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Submission by the World Food Programme
to the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA)
on views related to the identification of adaptation measures and assessment of agricultural practices and technologies to enhance productivity in a sustainable manner, food security and resilience.

The World Food Programme (WFP) is pleased to present its views in response to the SBSTA's request for inputs on the:

- *Identification of adaptation measures, taking into account the diversity of the agricultural systems, indigenous knowledge systems and the differences in scale as well as possible co-benefits and sharing experiences in research and development and on the ground activities, including socioeconomic, environmental and gender aspects;*
- *Identification and assessment of agricultural practices and technologies to enhance productivity in a sustainable manner, food security and resilience, considering the differences in agro-ecological zones and farming systems, such as different grassland and cropland practices and systems*

This submission provides information about adaptation measures and approaches to enhance food security and resilience of the most food insecure vulnerable populations, based on WFP's experiences in this field.

1. The importance of food security in building resilience and addressing climate adaptation

The World Food Programme welcomes the Paris Agreement and its recognition of the importance of achieving food security and eradicating hunger and poverty. The positive outcomes from COP 21 represent a major step forward in the global effort to tackle climate change and end hunger. Inputs to the UNFCCC"s work programme on agriculture will contribute to this objective.

WFP's work is focused on supporting the most vulnerable and food insecure around the world. Our experience highlights that a holistic approach is required to address all aspects of food security, defined by the World Summit in 1996 as "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". Food security has been identified to involve four key tiers: food availability, access, utilization, and stability over time.[1] In addition to working with partners focused on supporting agriculture to improve productivity and food availability within the countries and communities within which we work, WFP has developed technical expertise and assistance in addressing the latter three food security tiers, ensuring the most vulnerable are able to access available food (through transfers and local market support), that their nutritional needs are met (including mothers and young children), and that outside forces such as extreme weather events do not impact negatively on all components of food security.

[1] EC-FAO, 2008, *An Introduction to the Basic Concepts of Food Security.* URL:, http://www.fao.org/docrep/013/al936e/al936e00.pdf

Climate change poses a particular threat to present and future food security. Findings from the IPCC's 5th assessment report[2] indicates that climate change could increase the risk of hunger and malnutrition by up to 20 percent by 2050; it could also reduce potential agricultural output by up to 30 percent in Africa and up to 21 percent in Asia[3]. Rural livelihoods will be particularly affected, through impacts on water availability and supply, agricultural incomes, markets, nutrition and more frequent and intense natural disasters. These impacts are expected to disproportionately affect the welfare of the most vulnerable in the poor and marginalized in rural areas, such as female-headed households and those with limited access to land, productive assets, infrastructure, and education.

Many governments are already identifying these challenges. Of the 102 Parties that have included agriculture in their Intended Nationally Determined Commitments (INDCs) towards adaptation, 73 have given reference to food security as a key area of focus[4]. Further, even among the agricultural adaptation measures identified, several reflect broader ambitions to which WFP supports, including in knowledge transfer (prioritized by 35 Parties), early warning systems and seasonal forecasts (prioritized by 28 Parties), indigenous knowledge (19 Parties), and financial mechanisms such as crop-insurance (18 Parties).

2. Experiences in addressing adaptation that enhances food security and resilience

WFP has developed a range of on-the-ground experience to build the resilience of people's food security against climate change, working closely with governments, partners and communities to achieve this aim. A summary of these are outlined below, with case studies presented in Annex I.

a) Adaptation measures supported by research and knowledge sharing to address different contexts

A key lesson that WFP has learnt in selecting different adaptation measures to support resilience-building is to first ensure there are robust climate analyses and assessments that enable an understanding of the impacts of climate change on food security. Currently there is limited research and methodologies to explore these impacts, especially looking beyond agricultural production to understand how people's food access, utilisation and stability over time will be affected. Such questions require a strong understanding of livelihood systems and nutrition dynamics, environment, socio-economic status, local practices, institutions and systems, and cultural and gender norms within the context in which they live. A range of activities have been undertaken to address the challenges these questions present.

- **Climate analyses:** WFP has been working with partners and governments on a number of different analyses and methodologies to contribute to the global effort to improve the evidence base of the impacts of climate change on all aspects of food security. These have been applied across different livelihood practices and associated agricultural systems, as well as geographical scales (from global to regional, national and local), producing a range of findings that are supporting governments in better understanding the impacts and necessary adaptive measures that should be considered. [See C-ADAPT; Hunger and Vulnerability Map].
- **Assessments:** Integrating climate questions into WFP assessment tools, especially at the household and community level, is enabling for a better understanding of local needs and to

[2] IPCC, 2014, *Fifth Assessment Report.* URL: https://www.ipcc.ch/report/ar5/
[3] FAO, 2009, *Agriculture to 2015 – the challenges ahead.* URL: http://www.fao.org/news/story/en/item/36193/icode/
[4] CGIAR, 2015, *How countries plan to address agricultural adaptation and mitigation. URL:* https://cgspace.cgiar.org/handle/10568/69115

take into account different socio-economic, indigenous and gender concerns. These for example, have been formative to design climate service, micro-insurance and integrated risk management projects, highlighting specific gender/cultural needs that have enabled designing the initiatives to target the most vulnerable to food insecurity and climate risks. [See Climate Services; R4.]

- **Programme design:** Findings from these analyses and assessments are helping to improve the design of programmes, by better understanding climate trends and foreseen impacts, priority areas of intervention, existing local capacities and adaptation practices, and feasible and cost-effective solutions. The findings also support the establishment of baselines for so as to measure results of interventions over time, and which has reinforced that integrated approaches that combine early warning systems and disaster risk reduction interventions with weather-index insurance, climate services and risk transfer mechanisms are helping to improve livelihoods and build people's resilience against climate shocks. {See section 2.c) below].
- **Knowledge sharing and capacity building:** An important lesson that has been learnt in undertaking climate analyses and assessments has to not do these in isolation but to work hand-in-hand with government and partners to both design and carry them out. This ensures a more inclusive set of questions to be incorporated into the analysis exercise to ensure different needs are more efficiently met, to build trust in sharing data, and to ensure buy-in with the final results. Working together also supports building the technical capacities of government counterparts to carry out these efforts in the future. WFP is also exploring innovative ways to share information to a wider audience so as to support further research and development and replication in other countries and contexts (both in terms of analyses but also programmes). This includes the use of non-traditional analysis products, outside of reports, such as interactive maps, infographics, videos and guidance. [See C-ADAPT.]

b) Adaptation measures and their co-benefits:

Adaptation measures can produce important mitigation co-benefits. WFP's mandate is to ensure the needs of the most vulnerable are met, and which results in our work focusing on supporting communities and governments through adaptation and resilience building initiatives. Where there are additional mitigation benefits that can emerge out of this work, but that do produce negative trade-offs for adaptation and resilience-building, WFP is able to work in partnership with others offering these technical skills. One example of this is cimate-smart agriculture programmes that are carried out in the field. [See CSA.]

c) Agricultural practices and technologies to enhance food security and resilience in different contexts:

The preparatory work in undertaking analyses and assessments is an important precursor to identify the most appropriate agricultural practices and technologies in a given context (section 2a above). As recognized by CGIAR, while there has been a strong focus by countries on agricultural technologies themselves, there is still a gap in adaptation measures that ensure the uptake, transfer and servicing of those technologies towards end-users, including the most vulnerable. This includes areas such as early warning systems, knowledge management and financial mechanisms, and which are seen to contribute more sustainably to people's adaptive capacity and building of resilience[4]. WFP has particular expertise and experience in these areas, and which are important components of adaptation concerns related to food security.

- **Financial mechanisms that links social protection to adaptation:** In partnership with Oxfam America, WFP has been testing and scaling up the R4 Rural Resilience initiative over the last five years, combining micro-insurance, safety nets and disaster risk reduction to support smallholder farmers and rural communities. Additionally, the Food Security Climate Resilience Facility (FoodSECuRE), launched at COP 21, is blending forecast-based financing with safety net

programmes (such as in nutrition), disaster risk reduction and resilience-building activities, to reduce the impacts of climate shocks on communities, now and in the future. [See R4; FoodSECuRE.]

- **Knowledge transfer that supports risk reduction and resilience:** WFP has extensive experience in early warning systems, emergency preparedness and disaster risk reduction, an outcome of its need to respond to humanitarian crises resulting from climate disasters. WFP has been working with governments and communities to ensure that this knowledge transfer can better support their decision processes. WFP's work on climate services, for example, is allowing for climate information (immediate and long-term) to be tailored to meet the needs of vulnerable communities, ensuring that it addresses their socio-economic and environmental contexts, their knowledge systems and cultures, and helping them make more informed decisions with beneficial adaptation and food security outcomes. Similarly with the R4 Rural Resilience Initiative, an important component of the programme is to connect rural communities with the micro-insurance sector and information about the services on offer. Other knowledge and technological skills transfers can also be linked to WFP programmes (through technical partnerships) to ensure those most vulnerable are targeted and benefit from these activities. [See Climate Services; FFA; CSA]
- **Integration of activities to build climate resilience:** Achieving long-term adaptation and climate resilience within the food security sector can only be achieved if implemented in a holistic way. Integrating a variety of technologies and services together provides communities with a comprehensive set of tools that will better equip them to adapt to the impacts of climate change. This also includes working with governments to ensure these initiatives can be integrated into national systems, including early warning, social protection and financial/insurance mechanisms. [See R4; FoodSECuRE; Climate Services; FFA]

Annex I: Case studies of adaptation measures and practices

C-ADAPT: The Climate adaptation management and innovation initiative (C-ADAPT) is an initiative supporting efforts to develop innovative climate-induced food insecurity analyses and practices to inform programming and decision-making for WFP, partners and governments. Funded by the Government of Sweden. C-ADAPT has two main goals: (i) to better understand the impacts of climate change and climate risks on the most food insecure populations, which will be able to inform policy and support the development of innovative programmes for adaptation and resilience activities that make a difference to vulnerable communities today; and (ii) to help individuals, communities and governments adapt, strengthen livelihoods, build resilience and ensure food security by drawing upon experiences that positively impact people's investment in adaptation and resilience. Some of the most recent findings from this initiative include:

- **Climate analyses and adaptation planning:** Climate risk and climate change analyses are helping WFP, partners, governments and communities to understand how climate trends may impact on vulnerable people's food security and livelihoods, and which is enabling these issues to be considered in national policies and programmes and for appropriate adaptation measures to be identified. Investment in this type of research has also entailed the development of improved methodological tools, approaches and guidance for undertaking these analyses and assessments; an example of one of these methodologies is the Consolidated Livelihood Exercise for Analyzing Resilience (CLEAR) methodology. Some examples of analyses produced to date include in Ethiopia, Nepal, Kyrgyz Republic, Senegal, and Sri Lanka. For more information, see http://www.wfp.org/climate-change/innovations/analyses.
- **Models and standards:** WFP is also working to identify and document good practices and innovations in food security and climate change adaptation programmes, to build an evidence base and encourage knowledge sharing among governments, humanitarian partners and communities. These practices entail a wide range of different activities, including the development of innovative tools and approaches to assess the impacts of climate risk on food security to implementation of adaptation practices that considers the four pillars of food security. An innovative approach to knowledge sharing is being undertaken to ensure this information can reach different audiences and which are captured at http://www.wfp.org/climate-change.

Hunger and climate vulnerability map: The Food Insecurity and Climate Change Vulnerability Index was developed by the UK Met Office and WFP and launched in Paris at COP 21. Presented in the form of an interactive map, it highlights to policy makers and the wider public how important it is that large-scale action to both mitigate and adapt will be in our efforts to end hunger by 2030 and beyond. The joint analysis demonstrates that if there is a rapid and sustained reduction in future emissions, then vulnerability to food insecurity remains steady after the 2050s to the 2080s; and with adaptation, improvements can be made to the present day situation. However, if there are considerable future increases in emissions, then vulnerability to food insecurity from the 2050s will continue to increase. Although adaptation measures can limit this deterioration, the situation by the 2080s could still be worse than the present day, with many more hungry and vulnerable people. This analysis was made possible through the C-ADAPT initiative. See: http://www.metoffice.gov.uk/food-insecurity-index.

The R4 Rural Resilience Initiative: launched by WFP and Oxfam America in 2011, the R4 Rural Resilience Initiative is a comprehensive risk management approach to help communities be more resilient to climate variability and shocks and enable vulnerable rural households to increase their food and income security in the face of increasing climate risks. R4 builds on the initial success of the Horn of Africa Risk Transfer for Adaptation (HARITA) initiative, pioneered in Ethiopia by Oxfram America, the Relief Society of Tigray (REST) and Swiss Re. R4 is currently active in Senegal, Ethiopia, Malawi and Zambia. WFP and Oxfam America vision is to insure 500,000 farmers by 2020. A target

of 60 million USD of the next five years has been established for the scale up. Some recent results:

- In 2015, R4 reached 32,288 vulnerable farmers and their families with four integrated risk management tools: improved resource management through asset creation (risk reduction), insurance (risk transfer), livelihoods diversification and microcredit (prudent risk taking) and savings (risk reserves).
- Due to the impacts of El Nino, Ethiopia experienced its worst drought in 30 years in 2015, exceeding the levels of the 2011 Horn of Africa Crisis, and which led to R4's early window index to be triggered in 50 of the 81 R4 villages, with payouts ranging from four to 100 percent. The presence of R4 allowed farmers to continue their saving and credit activities, and complete their risk reduction work, compost-making and micro-gardening. In 2016, further payouts of $445,000 have already been distributed in Ethiopia and Senegal in response to El Nino; based on how the current season performs in Malawi and Zambia, further payouts may occur between May and June 2016.
- See: http://www.wfp.org/climate-change/initiatives/r4-rural-resilience-initiative.

Climate services: Climate risks are among the key drivers of hunger in the world. Many countries and vulnerable people often lack access to basic climate and weather information, such as reliable forecasts, to properly manage the climate-related risks they face. Climate services help vulnerable communities address these cha4llenges by providing the information they need to make well-informed decisions. Timely, easy to understand and act-upon climate information can help communities take the necessary actions to better anticipate and prepare for these changing risks, adapt to a changing climate and strengthen their resilience and food security. WFP has developed extensive experience in using, developing and translating climate information for our emergency operations through collaboration with world-renowned research and modelling centres to provide the latest immediate and seasonal weather hazard information to support government and humanitarian actors in deciding appropriate action. This work also involves the translation climate and weather information into early warnings of drought events and potential production shortfalls. Coupled with detailed analyses of household vulnerability, WFP and partners use this information to assess how droughts or floods will affect people's food security to ensure an early response. Two examples of WFP's experiences in climate services include:

- **The Livelihoods, Early Assessment and Protection (LEAP):** is an integrated food security early-response system jointly developed by the Government of Ethiopia, WFP and the World Bank in 2008, designed to increase the predictability and timeliness of response to climate-related food crises in Ethiopia. LEAP combines early warning with contingency planning and contingency funding, to allow the government, WFP and other partners to provide early assistance in anticipation of an impending drought. The LEAP early warning tool uses crop and weather information to estimate the number of people, by region, projected to be in need of early livelihood protection in the face of an impending drought. Resources can then be disbursed, in a timely and transparent manner, from a US$220 million contingent fund. This enables the immediate scale-up of Ethiopia's national Productive Safety Net Programme (the PSNP) to provide early assistance to the additional people at risk of food insecurity in a given year, as well as to existing safety-net beneficiaries requiring additional months of assistance. See: http://www.wfp.org/climate-change/initiatives/livelihoods-early-assessment-protection.
- **GFCS Climate Services for Action in Africa project:** In Malawi and Tanzania, WFP is part of a multi-sectoral, multi-partner pilot, which WFP's focus on ensuring tailored weather and climate information is being provided to rural communities (pastoralists and farming households) to help them enhance their food security and livelihoods. Climate advisories are reaching these communities, farmers and pastoralists through a number or activities, including radio programmes, mobile phone (SMS and audio) and the training of agricultural extension workers on how to interpret and communicate relevant climate information to rural audiences. Given the dramatic effects of El Niño, agricultural intermediaries, pastoralists and farmers have welcomed access to additional information in the two countries.

- See https://www.wfp.org/climate-change/innovations/climate-services for more information on climate services.

Climate smart agriculture: The Global Alliance on Climate Smart Agriculture (GACSA) was launched in 2014 as an effort to address the food security and agricultural implications of climate change. Climate Smart Agriculture (CSA) focuses on three pillars: (1) increasing food production; (2) improving vulnerable people's food security, livelihoods and resilience; and (3) mitigating agricultural emissions. As a member of this Alliance, WFP collaborates through the Rome-based agencies (FAO and IFAD) in its engagement on CSA. WFP's interest lies in ensuring CSA reaches the most vulnerable at the field level, and in that respect, works to ensure that pillar 2 is given precedence among any trade-offs between adaptation and mitigation, and that there should be a focus on working with communities through integrated technical partnerships to achieve the three pillars where and when appropriate.

FoodSECuRE: WFP has developed the Food Security Climate Resilience Facility (FoodSECuRE) as a unique and institutional financing mechanism to address the challenges of increasing vulnerability from climate disasters, by building the resilience of those most food insecure. The mechanism contains three windows, by: i) triggering action based on climate forecasts to reinforce community resilience before shocks occur; ii) supporting early action during a large-scale climate-disaster by complementing existing, government-led emergency response mechanisms through replica policies of the African Risk Capacity; and iii) providing predictable multi-year financing to deliver high-quality community resilience-building and institutional capacity building as part of post-disaster recovery operations. In this sense, FoodSECuRE is a forecast-based mechanism that triggers funds before climate disasters occur, allowing WFP to scale-up nutrition programming and disaster risk reduction activities so that people enter forecasted crises more resilient and prepared.

- FoodSECuRE aims also to significantly reduce humanitarian response costs for governments and donors. Growing evidence shows that investment in early response and resilience is more cost effective. A 2015 Cost Benefit Analysis (ex-ante) FoodSECuRE in Sudan and Niger suggests that early action using a climate triggered forecast mechanism would reduce the cost of emergency response by approximately 50%. Further, the economic argument for investment in multi-year resilience programming is unequivocal. The net cost of late response is five to seven times higher than multi-year resilience building. FoodSECuRE will enable WFP to systematically realize this kind of cost savings while achieving significant decreases in losses of life, assets, and livelihoods in food insecure communities.
- See: http://www.wfp.org/climate-change/initiatives/foodsecure.

FFA: Food Assistance for Assets (FFA) programmes, are one of WFP's key tools for providing food assistance to the most vulnerable. Using food, vouchers or cash transfers, they get communities participating in activities such as soil and water conservation, rehabilitation and stabilization of degraded lands to restore agricultural potential, repairing irrigation systems, building bridges, and setting up community granaries; they may also involve skills development trainings related to natural resources management, asset management, livelihood diversification, disaster risk reduction, income generating activities, climate services and/or promoting access to risk transfer schemes (e.g. FFA linked to insurance). See: https://www.wfp.org/food-assets.

Adaptation Fund: The UNFCCC Adaptation Fund finances concrete climate change adaptation projects that aim at reducing vulnerability and increasing adaptive capacity to climate change impacts. Since 2011, WFP is the Adaptation Fund's second largest multilateral implementing entity with six approved projects worth approximately $45 million. The following examples describe activities from three projects in Ecuador, Egypt and Mauritania respectively that focus on building long term resilience of livelihoods and food security to the adverse impacts of climate change. These

projects are implemented by WFP in collaboration with national government bodies such as the Ministry of Agriculture and the Ministry of Environment.

- **Ecuador:** In Ecuador's Pichincha Province and the Jubones River basin, poverty forces people to occupy unsafe areas most prone to natural disasters and increased population density is leaving more people exposed to reductions in water flows, decreased crop yields and ongoing environmental damage. To combat these challenges, the project executed by Ecuador's Ministry of Environment in coordination with the Ministry of Agriculture, Livestock, Aquaculture and Fisheries focuses on developing physical assets and infrastructure including for example water harvesting and storage measures, irrigation and drainage systems, flood defense and other climate proofing of infrastructure, such as check dams and storage tanks. These actions help to maintain water supplies and provisioning services, partially through the reduction in the wastage of water and the promotion of sustainable practices. As well, provisioning services are supported by efforts to manage water demand based on climate change scenarios and the expected precipitation decreases.
- **Egypt:** Southern Egypt is a region that is already economically stressed and whose food supplies are under constant threat of disruption. It stands to lose a minimum of 30 percent of its food production by 2050 as a result of negative climate change impacts such as reduced crop and livestock productivity, increasing crop-water demand and reduced water use efficiency; and increases in pest and disease infestations. To address the above, the project executed by the Ministry of Agriculture is supporting food insecure people in the region with: hybrid seeds of common crops that can better cope with droughts, hot weather and saline soil; new agricultural practices that reflect changing seasons, as well as intercropping and low-cost plant nutrient supplementation practices; introducing organic farming and high-value crops for niche markets; water conservation and irrigation technologies, and non-farm activities to diversify the incomes of communities.
- **Mauritania:** Mauritania is particularly vulnerable to climate change-induced drought, decreasing rainfall and more frequent flash floods. The project executed by the Ministry of Environment and Sustainable Development aims to improve adaptation in the area of food security in Mauritania by improving technical services at the community level so that village residents can undertake their own analysis of climate change impacts and prepare detailed adaptation plans – including harmonized plans for livestock, land and water management and the overall use of natural resources. Two sets of interventions are being implemented. The first includes preventing sand dunes from threatening productive assets of rural communities by planting appropriate species of trees and bushes with good soil and sand fixation properties; and supporting nurseries in the area with cost-efficient access to relevant seedlings and a focus on sustainable plantations and local income-generation. The second involves investing in diguettes and water retention dams to address erosion. This in turn supports increased vegetable production, replenishment of underground reservoirs and regeneration of vegetation cover, biodiversity and a more resilient ecosystem in which communities live and from which they derive their livelihoods.