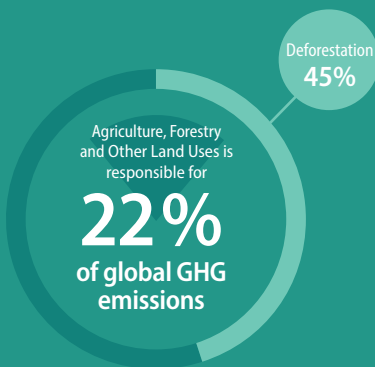


Limiting Global Warming: AFOLU Agriculture, Forestry and Other Land Uses

Land is currently a carbon sink, absorbing around 1/3 of human-caused emissions. Many mitigation options are available and ready to deploy but concerted, rapid and sustained effort by all stakeholders is a pre-requisite to achieving high levels of mitigation. Mitigation in this sector can't compensate for inaction in other sectors.

EMISSIONS SHARE

GETTING TO NET ZERO EMISSIONS



CO₂ emissions from deforestation have generally declined, with substantial differences by region.

- CH₄** Methane emissions continue to increase, mostly due to livestock and farming related activities, such as manure management and rice cultivation.
- N₂O** Nitrous oxide emissions are increasing, mostly due to nitrogen fertiliser use.

Mitigation options involve both reducing emissions and sequestering carbon (capturing carbon in the atmosphere and storing it on land and in products, such as harvested wood products like furniture and building materials).

Potential: AFOLU policies have mitigated about 1.4% of global emissions, but the sector can provide 20–30% of the mitigation needed for a 1.5°C or 2°C pathway towards 2050.

Low-cost options: Largest share of low cost options consist of reducing deforestation in combination with reforestation and sustainable forest management. This is followed by options in agriculture and demand-side measures.

Achieving net zero greenhouse gas emissions globally generally relies on reaching net negative CO₂ emissions from AFOLU.

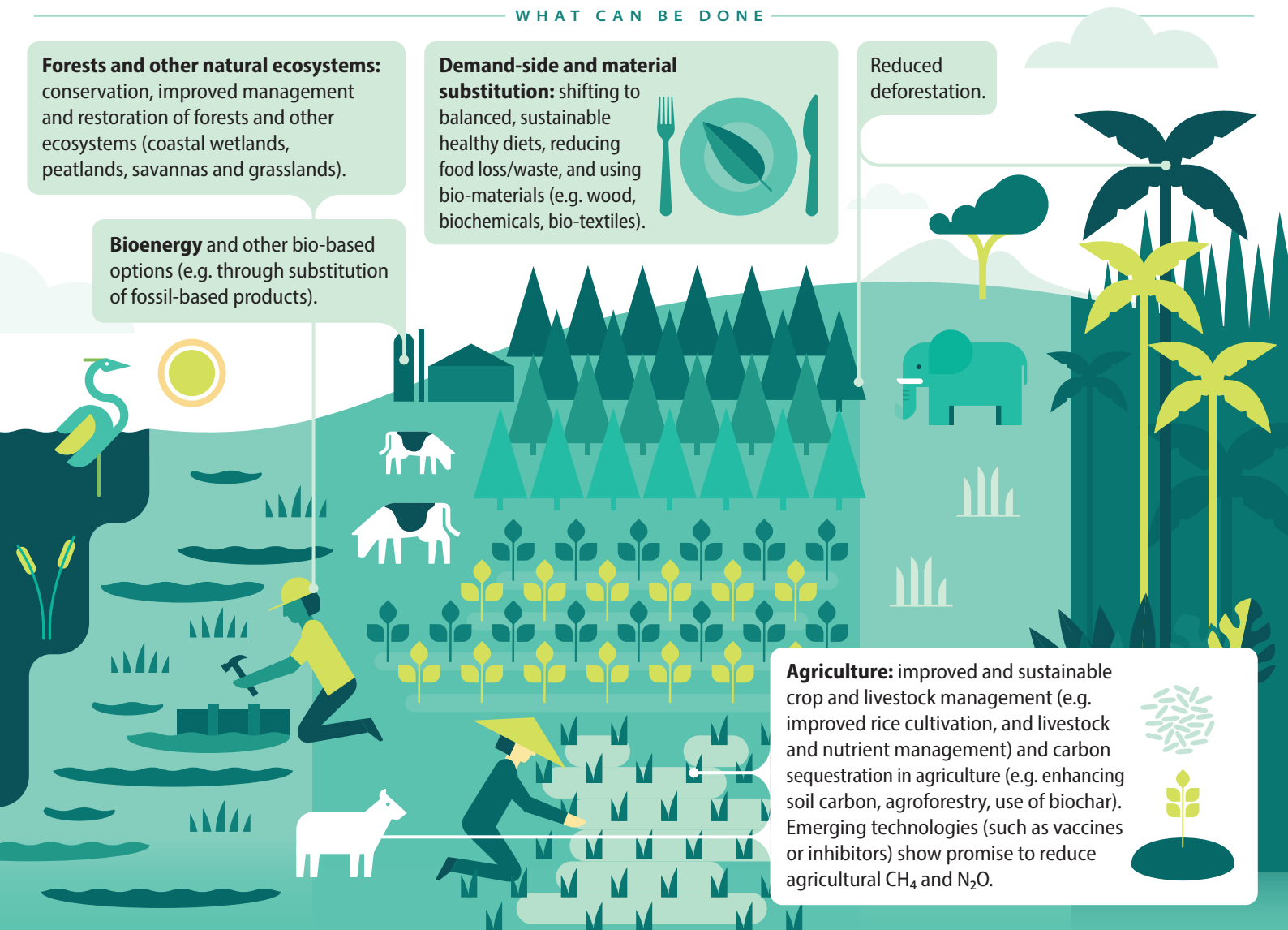
WHAT CAN BE DONE

Forests and other natural ecosystems: conservation, improved management and restoration of forests and other ecosystems (coastal wetlands, peatlands, savannas and grasslands).

Bioenergy and other bio-based options (e.g. through substitution of fossil-based products).

Demand-side and material substitution: shifting to balanced, sustainable healthy diets, reducing food loss/waste, and using bio-materials (e.g. wood, biochemicals, bio-textiles).

Reduced deforestation.



Agriculture: improved and sustainable crop and livestock management (e.g. improved rice cultivation, and livestock and nutrient management) and carbon sequestration in agriculture (e.g. enhancing soil carbon, agroforestry, use of biochar). Emerging technologies (such as vaccines or inhibitors) show promise to reduce agricultural CH₄ and N₂O.

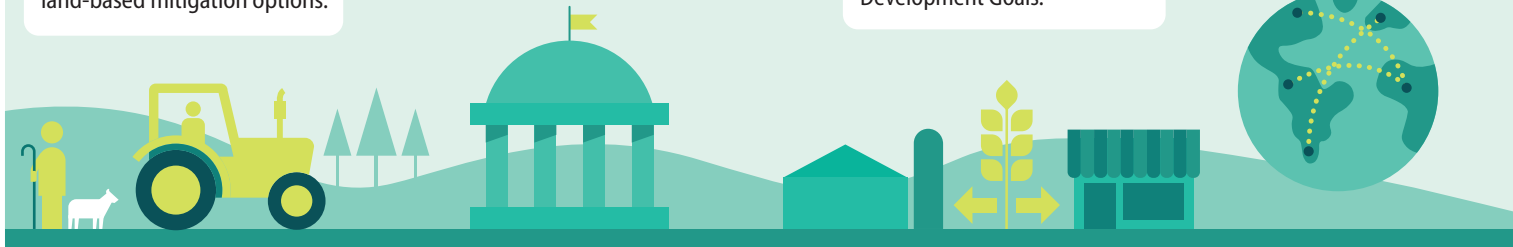
Mitigation options have synergies, risks and trade-offs with ecosystem services and sustainable development goals. Mitigation efforts should maximise synergies and minimise trade-offs.

Recognising and respecting diverse forms of knowledge: Indigenous Peoples, private forest owners, local farmers, and communities manage a significant share of global forests and agricultural land and play a central role in land-based mitigation options.

Drawing on **past experience with regulations, policies, economic incentives, and payments;** examples include establishing and respecting tenure rights and community forestry, improved agricultural management and sustainable intensification, biodiversity conservation, and payments for ecosystem services.

Governance emphasising **integrated land-use planning.** E.g. In agriculture and forestry, approaches that consider biomass, food and timber production alongside ecosystem services can deliver multiple Sustainable Development Goals.

Context-specific policies and measures have been **effective** in demonstrating AFOLU mitigation options, but some constraints hinder their application at large scales.

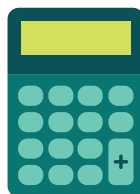


BARRIERS

Economic and political feasibility are hampered due to, for example, weak governance, insecure land ownership, low incomes and the lack of access to alternative sources of income, the risk of policy reversal, and lack of accountability and institutional capacity.

Cost of mitigation options and insufficient institutional and financial support. The investment gap is wide for all sectors, but widest for AFOLU. Current government funding efforts are insufficient to realise the sector's economic potential. A gradual redirection of existing agriculture and forestry subsidies would greatly advance mitigation.

- Limited access to **technology, data, and know-how**
- **Reconciling alternative methods for calculating** emissions and sinks of human caused CO₂ on land greatly enhances the credibility of AFOLU-based emissions offsetting. It would also assist in assessing collective progress in a global stocktake.



USD 400 billion per year by 2050 would be needed for the AFOLU sector to cover the investment gap.

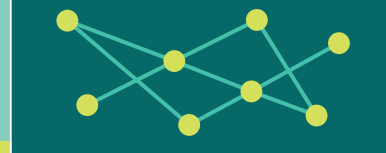
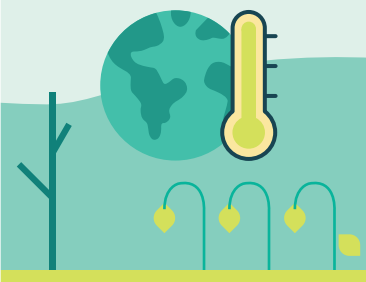


Research priorities include better understanding of the impacts of climate change on mitigation potential, and improved measurement, reporting and verification (for example, processing data quickly in real-time and at a low cost).

Targeted research is needed to develop appropriate country-level, locally specific, policy and land management response options.

Climate change itself may threaten the capacity of the land to support both mitigation functions and other services land provides (e.g. food).

Differences in cultural values, diversity and complexity of agricultural systems and consumer contexts, maximising synergies and minimising trade-offs of mitigation options, increasing demands on agricultural yields and livestock products, widespread landowner decision makers all make it challenging to achieve deep and sustained mitigation in AFOLU.



LINKAGES

Co-benefits: Sustainable **intensification of agriculture**, shifting to balanced and sustainable healthy diets, and reducing **food waste** could enhance efficiencies and **reduce agricultural land needs.** These are critical for **enabling supply-side measures** such as **reforestation**, restoration, as well as **decreasing methane and nitrous oxide** emissions from agricultural production.



Trade-offs: AFOLU mitigation options that **compete** for land and land-based resources (such as biomass for energy) can pose **risks**, e.g. for food and water security, wood supply, livelihoods and land tenure and land-use rights of Indigenous Peoples, local communities and small land owners. Risks vary depending on the activity undertaken, context, and time frame, but **can be avoided when activity is pursued in response to the needs and perspectives of multiple stakeholders** to achieve outcomes that maximize co-benefits while limiting trade-offs.



To read full AR6 Working Group III report, please visit www.ipcc.ch/report/ar6/wg3