Intergovernmental Panel on Climate Change - Sixth Assessment Report Highlights

ProTerra™ FOUNDATION

The IPCC is the United Nation body for assessing the science related to climate change. It was set up in 1988 by the World Meteorological Organization and United Nations Environment Programme to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. The latest published Assessment Report (AR5) presented the following key findings:

- **Human influence on the climate system is clear.**
- **The more we disrupt our climate, the more we are exposed to severe risk, pervasive and irreversible impacts, and**
- **We have the means to limit climate change and build a more prosperous, sustainable future.**

Since 1988 the Intergovernmental Panel on Climate Change (IPCC) has produced five comprehensive Assessment Reports and several Special Reports on topics related to climate change. The last one, the Fifth Assessment Report (AR5), was finalized in 2014.

Currently, the IPCC is in its Sixth Assessment cycle (AR6) which is expected to be finalized in the second semester of 2022.

The AR6 will provide an overview of the state of knowledge on the science of climate change, emphasizing new results since the publication of AR5. AR6 will be based on the content of the three Working Groups Assessment Reports[1] and the three Special Reports[2].

On 4 April 2022, IPCC published the summary for Policymakers of the IPCC Working Group III report, Climate Change 2022: Mitigation of climate change, it is the most recent publication connected to AR6. This Working Group III report provides an updated assessment of climate change mitigation progress and pledges and examines the sources of global emissions.

In the simulations made by Working Group III, limiting warming to around 1.5°C (2.7°F) requires global greenhouse gas emissions to peak before 2025 at the latest, and be reduced by 43% by 2030. At the same time, methane would also need to be reduced by about a third. Even if this occurs, experts believe that it is almost inevitable that we will temporarily exceed this temperature threshold possibly returning below it by the end of the century[3]. In this situation, even with the significant effort from society and governments in limiting warming to 1.5°C, we will still face many challenges making mitigation and adaptation urgent needs.

[1] WGI – The Physical Science Basis, WGII – Impacts, Adaptation and Vulnerability and WGIII – Mitigation of Climate Change.

[2] Global Warming of 1.5°C, Climate Change and Land, and The Ocean and Cryosphere in a Changing Climate.

[3] Source: Press release (ipcc.ch)

The report indicates that without immediate and deep emissions reductions across all sectors, limiting global warming to 1.5°C is beyond reach[4]. In the agricultural field, impacts are foreseen to production impacting food security[5].

ProTerra Foundation **reproduces** several highlights of the Summary for Policymakers (SPM) Working Group III Summary Report that are considered key to help to understand where we are in the agricultural sector and closely related topics (such as deforestation). Note that the conclusions from the IPCC specialists are "rated" with the level of confidence the experts have in each statement they make. Key conclusions include:

- **Total net anthropogenic GHG emissions have continued to rise during the period 2010 – 2019, as have cumulative net CO2 emissions since 1850. Average annual GHG emissions during 2010-2019 were higher than in any previous decade, but the rate of growth between 2010 and 2019 was lower than that between 2000 and 2009. (high confidence).**

- **In 2019, approximately 34% [20 GtCO2-eq] of total net anthropogenic GHG emissions came from the energy supply sector, 24% [14 GtCO2-eq] from industry, 22% [13 GtCO2- eq] from agriculture, forestry and other land use (AFOLU), 15% [8.7 GtCO2-eq] from transport and 6% [3.3 GtCO2-eq] from buildings.**

- **Average annual GHG emissions growth between 2010 and 2019 slowed compared to the previous decade in energy supply [from 2.3% to 1.0%] and industry [from 3.4% to 1.4%] but remained roughly constant at about 2% per year in the transport sector (high confidence). Emissions growth in AFOLU, comprising emissions from agriculture (mainly CH4 and N2O) and forestry and other land use (mainly CO2) is more uncertain than in other sectors due to the high share and uncertainty of CO2- LULUCF (land use, land-use change and forestry) emissions (medium confidence). About half of total net AFOLU emissions are from CO2 LULUCF, predominantly from deforestation (medium confidence).**

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[4] Source: IPCC_AR6_WGIII_SummaryForPolicymakers.pdf

[5] Source: Report on Climate Change and Land

- **AFOLU mitigation options, when sustainably implemented, can deliver large-scale GHG emission reductions and enhanced removals, but cannot fully compensate for delayed action in other sectors. In addition, sustainably sourced agricultural and forest products can be used instead of more GHG-intensive products in other sectors. Barriers to implementation and trade-offs may result from the impacts of climate change, competing demands on land, conflicts with food security and livelihoods, the complexity of land ownership and management systems, and cultural aspects. There are many country- specific opportunities to provide co-benefits (such as biodiversity conservation, ecosystem services, and livelihoods) and avoid risks (for example, through adaptation to climate change) (high confidence).**

The AR6 special report on Climate Change and Land, made public in 2019, addresses greenhouse gas (GHG) fluxes in land-based ecosystems, land use and sustainable land management in relation to climate change adaptation and mitigation, desertification, land degradation and food security, topics deeply relating to agricultural activities (noted that all IPCC reports bring relevant information to the agricultural sector as synergy exists). Therefore, ProTerra Foundation reproduces herein some of the key conclusions presented in the Summary for Policymakers of the Climate Change and Land Report that have a direct relation to agricultural activity. As occurs with the Working Group III report, it helps place the agricultural sector in perspective when the topic is climate change. The key conclusion, as perceived by ProTerra Foundation, includes:

- **Data available since 1961 show that global population growth and changes in per capita consumption of food, feed, fibre, timber and energy have caused unprecedented rates of land and freshwater use (very high confidence) with agriculture currently accounting for ca. 70% of global fresh-water use (medium confidence). Expansion of areas under agriculture and forestry, including commercial production, and enhanced agriculture and forestry productivity have supported consumption and food availability for a growing population (high confidence). With large regional variation, these changes have contributed to increasing net GHG emissions (very high confidence), loss of natural ecosystems (e.g., forests, savannahs, natural grasslands, and wetlands), and declining biodiversity (high confidence).**

- **Climate change has already affected food security due to warming, changing precipitation patterns, and greater frequency of some extreme events (high confidence). Studies that separate climate change from other factors affecting crop yields have shown that yields of some crops (e.g., maize and wheat) in many lower- latitude regions have been affected negatively by observed climate changes, while in many higher-latitude regions, yields of some crops (e.g., maize, wheat, and sugar beets) have been affected positively over recent decades (high confidence). Climate change has resulted in lower animal growth rates and productivity in pastoral systems in Africa (high confidence). There is robust evidence that agricultural pests and diseases have already responded to climate change resulting in both increases and decreases in infestations (high confidence). Based on indigenous and local knowledge, climate change is affecting food security in drylands, particularly those in Africa, and high mountain regions of Asia and South America.**

- **The stability of food supply is projected to decrease as the magnitude and frequency of extreme weather events that disrupt food chains increases (high confidence). Increased atmospheric CO2 levels can also lower the nutritional quality of crops (high confidence). In SSP2[6], global crop and economic models project a median increase of 7.6% (range of 1–23%) in cereal prices in 2050 due to climate change, leading to higher food prices and increased risk of food insecurity and hunger (medium confidence). The most vulnerable people will be more severely affected (high confidence).**

- **Land degradation in agriculture systems can be addressed through sustainable land management, with an ecological and socioeconomic focus, with co-benefits for climate change adaptation. Management options that reduce vulnerability to soil erosion and nutrient loss include growing green manure crops and cover crops, crop residue retention, reduced/zero tillage, and maintenance of ground cover through improved grazing management (very high confidence).**

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[6] In the report the implications of future socio-economic development on climate change mitigation, adaptation and land-use are explored using shared socio-economic pathways (SSPs). The SSPs span a range of challenges to climate change mitigation and adaptation. SSP2 includes medium population growth (~9 billion in 2100), medium income, technological progress, production and consumption patterns are a continuation of past trends, and only a gradual reduction in inequality occurs. Relative to other pathways, SSP2 has medium challenges to mitigation and medium challenges to adaptation (i.e., medium adaptive capacity).

- **Land degradation in agriculture systems can be addressed through sustainable land management, with an ecological and socioeconomic focus, with co-benefits for climate change adaptation. Management options that reduce vulnerability to soil erosion and nutrient loss include growing green manure crops and cover crops, crop residue retention, reduced/zero tillage, and maintenance of ground cover through improved grazing management (very high confidence).**

- **Adaptation and enhanced resilience to extreme events impacting food systems can be facilitated by comprehensive risk management, including risk sharing and transfer mechanisms (high confidence). Agricultural diversification, expansion of market access, and preparation for increasing supply chain disruption can support the scaling up of adaptation in food systems (high confidence).**

- **Technological, biophysical, socio-economic, financial and cultural barriers can limit the adoption of many land-based response options, as well as the uncertainty about benefits (high confidence). Many sustainable land management practices are not widely adopted due to insecure land tenure, lack of access to resources and agricultural advisory services, insufficient and unequal private and public incentives, and lack of knowledge and practical experience (high confidence). Public discourse, carefully designed policy interventions, incorporating social learning and market changes can together help reduce barriers to implementation (medium confidence).**

- **Agricultural practices that include indigenous and local knowledge can contribute to overcoming the combined challenges of climate change, food security, biodiversity conservation, and combating desertification and land degradation (high confidence). Coordinated action across a range of actors including businesses, producers, consumers, land managers and policymakers in partnership with indigenous peoples and local communities to enable conditions for the adoption of response options (high confidence).**

ProTerra approach to GHG emission in agriculture

ProTerra Foundation acknowledges the significant amount of work that has to be done in the agricultural sector to reduce emissions, mitigate and adapt to climate change.

In an effort to contribute to farmers in facing this challenge, ProTerra encourages organizations to minimize the use of non-renewable energy and adopt sustainable agricultural production practices to minimize GHG emissions through a series of requirements, many of which are core and therefore must be met for certification under the ProTerra Standard. Specifically, ProTerra has certification criteria related to the reduction or compensation of GHG emissions or energy management and also defines a set of indicators related to agricultural best practices, such as the reduction of the use of chemical fertilizers, banning the burning of agricultural residues, stimulating the use of cover crops, non-tillage and crop rotation. ProTerra also requires the implementation of measures to reduce soil erosion and water usage.

ProTerra has several requirements related to secure land tenure, reducing uncertainties and therefore effort for framers to improve towards sustainability.

To minimize land-use change related to agricultural activities, ProTerra has defined a cut-off date[7] for land conversion, in particular, primary forests (such as tropical rain forests), riparian vegetation (those alongside water bodies), wetlands, swamps, steep slopes and areas defined by the High Conservation Values Resources Network[8] (HCVs).

The ProTerra Standard also includes a set of indicators related to the maintenance and enrichment of biodiversity. Forests, through tree growth and an increase in soil carbon, contain a large part of the carbon stored on land. Forests present a significant global carbon stock[9] and therefore help to reduce the amount of CO2.

The ProTerra Foundation believes that this is fundamental to produce food in a sustainable way and in the long run reduce the impact of climate change on food security.

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[7] Land conversion after 2008 is not possible under ProTerra

[8] https://hcvnetwork.org/how-it-works/

[9] https://unfccc.int/topics/land-use/workstreams/land-use--land-use-change-and-forestry-lulucf/land- use--land-use-change-and-forestry