FOR TRIPLE CHALLENGE THINKING? 24
2.2.3 MORE INTEGRATED AND INFLUENTIAL RESEARCH ON SYNERGIES, SOLUTIONS AND TRADE-OFFS 26
2.3 THE ROLE OF THE PRIVATE SECTOR 28
3. CONCLUSION 29
4. REFERENCES 30

GLOSSARY OF TERMS

Just Transition: a package of economic and social policies that ensure climate action and nature restoration are delivered fairly and in a way that reduces inequalities.

Nature-based solutions: actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits (Cohen-Shacham et al 2016 and adopted by the IUCN).

Nature-based solutions to climate change: Ecosystem conservation, management and/or restoration interventions intentionally planned to deliver measurable positive climate adaptation and/or mitigation benefits that have human development and biodiversity co-benefits managing anticipated climate risks to nature that can undermine their long-term effectiveness (WWF 2020a).

One Health: a collaborative, multisectoral, and transdisciplinary approach - working at the local, regional, national, and global levels - to achieve optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment. [1]

Response options: policy measures aimed at addressing one or more of the goals in the triple challenge.

Synergy: response options that are able to deliver benefits towards two or more goals of the triple challenge with no or minor trade-offs.

Trade-off: choices over the use or management of land, water, or marine resources, that increase the delivery of one (or more) ecosystem service(s) at the expense of the delivery of other ecosystem services (adapted from Turkelboom et al 2018). In the context of this report, these are ecosystem services towards food, climate and biodiversity goals.

The triple challenge: the challenge of simultaneously avoiding dangerous climate change, halting and reversing dramatic biodiversity loss, and meeting the food and other needs of a growing global human population within the first half of this century.

1 https://www.cdc.gov/onehealth/basics/index.html#:~:text=One%20Health%20is%20a%20collaborative,Read%20More accessed 25/9/20

EXECUTIVE SUMMARY

Humankind faces a triple challenge over the next 30 years: meeting the dietary and other needs of a growing population, while staying on track to keeping global warming below 1.5°C and reversing biodiversity loss.

We have more pooled knowledge than ever before on biodiversity loss, climate change and our failing food system. It is clear that failing to address climate change and biodiversity loss will jeopardise our future wellbeing and prosperity, including our food security. At the same time the food system is itself one of the major drivers of climate change and biodiversity loss, and yet a huge amount of food is wasted and a large proportion of our population is malnourished. We are not on course to deliver on the triple challenge, but we know what we need to do to turn this around.

An integrated approach to these goals is needed to meet the triple challenge globally, because the three goals are deeply interdependent. The Sustainable Development Goals provide a compass and an example of an integrated framework, but delivery is falling short of the targets set in 2015 and the triple challenge requires us to look beyond their deadline of 2030.

In 2021, UN summits on biodiversity, climate change and the food system provide an unprecedented opportunity to make good on commitments, to raise ambition and to take an integrated approach to the triple challenge. This is particularly relevant while we rebuild our economies and societies in the wake of the Covid-19 pandemic and seek to build resilience.

There are many synergies to be found in response options, but there are also likely to be trade-offs at national or local levels in this global effort - i.e. progress on one goal may undermine others depending on the responses prioritised because they each require land, freshwater and marine resources. There will need to be global and local solutions that ensure the voices of those most affected - very often those living in poverty or in minority groups - are heard and their priority needs met. The benefits and costs of the required transition must be fairly shared across the global population including through appropriate trade, finance, aid and economic policy frameworks. This includes support for a just transition.

There are a small number of well-evidenced responses that are particularly important to delivery of the triple challenge and have the potential to reduce competition for resources between the three goals.

These represent the priority actions to be included in an integrated response from governments and businesses globally:

1. Rapid and deep cuts to fossil fuels use.
2. Global action towards sustainable and healthy diet choices.
3. Cut food loss and waste.
4. Increase food productivity through nature positive approaches.
5. Improve governance, planning and use of landscapes, basins and seascapes and their natural resources as part of an ecosystem approach, including restoration of degraded ecosystems.
6. Equitably increase the extent and management effectiveness of protected areas and other effective area-based conservation measures to at least 30% of the world's surface, including full recognition of indigenous rights and fulfillment of human rights.

To identify, understand and manage potential trade-offs between these three goals at local and national levels, three approaches are recommended:

- Integrated policy at international, national and sub-national levels on biodiversity, climate change and food, starting with joined up national submissions for the three global summits in 2021.
- Launching 'triple challenge dialogues' with non-state actors to identify and understand trade-offs and develop appropriate responses.
- Further integrated research across the three goals, research on effective ways to deliver the six priorities set out above, and development of politically relevant tools to support the dialogues and to enable policy-makers to better identify and compare response packages.

Meeting the triple challenge means delivering a positive future where we all live in a healthy society, with a stable climate and surrounded by thriving nature. It is a future where we are all included in the major decisions of our governments on food, climate change and biodiversity and, therefore, our prosperity. Policy makers, the research community, and wider civil society, including citizens, all have responsibilities in finding a route through to this future.

1. INTRODUCTION: THE TRIPLE CHALLENGE

1M

SPECIES ARE THREATENED WITH EXTINCTION GLOBALLY - A RATE UNPRECEDENTED IN HUMAN HISTORY

Simultaneously avoiding dangerous climate change, halting and reversing dramatic biodiversity loss and meeting the needs of a growing global human population are three interlinked and critical goals we must achieve within this half-century.

Climate change is a global emergency, with the current ~1°C of global warming already negatively affecting people and nature all around the world, and with climate risks increasing with rising global temperatures (IPCC, 2018; IPCC 2019a,b). These climate impacts and risks are driven by human activity - primarily the burning of coal, oil and gas for energy and mass destruction of natural habitats for food production (IPCC, 2018; IPCC 2019a).

At the same time, we are at the start of the sixth mass extinction in our planet's history. Population sizes of vertebrates decreased, on average, by 68% globally between 1970 and 2016, and one million species are threatened with extinction globally – a rate unprecedented in human history (IPBES 2019; WWF 2020). This loss of nature is a result of human activity with much of the terrestrial and freshwater habitat loss and degradation associated with food production (IPBES 2019; IPCC 2019a). This loss of biodiversity constitutes a direct threat to human well-being in all regions of the world (IPBES 2019). The continued loss of biodiversity and just some of its services on a business-as-usual scenario leads to a total cumulative economic loss of nearly $10 trillion by 2050 and price hikes for commodities including oil seeds and fruit and vegetables (Roxburgh et al 2020). In the ocean, over-exploitation coupled with increased acidification and a reduced ability to hold oxygen - linked to elevated atmospheric CO2 levels and warmer waters - are disrupting the functioning of key ecosystems (IPCC 2019b). Such changes in the oceans were also thought to have accompanied past major extinction events in Earth's history (Barnosky et al 2011; Bartlett et al 2018; Henehan et al 2019).

OVER 1/3 OF ADULTS WORLDWIDE ARE OVERWEIGHT OR OBESE, 1/9 ARE UNDERNOURISHED AND 1/3 OF THE FOOD WE PRODUCE IS LOST OR WASTED.

The needs and aspirations of our growing global population are many and varied. While recognising that the needs of those suffering hunger or extreme poverty stretch beyond securing good nutrition and food security, we focus here on the food sector. This is because it is the major economic sector driving the use and conversion of land, the single biggest consumptive water user, a major source of pollution (including, but not limited to, greenhouse gases) and, through fisheries and aquaculture, has significant impacts on ocean and freshwater habitats. Globally, the way we currently produce and consume food is resource-intensive and is associated with significant negative impacts on public health. While over one third of adults worldwide are overweight or obese,[2] 1 in 9 are undernourished (FAO 2018) and a third of the food we produce is lost or wasted.[3] We already produce enough food to feed 10 billion people, but this food is not accessible and available to those experiencing hunger or malnutrition, often due to poverty and inequalities (Holt-Gimenez et al 2012).

Human impact on the planet is a function both of the number of individuals and, especially, their patterns of consumption. The global population growth rate is slowing as, generally, people are having fewer children; a trend that is partially offset by significantly increased life expectancies. Current estimates suggest the global population will grow from 7.8 billion today to reach between 9.4 and 10.1 billion in 2050 before slowly leveling out by the end of the century at around 11 billion (UN DESA 2019). The general decline in birth rates is linked to the provision of education and access to reproductive health rights for women and girls, and can be maintained through delivery of the Sustainable Development Goals (SDGs) (Vollset et al 2020). Supporting the on-going realisation of all rights enshrined in the SDGs should be a priority for all nations.

THE RICHEST 10% OF THE WORLD'S POPULATION WERE RESPONSIBLE FOR 52% OF THE CUMULATIVE CARBON EMISSIONS IN THE PERIOD 1990-2015

Importantly, it is the number of high consuming individuals on the planet rather than the size of the human population that is driving the unsustainable impacts on natural systems. By some estimates, over half the human population can already be considered middle class and a further 1.3 billion people will be added to their ranks by 2030,[4] leading to more resource-intensive lifestyles. Moreover, those parts of the world where population is set to grow most, notably in Africa, is also where per capita environmental impacts are relatively low. It must also be recognised that a large proportion of the global population will need to increase their consumption in order to achieve an adequate standard of living. For others, a more sustainable level of consumption is needed. A recent review shows the richest 10% of the world's population were responsible for 52% of the cumulative carbon emissions in the period 1990–2015 (Oxfam 2020). This places an imperative on the pursuit of sustainable consumption, including food and energy use.

Exemplifying our imbalanced relationship with nature, there is growing evidence that the way we manage ecosystems and use wild animals increases the risk of spillover of infectious diseases from animals to humans. Over half of emerging infectious diseases that impact humans originate in animals, with over 70% of those from wildlife; exacerbating factors include deforestation and environmental degradation linked to the food system (Jones et al 2008; Jones et al 2013; WWF 2020). Covid-19 and the need to rebuild society and economies is the near term crisis in which the reform of food systems, the reversal of biodiversity losses, and the pursuit of greenhouse gas neutrality will play out.

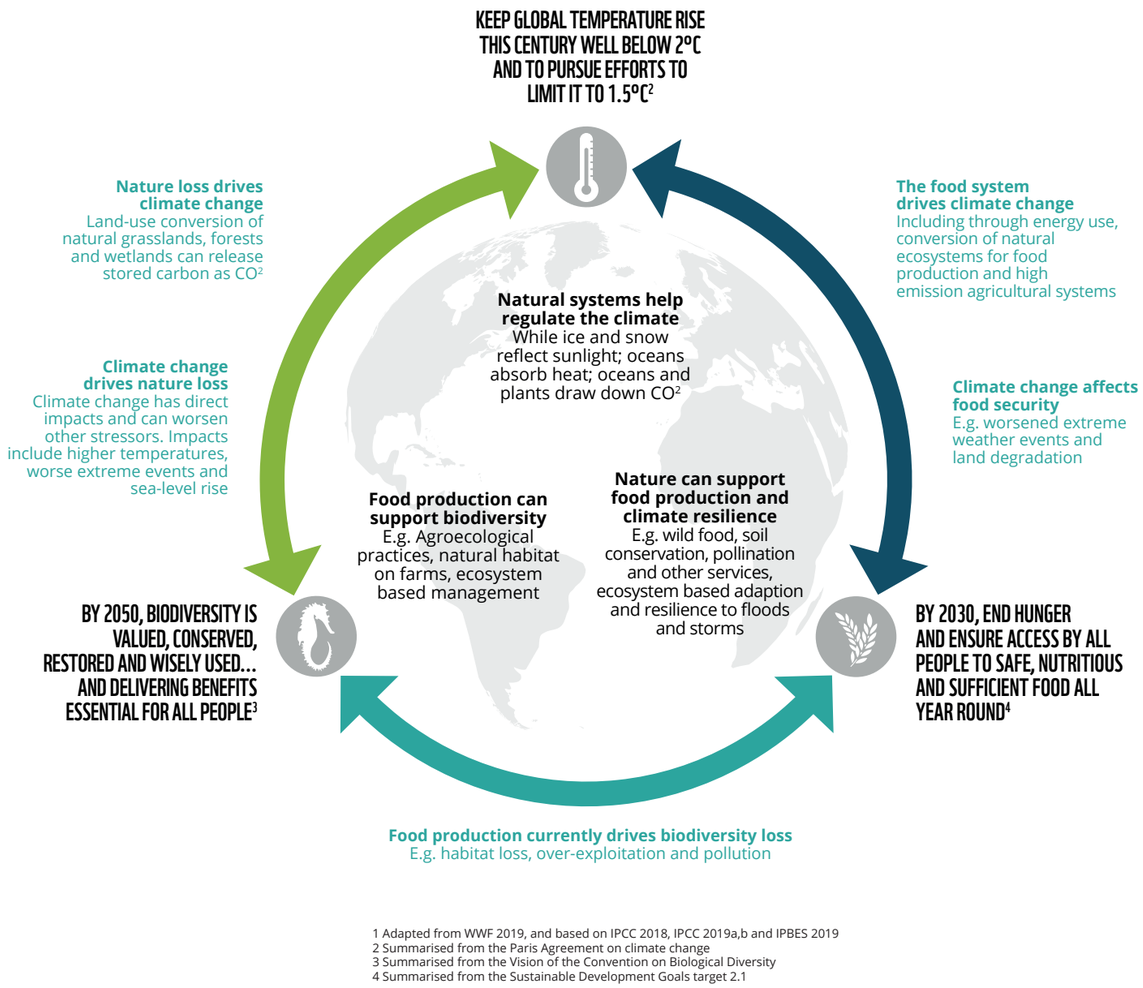
It is clear that continuing on a business-as-usual path is not an option. Even individually, climate change, biodiversity loss, and food security pose tremendous challenges for the global community, but together they form a triple challenge that must be addressed together (Figure 1). Despite the impression given by the threats and challenges set out in this section, the triple challenge is a positive agenda about pursuing a future where we live in a healthy society, with a stable climate and surrounded by thriving nature.

It is possible to meet the triple challenge and deliver on all three goals through international cooperation and a coherent, integrated response (Heck et al 2018; FOLU, 2019; Leclere 2020). A coherent response to the triple challenge would be achieved when governance systems at local, national and global levels align their policy goals to jointly address this cross-cutting problem, which they would do through searching for synergies, mitigating externalities and working towards a system-wide integrated policy strategy (Rayner and Howlett 2009, in Candel and Biesbroek 2016).

Given this knowledge, in this report we draw on existing literature to identify a small number of priority responses (the global synergies), are explicit on the risk of trade-offs between the three goals (externalities), set out how more integrated policy on food, climate and biodiversity can be achieved, the role of dialogues with non-state actors in identifying and navigating trade-offs and how researchers can best support integrated responses and those dialogues. In addition, through three case studies we explore the triple challenge at a national or landscape level and also illustrate how WWF and partners are putting these ideas into practice. Others have also highlighted this three dimensional problem (e.g. FOLU 2019, Bond DEG 2020, WWF 2019, WWF 2018), and this report builds on that earlier work.

2 https://www.who.int/gho/ncd/risk_factors/overweight/en/ accessed 11/5/2020
3 http://www.fao.org/food-loss-and-food-waste/en/ accessed 11/5/2020
4 https://www.brookings.edu/blog/future-development/2018/09/27/a-global-tipping-point-half-the-world-is-now-middle-class-or-wealthier/ accessed 11/5/20

FIGURE 1:
THE TRIPLE CHALLENGE: THREE GOALS, ONE PLANET



1 Adapted from WWF 2019, and based on IPCC 2018, IPCC 2019a,b and IPBES 2019
2 Summarised from the Paris Agreement on climate change
3 Summarised from the Vision of the Convention on Biological Diversity
4 Summarised from the Sustainable Development Goals target 2.1

CASE STUDY:
TRIPLE CHALLENGE AND ONE HEALTH IN THE GREATER VIRUNGA LANDSCAPE

Cath Lawson (WWF-UK)

Resting along the shared boundaries of the Democratic Republic of Congo (DRC), Rwanda, and Uganda, the Greater Virunga Landscape (GVL) is an interconnected set of protected areas in a region that contains more terrestrial vertebrate species and more endemic vertebrate species than any other site in mainland Africa (Plumptre et al 2007).

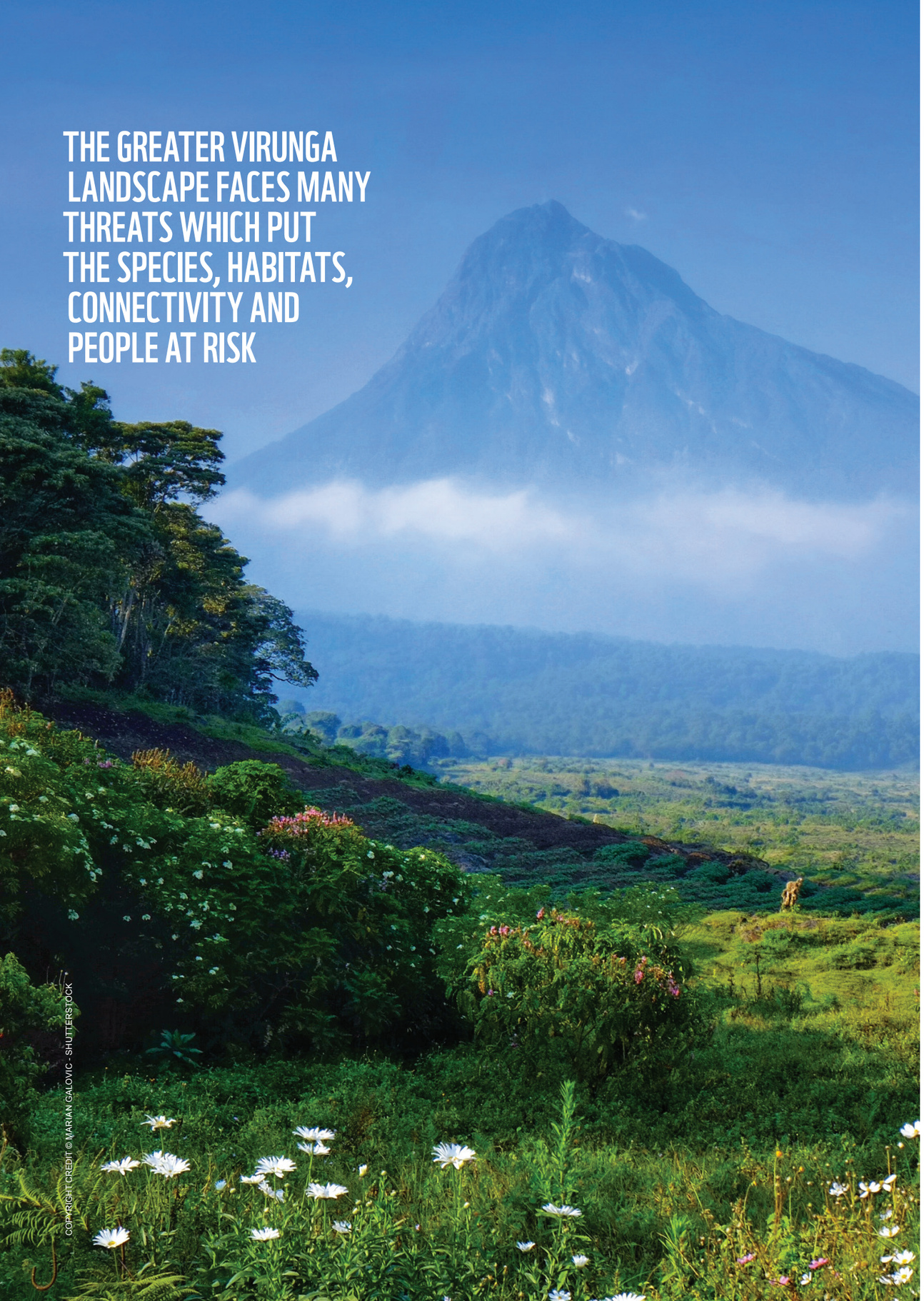
The GVL is also home to a large and growing human population, some of the world's highest densities of rural populations (GVTC 2015), characterised by high poverty levels. GVL's rich natural capital is crucial for these communities, and also contributes significantly to sustainable national and regional economic growth. Forest products and other natural resources are a key income source, supplemented by income from small-scale agriculture and fisheries and increasingly tourism. The GVL's forested and mountainous nature makes it a transboundary water tower for the entire region, providing millions of people with fresh water for drinking and farming as well as being the highest and most permanent source of the River Nile (UWA 2015). Lake George and Lake Edward within GVL are two of Africa's most productive lakes.

Despite its importance, the GVL faces many threats which put the species, habitats, connectivity and people of the GVL at risk. This includes the pressure for additional agricultural land and freshwater resources from the growing rural population in need of income and food, the impact of armed conflict in Eastern DRC, unsustainable poaching and illegal trade in timber and wildlife products, and the pressure from extractive industries and infrastructure development. The biogeography of the GVL also renders it, and the people living within it, highly vulnerable to the impacts of climate change. Climate change impacts are already being seen, including changing species movement, increasing rainfall as predicted by climate models, increasing temperatures and increasing fire frequency (Plumptre et al 2007a). At the same time, the transmission of disease poses grave threats to the health of both wildlife and humans in the GVL. Zoonotic spill-over events of emerging infectious diseases are common in the landscape, including diseases with high human mortality rates such as Ebola (Jones et al. 2008).

Both government agencies and NGOs have been active in conservation and livelihood initiatives in the GVL over several decades, both within and outside the Protected Areas. This effort has achieved some significant successes, including the widely celebrated increase in mountain gorilla numbers (Hickey et al. 2019) . However, as pressures associated with the triple challenge continue to increase and zoonotic spill-over events, like the Covid-19 pandemic, increase in frequency there is a need to develop new, alternative, bold and innovative approaches.

Given the close interaction between human, animal, and environmental factors in the GVL and the dynamics of disease risk, interdisciplinary 'One Health' approaches that promote collaborative, multisectoral, and interdisciplinary ways of working are particularly relevant (Sikakulya et al 2020). The animal-human-ecosystems interface within the GVL provides a unique opportunity for integration of this approach, alongside and complementary to efforts to address the triple challenge, for the collective benefit of the landscape community and the global community.

Building on the successes that have been achieved and working in close collaboration with governments and local communities, WWF is working to establish a coalition of interdisciplinary NGOs working in the GVL. It is intended that this coalition will align to co-develop an overarching, people-centred GVL strategy and shared vision for conservation and sustainable development that strengthens existing mechanisms for strategic, transboundary and collaborative management through government and non-government and private partnerships. The interdisciplinary nature of this coalition, and genuine commitment to co-development and inclusivity, is critical in addressing the triple challenge, integrating the One Health approach and ultimately enabling impact within the GVL at a much bigger scale and more systemic level.



2. SYNERGIES AND TRADE-OFFS

Through international agreements, including the SDGs and UN conventions on climate and biodiversity, there is broad consensus on what we need to achieve (see Figure 1). Each of the three goals in the triple challenge has multiple potential pathways to achieve them which may have positive impact (synergy), negative impact (trade-off), or no impact on the achievement of one or both of the other two goals. For example, the range of IPCC scenarios demonstrate that we can limit warming (the climate goal) a number of ways; if we choose to reduce GHG emissions less rapidly we must rely more on carbon dioxide removal strategies such as bioenergy with carbon capture and storage, the expansion of forests and ocean fertilisation, all of which carry risks for biodiversity and affect land, water and sea use for food production (IPCC 2019a). On the other hand, if hydropower is adopted at scale to accelerate the transition to a lower-carbon energy supply, as it is in some places, this has profound implications for freshwater habitat connectivity and biodiversity with knock-on impacts on freshwater fisheries and food supply. The challenges for state and non-state actors therefore are to identify and prioritise synergistic response measures that help us meet the triple challenge, while also understanding and navigate trade-offs that might lead to unintended perverse outcomes.

2.1 PRIORITY POLICY RESPONSES

Given the negative consequences for human well-being and prosperity of climate change, biodiversity loss and the way our food system currently operates, it must be a policy priority to identify and implement responses that contribute to all three goals of the triple challenge. Moreover, given the risk of resource conflict between response options, priority responses should also have the potential to reduce competition for land, water and marine resources. Four global assessments published in 2019 provide us with more pooled knowledge than ever before on each goal and to some extent their interactions: the IPBES Global Assessment on Biodiversity and Ecosystems Services, the IPCC Special Reports on climate change and land, and on the oceans and cryosphere in a changing climate, and the EAT Lancet commission on Food, Planet, Health. From the response options highlighted in these global assessments and other research (Gardiner and Gulati 2017; FOLU 2019; Leclere et al 2020) we identify a small number of actions that can contribute to meeting all three goals of the triple challenge while reducing competition between them (responses 1-5 below and Figure 2).

However, these alone will not reverse biodiversity losses and integrating approaches on food and agriculture with additional conservation measures is necessary to do so (Leclère 2020.) We, therefore, highlight a sixth priority action for additional conservation measures. These conservation measures also represent nature-based solutions to climate change and will help to reduce atmospheric carbon dioxide levels by avoiding the conversion of natural ecosystems to other land uses, and aiding their restoration (Griscom et al 2017). They should be implemented in conjunction with indigenous peoples and local communities and with full recognition of their rights. However, this final priority action is distinct from the first five actions in that without transformations of the food system, the measures proposed could conflict with the future provision of food (Leclere et al 2020). Nonetheless, it is the integration of all six measures together that will make them effective and form a coherent global response strategy.

RAPID AND DEEP CUTS TO FOSSIL FUELS USE

To avoid dangerous climate change and minimise the need for carbon dioxide removal approaches that would affect land, water and ocean resources, all sources of emissions must be reduced early, fast and significantly. The burning of fossil fuels remains the largest contributor to anthropogenic greenhouse gas emissions. There is an additional and significant role for nature-based solutions such as avoided deforestation and 'blue carbon' approaches, which can in part be delivered through action 6 below, enabled by actions 2, 3 and 4.

GLOBAL ACTION TOWARDS SUSTAINABLE AND HEALTHY DIET CHOICES

This is essential to support a healthy population while minimising the amount of crop and pasture land and water use needed globally and supporting sustainable harvesting of seas, lakes and rivers.

CUT FOOD LOSS AND WASTE

To feed our global population while minimising the pressure for more agricultural land and water use, and harvesting of marine resources, we need to better use the food already available.

INCREASE FOOD PRODUCTIVITY THROUGH NATURE POSITIVE APPROACHES

To produce enough of the right food, in the right place, at the right time, while enabling the expansion of terrestrial, freshwater and marine habitat conservation and restoration measures (for carbon and biodiversity goals), we need to use fewer or better targeted inputs and with less impact. Nature-positive approaches can raise overall productivity globally, and reduce the yield gap, but have different benefits and disbenefits depending on the scale of analysis. This emphasises the need for locally appropriate approaches within a suite of options that boost nature and reduce externalities. Approaches include agroecological practices, regenerative agriculture, organic agriculture, agroforestry, irrigation management, sustainable harvesting of freshwater and marine living resources and an ecosystem approach to their management.

IMPROVE GOVERNANCE, PLANNING AND USE OF LANDSCAPES, BASINS AND SEASCAPES AND THEIR NATURAL RESOURCES AS PART OF AN ECOSYSTEM APPROACH, INCLUDING RESTORATION OF DEGRADED ECOSYSTEMS

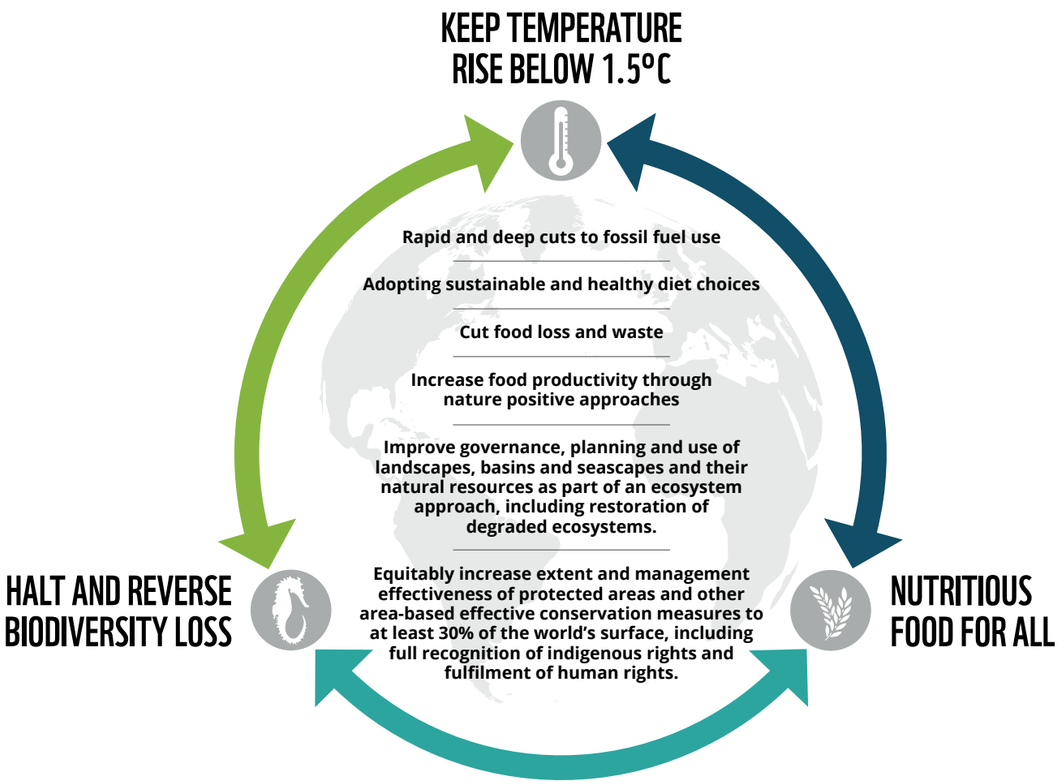
This includes using extensive, proactive and participatory landscape/catchment/seascape-scale spatial planning to prioritize resource uses and balance productive use, climate adaptation and mitigation, biodiversity conservation. It incorporates water allocation planning and management that respects environmental flow regimes and safeguards river connectivity. It also facilitates action to reduce agricultural pollution loads (nitrogen, phosphorous and sediment) to rivers, lakes, estuaries and coastal zones. Ecosystem-based management is a holistic approach that recognizes all the interactions within an ecosystem rather than considering a single species or issue in isolation. This action also includes delivering on the Bonn Challenge and going further.

EQUITABLY INCREASE THE EXTENT AND MANAGEMENT EFFECTIVENESS OF PROTECTED AREAS AND OTHER EFFECTIVE AREA-BASED CONSERVATION MEASURES TO AT LEAST 30% OF THE WORLD'S SURFACE, INCLUDING FULL RECOGNITION OF INDIGENOUS RIGHTS AND FULFILLMENT OF HUMAN RIGHTS

This includes protected, indigenous and community conserved areas, and where Free Prior and Informed Consent has been secured in a full and respectful process. For new protected areas, synergies can be found by considering ecosystems that have highest value in terms of biodiversity and carbon and the rights to the lands and waters that are traditionally and collectively governed by Indigenous Peoples and local communities for the conservation and the sustainable use of biodiversity.

Success in meeting the triple challenge will depend on delivery of these responses and more. In particular, the economic costs of climate change and biodiversity loss, including to the food sector, highlight the importance of incorporating the value of biodiversity and the ecosystem services it provides into national growth, development and land-use planning processes - as part of a wider policy integration approach discussed below. National and international economic policy will also be critical to ensure that the benefits and costs of the required transition are fairly shared across global and national populations, including through appropriate trade, finance, aid policy frameworks (see Box 2: A Just Transition).

FIGURE 2:
PRIORITY RESPONSES THAT DELIVER ON THE TRIPLE CHALLENGE AND REDUCE COMPETITION FOR LAND, WATER AND MARINE RESOURCES



BOX 1

NATURE-BASED SOLUTIONS AND THE TRIPLE CHALLENGE

The concept of nature-based solutions has gained momentum in several international fora, including the UN Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the Sendai Framework for Disaster Risk Reduction, the World Economic Forum, and the UN General Assembly, among others (WWF 2020b).

The IUCN defines nature-based solutions as 'actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits' (Cohen-Shacham et al 2016). While nature-based solutions can be deployed to address a number of societal challenges from mental health to flood management, they have, perhaps most significantly, emerged as essential tools to both adapt to and mitigate climate change. Examples include the protection of ecosystems like mangroves, better management of ecosystems like wetlands and grasslands, restoration of habitats like sea grasses and peatlands, and the creation of carbon dense ecosystems like forests.

Multiple studies have highlighted the huge and still untapped potential of nature-based solutions for climate change. It is estimated that nature-based solutions on land and in wetlands could deliver around one third of the cost-effective climate mitigation needed by 2030 (Grisom et al 2017). In addition, mangroves, saltmarshes and sediments are considered to have an enormous potential to store greenhouse gases for long periods of time potentially up to millennial time scales (Laffoley and Grimsditch 2009). Yet only around one quarter of NDCs nclude quantified actions on nature-based solutions,[5] and the share of climate finance directed to nature-based solutions is around 8%.[6]

By the nature of their very definition, nature-based solutions intend to provide actions that can deliver for multiple goals: climate change, biodiversity and societal needs like health and wellbeing. They present, therefore, a suite of effective response options to the triple challenge. Before and after the international policy milestones in 2021, national governments and their multilateral agreements should greatly increase support for and action on nature-based solutions, including for example in their national strategies and the share of public finance in support.

However, there are challenges to overcome to deliver nature-based solutions at scale and they are not necessarily free of trade-offs, so it is very important these are considered as part of an inclusive, locally appropriate strategy (WWF 2020b). For example, in recent years there has been a significant growth in interest in large-scale afforestation, with some estimates placing the biophysical potential for global tree cover to expand by nearly 1 billion hectares (Bastin et al 2019). Others have highlighted that although forest landscape restoration has the potential to deliver multiple benefits locally and globally, the real potential for global tree cover expansion is much lower than 1 billion hectares when considering local socioeconomic needs and interests. Moreover, maximising the climate change mitigation potential on land does involve reducing grazing lands (for expansion of forests), agricultural productivity improvements and diet change (Griscom et al 2017). To use another example, protecting and restoring coastal and marine carbon stores has implications for port development, and therefore trade in food. This again highlights the need for an integrated approach and the importance of local dialogues (see below for more.) Specifically it also identifies the importance of nature-based solutions being applied in tandem with measures that relieve pressures for land, water and marine resources as set out above.

MULTIPLE STUDIES HAVE HIGHLIGHTED THE HUGE AND STILL UNTAPPED POTENTIAL OF NATURE-BASED SOLUTIONS FOR CLIMATE CHANGE

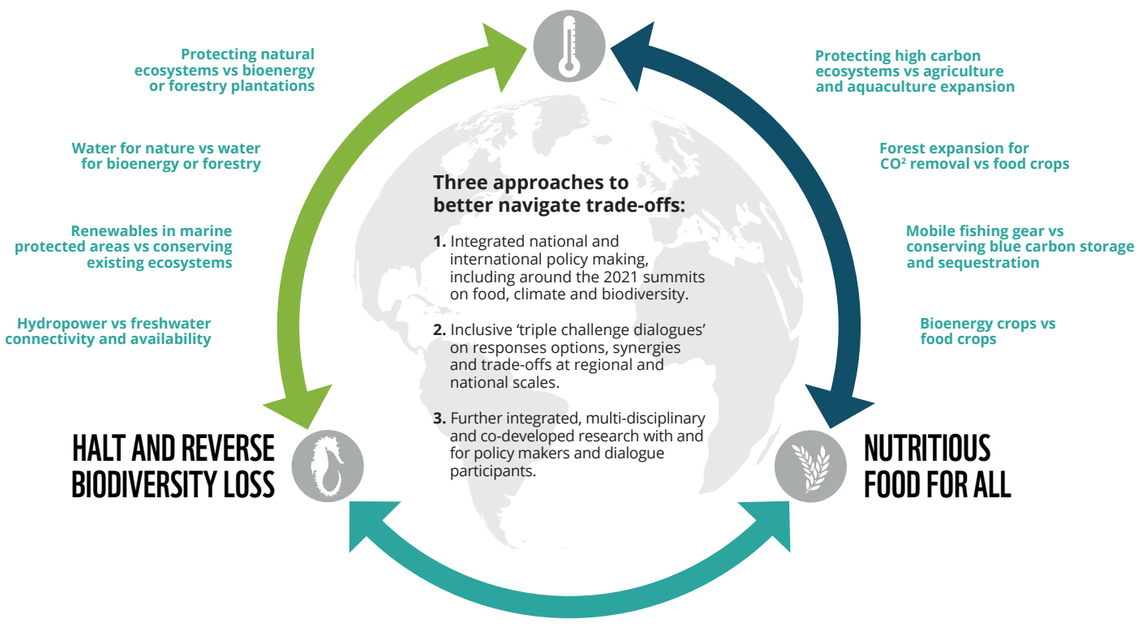
5 https://www.undp.org/content/dam/LECB/docs/pubs-tools-facts/undp-ndcsp-pathway-for-increasing-nbs-in-ndcs-final.pdf accessed 11/5/2020
6 https://nature4climate.org/about/ accessed 27/9/20

2.2 NAVIGATING TRADE-OFFS

Although it has been shown that at a global level meeting the triple challenge is achievable, insufficient national ambition and action on this triple challenge is making it harder to achieve our stated goals without having to manage significant trade-offs (IPCC 2018; IPBES 2019; CBD secretariat 2020). For example, by 'locking in' major infrastructure incompatible with the triple challenge, or increasing the scale at which carbon dioxide removal strategies or habitat restoration will be needed. Within the global picture there are also different pathways at national and sub-national level that will require consideration of trade-offs and economic and social transitions. And even the best available integrated analysis of food, climate and/or biodiversity pathways are not truly holistic and in some cases do not take into account the opportunities and impacts for freshwater and marine resource use (e.g. Leclere 2020).

Therefore, while increasing global ambition and promoting synergies must be our top priority, we should also prepare to manage trade-offs between food production, climate change mitigation and biodiversity conservation.

FIGURE 3:
TRADE-OFFS BETWEEN POSSIBLE RESPONSES TO EACH PILLAR OF THE TRIPLE CHALLENGE, AND APPROACHES TO MANAGE THESE TRADE-OFFS



There is a clear need for careful policy choices, informed by more detailed understanding of potential trade-offs at appropriate scales, and adoption of a dynamic and adaptable approach to respond to new evidence in years to come. Figure 3 identifies some of the remaining trade-offs that may arise at different geographic scales. Exercises of the imagination have also suggested that a focus on one of the goals of the triple challenges to the detriment of others might affect our lifestyles in more personal ways too, including the quality of our morning cup of coffee, our holidays and travel, and our connection to wildlife and nature (Wyborn et al 2020).

We propose three approaches to help navigate these trade-offs and support the identification of optimal pathways. We adopt a definition of trade-offs in this context as 'land-use [or water use, or sea use] or management choices that increase the delivery of one (or more) ecosystem service(s) at the expense of the delivery of other ecosystem services' (in Turkelboom et al 2018; derived from TEEB, 2010, UKNEA, 2011, Felipe-Lucia et al, 2015). Although these three approaches broadly propose actions for policy makers, then non-state actors and then researchers, it is important to note the fact that they should run together and we intend for different sectors to be integrated into each: these are not siloed approaches.

2.2.1 INTEGRATED POLICY MAKING ON FOOD, BIODIVERSITY AND CLIMATE CHANGE

In 2021, three major UN conferences will be held on biodiversity (Convention on Biological Diversity COP 15), climate change (UN Framework Convention on Climate Change COP 26) and food (Food Systems Summit). As part of those international processes, governments are asked to communicate their national response, through National Biodiversity Strategies and Action Plans (NBSAPs) for biodiversity, Nationally Determined Contributions (NDCs) and long-term strategies under the Paris Agreement for climate change, and a 'voluntary declaration' in the case of the food summit. In 2021, there will also be a UN summit on oceans and a Conference of the Parties to the UN Convention to Combat Desertification. Also relevant are the three UN decades we are embarking on: the decade on family farming (2019-2028), the decade of action on the SDGs (2020-2030) and the decade on ecosystem restoration (2021-2030). Combined, these offer an unprecedented opportunity to create an integrated policy framework in response to the triple challenge.

Policy integration is an often called-for response, particularly in the context of sustainable development, and can be open to interpretation so we explore here what would be meant by an integrated policy approach to the triple challenge. We define integrated policy as: 'constituent [policy] elements [that] are brought together and made subject to a single, unifying conception' (Candel and Biesbroek 2016). Other terms, often political in origin, have been used to describe policy integration, including 'holistic government', 'joined up government', 'whole-of-government' and the 'mainstreaming' of an issue (Tosun et al 2017). And the 'nexus' approach promoted by the World Economic Forum and others explored greater coordination among different policy domains, including climate change, energy, food and agriculture, and water (e.g. World Economic Forum, 2011).

What are the challenges to achieving policy integration?

Policy integration is not easy to achieve. In fact, albeit with some success stories, in general national governments have a poor track record at successfully integrating policy domains (Jordan and Lenschow 2010; May, Jochim and Sapotichne 2011). Perhaps the greatest example of integrated international policy is the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. However, 21 of the 169 targets in those goals expire in 2020, and none will be met (Bond DEG 2020). The extent to which the SDGs have fully integrated ecosystem and biodiversity concerns has also been questioned (Zeng et al, 2020; Dickens et al, 2020).

There are numerous barriers to achieving policy integration, including: i) the vested interests, political power and policy preferences of the relevant actors, ii) demonstration of public support, iii) extent to which international institutions support integration, iv) the framing of the policy problem (i.e. whether a cross-cutting problem is recognised as such by the policy makers), v) having a minimum level of human and institutional capacity, vi) the absence of centralised agencies and centralised leadership, vii) lack of incentives to attain integration, viii) 'lock in' effects from pre-existing policies, ix) existence of dominant policy domains within institutions, x) the need for and difficulty in changing or aligning policy beliefs of actors involved, and xi) lack of political will to genuinely move beyond symbolic action (Candel and Biesbroek 2016; Tosun et al 2017).

Very often, effective policy integration faces the challenge of 'layered' pre-existing policies that have built up over time in the given policy domain(s), a response to which is the development of 'new governance arrangements' (NGAs) specifically intended to overcome shortcomings of more ad-hoc policy frameworks (Howlett and Rayner 2007). NGAs involve a radical rethink of existing mixes of policy instruments leading to a redesign based on a new objective(s) and in pursuit of an optimal mix of policy instruments to support rather than undermine one another. NGAs have been developed in policy areas ranging from health, national forest programmes, integrated coastal zone and water management among others (Howlett and Rayner 2017).

The level of rethink that may be required in many jurisdictions to effectively deliver on the triple challenge is equivalent to an NGA, given that food and agriculture, climate change and biodiversity, and the environment more broadly, are longstanding and complex policy areas and likely have a deep layering of existing instruments. The UK is one jurisdiction arguably undergoing such a process as a result of its exit from the European Union, including its Common Agricultural Policy, and the subsequent reform of farming subsidies to target 'public money for public goods' (see case study below for more). Taking such an approach raises implementation challenges, including transitioning actors off subsidies, re-regulating some social and economic activities, and opposition from actors benefitting from the status quo (Howlett and Rayner 2017). Given this, there will need to be local and global solutions that ensure that the benefits and costs of the required transition are fairly shared across the global population including appropriate trade, finance, aid and economic policy frameworks, and widespread consultation of different stakeholder groups to ensure all values and perspectives are incorporated into decisions (see Box 2: A Just Transition).

CASE STUDY:

THE TRIPLE CHALLENGE POLICY OPPORTUNITY IN THE UK

Shirley Matheson and Lucy Young (WWF-UK)

Multiple legislative developments currently underway in the United Kingdom will shape food, climate and nature policy for decades to come. They provide an unprecedented opportunity to develop an integrated approach to the triple challenge.

The UK is one of the world's most nature depleted countries, natural ecosystems are increasingly fragmented and many species and habitats are in continued decline (WWF 2018; Hayhow et al 2019). The government's 25 year environment plan launched in 2018, stated its intention to create "a growing and resilient network of land, water and sea that is richer in plants and wildlife" and committed to creating or restoring 500,000ha of wildlife rich habitat and taking action to reverse species declines (Defra 2018). The plan also recognised the need to reduce the UK's global footprint, so actions taken in the UK should not lead to unintended consequences in other countries.

Agriculture currently makes up 75% of the UK's land use (Development Economics 2017). The UK will leave the Common Agriculture Policy when it exits the EU, providing a huge catalyst for change. The Environmental Land Management Scheme is the government's current proposal to fill this policy gap. This will put into practice the idea of 'public money for public goods' (i.e rewarding farmers for adopting initiatives such as improved air, water and soil quality, increased biodiversity, climate mitigation, better protection of natural and cultural heritage, and so on) in the agriculture sector. The government is also developing a new Food Strategy to recommend actions on health, sovereignty and environmental standards.

In 2018, the UK legislated a target to achieve net zero greenhouse gas emissions by 2050 across the whole economy. The National Farmers Union representing farmers and growers in England and Wales swiftly supplemented this with a commitment to achieve net zero GHG by 2040 in the land sector. UK land use – including agriculture, forestry and peatland - accounts for 12% of total UK greenhouse gas emissions (Committee on Climate Change, 2020). To achieve the necessary shift in carbon emissions in this sector, the Committee on Climate Change (CCC), an independent statutory body established under the UK Climate Change Act, has called for a broad range of actions including low carbon farming practices, dietary changes, agroforestry, and restoration of key habitats. In doing so, the CCC recognises the importance of "maintaining other essential functions of land, including food production" (Committee on Climate Change, 2020).

Adding to this complexity is the impact of the UK's trade relationships. The UK imports about half of its food and livestock feed (European Union Committee 2018). Between 1986 and 2009, the amount of land used to grow the country's food increased by 23%, with 70% of it located overseas (Lang 2020). Moreover, 46% of the UK's carbon footprint comes from emissions released overseas in the production of goods for UK consumption, also reflecting a growing share of emissions relating to goods and services imported from overseas since 1990 (WWF, 2020c). And due to the country's exit from the EU, the UK is negotiating new trade deals that could significantly affect the footprint of the country's consumption at home and abroad.

All these changes are occurring in the context of the Covid-19 pandemic, which has put a spotlight on the overall resilience of the UK's food supply chains and led to a UK economic recovery plan aiming, among other things, to 'build back greener' by supporting green technologies and large scale afforestation.[7]

By following the guidance in this report and elsewhere, the UK government has an opportunity to create a body of new policies and incentives that could form an integrated and coherent package in response to the triple challenge. To increase the chance of this success, with others, WWF is embarking on a programme of work including new spatial analysis, scenario building with stakeholders, developing policy options and working with corporate partners in the food sector to link up on-farm practices to landscape opportunities for biodiversity and climate change benefits.

7 https://www.gov.uk/government/news/pm-a-new-deal-for-britain viewed on 15/10/20

How can it be delivered?

There have been limited attempts to empirically assess the real-world outcomes from achieving more integrated policy strategies (Tosun et al 2017; Jordan and Lenschow 2010). This is in part due the challenges of measuring this impact. However, for the clear reasons set out in the introduction above, pursuing appropriate levels of integration on food, climate change and biodiversity policy is nonetheless necessary for success and therefore our future prosperity. So it will be important to use what lessons do exist in research literature to guide the design of integrated policy.

An effective process of integration would begin with a statement from central government leadership (e.g. head of government or Cabinet) that identifies the need and objectives of the integrated policy - the role of visible leadership from political figures is very important (Jordan and Lenschow 2010; Tosun et al 2017; Howlett and Rayner 2017). Many researchers cite the framing of the policy domain as an important factor for integration, and the need for re-framing of policies to generate common understanding of the causes and solutions for policy problems (Peters 2015 in Tosun 2017) - which is one of the intentions of this report. In turn, this is more likely to be successful if there are institutions that facilitate the integration process, such as relevant parliamentary committees or executive agencies (Tosun et al 2017). Critically, these steps must be followed through to genuine reform of relevant policy instruments, rather than adapting existing instruments or modifying goals in light of existing instruments (Howlett and Rayner 2017). For a summary of further routes to integration and tools or instruments that can enable this, see Table 1. And for comprehensive advice and guidance on policy coherence for sustainable development, with a specific focus on green growth and food security, see OECD (2016) and its online toolkit which includes case studies to learn from and a self assessment tool. [8]

There is also a step in the process of integration that cannot be planned. The starting trigger for the pursuit of integrated policy can often be a shock, natural disaster or significant moment of public mobilisation, or similar. This is evident in the way the 9/11 attacks led to a push for integrated homeland security policy in the US, for example (May, Jochim and Sapptichne 2011). It is also evident in global river restoration initiatives (Speed et al 2016). The Covid-19 pandemic will be a trigger for many policy initiatives, and many have argued it strengthens the case for taking a One Health approach that integrates consideration of animal health, ecosystem health and human health (e.g. WWF 2020d). Our food system can be linked closely to an increased risk of infectious diseases, through its impact on ecosystems and the trade and treatment of animals. Due to this fact and in its similar pursuit of human wellbeing, an integrated response to Covid-19 must consider many of the same considerations as a response to the triple challenge. For example, halting the conversion of forests and other ecosystems for agriculture, building a resilient food system locally and globally, and stimulating a low-carbon economic recovery are all responses relevant to the increased risk of emerging infectious diseases and to the triple challenge (WWF 2020d).

8 https://www.oecd.org/governance/pcsd/toolkit/ accessed 17/10/20

Table 1:
Potential routes to achieving integration and tools and instruments that can enable that

ROUTES TO INTEGRATION (Ollila 2011 in Tosun et al 2017)	ENABLING TOOLS AND INSTRUMENTS (Jordan and Lenschow 2010; Candle and Biesbroek 2016; OECD 2016; Tosun et al 2017)
1. All policy sectors are asked to adopt policies that advance the objectives of the others. 2. Launching specific policy measures that help to mutually attain the objectives of the shared policy objectives. 3. Making expertise available from one sector (e.g. food) to another (e.g. climate). 4. Assessing and possibly addressing the impacts of policy proposals from one sector to another.	• Regulatory Impact Assessments, Strategic Environmental Assessments or other forms of policy appraisal. • New cross-cutting cabinet committees. • Interministerial or interagency collaborative units or task forces. • Ownership by a central department and/ or head of or vice/deputy head of state / government. • Mission statements endorsed/set by government leaders on the integration of policy areas. • Personal leadership from the top. • Shared budgets across policy areas to be integrated. • Shared accountability (e.g. reporting) among institutions with policy responsibility. • Network-building among policy makers from different domains. • Incentives for policy makers, including for example access to budgets or career progression, as well as greater transparency on government decision making thus enhancing accountability. • Monitoring, evaluation and reporting both progress in achieving policy integration and the impact of policies and financial incentives with the integrated domain.

The different levels of integration

Policy integration is not a binary concept, meaning it is not as simple as being present or not. A spectrum exists from 'do-no-harm' cooperation (a new policy is checked for potential negative impacts on other policy areas) to positive coordination (multiple policy sectors work together towards a comprehensive approach), and full integration (such as appointing a single authority for an integrated policy area and producing a single overarching strategy) (Candel and Biesbroek 2016). Integration can also be achieved at the levels of policy goals, policy institutions and/or the implementation of policy instruments. For this reason, for some jurisdictions effective cooperation and coordination between policy areas may be desirable and/or a necessary stepping stone to full integration. Given the significant (but potentially beneficial) effort involved, there may be a trade off between integration and pace or ambition. Therefore, in the case of the triple challenge, there is a particular importance in understanding the most synergistic and impactful actions (as in Figure 2) and pursuing these at pace while additional policy actions flow from the remainder of the integrated policy development process.

Policy makers will need to break out of their area of expertise and responsibility and work across institutions relevant to the triple challenge. This will mean facing up to complexity, understanding trade-offs in their decision making and being transparent about their response to those. It will be necessary to create political space in which these trade-offs may be identified, understood, negotiated and then avoided, managed or accepted. Indeed, policy integration can both enable and depend on the pluralisation of politics by bringing in more actors and interests as well as facilitate the involvement of the public (Turnpenny et al 2009 in Tosun et al 2017). This is discussed further in the following section on 'triple challenge dialogues.'

Vertical integration is also very important: joined up system level policy (i.e. national or federal government) does not mean joined up delivery or more local level policy (Candel and Biesbroek 2016). At sub-national level, integrated and inclusive land, water and marine management and effective spatial planning have been highlighted as critical to responding to the climate and biodiversity crises, and can help find balance with production needs (e.g. agriculture, aquaculture etc) (IPBES 2019; IPCC 2019a). Indeed much of the triple challenge will materialise in formal or informal land, water and sea use planning. This highlights the importance of sub-national policy achieving the same level of integration as recommended above for national policy and below for international policy. It also highlights the importance of understanding the needs, motivations and incentives that could influence the behaviour of multiple landowners, such that their behaviour adds up to significant cumulative impact towards the integrated strategy.

The trade-offs and most appropriate responses will also vary between landscapes, seascapes and catchments and therefore efficiencies can be gained through playing to the particular attributes of each landscape (e.g. more protection measures in places with relatively intact ecosystems and low population densities; or more rehabilitation and productive use of degraded places). But in this context, incentives should align appropriately so that those resident in, or dependent upon, intact ecosystems do not lose out economically while fulfilling this part of an integrated national or regional strategy (e.g. payments for ecosystem services or carbon finance opportunities for avoiding ecosystem conversion). Another important economic policy approach relevant here is stimulating a 'just transition' to support the shift of affected communities to good jobs and livelihoods in low carbon, biodiversity positive industries (see Box 2).

BOX 2

A JUST TRANSITION

Angela Francis (WWF-UK)

The concept of a just transition developed out of the trade union movement's concern about the costs of industrial change to address environmental challenges being unfairly borne by the workers in the sectors most affected (Pinker 2020). However, rather than becoming a block on climate action, it quickly became the banner under which economic and social policies to deliver climate change and nature restoration fairly were called for and developed.

There are two general understood meanings of the term just transition. One focuses on justice for workers in affected industries and supporting them to secure new equivalent employment. The other wider use looks at impacts on all groups affected by the transition to a green economy, and in some cases, how the transition should address existing inequalities in society (Pinker 2020). These definitions of just transition allow us to distinguish various elements of justice (WWF & IPPR 2019), proposed as follows::

- Compensatory justice for the people and communities who are directly affected by sectoral change such as the move away from oil and gas, or the cost of new environmental practices in farming. The focus here is often on training and business support to maintain or bring jobs to the local area. There is increasing acknowledgement that this support rarely reaches ancillary workers in the supply chain who are also affected and often more vulnerable because they are lower skilled and lower paid.

- Decisions about investment, tax and subsidies raise issues of distributive justice. Meaning how people already struggling to find a job, earn a decent living, or communities suffering the worst effects of pollution or lack of green space in their local area can expect investment in the green transition to benefit them. And ensuring taxes and subsidies are designed so the costs do not fall unfairly on those least able to pay, or similarly, the opportunities to take up subsidies and support are not only accessible to business or individuals with assets and capacity to draw them down.

- International justice requires the responsibility for environmental harm to be borne by the countries that contributed most to it, and that the global south be supported with finance and technology that enables the move to a green economy that can mitigate and adapt to climate change. Similarly, the stewardship of the globally significant commons for climate and biodiversity by global south needs to be rewarded to encourage their preservation, and the urgent work of restoring habitats and expanding carbon sinks needs to be fairly allocated amongst all countries by international agreement.

- National and international justice require procedural justice, so the people affected by climate change, environmental breakdown and the policy responses to it, are fully engaged in an inclusive democratic process which ensures solutions are not developed for them but with them.

- And, underlying all action on climate and nature, is the need for intergenerational justice which requires us to pass on a beautiful, thriving and healthy planet for future generations.

These various elements of justice can conflict so should all be weighed up as part of an integrated approach to policy development and delivery. Policies that are developed with a full consideration of justice and fairness should build more industry support, enable wider take up, be better aligned with wider political imperatives and provide a platform for international cooperation. The challenges of delivery will not be eliminated of course, but a serious approach to a just transition should build confidence amongst public, businesses, investors and international partners that the social and economic barriers to change can be addressed.

Delivering a just transition in food, farming and fishing will be key to all three elements of the triple challenge and has implications for local and international food production. In a promising development, a number of governments are already working with international partners and have committed to "creating food systems that are resilient and sustainable, providing nutritious, affordable food for all people while protecting vital ecosystems and enhancing rural livelihoods" as part of the 'Just Rural Transition' initiative. [9]

9 https://justruraltransition.org/ accessed 25/09/20

International policy integration

Despite the opportunity presented by the 2021 international milestones, evidence suggests that policy integration is not currently taking place to the degree that would be necessary to seize these opportunities. A prominent role for nature-based solutions might signal a high level of integrated thinking between climate change and biodiversity policy. However, with some notable examples from a number of countries, there is significant untapped potential for nature-based solutions to be included in NDCs, to be funded by public and private sources, and to be explicitly encouraged by the UNFCCC (WWF 2020 a,b; and see Box 1: Nature-based solutions above).

EVIDENCE SUGGESTS THAT POLICY INTEGRATION IS NOT CURRENTLY TAKING PLACE TO THE DEGREE THAT WOULD BE NECESSARY TO SEIZE THESE OPPORTUNITIES

In the biodiversity domain, the latest draft of the Global Biodiversity Framework promotes a "whole-of-government approach" to ensure policy coherence and transitions, and "mainstreaming" of biodiversity in all sectors (UN CBD 2020). However, this draft falls short of addressing the role of the most significant drivers of biodiversity loss, in particular climate change and food production. While recognising that each UN convention must respect its mandate, if the Global Biodiversity Framework fails to incorporate climate change and food systems, its effectiveness and wider relevance will be significantly hampered.

On the other hand, the Food Systems Summit is underpinned by five action tracks that are consistent with the analysis here of how the food system needs to change for us to meet the triple challenge: i) Ensuring access to safe and nutritious food, ii) Shifting to sustainable consumption patterns, iii) Boosting nature-positive production, iv) Advancing equitable livelihoods, and v) Building resilience. [10] Some reports indicate it will also have a specific focus on trade-offs, [11] creating an opening to build much-needed links with climate change and biodiversity processes.

10 https://www.un.org/en/food-systems-summit/action-tracks accessed 15/10/20
11 https://sdg.iisd.org/events/2021-un-food-systems-summit/ accessed 11/5/20

Across all these processes, open dialogue on the triple challenge is needed at the global leaders' level to raise collective action, support transboundary solutions, support alternative economic pathways for countries with high coverage of intact ecosystems, growing the right crops in the right places, and managing transboundary biomes and natural resources. Moreover, as noted above, the signal sent by heads of government is crucial to achieving effective policy integration. It is notable therefore that in September 2020 more than 60 Heads of State and Government, including the leaders of five of the world's largest economies, endorsed the 'Leaders' Pledge for Nature.'[12] The pledge not only sets a high ambition level but also highlights the interdependent nature of the climate change, food and biodiversity global challenges:

> **WE... SEND A UNITED SIGNAL TO STEP UP GLOBAL AMBITION FOR BIODIVERSITY AND TO COMMIT TO MATCHING OUR COLLECTIVE AMBITION FOR NATURE, CLIMATE AND PEOPLE WITH THE SCALE OF THE CRISIS AT HAND.**
>
> WE WILL RE-DOUBLE OUR EFFORTS TO END TRADITIONAL SILO THINKING AND TO ADDRESS THE INTERRELATED AND INTERDEPENDENT CHALLENGES OF BIODIVERSITY LOSS, LAND, FRESHWATER AND OCEAN DEGRADATION, DEFORESTATION, DESERTIFICATION, POLLUTION AND CLIMATE CHANGE IN AN INTEGRATED AND COHERENT WAY, ENSURING ACCOUNTABILITY AND ROBUST AND EFFECTIVE REVIEW MECHANISMS, AND LEAD BY EXAMPLE THROUGH ACTIONS IN OUR OWN COUNTRIES.
>
> **WE COMMIT TO TRANSITION TO SUSTAINABLE PATTERNS OF PRODUCTION AND CONSUMPTION AND SUSTAINABLE FOOD SYSTEMS THAT MEET PEOPLE'S NEEDS WHILE REMAINING WITHIN PLANETARY BOUNDARIES...**

This leaders' declaration is promising. In reality, the optimisation of resource use globally also needs to compete with local and national interests (Heck et al 2018). So action needs to be economically incentivised. Sustainable trade and economic cooperation are critical parts of the solution (FABLE 2019; FOLU 2019; Roxburgh et al 2020). Through trade, small changes to policies in one country can lead to significant impacts on land use and food systems in others (FABLE 2019). Given this and the clear economic costs of the loss of biodiversity and climate change, the triple challenge should be a topic of core economic discussions at national and international levels, such as meetings of G20 and G7 leaders and regional groupings such as the EU, ASEAN or SADC. This would support the earlier mentioned need for the incorporation of the value of biodiversity and ecosystem services, and the costs of climate change into national growth, development and land-use planning processes.

WHAT WOULD SUCCESS LOOK LIKE?

- More and eventually all leaders of national governments endorse the 'Leaders' Pledge for Nature' and adopt the triple challenge as a priority, and in doing so set the motivation, incentives and mechanisms for their governments to take an integrated approach to responding to it.
- Heads of state or government highlight all three challenges and their interdependence through the outputs of leaders' meetings at the UN General Assembly and economically focused fora including the G7, G20, EU, ASEAN, SADC and more.
- Moving through the levels of policy integration, national governments have at least demonstrable and explicit coherence, and ideally achieve higher levels of integration, in their submissions to each UN conference / convention in 2021.
- The outcomes of the 2021 meetings of the conventions on climate change and biodiversity and the food summit, and other UN summits on oceans and desertification, should explicitly recognise the importance of integrated action across these sectors for their own success, and vice versa, while maintaining their respective mandates.

12 https://www.leaderspledgefornature.org/ accessed on 15/10/20

2.2.2 TRIPLE CHALLENGE DIALOGUES

As discussed earlier, there are many alternative combinations of responses to the triple challenge, and within the six core priorities shown in Figure 2 there are different routes to deliver them. The triple challenge is global in nature but will require responses that are locally and culturally appropriate. Moreover, the triple challenge affects multiple stakeholders, including non-state actors concerned with food, energy, economic planning, infrastructure, environment, health, and so on. We propose context-specific stakeholder dialogues - so called 'triple challenge dialogues' - to: help to identify and discuss the response options available; understand the potential positive and negative consequences of these options; and help identify the preferred set of actions to follow.

By context-specific, we mean they will need to be framed either geographically in terms of relevant natural resource constraints, development status and trajectory, and socio-cultural factors, or sectorally in terms of resource demands and international trade links. There will not be a one size fits all approach. These dialogues put the triple challenge into a real-world context – at the geographic level where the choices will be made, or across trade routes, or between companies operating in different sectors - where the consequences are felt, and aim to move towards broad stakeholder agreement on ways forward.

These dialogues would be informed by strategic policy imperatives (e.g. stated desire for national food security) and evidence (e.g. impacts on water availability or freshwater fisheries of constructing a hydropower dam). As well as local social and economic factors, including an explicit recognition of the importance of the rights, incentives and motivations of resource users or stewards, such as local communities (e.g. an area of forest may have religious or social values, or be a critical source of building material).

Although we focus on synergies and trade-offs within the triple challenge in this report, the choices between pathways come with broader political, social and economic consequences (e.g. loss of coal mining jobs but possible growth in the renewable energy sector when phasing out fossil fuel use). Triple challenge dialogues could identify the most appropriate pathways in their context, potential mitigating measures for possible negative impacts, and thereby help to overcome resistance to change, thus increasing the chance that the resulting agreements and recommendations are implemented (Turkelboom et al 2018).

Participatory engagement is central to negotiating equitable trade-offs and there is a rich history of research on dialogue initiatives and participatory learning that can serve as guides (e.g. Brouwer et al 2016; ILO-ITUC 2016). We propose also drawing on learning and evidence from integrated landscape management (see e.g. Denier at al 2015) whereby stakeholders in a landscape aim to reconcile competing social, economic and environmental objectives to achieve sustainable landscape management. Interested stakeholders in the landscape come together for cooperative dialogue and action in a multi-stakeholder platform. They undertake a systematic process to exchange information, discuss perspectives and negotiate outcomes to achieve a shared understanding of the landscape conditions, challenges and opportunities. This enables collaborative planning to develop an agreed action plan.

Core principles for 'triple challenge dialogues'

- Clarity of purpose
- Inclusiveness
- Transparency
- Accountability
- Application of a sound data and evidence base
- Connection to institutions with decision making power
- A commitment from all participants to building shared understanding of issues that will be seen from different perspectives.

WHAT WOULD SUCCESS LOOK LIKE?

- 'Triple challenge dialogues' in multiple jurisdictions at multiple levels, have identified the most appropriate pathways for their context within the global picture. They have developed an understanding of and ownership of decisions on the acceptance, avoidance or mitigation of trade-offs such that conflicts are avoided or minimised. And they have been informed by integrated and up-to-date research and evidence (see the following section).

- These pathways simultaneously meet priority local needs (e.g. ensuring water availability for households, farms, businesses and wildlife; biodiversity for crop pollination and local wildlife tourism; local food security and income), while also contributing to national commitments and global targets (e.g. net reductions in land-based greenhouse gas emissions; targets for biodiversity conservation; providing rural employment; generating power from renewable resources; supplying surplus agricultural production to feed urban dwellers).

- The dialogues benefit from leadership and involvement of government leaders and policy makers so that their outcomes are taken into full consideration in policy direction thereafter.

CASE STUDY:

THE LLANOS OF COLOMBIA - AN EXEMPLAR FOR TRIPLE CHALLENGE THINKING?

Sofia Rincon (WWF-Colombia) and James Gordon (WWF-UK)

The Llanos (lowlands) of Colombia's Orinoco region cover about 17 million hectares of savannas and wetlands with occasional forested areas, particularly along riverbanks. It forms part of the Orinoco River's drainage basin which Colombia shares with Venezuela.

Culturally it is diverse with several indigenous groups and a distinctive and traditional Llanero culture associated with extensive cattle ranching by mestizo (non-indigenous) ranchers. The mixture of wetlands, natural savannas and forest has also given rise to an exceptional biological diversity that includes nearly 40% of Colombia's avifauna, the endemic Llanos long-nosed armadillo (Dasypus sabanicola) and the endemic Orinoco crocodile (Crocodylus intermedius).

Over the last few decades, the Llanos have seen considerable change, with rice and sugarcane cultivation, livestock intensification, petroleum extraction and more recently oil palm production being amongst the productive activities that have driven its development. This has sometimes been at the expense of natural ecosystems. It is estimated by Romero-Ruiz, Flantua et al (2012) that between 1987 to 2007 14% of the Llanos underwent some kind of land use change, with the transition from flooded savannas to crops and exotic pasture being especially notable. Aside from negative interaction between biodiversity and economic development there are also climate concerns. San José and Montes (2001) show that the transition of native to non-native habitat types in the Orinoco has led to net increases in greenhouse gas emissions. Even when above ground biomass has increased, e.g. through transition to tree plantations, the loss from soil carbon stocks overrides any positive above-ground effect.

The region has attracted resources from multilateral donors including the BioCarbon Fund and GEF. Increasingly such donors implicitly recognise that the region is an exemplar of the triple challenge, there being inevitable trade-offs between food, nature and climate along the development pathways being promoted. For example, the further expansion of oil palm may be more or less negative for biodiversity - depending on which parts of the landscape become oil palm plantations and what proportion of the total landscape is converted. Ocampo-Pañuelo et al (2018) show that further expansion of oil palm into cattle pasture may still impact bird and mammal diversity but not as much as if the expansion occurred elsewhere in Colombia. Although the impact on ranching is significant and is likely to be for water resource management as well. However, if left unchecked for some time, oil palm expansion in this landscape could reach a point where the biodiversity loss accelerates significantly (Pardo et al 2018). Historically, conversion to oil palm in the Llanos has been driven by government policy and elite interests that are not necessarily responsive to local needs (Porter 2020), suggesting the need for more explicit negotiation on policy pathways and their trade-offs between stakeholders are needed for a just rural transition. The challenge is to ensure that trade-offs are explicit, are based on best available knowledge and are negotiated equitably.

In this context three particular gaps in our understanding need to be overcome if significant trade-offs are to be avoided:

- Although research has emerged in recent years, there remains a high level of uncertainty about carbon reserves in non-forest ecosystems, such as savannahs and wetlands.
- Context specific measures for the incorporation of biodiversity and ecosystem services from the varied ecosystems in the landscape into development plans are not yet understood.
- The skills and capacities required to design and implement solutions are not yet embedded, particularly with respect to the inclusion of local rights holders.

In response, WWF and partners are developing a 'triple challenge dialogue' to provide a mechanism to share the latest information and research amongst relevant decision makers and to explore the consequences of the full range of policy options available. In doing so, it will allow for the identification of trade-offs associated with policy alternatives as well as the means to compare the relative benefits and disbenefits of the options available. It is anticipated that this will result in final policy decisions being made on the basis of the best available understanding of the consequences and reflecting the inputs of a broad range of relevant stakeholders.

2.2.3 MORE INTEGRATED AND INFLUENTIAL RESEARCH ON SYNERGIES, SOLUTIONS AND TRADE-OFFS

More integrated and effective policy development and stakeholder dialogues must be underpinned by relevant and equally integrated research to be sufficiently informed about the range and consequences of different choices. This research might be split into six categories.

First, given the paucity of research into the web of interactions between all three of the triple challenge elements, there is scope for further analysis of how climate, biodiversity and food systems connect with and influence each other. The aforementioned four major global assessments of 2019 only partially recognise the synergies and trade-offs across the triple challenge, and with notable exceptions (FOLU 2019; FABLE 2019) there is limited truly integrated analysis in the wider literature. It will be important that such analysis is undertaken at multiple scales, including national and local scales which are typically more important for policy-making and dialogue than global analysis. It should also be spatially explicit where possible and should highlight the synergies and trade-offs that are likely to emerge from different socio-economic scenarios. Analyses that are based on, or that incorporate, stakeholder perceptions are as important as quantitative modelling. At the global scale, the IPBES and the IPCC can lead by example in producing with urgency a strong and policy relevant integrated report in their next assessment cycle.

Further, the research community must collaborate and think afresh about how to produce such an integrated picture in a way that senior politicians and global leaders will listen and use. Decisions affecting the triple challenge will always be at the mercy of the imperfections of data and modelling assumptions, political decision-making systems and the power of vested interests. Decision-makers often lack the time and knowledge (and sometimes the inclination) to fully understand complex implications of potential choices, particularly in the context of dynamic socio-ecological systems in which feedback and interactions span multiple spatial and temporal scales, and all sectors of society. To bring about transformational change,[13] a prerequisite will be the development of improved approaches to trade-off identification incorporating multiple stakeholder perspectives and epistemologies. This necessitates better connections between science and political processes, and societal discourses.

Second, given the politically contested nature of decisions about natural resources, we need a better understanding of how best to deploy combinations of i) narratives and stories, and ii) scientific evidence (including that derived from modelling and tools and that from traditional knowledge bases). This is in order to engage the full range of stakeholders and decision-makers and to stimulate their ownership of triple challenge dialogues and policies. In other words, what makes for an effective integrated triple challenge policy process that involves people beyond the usual suspects?

Third, in light of the well-documented difficulties in ensuring policy coherence (see above), we need insights into common barriers that prevent development and implementation of coherent policies and descriptions of the enabling conditions that have typically aided better policy-making. Tosun et al (2017) provide a good summary of research to date on achieving policy integration, with a number of suggestions as to what further understanding would be productive. For example, assessing the policy outcomes produced by policy integration, why they were successful or unsuccessful, and the intended and unintended consequences that resulted. Appreciative analysis of successful triple challenge case studies at multiple scales might also provide powerful empirical evidence that could inspire and inform policy development in other contexts. Such case studies should shed light on the human story of decision-making, i.e. the political-economic and socio-cultural aspects, rather than focusing only on technical barriers and enablers. It will be important that such research embraces awkward questions around the influence of vested interests, corruption and potential impacts of triple challenge policies on less powerful and disadvantaged groups in society.

Fourth, while a wide range of analytical tools and frameworks already exist – such as Strategic Environmental Assessment, systematic conservation planning, many-objective trade-off analysis, natural capital assessment and the like – there are few documented examples of these being used successfully to encourage integration in major national and international policy decisions (e.g. spending reviews, infrastructure strategies). As an exceptional example, a strategic environmental assessment of the hydropower sector in Myanmar, supported by the International Finance Corporation, identified tributaries where new hydropower dams would incur lower environmental and social risks compared to other siting options. The assessment recommended keeping the main stem Irrawaddy and Salween rivers free flowing to maintain migratory fish populations and freshwater fisheries, and to safeguard sediment delivery to deltas threatened by rising seas (ICEM 2018). A different category of tool which can be effective and usually targets resource users rather than policy makers, is games and role playing. For example the work of Oil Palm Adaptive Landscapes[14] to 'play out' scenarios for oil palm development with plantation holders and others to illustrate the various impacts of different management options. Another example is the 'river basin game' successfully used with decision makers and water users in Tanzania and Nigeria (Lankford and Watson 2007).

There is scope to use such tools and frameworks more widely and to improve them through i) further testing in a wider range of real-life contexts with real-life stakeholders and decision-makers, and ii) expanding the scope of such tools, e.g.by introducing freshwater and marine elements into predominantly terrestrial analyses. Lessons learned through earlier work on the water-food-energy nexus, suggests tools and analysis could usefully focus on detailing likely risks and opportunities (using a social-economic-strategic risk typology) that could arise from different scenarios (World Economic Forum 2011).

Fifth, researchers should also focus on how to deliver the priority actions outlined in Figure 2 - e.g. how to influence the widespread adoption of sustainable diets and reduction in food waste through policy frameworks and behaviour change? With recent research suggesting that in the conservation science domain, researchers are far less frequently or effectively focusing on developing and testing solutions, than they are at investigating the state and drivers of nature, there is significant scope for more here (Williams et al 2020).

Finally, cutting across all four of these priorities is a need for research to be interdisciplinary and cross-thematic. For instance, this means that natural scientists need to combine with social scientists; experts and stakeholders from the global north need to work together with those from the global south; climatic, aquatic (freshwater and marine) and terrestrial experts need to get out of their disciplinary comfort zones to understand interactions and policy impacts between different earth system processes, ecosystems and biomes; and academics, practitioners and policy-makers need to co-design research from first principles. This is not a new idea, and yet making it happen has proven challenging, suggesting that perhaps first experimentation and research into how to do this successfully may be a necessarily first step. Perhaps tools like role play games have a role to play here too, as do efforts like the Research on Research Institute.[15] Nonetheless, research funders in government, NGOs, the private sector and foundations should actively encourage such connections.

13 Although there is no universally acceptable definition of transformational change, it is a term increasingly used in climate finance domains, and from which we borrow this definition: **"a structural change that alters the interplay of institutional, cultural, technological, economic and ecological dimensions of a given system. It will unlock new development paths, including social practices and worldviews."** (Mersmann et al 2014)

14 https://www.opal-project.org/our-games/ accessed 16/10/20

15 http://researchonresearch.org/ accessed 16/10/20

WHAT WOULD SUCCESS LOOK LIKE?

- A large and growing body of research analysing integrated pathways towards national, regional and international food, climate and biodiversity goals, that is spatially explicit where possible and produced by interdisciplinary teams from natural sciences to social and political scientists. The IPCC and IPBES play a leading role in this.
- A strong and growing body of research on how to effectively deliver on the priority policy responses outlined in Figure 2, that is wise to the socio-political factors involved, building on critical analysis of case studies of success and failure.
- Efforts to achieve policy integration and more successful as a result of more research on how to effectively achieve and implement integrated policies, specifically but not exclusively on food, climate and biodiversity.
- A wider pool of accessible tools available to policymakers that help to identify and compare (with respect to overall ambition, synergies and trade-offs) policy pathways, and that have the potential to be socially and politically influential.

2.3 THE ROLE OF THE PRIVATE SECTOR

We have focused particularly on policy led responses to the triple challenge in this report, but there is a very significant role for the private sector to play. Just as the triple challenge calls for integrated approaches across food, climate and biodiversity led interests, so does it call for cross-sectoral responses within the private sector and between it and policy and civil society sectors. With this in mind, there are three particular contributions that businesses large and small can make:

1. **Voluntary action towards the five priority responses.** Given both the risk that climate change presents, the opportunity and economic benefits offered by mitigation and adaptation approaches, and likewise for biodiversity loss and water (in)security to businesses (GCA 2019; Roxburgh et al 2020; WEF 2020), it is in the interests of business to act voluntarily on the triple challenge. Actions businesses can take include: setting Science Based Targets [16] (scopes 1-3) to reduce their greenhouse gas emissions from their operations and supply chain in line with the Paris Agreement; setting, reporting and delivering on commitments to deforestation and conversion-free supply chains; [17] understanding and responding to water risks in their supply chains; [18] using their marketing influence to encourage sustainable consumption choices including healthy diets; and work towards nature related disclosures. [19]

2. **Advocate for joined up and high ambition responses from policy makers and from other businesses.** Including through joining groups such as the Business for Nature Coalition, [20] Just Rural Transition and Race to Zero. [21] Through these groups businesses can work together to leverage their strengths and amplify positive corporate voices at key national and international events. There is also an important role for producing businesses to support jurisdictional/landscape/catchment scale policies and planning that can amplify their impact outside of their supply base/farm unit.

3. **Fully engage with triple challenge dialogues.** To contribute their interests and needs as well as listen deeply to those of others, integrating into the decision making process as a pathway towards resilience.

16 https://sciencebasedtargets.org/
17 https://accountability-framework.org/
18 https://waterriskfilter.panda.org/
19 https://tnfd.info/
20 https://www.businessfornature.org/
21 https://unfccc.int/climate-action/race-to-zero-campaign

3. CONCLUSION

Over the last two years we have amassed a greater body of knowledge on the climate and biodiversity crises and the challenges facing our food system than ever before. Business as usual will lead to further health problems caused by poor diets, dangerous climate change and biodiversity collapse, in turn undermining our food security. The triple challenge highlights the urgent need for integrated action. Globally we can meet this challenge, but at national and local levels it is likely that trade-offs between these three goals will exist. The slower we act the greater the trade-offs. Much of the solution is known, but trade-offs need to be understood, acknowledged and negotiated in pursuit of transformational change to our economy and society. Trade, finance, aid and economic policy frameworks at large will need to ensure that the benefits and costs of the required transition are fairly shared globally and locally. Political leaders and policy makers, the research community, and wider civil society all have responsibilities in agreeing a route towards our agreed global goals on climate change, biodiversity and food.

The international policy milestones in 2021 present an opportunity for governments and non-state actors to adopt actions commensurate with the scale of the challenge, and with the evidence base to produce integrated national and international plans, supported by multi-disciplinary research and influential stakeholder dialogue. Doing so will set us on course towards a positive future where we live in a healthy society, with a stable climate and surrounded by thriving nature, and where we are all included in the major decisions of our governments on food, climate change and biodiversity and, therefore, our prosperity.

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