Submission by the United States of America

Subject: Subsidiary Body for Scientific and Technological Advice (SBSTA) & Subsidiary Body for Implementation (SBI) – Koronivia Joint Work on Agriculture (KJWA)
Washington, D.C. 6 May 2019

In response to the call for submissions in the Koronivia road map,[1] the United States welcomes the opportunity to submit its views on topic 2(b) and 2(c) from decision 4/CP.23[2] 'methods and approaches for assessing adaptation, adaptation co-benefits and resilience'; and 'improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management.'

We also welcome the secretariat's report from the last workshop on topic 2(a) 'modalities for implementation of the outcomes of the five in-session workshops on issues related to agriculture and other future topics that may arise from this work.'

Advancing the discussions on issues related to agriculture should continue to focus on technical issues and draw on the expertise of the constituted bodies under the Convention and other relevant institutions. To achieve this, each workshop topic should be allotted one in-session day. Committing the time to have robust presentations by a variety of Parties and observers, including producers, will allow ample time for questions and answers.

We look forward to sharing our best practices and lessons learned to assist countries and other stakeholders in addressing climate change through policies and practices that foster more efficient, productive, and resilient agricultural systems while also learning from other Parties, observers, and especially producers. Inclusion of observers will be important as external stakeholders have important perspectives to share and play a role in implementing actions on the ground.

Adaptation & Resilience

While the scope, severity, and pace of future climate change impacts are difficult to predict, changes could have important effects on agricultural producers globally. Best practices suggest multi-pronged approach toward adaptation and resilience, including research, education, extension, risk management, voluntary conservation implementation and strategic conservation planning.

The vulnerability of agriculture to climatic change is strongly dependent on the changes in climate and weather patterns experiences in the specific region, including changes in temperature and precipitation. Adaptive actions within agricultural sectors are driven by perceptions of risk, direct productivity effects of climate change, and by complex changes in domestic and international markets, policies, and other institutions as they respond to those effects. Opportunities for adaptation are shaped by the operating context within which decision-making occurs, access to effective adaptation options, and the capacity of individuals and institutions to take adaptive action as climate conditions change.

Anticipated adaptation to climate change in production agriculture includes adjustments to production system inputs, tillage, fertilizer, crop species, crop rotations, and harvest strategies. New research and development in new crop varieties that are more resistant to drought, disease, and heat stress will increase the resilience of agronomic systems to climate change. Enhancing the soil to improve water and nutrient availability provides the foundation for resilient or climate smart agriculture because the crop has access to these vital natural resources that often limit productivity.

[1] Annex I to FCCC/SBI/2018/9 and FCCC/SBSTA/2018/4.
[2] 4/CP.23, November 2017, Koronivia joint work on agriculture: https://unfccc.int/documents/65126

Examples of programs designed to enhance the resilience of agricultural production in the in the United States are included in Annex 1 below.

Soil Carbon & Health

As world population and food production demands rise, keeping our soil healthy and productive is of paramount importance. By farming using soil health principles and systems that include reduced tillage or no-till, cover cropping and diverse rotations, more and more farmers are improving microbial activity, thereby increasing their soil's organic matter. As a result, farmers are sequestering more carbon, increasing water infiltration and storage, enhancing nutrient cycling, reducing greenhouse gas emissions, improving wildlife and pollinator habitat—all while harvesting better profits and often better yields. The United States has a variety of tools and initiatives that support U.S. agriculture producers in building, maintaining, and enhancing their soils' carbon stocks and health.

Examples of programs designed to improve soil carbon and health in the in the United States, including through maintaining or enhancing soil carbon, are included in Annex 2 below.

Annex 1: Adaptation & Resilience

USDA Climate Hubs – USDA has established a network of Regional Climate Hubs. The Climate Hubs link USDA research and program agencies in their regional delivery of timely and authoritative climate-related tools and information to agricultural producers and professionals. The mission of the Climate Hubs is to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions.

Biotechnology & Other Innovative Tools – The United States believes that innovation and technology, including agricultural biotechnology, play a critical role in promoting sustainable agricultural development. Agricultural biotechnology can reduce the environmental footprint of agriculture by sustainably increasing productivity and by enabling farmers to adapt to changing environmental, pest, and disease pressures.

For example, a 110-fold production growth from 1996 to 2015 because of the use of crop biotechnology prevented 174 million hectares of land from being converted into cultivated area, which contributed to protecting biodiversity, conserving ecosystems, and reducing the environmental footprint of agriculture. In 2015, conservation agricultural practices enabled by biotech crops prevented 26.7 billion kg of CO_2 from entering the atmosphere.[3]

In addition, insect-resistant and virus-resistant biotech crops make farmers more resilient to changing pest and disease pressures, delivering economic gains of $167.8 billion to farmers worldwide from 1996-2015 while reducing the use of pesticides by 620 million kg.[4] Innovative biotech crops capable of withstanding

[3] International Service for the Acquisition of Agri-Biotech Applications. Brief 52 – Global Status of Commercialized Biotech/GM Crops: 2016. https://www.isaaa.org/resources/publications/briefs/52/download/isaaa-brief-52-2016.pdf

[4] International Service for the Acquisition of Agri-Biotech Applications. Brief 52 – Global Status of Commercialized Biotech/GM Crops: 2016. https://www.isaaa.org/resources/publications/briefs/52/download/isaaa-brief-52-2016.pdf

abiotic stress, such as the ability to grow in salty soils or better withstand drought conditions, are also under development and the first such products are just entering the marketplace.

Famine Early Warning Systems Network (FEWS NET) – FEWS NET, funded by the United States Agency for International Development (USAID), provides objective, evidence-based food security information and analysis to help the U.S. Government, national, international partners, and relief agencies forecast and respond to food security crises and mitigate human suffering. Created in 1985 in response to famines in East and West Africa, FEWS NET currently monitors food security conditions in over 70 countries across the globe. The FEWS NET activity brings together the technical expertise from USDA, the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), the U.S. Geological Survey (USGS), and two contractors who manage more than 20 field offices. Based on in-depth understanding of local livelihoods, FEWS NET analysts monitor information and data on factors that affect food security, such as weather conditions and climate, crops, pasture, markets, trade, and nutrition.

Annex 2: Relevant U.S. Experiences with Soil Carbon & Health

COMET-Farm and COMET-Planner – USDA has developed quantification tools that enable the implementation of voluntary conservation practices that enhance soil carbon sequestration and/or reduce agricultural GHG emissions. The tools allow farmers, ranchers and forest landowners to assess their carbon footprint and evaluate various conservation scenarios the reduce GHG emissions and enhance soil carbon stocks. The COMET tools are a component of USDA's efforts to build an economic value for carbon sequestration and GHG emissions reductions, providing farmers, ranchers and forest landowners with access to an additional revenue stream – carbon credits and carbon payments. The COMET tools allow farm/ranch operation to evaluate different options and select voluntary conservation strategies that reduce GHG emissions and sequester more carbon. General guidance is provided to farmers/ranchers, providing them with potential management practice changes that can be implemented to sequester additional carbon and reduce greenhouse gas emissions.

U.S. Drought Monitor and Tools – The National Drought Mitigation Center helps people and institutions develop and implement measures to reduce societal vulnerability to drought, stressing preparedness and risk management rather than crisis management. The center has developed various tools including the Drought Risk Atlas, drought management data base, drought planning guidance on preparedness, the vegetation drought response index, and groundwater and soil moisture conditions.

The U.S. Drought Monitor (USDM) is a weekly map of drought conditions produced jointly by the National Oceanic and Atmospheric Administration, United States Department of Agriculture (USDA), and the National Drought Mitigation Center (NDMC) at the University of Nebraska- Lincoln. The weekly map is based on climatic, hydrologic, and soil conditions, as well as reported impacts and observations from more than 400 contributors around the United States.

Countries around the world have sought to emulate the USDM. Since 2003, scientists in Canada, Mexico, and the United States have partnered to produce the monthly North American Drought Monitor. More recently, several countries have begun to produce independent, unique versions of the USDM, after benefiting from training and instruction provided by NDMC and other collaborating agencies.

USDA's Soil Health Initiative – USDA offers technical and financial assistance to agricultural producers through many conservation practices and programs (i.e., Environmental Quality Incentives Program – EQIP, Conservation Stewardship Program (CSP), etc.) that help producers reduce GHG emissions, enhance carbon sequestration and adapt to a changing climate while improving the natural resource base.

Key air, soil and water programs include a host of agronomic and soil health related practices such as cover crops, no-till, strip till, crop rotation, grazing management, and nutrient management as well as an array of water conservation and management practices and technologies in irrigated and rain fed farming practices.

Cover crop and no-till provide important benefits like improving soil moisture with a decrease in erosion/runoff, and an increase in soil water infiltration, as well as an increase in recharge of the subsoil profile. Long term benefits of cover crops include increased soil organic carbon, which positively impacts soil water holding capacity and sustained soil biological activity. USDA also actively promotes use of advanced and highly efficient micro and sprinkler irrigation technologies and precision or variable rate irrigation where water is applied when needed by the crop at the right amount and the right place in the field, increasing yield uniformity and stability, and reducing water waste. Water management is an integral part of USDA's water conservation efforts, including managing drainage water as well as recycling drainage water for sub-irrigation purposes and supporting various limited/deficit irrigation strategies in water-limited environments. USDA is involved in supporting the use of advanced water management strategies and technologies including use of sensors that allow real-time, remote access and online deployment of soil water and pumping rate data for effective on-farm irrigation water management. These along with practices that offer use and reuse of low-quality water (such as tail-water runoff and liquid manure) collectively help enhance the resource base as well as land resiliency towards climate disturbances and extreme weather events such as drought. These water conservation practices often result in reduced water pumping, reducing ambient air pollutants and GHGs from diesel pumps.

USDA promotes the use of more efficient nutrient management strategies, e.g., nitrogen stabilizers, split applications, alternative forms, reduced rates, and precision applications across variable soils within a field that help reduce the overall footprint of agriculture on the environment. These changes have a positive effect on greenhouse gas emissions and reduce the water quality impact.

USDA provides assistance to producers to facilitate adoption of a host of voluntary working lands conservation practices that address in-efficient use of surface and ground water resources. These practices are intended to reduce aquifer pumping and overdraft by increasing irrigation system efficiency and improving seasonal water management. USDA is currently exploring practices that promote efficient and effective groundwater recharge for land owner adoption. Potential interim practices for local and regional testing may include infiltration ditches and basins as well as direct groundwater injection wells in places where quality surface water is available. Challenges to overcome will likely include surface water availability and rights, as well as water quality issues associated with re-introducing surface water into an aquifer.

GRA Croplands and Integrative Research Groups – Launched in December 2009, the Global Research Alliance on Agricultural Greenhouse Gases (GRA) brings together 48 countries to conduct joint research for minimizing agricultural greenhouse gas emissions while still sustainably intensifying agriculture and advancing our food security goals. The U.S. actively participates in the GRA. In line with the goals of improving soil carbon and health the U.S. co-chairs the GRA Croplands Research Group (CRG) and actively participates in the GRA Integrative Research Group (IRG). The U.S. contributes expertise and coordination to these global networks of researchers, building better understanding and better practices. Ongoing work includes assessing the impact of conservation agriculture on GHG emissions and carbon cycling. The IRG leads a GRA flagship research project on soil carbon sequestration. The U.S. participates in and co-leads some related activities, and in activities under the GRA Inventories Flagship. Aspects involve modeling to predict carbon balance at farm-to landscape scales under different management and environments, and ways to assess and manipulate soil microbial communities for improved health and carbon sequestration.

GRACEnet – USDA's Greenhouse gas Reduction through Agricultural Carbon Enhancement network (GRACEnet) unites Agricultural Research Service researchers with the goals of better quantifying greenhouse gas GHG emissions from cropped and grazed soils under current management practices and identifying and further developing improved management practices that will enhance carbon (C) sequestration in soils, decrease GHG emissions, and promote sustainability, among other benefits. This program generates information that is needed by agro-ecosystem modelers, producers, program managers, and policy makers.