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Land use related mitigation benefits and co-benefits of policies, practices and actions for enhancing mitigation ambition and options for supporting their implementation

Technical paper by the secretariat

Summary

This updated technical paper compiles information on mitigation benefits and co-benefits of policies, practices and actions for enhancing mitigation ambition in land use. It also includes examples of options for supporting the implementation of these policies, practices and actions. The paper is based on presentations and discussions that took place at the technical expert meeting on mitigation, including the collaboration forum, held during the forty-sixth session of the subsidiary bodies, and on a review of the latest literature. It is an update of the technical paper contained in documents FCCC/TP/2014/13 and Add.1, and FCCC/TP/2015/4 and Add.1 and 2. For the updated technical paper on mitigation benefits and co-benefits of policies, practices and actions for enhancing mitigation ambition in urban environments, see document FCCC/TP/2017/2.

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Contents

I. Background

A. Mandate

1. This technical paper, prepared in response to the request of the Conference of the Parties (COP) at its twenty-first session, focuses on mitigation benefits and co-benefits of policies, practices and actions in land use for enhancing mitigation ambition and options for supporting their implementation. This is an update of the technical paper contained in document FCCC/TP/2014/13 and Add.1. This update does not supersede the previous technical paper; it builds on the findings and information contained therein.

2. This technical paper is based on information provided at the technical expert meeting (TEM) on mitigation focusing on land use issues held during the forty-seventh sessions of the subsidiary bodies in Bonn, Germany, from 8 to 12 May 2017. It draws on presentations and discussions that took place during the TEM, including the collaboration forum, and relevant literature.

B. Objective

3. The objectives of this technical paper are to present compiled information on mitigation policies, practices and actions to unlock mitigation potential in the agriculture, forestry and other land use (AFOLU) sector; and to facilitate a transition in discussions under the technical examination process (TEP) on mitigation from policy and action identification to transformational policy and action implementation. With these objectives, the paper presents policy options and good practices that can enhance mitigation ambition of pre-2020 action and support the achievement of sustainable development. The experience and lessons learned from implementing policies, practices and actions presented are intended to support Parties and non-Party stakeholders alike in facilitating the implementation of policies, practices and actions in the AFOLU sector identified during this process in accordance with national sustainable development priorities. To facilitate the achievement of this objective, the paper highlights examples of successful policies, actions and approaches as best practices that provide valuable lessons that may be replicated and scaled up, in accordance with national circumstances. It also presents examples of successful enabling initiatives, practices and cooperation in support of countries, farmers, livestock owners, foresters, other land users and related stakeholders to address climate challenges, replicate solutions and overcome barriers to bring climate and sustainable development goals to fruition and achieve transformational policy implementation.

4. The information presented in this technical paper does not imply consensus among Parties on the issues or options covered at the TEMs; rather, it provides an overview of the discussions that took place along with supplementary information from relevant literature.

C. Structure

5. Chapter I contains background information on the mandate for, and objectives and structure of, the technical paper. Chapter II presents information on mitigation potential, progress, benefits, costs and barriers to actions in the AFOLU sector. Chapter III provides examples of existing opportunities, practices, policies and actions in place to achieve mitigation in relation to land use. Chapter IV provides examples of support available and enabling practices likely to increase the mitigation ambition of implemented actions in land use. Chapter V concludes by recommending possible next steps for advancing the TEP on mitigation and increasing the mitigation ambition of actions in the AFOLU sector in the pre-2020 period.

II. Mitigation potential, progress, benefits, costs and barriers

6. Emissions from the AFOLU sector are mainly the result of loss of carbon stocks from the conversion of forests (i.e. deforestation) and forest degradation, direct emissions from livestock (e.g. enteric fermentation, manure left on pasture and manure management), and crop production (e.g. synthetic fertilizer use, rice cultivation and residue burning).

7. The AFOLU sector is often the principal source of emissions in low-income countries with limited industrial bases, generating the majority of national greenhouse gas (GHG) emissions.

8. In 2010, the AFOLU sector was the second largest emitter, after the energy sector, accounting for nearly 25 per cent of global GHG emissions (10–12 gigatonnes of carbon dioxide equivalent per year (Gt CO_2 eq/year)) (Edenhofer et al., 2014). Direct emissions from agriculture contributed 10–12 per cent of global GHG emissions (5.4–5.8 Gt CO_2 eq) and emissions from forestry and other land use (including land-use change) contributed approximately 12 per cent of global GHG emissions (5.8 Gt CO_2 eq) (Tubiello et al., 2013; Edenhofer et al., 2014).

9. From 1990 to 2010, non-CO_2 GHG emissions from agriculture increased by an average of 0.9 per cent per year, with a slight increase in the rate of growth after 2005. Since the mid-2000s, agriculture has been a larger source of global GHG emissions than deforestation (Tubiello et al., 2013; Edenhofer et al., 2014). Estimates of CO_2 flux from forestry and other land use indicate that there has been a decline in global emissions from land-use change over the most recent years largely owing to a decrease in the rate of deforestation (Edenhofer et al., 2014).

10. The subchapters below provide more details on the mitigation potential, progress, benefits and barriers to mitigation action in the AFOLU sector.

A. Mitigation potential

11. The AFOLU sector harbours significant mitigation potential. At the same time, the sector, especially through agriculture, plays a central role in food security, rural livelihoods and sustainable development. In agriculture, mitigation is therefore generally part of broader sustainable development objectives, such as enhancing productivity, livelihoods and food security.

12. Speakers at the TEM identified that the potential in the AFOLU sector for large-scale mitigation and adaptation is not fully tapped. In addition, there is a high degree of complexity involved in the measurement, reporting and verification of GHG emissions and removals in the AFOLU sector. Estimating emissions and removals from land-use activities is challenging because of the distributed nature of emissions sources, the multitude of processes involved, and the high level of uncertainty often involved in measuring changes in carbon stocks, in particular for soil organic carbon. Many countries simply use aggregate land-use statistics (i.e. activity data) and default emission factors (tier 1 methods), while others have begun to use more advanced methods, employing a mixture of remote sensing, ground measurements and surveys, and process-based models (National Research Council, 2010).

13. Since forests have high carbon reserves, reducing deforestation and forest degradation holds significant mitigation potential. Examples of international initiatives aiming to achieve mitigation in relation to forests, for example REDD-plus,[1] were discussed at the TEM. REDD-plus was recognized in Article 5 of the Paris Agreement and serves as an example of a mitigation action with multiple sustainable development benefits, and for which there is considerable momentum for pre-2020 climate mitigation action. For example,

[1] In decision 1/CP.16, paragraph 70, the Conference of the Parties encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

the recently submitted REDD-plus results for reducing emissions from deforestation in the Amazon biome documented in a REDD-plus technical annex to Brazil's biennial update report is an example of this mitigation potential translating to action. The results are the first that have been fully measured, reported and verified[2] in accordance with the Warsaw Framework for REDD-plus.[3] Based on the forest reference emission level for deforestation in the Amazon biome,[4] Brazil measured emission reductions of just over 6 Gt CO_2 eq between 2006 and 2015:[5] in comparison with the estimates for global emissions from forests for 2010 (5.8 Gt CO_2 eq), this is a significant mitigation action, highlighting the potential of the sector.

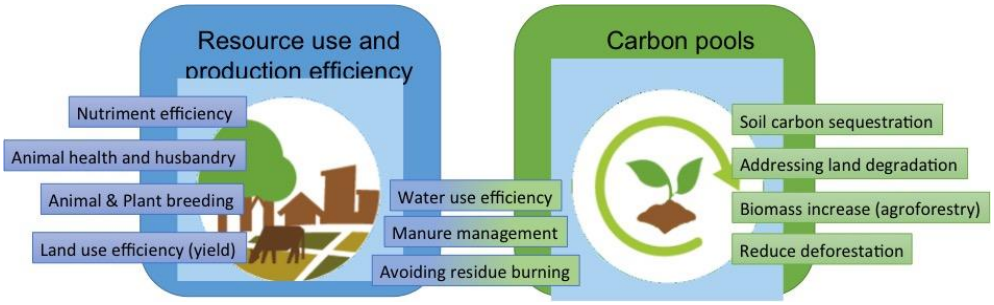
14. Wetlands, especially mangroves, tropical peat and coastal wetlands, also deserve special attention given their high carbon reserves. Protecting and restoring such ecosystems offers significant mitigation potential. The Intergovernmental Panel on Climate Change (IPCC) recently published a supplement on wetlands to the national GHG inventory guidelines, which may assist a greater number of countries in reporting GHG emissions and removals from wetlands, which is a necessary first step for assessing mitigation potential (IPCC, 2014a).

15. The IPCC (IPCC, 2014b) estimates the future economic mitigation potential of supply-side measures (i.e. measures aimed at reducing GHG emissions per unit of land, animal or product) for various carbon prices. It is estimated that by 2030 the mitigation potential in the AFOLU sector will be between 7.18 and 10.6 Gt CO_2 eq/year, at a cost of up to USD 100/t CO_2 eq: that is to say, if carbon prices reach USD 100/t CO_2 eq in 2030, the AFOLU sector could abate between 7.18 and 10.6 Gt CO_2 eq from global GHG emissions.

B. Benefits

16. Significant experience has now been gained in the implementation of land-use mitigation options. The options generally fall into one of two broad categories, which are often linked: (1) resource use and production efficiency; and (2) GHG emissions and removals (i.e. carbon pool storage and replenishment). The figure below shows examples of these land-use mitigation options as presented at the TEM.

The agriculture, forestry and other land use sector can substantially contribute to the mitigation of greenhouse gas emissions



17. Yield gains and productivity increases are considered a way to reduce the pressure on natural forests and the expansion of agricultural land (and aquaculture) into valuable natural ecosystems.

[2] FCCC/SBI/ICA/2015/TATR.1/BRA and FCCC/SBI/ICA/2017/TATR.2/BRA.
[3] http://redd.unfccc.int/fact-sheets/warsaw-framework-for-redd.html.
[4] FCCC/TAR/2014/BRA.
[5] Brazil's biennial update reports are available at http://unfccc.int/national_reports/non-annex_i_natcom/reporting_on_climate_change/items/8722.php.

18. TEM participants agreed that GHG emissions in agriculture are under-recognized and that the potential for large-scale mitigation and adaptation is not fully appreciated. Rice-production mitigation options and the World Business Council for Sustainable Development (WBCSD) Climate-smart Agriculture Programme were cited as just two examples of emission reduction options offering significant mitigation and adaptation benefits.

19. Recent reports and other publications have covered examples of agricultural mitigation options in detail, including animal health (see FAO, 2016) and soil carbon sequestration (see FAO 2017; Paustian et al., 2016), which were highlighted by presenters at the TEM.

20. While implementing these mitigation options to reduce GHG emissions from the AFOLU sector is imperative for keeping global warming below 2 degrees Celsius, mitigation actions, as previously mentioned, also provide a variety of sustainable development co-benefits.[6] AFOLU mitigation measures can support the enforcement of sectoral policies (e.g. conservation policies) and cross-sectoral coordination of policies in the AFOLU sector. AFOLU mitigation measures linked to increased food production (e.g. agroforestry, intensified agricultural production and integrated systems) can enhance food security.[7] Reducing emissions from the AFOLU sector may also improve air, soil and water quality, benefitting human health and well-being. AFOLU mitigation measures can also promote the conservation of biological diversity, and often have positive effects on water resources.

21. Finally, AFOLU mitigation measures can promote innovation, increasing agricultural and sylvicultural efficiency thereby potentially freeing land for carbon sequestration and/or bioenergy production (for a more detailed discussion of co-benefits, risks and spillovers see Smith et al., 2014).

C. Progress

22. In addition to a growing body of literature on land-use mitigation options and co-benefits, progress is evident from various country-specific initiatives, including those presented at the TEM and summarized in chapter III. Initiatives are also under way at the international level focusing on mitigation and adaptation in agriculture, reducing emissions from deforestation and forest degradation (REDD-plus), conserving and restoring coastal and marine ecosystems, and supporting countries in achieving the mitigation potential detailed in chapter II.A above.

23. International organizations, programmes and partnerships – such as the Food and Agriculture Organization of the United Nations, the Forest Carbon Partnership Facility (FCPF),[8] the United Nations Development Programme, the United Nations Environment Programme, the UNFCCC and the UN-REDD Programme – facilitate these initiatives and document progress in their annual reports (see FCPF, 2016; UN-REDD Programme, 2016).

[6] For example, AFOLU mitigation measures may result in the clarification of land tenure and the harmonization of land-use rights for multiple social groups, including indigenous peoples and local communities.

[7] Other measures (e.g. forest or energy crop plantations) can reduce food production, at least locally.

[8] FCPF is a global partnership of governments, businesses, civil society and indigenous peoples focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, sustainable forest management and enhancement of forest carbon stocks in developing countries (i.e. REDD-plus). It has four strategic objectives: (1) to assist countries in their REDD-plus efforts by providing them with financial and technical assistance in building their capacity to benefit from possible future systems of positive incentives for REDD-plus; (2) to pilot a performance-based payment system for REDD-plus activities with a view to ensuring equitable benefit-sharing and promoting future large-scale positive incentives for REDD-plus; (3) within the approach to REDD-plus, to test ways to sustain or enhance livelihoods of local communities and to conserve biodiversity; and (4) to disseminate broadly the knowledge gained in the development of the facility and the implementation of readiness preparation proposals and emission reduction programmes.

24. According to its 2016 report, the UN-REDD Programme supports nationally led REDD-plus initiatives in 64 developing countries; 14 partner countries have submitted forest reference emission levels/forest reference levels (FRELs/FRLs), and 10 additional countries have increased their capacities in and understanding of FRELs/FRLs through training. Forty countries are putting in place their national forest monitoring systems, several of them generating forest data for the first time. Twenty-six countries are preparing national REDD-plus strategies or action plans. There has been significant technical and political support for developing REDD-plus policies and measures and numerous other examples of achievements at the national level. More than 30 countries are developing approaches to meet UNFCCC safeguards while 9 are each developing a safeguard information system. Among the many countries addressing governance, tenure and gender issues related to REDD-plus, 29 have set up mechanisms to promote the inclusion and participation of indigenous peoples, local communities and civil society organizations in formulating national REDD-plus policies. The UN-REDD Programme also serves as a major platform for knowledge-sharing (UN-REDD Programme, 2016).

25. In addition, 47 countries selected for FCPF have signed participation agreements. Of the more than USD 1.1 billion total funds committed to FCPF, USD 370 million is committed to the Readiness Fund and USD 750 million to the Carbon Fund. USD 236 million in readiness grant funding has been allocated, USD 178 million made available in signed grants and USD 246 million leveraged in non-FCPF investments in readiness. Thirty-nine countries have signed readiness preparation grants, 19 are in the Carbon Fund pipeline, and Costa Rica and the Democratic Republic of the Congo have presented fully fledged emission reduction programmes to the Carbon Fund and will soon begin receiving payments from FCPF for emission reductions achieved from reduced deforestation and forest degradation (i.e. for conserving tropical forests at scale) (FCPF, 2016).

26. Many countries are showcasing their national accomplishments, while international initiatives, especially related to REDD-plus, are funding progress and laying the foundations for accelerated mitigation actions for and significant emission reductions from the AFOLU sector.

D. Barriers

27. Despite the significant potential for mitigation and progress in the AFOLU sector, there are barriers to implementation due to the complexity of drivers of land use and land-use change.

28. Barriers to scaling and replicating land-use mitigation actions fall into four main categories: (1) socioeconomic; (2) environmental; (3) institutional; and (4) technological. Although not insurmountable, in each context or country there will be an intersection of socioeconomic, environmental, institutional and technological barriers that may result in implementation difficulties or may hinder replication and scaling up. These barriers, as summarized in the previous version of the technical paper (see document FCCC/TP/2014/13/Add.1, table 1), include:

(a) Socioeconomic barriers:

(i) Lack of sufficient upfront finance to cover transaction and monitoring costs;

(ii) Long implementation time frames requiring significant resource allocations that are challenging for donors and countries. Furthermore, long time periods are required to overcome social resistance, ensure engagement of indigenous peoples and incorporate diverse value systems;

(iii) Complications resulting from the multiple objectives influencing the drivers of land use and land-use change from different economic sectors and policy contexts, such as food security and development;

(b) Environmental barriers:

(i) Diverse environmental conditions that render the replication and scaling up of mitigation actions difficult;

(ii) Depletion and degradation of land, which reduces the availability of productive land and influences land-use decision-making;

(c) Institutional barriers: inadequate subnational and cross-sectoral integration. Coordination is required for national, subnational and local implementation. Further, because of complex policy drivers of on forestry and other land uses, cross-sectoral integration is necessary to create an enabling environment for implementation;

(d) Technological barriers: complexity of methods for measurement, reporting and verification, and capacity barriers in implementing these methods.

29. To address these barriers and facilitate the successful implementation of mitigation actions, there needs to be an enabling environment characterized by factors including:

(a) Integrated approaches to land use, balancing agricultural needs for production and food security with the sustainable management and conservation of forests;

(b) Clear linkages between mitigation actions and social, environmental and governance-related development objectives covering a range of sustainable development goals;

(c) High-level government commitment, clear mandates and the inclusion and participation of cross-sectoral stakeholders;

(d) Sufficient financial support that is tailored to national and local circumstances;

(e) Adequate governance through strengthened institutional arrangements and legal and regulatory frameworks;

(f) Context-specific local priorities and solutions.

30. The successful implementation of mitigation options in the AFOLU sector requires the establishment of an enabling environment and the consideration of socioeconomic, environmental, institutional and technological factors. The following chapter provides examples of country-specific implementation and highlights best practice policies, actions and approaches that may be replicated and scaled up in the context of specific national circumstances.

III. Policy and technology solutions to unlock mitigation potential

31. This chapter summarizes examples presented at the TEM of opportunities, practices, policies and actions used to achieve mitigation in relation to land use.

32. Lessons can be learned from the implementation of successful AFOLU mitigation initiatives. A number of speakers informed the TEM of how their countries had implemented effective mitigation actions. Their presentations provided examples of potentially scalable and replicable climate mitigation actions. Selected examples are provided in boxes 1 and 2. In addition to showcasing country-specific mitigation actions, the speakers provided insights based on their country's experience, stressing, for example, the importance of institutional arrangements, tracking and documenting progress, engaging with a broad range of stakeholders, and links with broader land-use and development plans.

Box 1

Examples of agricultural activities with climate and sustainable development benefits

Botswana: the Botswana Institute for Technology Research and Innovation presented on the scaling-up of low-cost drought-tolerant fodder crops in Botswana. *Lablab purpureus* is a drought-tolerant fodder legume native to Africa. Since it restores soil fertility through nitrogen fixation, it has the potential to reduce nitrogen fertilizer application and nitrous oxide (N_2O) emissions.

Brazil: the Brazilian Agricultural Research Corporation of the Ministry of Agriculture, Livestock and Food Supply presented on Brazil's climate actions in agriculture, including the Low-carbon Agriculture Plan (ABC Plan) and integrated crop–livestock forestry systems. The ABC Plan,

launched in 2009, aims to increase agricultural production, adaptation and resilience, and mitigate carbon emissions. Emission reductions come from pasture recovery, integrated crop–livestock forestry systems, biological nitrogen fixation, planted forests, no-tillage systems and manure treatment. For example, integrated crop–livestock forestry adoption in Brazil covered 11.5 million hectares by 2015 and contributed an estimated carbon dioxide (CO_2) mitigation potential of 35.1 million metric tonnes of carbon dioxide equivalent in the period 2005–2015. Brazil has expanded the adoption of low-carbon agriculture beyond the ABC Plan by moving from federal to state and local programmes, from public to private financing, and from ABC Plan training courses to widespread technical knowledge-sharing.

Japan: the Ministry of Agriculture, Forestry and Fisheries in coordination with the Institute for Agroenvironmental Sciences and National Agriculture and Food Research Organization presented on Japan's soil carbon management initiatives, including long-term monitoring of agricultural soils and calculation models for soil organic carbon stock in cropland (e.g. the modified Rothamsted Carbon model) and for methane (CH_4) emissions from rice cultivation (Denitrification–Decomposition-Rice model). Results suggest that mitigation scenarios aimed at increasing soil carbon inputs will decrease CO_2 emissions but increase CH_4 emissions from rice cultivation and N_2O emissions from fertilizer application. Therefore, successful mitigation scenarios for Japan (and other Asian countries with similar rice cultivation activities) will need to combine mitigation options for CH_4 and N_2O in addition to those for soil carbon. The Greenhouse Gas Mitigation in Irrigated Rice Paddies in Southeast Asia research project, funded by the Ministry of Agriculture, Forestry and Fisheries, is assessing the feasibility of greenhouse gas mitigation through alternative wetting and drying in irrigated rice fields, with results showing an effective reduction in CH_4 and N_2O emissions without a significant reduction in rice yield.

Kenya: the State Department of Agriculture presented on Kenya's policies in support of climate mitigation and the climate benefits of agroforestry activities. The 2010 Constitution of Kenya calls for the maintenance of at least 10 per cent tree cover, the Farm Forestry Rules of 2009 require that at least 10 per cent of all agricultural land holdings are under tree cover, and the Forest Act 2015 recognizes the role forests play in soil and water restoration and climate moderation. Kenya has also established the Natural Resources Benefits Sharing Bill 2014, which shares ecosystem-service benefits between users and the government, and the Agriculture Sector Development Strategic Plan. Kenya is also in the process of aligning these policies with its Constitution.

Agroforestry offers the highest potential for carbon sequestration (i.e. the highest sequestration factor per unit area) among the land use options analysed in Kenya's national inventory report, and while the number of trees in forests is declining, the number of trees on farms is increasing. In addition, agroforestry has contributed to reduced forest degradation from fuelwood extraction and promoted fuelwood, timber harvesting and other tree products from planted rather than natural forests. Agroforestry has also improved soil health and restored soil integrity, provided livestock feed from agroforestry shrubs, and integrated tree cover with annual crops.

New Zealand: the Ministry for Primary Industries presented on agricultural activities with climate and sustainable development benefits with a focus on New Zealand's livestock sector. A high proportion (49 per cent) of New Zealand's emissions are from the agriculture sector and over 40 per cent are CH_4 emissions. While the emission intensity of the economy has decreased by 34 per cent since 1990, the focus is now on improving agricultural productivity, efficiency and resilience, and reducing the environmental footprint. For example, the emission intensity related to beef, dairy and sheep farming fell by 30.9 per cent, 24.5 per cent and 30.5 per cent, respectively, from 1990 to 2014. These emission intensity reductions reflect the various mitigation efforts initiated in New Zealand. For example, the Sustainable Dairy Water Accord, which established riparian buffers and excluded livestock from waterways, reduced greenhouse gas emissions by 4 per cent (13 per cent, including land use). New Zealand has invested heavily in mitigation research and development, including the New Zealand Agricultural Greenhouse Gas Research Centre[a] and Primary Growth Partnership.[b] In addition, New Zealand is engaged in various international initiatives, including the Global Research Alliance on Agricultural Greenhouse Gases and the Climate and Clean Air Coalition.

[a] NZAGRC, as a partnership between the leading New Zealand research providers working in the agricultural greenhouse gas area and the Pastoral Greenhouse Gas Research Consortium, is a virtual centre and the research it funds is carried out by researchers working in their own organizations. NZAGRC was created to build on existing research, working with existing organizations to create an effective, trusted partnership to bring cost-effective, simple solutions to New Zealand farms, and contribute world-leading

results to the international science community.

[b] The Primary Growth Partnership invests in long-term innovation programmes in partnership with industry to increase the market success of primary industries. The partnership aims to: boost productivity, value and profitability in the primary sector; deliver long-term economic growth and sustainability across primary industries, from producer to consumer; and encourage more private investment in research and development in New Zealand.

Box 2

Activities related to forestry and other land use with climate and sustainable development benefits in Australia, Colombia, France and Indonesia

Australia: the Department of the Environment and Energy presented on Australia's experience with project-level land-use sector mitigation. Australia established the Emissions Reduction Fund, which has contracted 435 projects with an estimated total mitigation potential of 189 million tonnes of carbon dioxide equivalent (t CO_2 eq). The estimated mitigation potential includes reductions associated with increases in carbon stocks (12.2 million t CO_2 eq), agriculture (17.7 million t CO_2 eq) and savannah burning (13.8 million t CO_2 eq). Examples of projects include the human-induced regeneration of native forests, controlled savannah burning to reduce the risk of wildfires, and projects designed to source least-cost abatement from across the Australian economy.

Colombia: the Ministry of Environment and Sustainable Development presented on REDD-plus implementation. Colombia has achieved a significant reduction (56 per cent) in deforestation rate, from a loss of 282,027 hectares in 2010 to one of 124,035 hectares in 2015. This corresponds to emission reductions of 28,983,527 t CO_2 eq for the period 2013–2014.[a] Colombia's deforestation control strategy includes: a shared vision for forests; land-use planning and zoning; monitoring, prevention and control; and institutional arrangements, finance and capacity-building. Colombia has moved from monitoring deforestation to implementing control actions to prevent deforestation, and proposed various institutional arrangements, including establishing a national council on deforestation for high-level coordination and decision-making, monitoring coordination to provide criteria and technically sound recommendations, and operational coordination to provide planning and execution of control actions targeting unauthorized deforestation events.

France: the Ministry of Agriculture, Agrifood and Forestry presented on agroforestry and forestry mitigation activities in France. France has established a national agroforestry plan, developed a research-development network and supported farmers with their projects. French agroforestry systems include mixed fields and hedges, silvopasture, orchards with pasture, and alley-cropping, the latter covering 5,000–10,000 hectares nationwide. The soil carbon sequestration from alley-cropping contributes to France's "4 per 1,000" soils for food security and climate initiative.[b] Forests covered 16 million hectares (or 31 per cent) of France in 2014. In May 2016, France launched the Sylv'ACCTES project to incentivize forest carbon through collective forest management. The project offers results-based payments upon the demonstration of mitigation, biodiversity and socioeconomic benefits.

Indonesia: the Ministry of Environment and Forestry presented on REDD-plus implementation and the role of peatlands in Indonesia. Indonesia's forests cover 128.9 million hectares (60 per cent of its total land area), 113.2 million hectares of which are natural. From 1990 to 2012, the deforestation rate was 0.918 million hectares per year and the forest degradation rate 0.5 million hectares per year. Indonesia estimates that approximately 96.5 million hectares of forest are potential areas for REDD-plus, including 6.7 million hectares of forested and 4.4 million hectares of unforested peatlands. Indonesia has already submitted a forest reference emission level and successfully completed the technical assessment process.[c] In addition, Indonesia has entered into bilateral and multilateral agreements with various entities, including Norway, the Forest Carbon Partnership Facility Carbon Fund, the BioCarbon Fund and the Forest Investment Programme, which provide support to reach results-based payments.

[a] FCCC/SBI/ICA/2016/TATR.1/COL.
[b] http://4p1000.org/.
[c] FCCC/TAR/2016/IDN.

33. The summaries in boxes 1 and 2, drawn from the country-specific presentations given during the TEM, highlight substantial, successful and potentially scalable and replicable policies and actions. The examples span the range of mitigation options previously identified for the AFOLU sector and show that the implementation of successful AFOLU mitigation initiatives is possible in a variety of country-specific circumstances and objectives. The following chapter presents examples of enabling practices, which are not specific to country circumstances and objectives, for accelerating the implementation of low-emission policies and technology solutions.

IV. Accelerating implementation of low-emission policies and technology solutions in land use

34. This chapter describes the support available and enabling practices likely to increase the mitigation ambition of implemented actions. It presents examples of enabling practices for accelerating the implementation of low-emission policies and technology solutions presented at the most recent TEMs, including the collaboration forum, held in Bonn from 8 to 12 May 2017, in two thematic areas: existing partnerships; and the role of non-Party stakeholders, including the private sector.

A. Existing partnerships

35. As noted above, a number of existing partnerships support a range of international initiatives relating to the AFOLU sector. In addition, effective and scalable partnerships between the public and private sector have been established relating to multiple commodities, soil health and nutrient management.

36. Organizations often collaborate to develop technical materials or share knowledge that equip countries with guidance and tools for mitigation actions in the AFOLU sector. For example, in the agriculture sector, notable research programmes and multi-stakeholder initiatives include the Consultative Group on International Agricultural Research (CGIAR) Research Program on Climate Change, Agriculture and Food Security (CCAFS) and the Global Alliance for Climate-Smart Agriculture (GACSA).

37. CCAFS addresses the effects on agricultural practices, policies and measures of the increasing challenges of global warming and declining food security through a strategic collaboration between CGIAR and Future Earth. Led by the International Center for Tropical Agriculture, CCAFS is a collaboration among all 15 CGIAR research centres. In addition, there is an ongoing engagement with Future Earth as a major international partner. CCAFS brings together some of the world's best researchers in agricultural, climate and environmental science and the social sciences to identify and address the most important interactions, synergies and trade-offs between climate change and agriculture. CCAFS will define and implement an innovative and transformative research programme to address agriculture in the context of climate variability, climate change and the future uncertainty of climate conditions.

38. GACSA is an inclusive, voluntary and action-oriented multi-stakeholder platform on climate-smart agriculture. Its vision is to improve food security, nutrition and resilience in the face of climate change. GACSA aims to catalyse and help create transformational partnerships to encourage actions that reflect an integrated approach to the three pillars of climate-smart agriculture: productivity, adaptation and mitigation. GACSA fosters learning, knowledge-sharing and partnership-building, and provides a space for dialogue and debate. GACSA works towards three aspirational outcomes: (1) improve farmers' agricultural productivity and incomes in a sustainable way; (2) build farmers' resilience to extreme weather and changing climate; and (3) reduce GHG emissions associated with agriculture where possible. Context-specific priorities and solutions must be aligned with national policies and priorities.

39. In addition to the research-based programmes (e.g. CCAFS) and multi-stakeholder initiatives (e.g. GACSA), there is a number of partnerships that more directly support the funding and implementation of climate action (e.g. FCPF).

B. Role of non-Party stakeholders, including the private sector

40. Farmers, livestock owners, foresters and other land owners are the most important private sector actors whose engagement is required in climate mitigation actions and implementing solutions on the ground. In addition, the private sector and public–private partnerships play a key role in providing finance and supporting solutions.

41. Attracting private sector engagement is important for achieving ambitious mitigation actions. The World Farmers' Organisation stresses that poverty hinders mitigation and adaptation in agriculture and that longer value chains in sophisticated markets are important for creating jobs and wealth. Profitable farmers are able to produce more on less land with decreasing amounts of inputs compared with poor communities that need more land area. The private sector can support solutions by providing, for example, finance, technology, knowledge, expertise, skills, education, training and opportunities for empowerment.

42. Moreover, private sector investors and business are in a position to provide funding for mitigation research and development initiatives and to influence producer livelihoods, levels of food and fibre production, the exchange of information and services with producers, and the efficiency of international operations (e.g. supply chains). Non-Party stakeholders, including the private sector, appear especially involved in agricultural adaptation and mitigation working groups around the world.

43. The WBCSD supports goals to make more food available (e.g. reduce food waste) and reduce agricultural and land-use change GHG emissions. To this end, WBCSD contributed to the creation of the Food Loss and Waste Accounting and Reporting Standard [9] and supports target 3 of Sustainable Development Goal 12. [10] In addition, WBCSD is involved in other land-use related initiatives involving ecosystems and agricultural adaptation and mitigation, partnering with the Global Agri-business Alliance.[11]

44. While partnerships between the public and the private sectors are at an early stage, there are already very positive and scalable examples across various commodities, soil health and nutrient management. For example, the Tropical Forest Alliance 2020 is a global public–private partnership under which partners take voluntary actions, individually and collectively, to reduce the tropical deforestation associated with the sourcing of commodities such as palm oil, soy, beef, and paper and pulp.[12]

45. Other non-party stakeholders include indigenous communities. For indigenous communities, the Coordinator of the Indigenous Organizations of the Amazon River Basin stresses that forest and territories must be safeguarded, and the International Indigenous Peoples' Forum on Climate Change recommends the full and effective participation of indigenous peoples within all UNFCCC negotiations, policies, proposals, projects and programmes at all levels, including working groups, expert meetings, steering committees and all other policymaking and decision-making bodies.

46. Numerous partnerships exist to support initiatives, enable practices and facilitate successful cooperation to support countries, farmers, livestock owners, foresters, other land users and related stakeholders in accelerating the implementation of low-emission policies and technology solutions in the AFOLU sector. The following chapter discusses possible next steps to accelerate implementation in the pre-2020 period.

[9] http://flwprotocol.org/.

[10] Sustainable Development Goal 12, target 3: "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses".

[11] http://globalagribusinessalliance.com.

[12] See https://www.tfa2020.org/en/.

V. Possible next steps to accelerate implementation in the pre-2020 period

47. This chapter summarizes the views presented by Parties and non-Party stakeholders on next steps in the technical examination of opportunities for addressing issues in land use in the period until 2020 and views related to future political and technical work to enhance the mitigation ambition of actions in the AFOLU sector.

A. Overview of next steps for accelerating actions that address issues in land use

48. Achieving the mitigation ambition required to avoid dangerous climate change requires the pooling of resources from diverse actors through multi-stakeholder partnerships to mobilize and share knowledge, expertise, technology and finance, in particular to support developing countries. TEMs continue to provide space for Parties and non-Party stakeholders to interact, identify new opportunities for collaboration and partnership, showcase results achieved and consider ways to scale up existing initiatives well positioned to accelerate the global response to climate change in the pre-2020 period, and thereby lay the foundations for the implementation of the Paris Agreement.

49. Accelerating actions related to agriculture will require: combinations of mitigation measures, which are context specific; consideration of a broad range of measures, such as fighting animal and plant diseases, increasing resilience and reducing losses of agricultural harvests; farmer-centred, gender-sensitive plans and measures that engage local communities and integrate traditional and indigenous knowledge; and farmer-centred implementation supported by policies, research, communication, training and investments, and enabled through partnerships.

50. Accelerating actions related to forestry and other land use requires: continued and scaled-up finance for REDD-plus readiness activities; a better understanding of the drivers of deforestation; the ability to monitor and evaluate mitigation efforts, consolidate institutional arrangements and strengthen stakeholder engagement, while linking with land-use planning and development objectives; the integration of multiple objectives and drivers into the design and implementation of mitigation actions; the participation of a broad range of actors at all levels, in particular indigenous peoples; and integrated approaches to land use balancing agricultural needs for production and food security and sustainable land management, including forest conservation.

B. Options for advancing the technical examination process

51. COP 21 appointed two high-level champions to act on behalf of the President of the COP to facilitate, through strengthened high-level engagement in the period 2016–2020, the successful execution of existing efforts and the scaling-up and introduction of new or strengthened voluntary efforts, initiatives and coalitions. The high-level champions developed the Road Map for Global Climate Action, presented at a special event during the forty-fourth session of the subsidiary bodies, and issued a call for submissions on the road map in May 2016, inviting views from Parties and non-Party stakeholders.

52. The COP further decided to conduct in 2017 an assessment of the TEP with a view to improving its effectiveness. Although there was no call for submissions launched to invite views on the conduct of the assessment, the submissions from Parties and non-Party stakeholders received in response to the call of the high-level champions mentioned in paragraph 51 above contained views on aspects and actors in the TEP, including on the role of TEMs.

53. In response to the call for submissions on the Road Map for Global Climate Action, Parties underscored that the TEMs provide a valuable platform for sharing good practices and promoting cooperation, and supported the view of the high-level champions that the

TEMs should evolve to take account of the road map. In this regard, Parties made the following proposals:

(a) Ensure coherence between the road map and the TEMs;

(b) Foster cooperation between the high-level champions and the UNFCCC secretariat on the selection of TEM topics;

(c) Narrow the focus of TEM sessions to allow participants to engage in more in-depth technical and practical discussions;

(d) Focus the TEM sessions on scaling up existing initiatives, taking forward opportunities for greater multi-stakeholder cooperation, and overcoming barriers to implementation;

(e) Organize TEM sessions in smaller breakout groups to facilitate interactivity and learning;

(f) Invite speakers for and make information on the focus and objectives of each TEM session available well in advance;

(g) Support the participation of developing country experts, including through webinars and other forms of virtual participation;

(h) Organize TEM sessions at the regional level in coordination with the UNFCCC secretariat, constituted bodies such as the Climate Technology Centre and Network, and host countries.

54. Parties also recognized the importance of the active engagement of non-Party stakeholders in driving concrete and innovative climate action, including through their participation in the TEMs, and invited Parties to engage non-Party stakeholders at the national level.

55. The views expressed in the submissions of non-Party stakeholders echo the views of Parties in considering TEMs to be a valuable platform for dialogue between governments and non-Party stakeholders and in wishing to see the TEMs evolve to become oriented more towards solutions and result in tangible changes to domestic policy informed by real-world experience in pioneering climate action and catalysing further ambition from the private sector. To achieve such change, non-Party stakeholders suggested the following:

(a) Increase the participation of non-Party stakeholders in the TEMs, including subnational authorities, the private sector, industry experts beyond international organizations, technology providers and professional associations;

(b) Provide more time for questions and answers and dialogue between non-Party stakeholders and policymakers, using a round-table format to encourage interaction and dialogue;

(c) Organize regional TEMs on the margins of existing sectoral events at the regional level to cover topics of regional interest.

C. Options for work at the political level to enhance mitigation ambition

56. In the Road Map for Global Climate Action, the high-level champions proposed to ensure a durable connection between the Convention and the many voluntary and collaborative actions by:

(a) Engaging with interested Parties and non-Party stakeholders alike, including furthering the voluntary initiatives of the Lima–Paris Action Agenda by: building on existing initiatives, and supporting new and more geographically diverse initiatives; connecting initiatives and coalitions with national action plans such as nationally determined contributions; and enhancing transparency, tracking results and demonstrating credibility;

(b) Providing guidance to the secretariat on organizing TEMs, and working with the Executive Secretary and the current and incoming Presidents of the COP to coordinate annual high-level events.

D. Possible role of the Marrakech Partnership for Global Climate Action

57. In November 2016, the high-level champions launched the Marrakech Partnership for Global Climate Action as a way for future high-level champions to catalyse and support climate action by Parties and non-Party stakeholders in the period 2017–2020. The Marrakech Partnership aims to, among other things, enhance the connection and coherence among TEMs and ongoing regional activities to support and accelerate implementation.

58. In May 2017, the high-level champions published a document outlining their approach to realizing the objectives of the Marrakech Partnership until 2020. A series of high-level round tables will be organized to facilitate enhanced high-level engagement at COP 23 (November 2017). These round tables will build on discussions at the TEMs held during the forty-seventh sessions of the subsidiary bodies.

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