

CLIMATE ACTION PATHWAY

LAND USE

Executive Summary

2020



VISION STATEMENT

It is 2050, and the full contribution of the land-use sector to the global long-term temperature goal of the Paris Agreement has been attained through conservation, restoration, and improved land management actions in forest, wetland, grassland biomes and agricultural lands as well as in the food supply chain, consumption, diets and waste. Emissions from loss and degradation of remaining **primary forests and other natural terrestrial ecosystems** dropped by at least 70% by 2030, becoming a net sink by 2050. At least 350 million hectares of degraded lands were brought under restoration in 2030, including by improving the resilience and productivity of farmland. Emission reductions from **agriculture and food systems** by 25% was possible through application of technology and regenerative, climate-smart and agroecological practices as well as through enhancement of soil carbon sequestration, restoration and measures to improve soil health and avoid degradation. **Finance for nature-based solutions** reached \$440t/year by 2030 (WEF, 2020). Governments have adequate and effective **cross-sectoral institutional, legal and regulatory frameworks** to implement and promote sustainable and resilient land management, restoration and conservation, providing appropriate government incentives. Sustainable land management is the norm, with adequate action and support for adaptation outcomes, maintaining **habitats for biodiversity and ensuring climate resilience** and the provision of goods and services from key ecosystems that support water and food security. **Equal land rights** for men and women, indigenous people, local communities and smallholders are recognized and secured across jurisdictions, which played a key role in the reduction of deforestation and land degradation rates as well as upscaling regenerative, climate-smart and agroecological practices. Land-use **monitoring tools** are used by governments, land users and farmers to inform decisions and track whether goals are on target. Fuelwood consumption is a sustainable renewable energy source. **Restoration** supports local economies, ecological integrity and connectivity to ensure carbon sinks are enhanced and secured for the future. Forests and other terrestrial **ecosystem values are anchored in policy and financial decisions** from the public and private sector, which prioritize and align with the protection, restoration of forest, landscapes and terrestrial ecosystems, and reforestation. In 2050, **food systems are economically sustainable and profitable**, they have broad-based benefits for society, and have positive or neutral impact on the natural environment. The agricultural sectors and food systems can sustainably manage current and future stresses, both climatic and non-climatic, while contributing to emission reductions and ensuring sustainable land use, the protection of ecosystems and prosperity for farmers. Food loss and waste have reduced to 50% through a set of measures targeting both the supply and demand sides while ensuring that future generations, are well-nourished and food-secure.



SYSTEM TRANSFORMATION SUMMARY

The AFOLU sector represents 20-24% of total GHG emissions generated by agriculture and deforestation, and forest and terrestrial ecosystems loss re-enforcing the current biodiversity crisis and decreasing their capacity to adapt to climate change. It is critical to transform the AFOLU sector to maximize its potential contribution to the global mitigation goal as well as being at the centre of adaptive responses, combat desertification and land degradation, and enhance food security, biodiversity and prosperity for farmers. The goal here is two-fold to transform the AFOLU sectors. First, to understand how the system generates incentives for and influences capacities of actors to orient them towards behaviour that leads to a system transformation. Second, to facilitate the emergence of positive feedback loops that generate a self-sustained process of regeneration and performance improvement.

It is essential to address the drivers of emissions in the sector – such as global trade, production and consumption patterns, regulatory and governance mechanisms and the values and behaviours of society (WEF, 2020). Businesses, government, finance, technology and civil society have distinct roles to play in the sector's transformational change. The conservation of existing natural ecosystems and avoidance of further land use change leading to habitat loss and degradation needs to be implemented urgently and which will show immediate impacts. Necessary no-deforestation policies in commodity supply chains and enforcement need to be coupled with producer's shift of approaches and production techniques. Science-based targets can inform actions taken by the business sector. Concurrently, ecosystem restoration that includes all terrestrial ecosystems and soil need to be accelerated in order to generate mitigation and adaptation benefits in time to achieve the Paris Agreement. Regenerative land management options will be key to reduce demand for land conversion including sustainable forest management. Nature-based solutions are applied to urban planning and expansion follow a strict mitigation hierarchy.

Response options throughout the food and non-food commodity systems will need to scale up to reduce emissions on both the production and consumption side, reduce loss and waste, and transform all supply chains making them transparent and sustainable, including through circular economy systems and systems for reduced impacts (e.g. in the extractives industries). The potential of soil carbon as a vast carbon sink will have to be understood and leveraged, as well as integrated into carbon pricing. To transform food systems and agricultural sectors, we will have to support farming and rural livelihoods, de-risk smallholder farms and value chains, reduce emissions associated with our current diets and generated by food value chains and realign policies, social movements and innovation towards regeneration.

Finance for many of these responses is necessary whereby innovative public and private capital investment will play a key role. The Fourth Industrial Revolution technologies have a central place to help translate the implementation of the land responses at the scale needed, in topics such as resource efficiency, monitoring, natural capital internalization, etc. (WEF, 2020).

MILESTONES TOWARDS 2050

By 2021

- 150 M has have been brought to restoration
- Include targets to halt the loss of biodiversity and drastically reduce habitat degradation, in connection with adaptation measures, in the NDCs
- Establish rules to operationalize ITMOs from the forest and land use sector (including REDD+).
- Significantly increase climate finance allocated to the forest and land use sector in order to accelerate implementation of national REDD+ strategies, restoration and national adaptation plans.
- Action plans laid out to kick-start massive businesses transitions to nature-positive models in the AFOLU sector.
- Enable policies for transition of agricultural production towards resilient, low carbon, agroecological, regenerative and climate smart practices.
- Reduce financial risks, lower transaction costs, facilitate financial transactions, enable access to financial services and long-term investment for small-scale farmers.
- Enable access to agricultural inputs (climate-resilient seed, organic fertilizers, training, veterinary services, machinery) for the next season, through extension programme,

By 2025

- End of net deforestation and & degradation and 50% emission reductions from loss and degradation of natural ecosystems.
- Increase policy measures regarding mandatory corporate disclosure and due diligence of companies operating on forests risks commodity markets.
- Ensure forest and land-use governance frameworks are in place in all countries, jurisdictions and indigenous territories to promote integrated and sustainable land and forest management.
- Forest and other terrestrial ecosystems values are internalized in financial decisions
- Market and non-market approaches are functioning under Art. 6 where high-quality NbS credits, including from REDD+ are traded.
- Eliminate perverse fiscal incentives and subsidies to stop ecosystem conversion and increase conservation areas.
- Ensure access to market information enabling small-scale farmers to empower them in the market place, add value to their product, and to create new market opportunities.
- Maximize ecosystem services in the small-scale farming practices.
- Establish more tripartite frameworks for joint action by farmers and

By 2030

- 350 M has have been brought to restoration
- End of gross primary forest loss and other terrestrial natural ecosystems including mangroves, peatlands, grasslands and savannas, reducing source emissions by at least 70% from BAU
- Improved access to financial mechanisms for sustainable practices and reduction of pervasive incentives.
- The land use sector developed sustainable pathways and is resilient towards impacts of climate change
- Establish clear compliance mechanisms to ensure that investors and lenders do not support unsustainable forest and land-use practices or loss of biodiversity.
- Through public-private partnerships develop stronger climate information and early warning systems for the use of agricultural sector and disseminate to small scale farmers.
- Large scale companies teach the target of reducing emissions from livestock (enteric fermentation and manure) by 20 percent and from rice paddies by 20 per cent.
- Wide application of supply chain transparency, equity, procurement policies and commodity certification.

By 2040

- Land degradation has stopped and sustainable land management is the norm.
- Emissions from loss of natural ecosystems have dropped by 95% from BAU
- Food systems are resilient, sustainable and regenerative
- Emissions from agricultural sectors and food systems decreased 25% compared to BAU
- Demonstrable improvements in ecosystems integrity and stability are achieved
- Align financial priorities and investments across sectors with the protection of standing natural forests, reforestation and landscape restoration.
- Ensure that rural communities have access to the right technology infrastructure and planning framework to thrive and benefit from new business opportunities and realize their potential for advances in productivity.
- Further development of technology for agricultural production to meet the increasing food demand while not jeopardizing risks of climate change.
- Large scale companies reach the target of reducing emissions from livestock (enteric fermentation and manure) by 30 percent and from rice paddies by 70 percent.



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| <p>digital advisories, or public-private partnerships.</p> <ul style="list-style-type: none"> • Educating civil society about food systems and its impacts on and vulnerability to climate change and what actions can be taken in order to minimize these impacts. | <p>farmer organizations, private and public sector action to increase climate change adaptation and mitigation.</p> <ul style="list-style-type: none"> • Support extension services and consolidate close working relations with research institutes to accelerate technology field testing. |
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PROGRESS

- The Nature-Based Solutions Coalition co-led by China and New Zealand drew from over 180 proposals to develop a Climate Manifesto at the 2019 Climate Action Summit. The Climate Manifesto acknowledges the important role of nature in climate action and commits to unlocking its full potential in four priority areas.
- The United Nations General Assembly declared 2021–2030 the UN Decade on Ecosystem Restoration, which will offer unparalleled opportunity for more financial support, greater political will from countries, businesses and institutions to combine their efforts, and recognition and interest to restore natural landscapes that will result in job creation, food security and measures to address climate change.
- Countries recognize the potential of the land-use sector in achieving the Paris Agreement: in 2015, 89 per cent of all countries refer to agriculture and/or land use, land-use change and forestry when outlining their mitigation contributions in their nationally determined contributions (NDCs); 98 per cent of the countries that include priority areas for adaptation actions mention land use sectors in their NDCs. Yet, further support is needed for countries to implement these commitments, to upscale the ambition in the second NDCs, and to fully leverage the potential that the land-use sector offers to tackle climate change.
- In September 2020, the Bonn Challenge announced surpassing their first milestone goal, with 74 pledgers from 61 countries, 8 states and 5 associations voluntarily committing to bring over 210 million ha of degraded and deforested lands into restoration.
- Over 340 actors have registered 461 actions on the NAZCA Platform for land-based actions in contribution to the Paris Agreement.



- The global leaders and the UN Secretary-General António Guterres have agreed to hold the Food Systems Summit in 2021 to raise global awareness and land global commitments and actions that transform food systems to resolve not only hunger, but to reduce diet-related disease and regenerate the planet. The Summit will raise awareness for the need of collective action of all citizens to radically change the way we produce, process, and consume food.
- Following its adoption in 2017, the Koronivia Joint Work on Agriculture has been a considerable opportunity for countries and observers to exchange views on a variety of topics related to agriculture and climate change, including methods for assessing adaptation, soils, nutrient use, water, livestock, and the socio-economic and food security dimensions of climate change.
- Colombia and Indonesia signed REDD+ result-based payments agreements under the GCF in 2020 for 32.5 MtCO₂eq, following last year's agreements from Paraguay, Chile and Ecuador for over 45 MtCO₂eq
- Results in terms of emission reductions from REDD+ so far reach close to 8 billion tons of CO₂e/year as reported to the UNFCCC REDD+ Platform.

FACTS & FIGURES

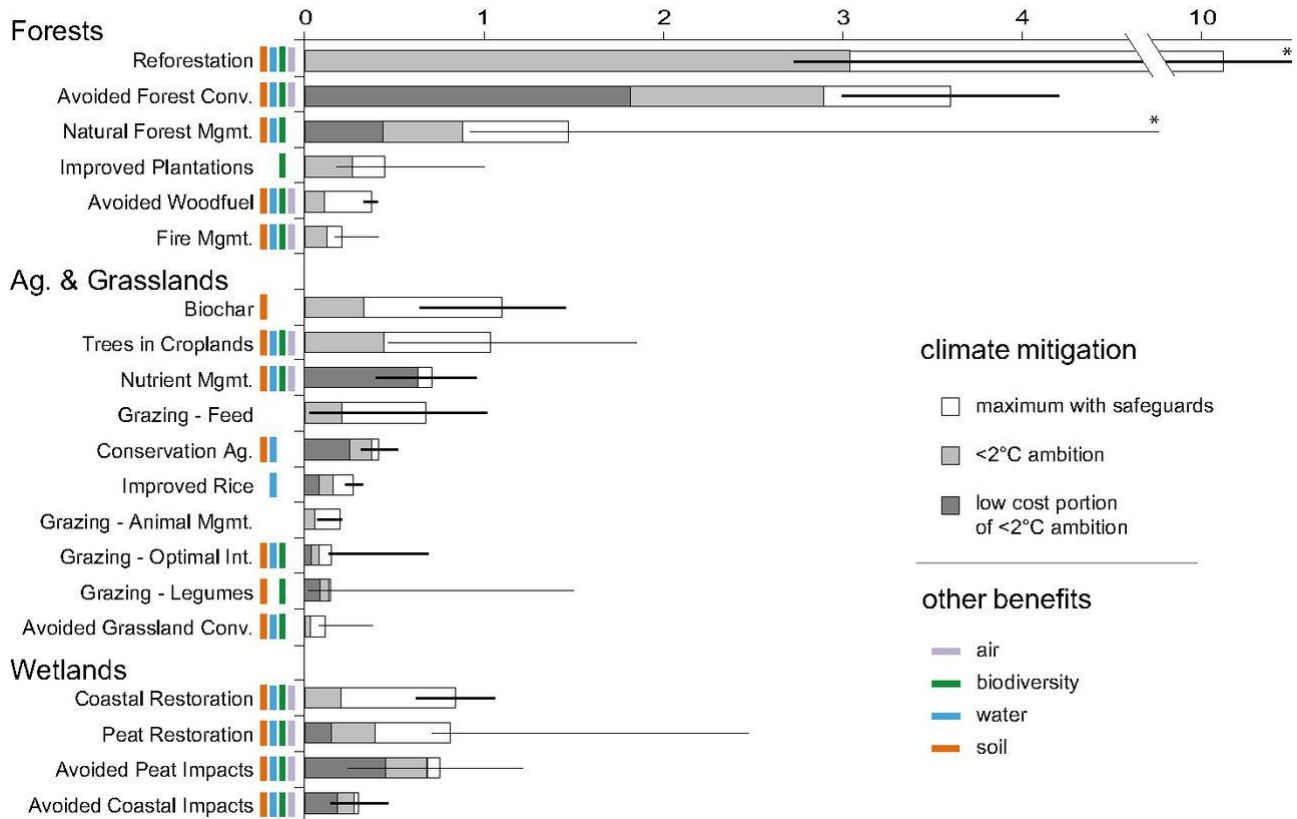
The first figure shows the climate change mitigation potential of 20 land-based pathways within conservation, restoration, and/or improved land management that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands. The analysis argues that these responses can provide over a maximum of one-third of the cost-effective climate mitigation needed between 2016 and 2030 to stabilize warming to below 2 °C.

The second figure shows pathways in the last use to achieve the 1.5 C goal by 2050, divided by eight wedges and twenty-four activity types. For each wedge, regions and activity types are highlighted based on bottom-up mitigation potentials and a political feasibility analysis. Countries shown in the table are countries with the highest global AFOLU emissions and the ones with the highest mitigation potential in the land sector from carbon removals, reduced land-use change, reduced enteric fermentation, diet shifts, food waste reduction (consumption and production). Achieving this scenario in could result in about 30% of global mitigation.

For the full explanation, sources and methods please refer to the original publications (links below).



Climate mitigation potential in 2030 (PgCO₂e yr⁻¹)



(From the original publication) "Figure 1. Climate mitigation potential of 20 natural pathways. We estimate maximum climate mitigation potential with safeguards for reference year 2030. Light gray portions of bars represent cost-effective mitigation levels assuming a global ambition to hold warming to <2 °C (<100 USD MgCO₂e⁻¹ y⁻¹). Dark gray portions of bars indicate low cost (<10 USD MgCO₂e⁻¹ y⁻¹) portions of <2 °C levels. Wider error bars indicate empirical estimates of 95% confidence intervals, while narrower error bars indicate estimates derived from expert elicitation. Ecosystem service benefits linked with each pathway are indicated by colored bars for biodiversity, water (filtration and flood control), soil (enrichment), and air (filtration). Asterisks indicate truncated error bars. See [SI Appendix, Tables S1, S2, S4, and S5](#) for detailed findings and sources." Griscom, Bronson W.; Adams, Justin; Ellis, Peter W.; Houghton, Richard A.; Lomax, Guy; Miteva, Daniela A. et al. (2017): Natural climate solutions. In Proceedings of the National Academy of Sciences 114 (44), p. 11645. DOI: 10.1073/pnas.1710465114

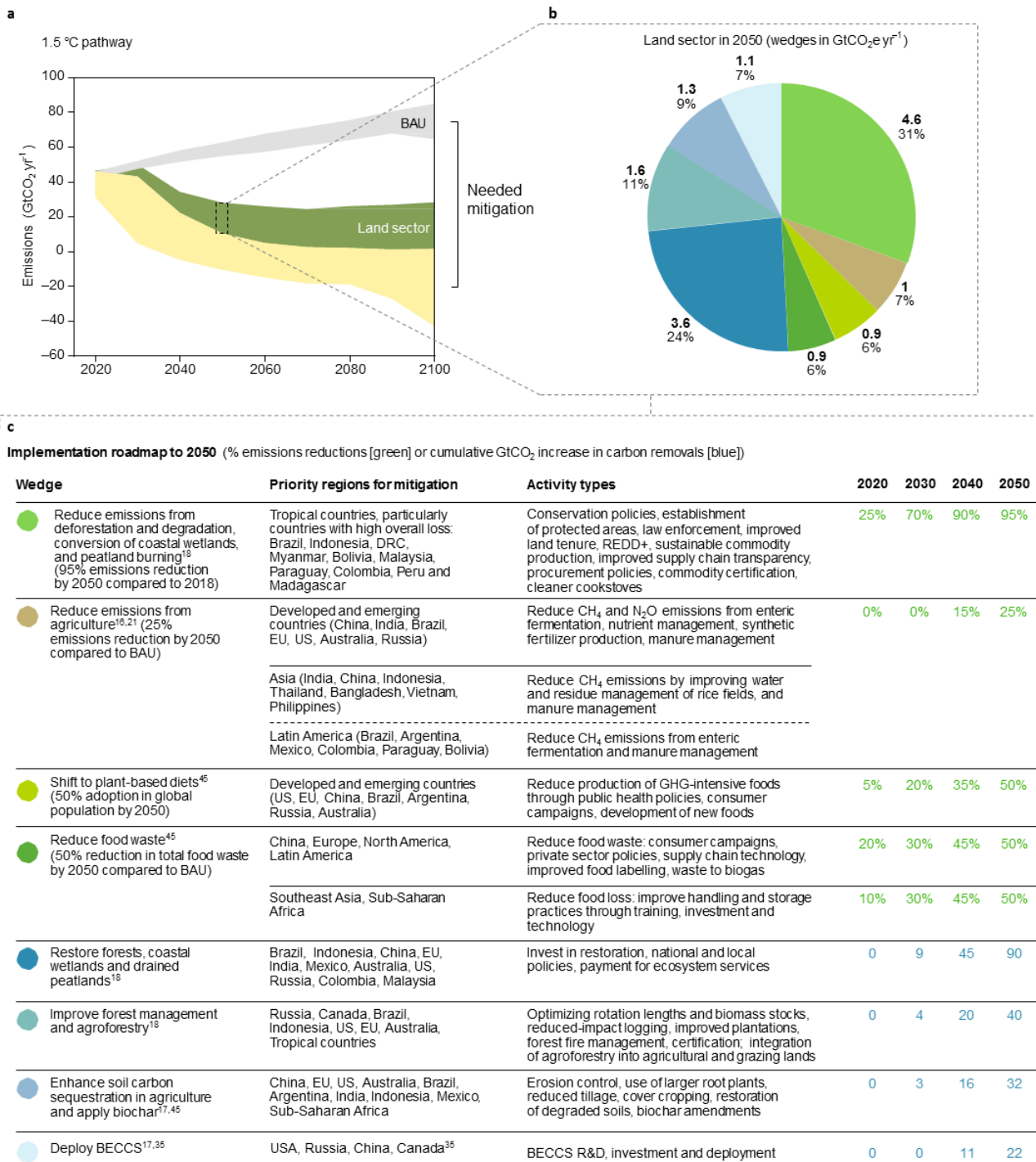


Fig. 6 | Land-sector roadmap for 2050. a, The land sector makes up 21–30% interquartile range (median 25%, approximately 14 GtCO₂e yr⁻¹) of the total mitigation in 2050 in modelled 1.5°C pathways (data from Fig. 2c). In the bottom-up assessment, the median mitigation potential of the land sector is about 15 GtCO₂e yr⁻¹ in 2020–2050, or about 30% of total mitigation needed. **b,** The needed mitigation is translated into eight priority land-based measures (wedges), combining the 24 land-based activities from the bottom-up assessment, and based on an analysis of co-benefits and risks, feasibility and sustainability to deliver mitigation of about 15 GtCO₂e yr⁻¹ by 2050 (detailed in Supplementary Tables 5 and 6). The green wedges represent emission reduction measures (7.4 GtCO₂e yr⁻¹), and the blue wedges represent carbon removal measures (7.6 GtCO₂e yr⁻¹). Each wedge is individually accounted for with the intent of avoiding double-counting (Supplementary Information Section 14). **c,** The implementation roadmap to 2050 details each wedge and related priority regions, activity types and implementation trajectories in per cent for emission reduction activities and cumulative GtCO₂e for carbon removal activities starting in 2020. The baseline and trajectory numbers in 2050 are based on the source used for each wedge (Supplementary Table 5). The 2020–2050 trajectories were developed through a political feasibility assessment combined with an expert assessment weighing trade-offs. A detailed details on priority regions and trajectories are provided in Supplementary Information Sections 13 and 14.

Roe, S., Streck, C., Obersteiner, M., Frank, S., Griscom, B., Drouet, L., Fricko, O., Gusti, M., Harris, N., Hasegawa, T., Hausfather, Z., Havlík, P., House, J., Nabuurs, G. J., Popp, A., Sánchez, M.J.S., Sanderman, J., Smith, P., Stehfest, E. and Lawrence, D. 2019. Contributions of Land Sector to 1.5°C World. In: Nature Climate Change [online] <https://www.nature.com/articles/s41558-019-0591-9>

LAND USE CLIMATE ACTION TABLES - STRUCTURE

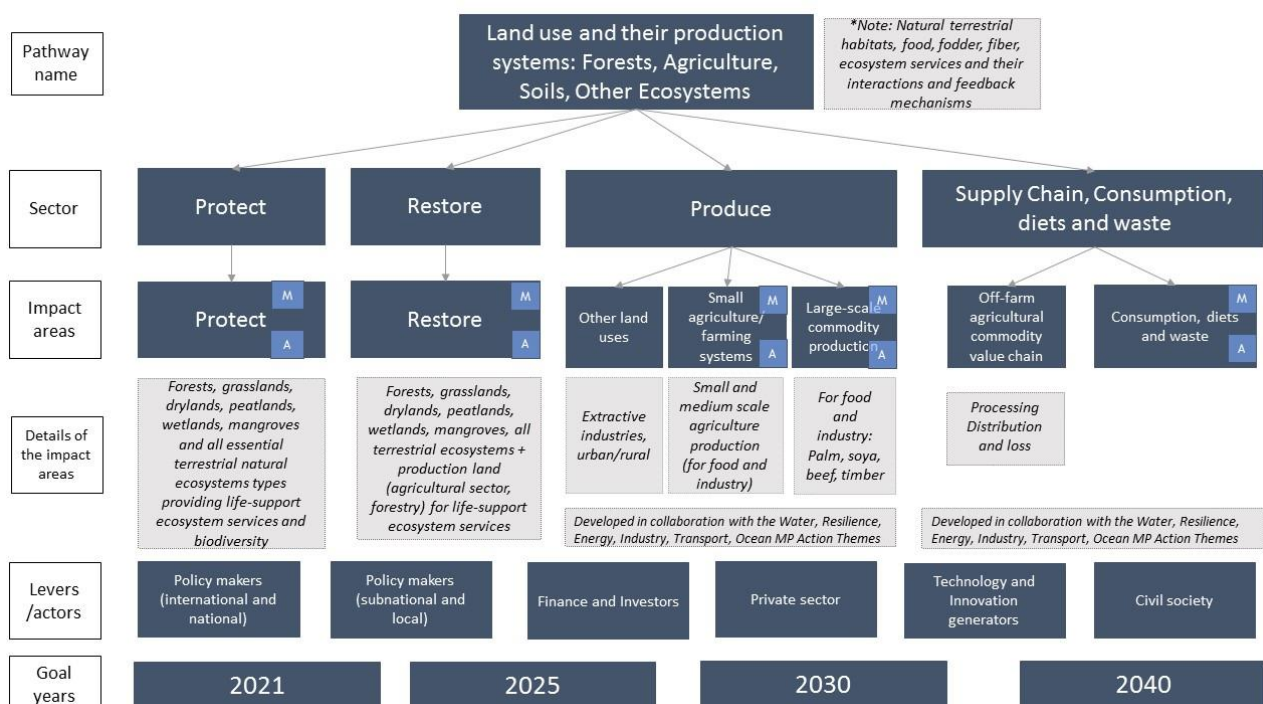
Land use or Agriculture, Forestry and Other Land Use (AFOLU) are major contributor to climate change, contributing with about 24 per cent of the anthropogenic greenhouse gas (GHG) emissions including through loss and degradation of forests and other ecosystems. At the same time broader natural ecosystems and agro-sylvo pastoral systems are in the front line of defense against climate extremes and weather variabilities, providing disaster risk reduction and adaptation for enhancing the resilience of livelihoods for food security and nutrition; it provides key solutions to achieve the goals of Paris Agreement. The Land Use Action Tables aims to address the complex nature of land use sectors and its interrelations and interactions.

The Land Use Action Tables are structured into four sub-sectors that correspond to classification of the IPCC Special Report on Climate Change and Land (IPCC, 2019):

- i. Protect;
- ii. Restore;
- iii. Produce; and
- iv. Supply chain consumption, diets and waste.

Overall seven impact areas addressing adaptation, resilience and mitigation actions were identified under the four sub-sectors, listing actions for each of the key groups of actors or levers to achieve by 2021, 2025, 2030 and 2040.

The diagram below provides additional details on the content of each impact area. Impact areas under sub-sectors i) and ii) are straightforward, while sub-sectors iii) and iv) are divided in a number of impact areas given that actions are distinct depending on the area's focus.



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